

Summer 2017

How Can We Use The Lake Superior Watershed To Connect To Anishinaabe Youth And Inspire Them To Continue As Stewards Of The Land?

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HOW CAN WE USE THE LAKE SUPERIOR WATERSHED
TO CONNECT TO ANISHINAABE YOUTH AND INSPIRE THEM TO CONTINUE AS
STEWARDS OF THE LAND?

by

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A capstone submitted in partial fulfillment of the requirements for the degree of Master of Arts
in Education: Natural Science and Environmental Education.

Hamline University

Saint Paul, Minnesota

August 2017

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ABSTRACT

Anishinaabe youth have historically experienced difficulty adjusting to mainstream education. Their graduation rates are the lowest in the country (Camera, 2015). By developing curriculum that is culturally relevant and rebuilds connections to the land educators can work towards closing the education gap. The curriculum in this capstone project uses the Lake Superior Watershed, environmental education practices, and American Indian Learner Outcomes to meet state standards. By using culturally relevant materials to connect to Anishinaabe youth it is expected that they will feel invested in the curriculum. They will build stronger community ties which in turn results in stewardship. The curriculum is organized as a kit which includes lesson plans, lesson materials, and supplemental literature. The kit provides four units, one for each season of the year, with four lessons in each unit. The lessons developed within are recommended for early education, grades 1-3.

ACKNOWLEDGEMENTS

I would like to give a very special thank you to my husband, Sam, for always believing in and supporting me. You were patient, kind, and took on extra duties while I researched, read, and wrote countless papers. You also single handedly took care of our boys while I attended classes and worked two jobs.

Tyler, Trevor, and Lil Sam: thank you for encouraging me to complete my master's even when it meant I missed special events in your lives. Thanks for understanding when I spent many hours in the office and not hanging out with you.

Thank you to Theresa Vermeersch for guiding me along the way with insight into the process and always pointing me in the right direction.

I would also like to thank my committee: Patty Born Selly, Bryan Wood, and Charlin Diver. The three of you have made a significant impact on the success of my capstone. Patty, you were there from beginning to end answering numerous emails, phone calls, attended meetings, all while showing excitement for what I was doing. Bryan, you are an inspiration. Your influential teaching leaves me feeling fortunate to have been your student. Charlin, you have been a role model to me for the past 20 years. You have always believed that I would do something good with my life. I hope I made you proud.

Finally, I owe much gratitude to my reading and editing crew: my sister Bridgit Maruska, my friends Beverly Korby, Salim Diab, PhD., and Michelle DeFoe. Miiigwech!

Quote

We are part of the earth and it is part of us... for all things are connected. – Chief Seattle

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CHAPTER ONE

INTRODUCTION

“Teaching children about the natural world should be treated as one of the most important events in their lives” – Thomas Berry.

When we look back at the memories that inspired us as youths and shaped who we are today, we can most often identify a connection to the natural world around us. This is expected as we are one with Mother Earth.

If you ask first graders to draw you a picture, what are they most likely to draw? Some students will really surprise you and draw something of their own particular interest, but if students are unsure of what to draw they resort to the picture of a sun, grass, tree, or their family. Some will add a flower or two, maybe some clouds, some birds, or even a pet. These are not students lacking creativity; these are students identifying what they know, where they feel comfortable, or what they are connected to. So is it not our job as educators to help them expand this inquiry and to help them build their connections with nature?

For our Anishinaabe youth, this connection is all that more important. Chief Seattle once said, “We are part of the earth and it is part of us...for all things are connected” (Jennings, 1995). Water “nibi” runs through all of us, as it does our lands. It is a flowing blood line that sustains life. Therefore, it is the perfect beginning to build connections between our land, our bodies, and our spirits. *How can we use the Lake Superior Watershed to connect to Anishinaabe youth and inspire them to continue as stewards of the land?*

My Past Experiences

In reflection on my own childhood – the memories and experiences that helped mold me, I discovered common ideas: nature, outdoors, exploring my surroundings, and finding my sense of place. My love and appreciation for the natural beauty of the environment started in the creek down the road from my home. I spent most of my childhood exploring the creek bed, building makeshift shelters, climbing trees, building tree houses, hunting for garter snakes, and smelting. We would do this from sun up until sun down only going in to eat when our parents were yelling our names throughout the neighborhood.

My older sister was a great mentor to me. She worked for a local university in their Toxicology Lab. I would join her every chance I could get. She taught me about zebra mussels, daphnia, gammarus, and mosquito larvae, as well as many other aquatic organisms. I fed the research organisms with her in the laboratory when they were short-handed. She also worked for the Wisconsin DNR doing fish research along the Brule River. We would park at designated fishing entries and wait for anglers to come off the river with their catch. Her job as creel census taker required her to identify, weigh, and measure the fish. Occasionally scale scrapings were taken. This information was used to assist the DNR to determine future restocking needs. There is no other place I would have rather been than by her side discovering the intriguing organisms that make up our environment. This time with my sister deepened my understanding of the ecosystem and how everything is connected.

As I continued on my path and became an elementary teacher, I found myself seeking environmental opportunities to further my education because it is what I enjoy and where my heart is. I have built a network of mentors and peers who have rejuvenated my passion for the great outdoors. Not only is it one of my passions, it is at the root of Native culture and essential

in understanding the ways of life.

While teaching at a tribal school on the reservation where I lived I was approached by an instructor from a neighboring university. She became instrumental in developing my passion for the Lake Superior watershed. She was looking for teachers to sign up for a Rivers2Lake program that she facilitates. Knowing that I have a life-long love of the outdoors, I agreed to participate. I had no idea at the time what a life-changing event this would prove to be.

This instructor had a preset curriculum and taught us lessons from within this curriculum, so we could reproduce these lessons with our own students. Her mission is to mentor teachers in integrating the Lake Superior watershed into their classrooms as a foundation for engaging place-based learning, Great Lakes literacy, stewardship and watershed restoration. Wendell Berry once said, “If you don’t know where you are, you don’t know who you are” (McNamara, 2014).

As our contribution to the future of the Rivers2Lake program, teachers who participated developed curriculum for the program that was then tested, revised, and published for future Rivers2Lake teachers and alumni. In doing this, the resource continues to expand and grow into a richer, all-inclusive program.

A requirement of the Rivers2Lake program is to attend four hours of professional development from another Environmental Education (EE) source. I attended trainings at a regional, freshwater aquarium and enrolled in their Science Institute. I made many network connections and discovered a treasure trove of resources. The aquarium believes that learning is lifelong, so teachers are students too! The aquarium is a classroom, a laboratory, a thinking space, and a portal to the natural world (Great Lakes Aquarium, 2017). The aquarium has a

teacher resource center that lends out EE kits that come with everything you need to teach a pre-designed lesson. The kits include lesson plans aligned to MN State Standards, materials to run most activities, and background information. They also offer virtual field trips. These resources are a great asset to teachers.

It was at an aquarium training that I met the director of an environmental learning center from the Great Lakes region. The environmental center offers trainings and pre-designed EE curriculum. Their format is very similar to Rivers2Lake in that they provide training, mentorship, field experience, and curriculum. It is a rural nature center that provides programming for urban schools. The director has included me in numerous trainings that include the Mississippi Headwaters Watershed Workshop, St. Louis River Watershed Workshop, and Renewable Energy Workshop.

Now, more than ever before, I realize what makes learning effective and fun. Place-based environmental education has been my path all along. I enjoy immersing students in culture, heritage, and the land. There is a sense of respect, responsibility, appreciation, and urgency that occurs when you discover your role as a steward of our earth. Living as an active citizen in your community is rewarding and honorable. When these traits are instilled within our youth they become stronger, happier, more dedicated and driven citizens. They want to learn! When you have students who want to learn, they become self-driven, they become explorers, they become scientists, they care. To me that is the rubric of life. The Anishinaabe have always been stewards of the earth. This stewardship has been somewhat lost with the assimilation into non-native culture. I feel it is necessary that we raise our youth to understand their heritage and the importance of being good stewards.

I am currently a first grade teacher at a rural school in northern Minnesota. I am blessed with a progressive and receptive principal who supports me in all efforts to get my students outdoors, participating in cultural events, and community involvement activities which I have freedom to help develop. I incorporate environmental education across disciplines throughout the day. Wednesdays are very unique. On these days, I have an environmental-cultural block that lasts an hour and a half. This special time is dedicated to outdoor learning, student lead discovery (from student inquiry “Ask a Scientist” requests), and appreciation for culture and its connections to Earth. As an educator, I strive to be effective in all that I teach. I encourage my students to achieve a higher level of learning beyond federal or state standards. I inspire them and draw out their inquisitiveness about life and nature.

I hope to expand my knowledge base through continuing my education in the Natural Sciences: Environmental Education field so that I can bring these experiences and resources back to my students in our “outdoor” classroom. I live and teach within the Lake Superior watershed. My dream is to rekindle strong stewards of this watershed to preserve its unique qualities and fresh waters for generations to come. There is no better place to be an educator than here, and there is no better time than now.

Watersheds and Place-Based Education

Sense of place is described as the interplay between the level of connectedness that individuals feel to specific places, and the meanings or descriptions associated with these places (Withrow-Clark, Konrad, & Siddall, 2015). Place-based education (PBE) immerses students in local heritage, cultures, landscapes, opportunities and experiences, using these as a foundation for the study of language arts, mathematics, social studies, science and other subjects across the curriculum (Promise of Place, 2015). Youth who participate in nature-based programs not

relevant to their everyday environment, experience changes, but they are short-term and do not guarantee continued participation when they return home. Therefore, place-based education to me is the starting point, the first stop on our youths' journeys, adventures, and explorations of life.

Another feature of effectively teaching environmental aspects is to use active learning techniques. Research and experiments should be hands-on to allow manipulation and exploration. They should also be place-based so that the results can be observed and assessed for impacts within the community. We care about the areas in which we reside; therefore, showing how our actions affect our community can have the greatest impact on long-term behavior change.

Minnesota is known as the Land of 10,000 Lakes (it actually has over 11,000). The most famous of these lakes is Lake Superior which holds 10% of all the fresh water on Earth. The Boundary Waters Canoe Area (BWCA) is equally celebrated and a large contributor to the Lake Superior watershed. The BWCA is comprised of a million acres of wilderness, with over 1,000 pristine lakes and streams, and over 1,500 miles of canoe routes. Its sheer beauty, peacefulness, and tranquility have made its mark on all who have experienced it. My goal is to share this appreciation with my students so that they may take ownership and implement stewardship plans to care for this great resource.

Anishinaabe Youth and Cultural Connections

Ethnobotany is the study of the interactions of plants and people, including the influence of plants on human culture. This connection spans back through time and in Native American culture it is a relationship that is especially important. One plant in particular that holds cultural significance to the local tribes in Minnesota is wild rice, also known as manoomin.

Translated from Ojibwemowin, manoomin means the “good berry.” It has always nourished the Ojibwe both physically and spiritually. According to the Great Lakes Indian Fish & Wildlife Commission (GLIFWC), some teachings relate that the Ojibwe people migrated from the East having been told to settle when they find the food that grows out of the water, which they discovered in the waters of the Lake Superior region (GLIFWC, n.d.). Manoomin is celebrated as a gift from the Creator. It is an important staple in the Anishinaabe diet as it contains many vitamins and minerals: protein, iron, potassium, phosphorus, thiamine, riboflavin, and niacin. Manoomin is packed full of protein, low in fat, and gluten free. Manoomin is also cherished for its ability to be dried and packaged for long periods of time. Minnesota winters can be long and harsh making other food sources scarce. The Ojibwe could always rely on manoomin to get them through these hard times. Highly nutritious, manoomin remains important to the Ojibwe diet today and is also one of several feast foods, traditionally served during ceremonies or community feasts.

Ethnobotany may be a modern term but its practices are ancient. Shaman, medicine men, and cultural leaders have been using the gifts of Mother Earth since the beginning. The practice of ethnobotany is invaluable. There are endless possibilities for discoveries in the world of plants, people, and cultures. As a society we need to embrace our elders and all of their knowledge; we need to listen, learn, and carry on the traditions of our people. Each and every one of us has the potential to be the next, unintentional, ethnobotanist that discovers a cure for some plague, illness, or disease. The gifts of the Creator are out there waiting for us to discover them.

Water Education

From outer space we look like a water rich planet but in reality only three percent of the earth's water is freshwater. Water scarcity is a real concern as 1.1 billion people do not have access to it as documented by the World Wildlife Fund (2017). This may not seem like a concern here in the U.S., but it is; droughts are increasing the concern. These droughts are also leading to massive forest fires, as the recent fires in the Great Smoky Mountains show. A joint report by the Union of Concerned Scientists and the Rocky Mountain Climate Organization predicts that hundreds of millions of acres of national parks and forests will be destroyed by 2027 (Kemp, 2014). We must take action now to protect our natural resources from such destruction. The Ojibwe believe all things are connected. You can see here the circle; the cycle of devastation if we don't care for our earth. But we can care for our earth; it just takes a little bit of education mixed with love and caring. To conserve energy we can buy energy star appliances, turn off the water when we brush our teeth, use low flow faucets, fix leaks, and water our gardens and lawns in the early mornings and late evenings. We can use eco-friendly herbicides and pesticides and non-toxic cleaners. These are small actions that have big impacts.

Environmental education improves all aspects of social-ecological systems including human well-being. Society needs to be healthy in body, mind, and spirit to be invested in external stimuli such as reading and math. Environmental education is the platform for such a holistic approach. Increase environmental connections and you in turn increase other areas of academics. This is a win for all disciplines of education.

Summary

Environmental literacy is understanding the natural systems and interrelated functions of Mother Earth which is comprised of all living things and societies depending upon her, biotic

and abiotic. To be literate in environmental studies, one is asking questions, seeking answers, and actively participating in the stewardship of the land. This type of literacy surpasses knowledge and/or wisdom to include experience and action. My complete purpose for seeking higher education is to become environmentally literate, excelling as an environmental educator to pass my knowledge, experiences, and ideas on to the next generations, the future stewards of our Earth.

As educators we wish to spark a desire in our students, a wonder, an awe, and amazement for the natural beauties that surround us every day. We hope to provide our future generations with information to fill their heads with knowledge and appreciation for their environment. We believe we can inform our youth of their role in our systems and give them the drive and voice to act on their beliefs. Each and every one of us has a job as a member of society. We want our children to be literate, make informed decisions, and be empowered to know that their efforts may create an impact on the world and its environment.

How can we use the Lake Superior Watershed to connect to our Anishinaabe youth and inspire them to continue as stewards of the land? As educators we must present our students with real issues, inspire them to question and seek answers, and support them along their journeys. Sometimes the biggest challenge for educators is finding time, appropriate materials, and lesson plans that meet standardized guidelines and still accomplish their desired task. My goal is to create one such resource. These lessons will help build connections between the Lake Superior watershed and the Ojibwe who call it home. They will also focus on conservation and stewardship. Next, I will conduct a literature review of related articles to provide additional scholarly support for my objective.

CHAPTER TWO

LITERATURE REVIEW

Introduction

It is my belief that younger members of the Anishinaabe community need to understand how watersheds are part of their history because they were a key factor along their migration and settlement here in the Lake Superior basin. I further believe it is our job as educators to develop relationships with our children. This includes understanding cultural differences and building cultural connections. These aspects are critical to obtaining their trust and fostering their passion to learn. My theory is that by using place-based education, outdoor environmental education, with cultural sensitivity educators will have the tools needed to effectively teach Anishinaabe youth. Achieving greater academic success as well as cultivating traditional stewardship roles is the desired outcome. *How can we use the Lake Superior Watershed to connect to Anishinaabe youth and inspire them to continue as stewards of the land?*

The Anishinaabe were the first stewards of the land in the Lake Superior watershed. They understood the importance of clean water and protecting the lands that fed into these bodies of water. Sense of place was strong amongst the people. They knew to be one with the land. The land fed them while also providing shelter and clothing. The Anishinaabe, otherwise referred to as the Ojibwe in this paper, had found the place where food grew on the water; this was to be their home.

Today, many Ojibwe still reside in the Lake Superior basin. They live both on and off reservations, attending tribal and public schools. Education for youth has transformed from traditional practices to formal education due to European assimilation. This movement has left a

gap in the holistic practices of being one with their sense of place. While there are still traditional practices taught through elders, cultural loss is felt throughout the formal school setting.

This curriculum is not designed to fix that problem. However, its goal is to get society one step closer to closing that gap. This curriculum is also not made for an immersion setting. An immersion setting is idyllic but not available for many students. The basis for this curriculum is to provide the general population of educators with lessons they can use with all students on the Lake Superior watershed and the Ojibwe who first settled the land. This curriculum will provide fully designed lessons to give educators more confidence about teaching misconceptions or false history. The fear of teaching false history is one of the reasons educators avoid cultural contexts. However, to be all-inclusive and to break down barriers, we need to become a united society. Educating ourselves and each other is a positive step towards healing and prospering. Through this process we can regain a sense of place and appreciation for this great land and its bodies of water. The end goal is stewardship. Raising stewards of the land is critical for the health and wellbeing of all, especially for those who come after us.

Importance of Water

“Water is the most critical resource issue of our lifetime and our children’s lifetime. The health of our waters is the principal measure of how we live on the land” declared Luna Leopold (Freshwater Society Guardianship Council, 2008, p. 30). The simple compound of hydrogen and oxygen is such an amazing, ever changing, and essential bond, vital to all life. Water is the bloodline, the connection between all things; it is spiritual.

Minnesotans have an even greater responsibility to water conservation and protection as we sit along the banks of Lake Superior, the largest body of freshwater in North America. We

are also home to the the Headwaters of the Mississippi River. The Headwaters supplies drinking water to a quarter of all Minnesotans (Mississippi Headwaters Board, 2016). It is a sacred place to the Ojibwe because the natural resources of the region provided large game for hunting, fish for netting, pelts from trapping, wild rice, and maple syrup. However, factors of sustainability remain at the forefront of preservation work, as the Freshwater Society Guardianship Council (FSGC) asserts, “Despite our wealth of water in Minnesota, we cannot presume our access to unspoiled drinking water is sustainable into the future. We know our rivers, lakes and streams are contaminated by runoff from sources near and far” (FSGC, 2008). Conservation, protection, and restoration of our watershed in the Great Lakes region has been deemed important enough to found the Great Lakes Water Quality Agreement (GLWQA) in 1972. The agreement provides a framework improving water quality and preventing ecological harm. It was updated in 2012 to address aquatic invasive species, habitat degradation and the effects of climate change, and support continued work on existing threats such as harmful algae, toxic chemicals, and discharges from vessels (EPA, 2017).

Fresh water is vital to our survival. We cannot sustain life without it. Our bodies require it as they are made up of 60% water (USGS, 2016). Three-fourths of the human brain is water (USGS, 2016), therefore, brain power = water power. We can only live an average of three days without it, yet one billion people are facing a water scarcity. This number will only increase unless we change our way of thinking and change the way we care for our water.

Water Conservation Barriers

Water is critical to our survival, so what are the barriers to conserving it? This sounds like a basic question but this question opens the doors to many existing issues. Societies across

the globe are facing problems of climate change, deforestation, access to water supplies, and pollution.

Climate Change. Because of climate change, the people living in the Mediterranean and Southern Africa are experiencing decreased rainfall. In the United States, droughts are becoming more common and sparking massive wildfires. Closer to home our lakes are warming up, in turn depleting oxygen levels necessary for native species. Minnesota is also expected to see greater concentration of precipitation in the form of severe storms which aggravates pollution from runoff. “Climatologists generally agree that rainfall will come in more extreme events, which is likely to increase the runoff of soil, fertilizers and pesticides to streams and lakes” (FSGC, 2008, p. 6). This was witnessed in the 100 year flood of 2012, affecting 9 counties, 3 watersheds, and

ultimately



Lake Superior
(NOAA, n.d.).

Photo:

Stormwater runoff along the shoreline of Lake Superior following the Solstice Flood of 2012.

Deforestation. More than one-third of our large cities receive their water supply from forests. What will happen as we continue to cut down these forest ecosystems? “Pollutants from

nonpoint sources, such as agricultural runoff, construction and development sites, forestry and urban runoff, contribute to the pollution of Minnesota's waters. Agricultural runoff and conversion of rural to urban land are by far the biggest contributors of nonpoint source pollutants, 60-70% and 10-15% respectively" (FSGC, 2008). Minnesota's population has grown from 1.7 million people in 1900 to 5.49 million people in 2015 (FSGC, 2008; U.S. Census, 2016). The growing population demands an expanse of developed areas. When we convert farmland, wildlife habitats, and forest ecosystems into suburban areas we increase impervious surfaces. This results in greater runoff into streams and lakes and less groundwater infiltration. Stormwater runoff from impervious surfaces can contain soil, fertilizers, animal waste, pesticides, salt applied to roads and walkways, oil, gasoline, antifreeze and metals from tires. The EPA has identified runoff as a leading source of pollution in Minnesota lakes (FSGC, 2008).

Access. The demand for fresh water is continually increasing to meet the need of population growth. Many water systems around the world are currently overtaxed and some have already collapsed. According to one estimate, by 2030 our planet's need for water will outstrip its reliable supply by 40% (CI). "Despite our wealth of water in Minnesota, we cannot presume our access to unspoiled drinking water is sustainable into the future. We know our rivers, lakes and streams are contaminated by runoff from sources near and far" (FSGC, 2008). We have made great strides over the past thirty years to clean up our waters. Education is essential to continuing these efforts.

Pollution. Pollution from human activities, especially agriculture, washes into streams, lakes, estuaries, and oceans. Nearly 60% of U.S. lakes are currently too polluted for fishing and swimming – and lakes such as Lake Erie have massive dead zones that put commercial activity like fishing at risk (CI). "Polluted waters not only endanger our health, well being and the

environment, but also threaten the recreational opportunities that are a heritage of all Minnesotans and the cornerstone of a \$10 billion annual tourism industry” (FSGC, 2008).

About 71 percent of the Earth’s surface is water-covered , but only 2.5% of this water is fresh (USGS, 2016). Of this 2.5%, less than 1% is accessible for human use. This prompts the question, how is this 1% shared, and how do we convey this to our youth? How do we teach water education without negativity and blame, rather supportively with optimism and stewardship?

Addressing the issue of distribution, it becomes evident that Americans play a significant role. The average American lifestyle is kept afloat by about 2,000 gallons of H₂O daily; twice the global average (National Geographic, 2015). It is our responsibility to investigate this usage and work towards change that supports and enforces water conservation policies.

American agriculture is the largest consumer of freshwater resources. They make up 70-80% of all the fresh water used (National Geographic, 2015). The U.S. is one of the largest food producers. One concern is the practices used to produce our crop and livestock yields. A huge amount of fresh water is wasted in leaky irrigation pipes, field application methods that are inefficient and careless, and the cultivation of crops that are not suited to the environment. These crops are thirsty and require excess water. An example of this can be observed in California and Utah. 32% of all U.S. water withdrawal goes into irrigating these two states (National Geographic, 2015). There may be other states that are better equipped to grow these products. Other crops may be better suited for these regions. These types of changes could have large impacts for the preservation of our freshwater. Another example, which includes a cultural aspect, is currently being debated in Klamath, Oregon: who should have rights to the water? Klamath ranchers require so much water they are drying up the rivers that are waterways for

salmon and suckerfish. These fish are sacred to the Klamath Indian Tribe and their fisheries. Every spring, the Klamath Tribes hold a ceremony to celebrate the return of the suckerfish. Once the staple food of the tribe, the suckerfish is now endangered (Templeton, 2013). It has been over 27 years since the tribe has been able to fish for suckerfish. Don Gentry, the chairman of the Klamath Tribes states, "The condition of our fish is just so dire. They're on the brink of extinction. And I believe that those fish are an indicator of the health of the watershed" (Templeton, 2013). Currently the tribes are in negotiations with the ranchers to come up with a plan to share the water. Both sides are aware of the impact each has on the other and on the ecosystem. They appear to be responding to each other respectfully and responsibly. The end result has the potential to be productive and sustainable, thereby could set precedence for others.

We all require access to fresh water to thrive. Fresh water helps renew us – culturally, spiritually, and physically. We swim in it, we catch its fish, we gaze at its wildlife and we place it at the center of some of our most ancient spiritual rituals. Anyone who has ever woken up early to go fishing, danced in the rain during a sun shower, or played in puddles after a fresh rainfall knows the happiness that water brings. The journey of the Ojibwe has always been linked to water. Recognizing this relationship in the formal education setting can be a driving force for today's youth.

Watersheds

A watershed is a geographical area in which all water, both surface and groundwater, converges and drains into a common waterway (often a stream, lake or river) and eventually into the ocean. Watersheds link all living creatures through this common hydrologic system. Each watershed, large or small, is unique and defined by its own geology. Kalvaitis & Heffernan

(n.d.) maintain that “the health of our watersheds affect the quality of our drinking water, the aesthetics of our recreation areas and the health of the plants and animals of our region” (p. 35).

The Environmental Protection Agency (EPA) (2009) estimated that 44% of the nation’s rivers and streams and 64% of lakes were not clean enough to meet basic uses such as fishing or swimming. Nonpoint sources of pollution, such as urban runoff and agriculture, remain the largest source of water quality problems across the nation (EPA, 2009). Please refer to before mentioned examples for agriculture. There is more that we can be doing to care for our watersheds. According to the Minnesota Pollution Control Agency (MPCA) the surest way to improve water quality is to better manage stormwater (MPCA, n.d.).

Urban runoff is in large part due to the high volume of impervious surfaces. According to Trauth-Nare & Austin (2015), these impervious surfaces do not allow precipitation to percolate into the ground slowly; instead, hard surfaces lead to increased stormwater volume and velocity, which carries with it pollutants such as motor oil, road salts, pesticides, fertilizer, and heavy metal straight into waterways. These pollutants have devastating effects on the native aquatic species. Testing done by the Freshwater Guardianship Council investigated the effects of four such pollutants; chloride, nitrate, volatile organic compounds, and pesticides. They found that chloride disrupts the metabolism of aquatic organisms and can be toxic. Nitrate is one of the most common contaminants in Minnesota. Nitrate not only affects aquatic organisms but nitrate poisoning can be fatal to infants. Volatile Organic Compounds (VOCs) have also ran their course through groundwater, up the foodchain, to now affecting human health. Some of the compounds cause damage to our liver, kidney, nervous system, and have been linked to cancer (FSGC, 2008). The ecological health impacts of pesticides include killing non-target organisms;

reduced growth and altered development; reduced reproductive capabilities, including birth defects; and genetic changes (FSGC, 2008).

Lake Superior Watershed

Caring for the watershed and the native plants and animals that reside within is a priority in native communities. Natural resource management divisions have been established for just this reason. The Lake Superior watershed is one of these protected areas.

Sea Grant is one organization working to protect our water resources. The National Sea Grant College Program has been around for 50 years helping to create and maintain a healthy coastal environment and economy (Sea Grant, 2017). The Minnesota Sea Grant division works to help citizens understand, conserve, and better utilize Great Lakes resources. According to Sea Grant (2017), Lake Superior is the largest freshwater lake in the world by surface area and the third largest by volume. Lake Superior holds 10% of the world's fresh surface water that is not frozen in a glacier or ice cap. Superior has a relatively small watershed (49,300 square miles) for its size. This watershed is laced with streams that feed Lake Superior's 848 tributaries. Water has two ways out of Lake Superior: a right exit that spills toward the Atlantic Ocean through the Soo Locks on the St. Mary's River or through evaporation.

Sea Grant (2017) explains how Lake Superior is well known for its shipping industry into the Duluth harbor. About 100 times per year a "saltie" makes the seven-day, 16-lock, 2,342-mile trip from the Atlantic Ocean through the Great Lakes-St. Lawrence Seaway to the Duluth/Superior Harbor to pick up grain, to drop off wind-energy equipment, or to conduct other business.

The lake is abundant with fish, both native and non-native. The large size of the lake brings in sport fisherman from everywhere and makes Duluth a popular destination in the tourism industry. Catching a Lake Sturgeon, that can reach six feet in length and weigh up to 200 pounds, is an experience that a person will never forget. Being that it is a primitive fish that has been listed as a special concern fish since the 1980s, sport fishing for Sturgeon has been closed unless a special permit is obtained. Another favorite among the native fish are Herring also known as Ciscoes. Ciscoes are a member of the Trout and Salmon family. They are a long and slender fish. Sea Grant (2017) describes Ciscoes as a fantastic source of omega-3 fatty acids and a regional smokehouse and restaurant favorite. Ciscoes are only one of the 34 native fish species present in the lake. Of the 97 non-native species, the worst offender of 2017 is the Sea Lamprey. The Sea Lamprey is a parasitic fish that can kill up to 40 pounds of large Great Lakes fish such as the Sturgeon and Ciscoes in a single feeding season. Thanks to ongoing control efforts the numbers of Sea Lamprey have been on the decline.

Another non-native species in the Lake Superior watershed is the Rainbow Smelt. Although being non-native it doesn't carry with it the negative connotations that the Sea Lamprey does. Sea Grant (2017) reports that Rainbow Smelt were first introduced in the Great Lakes in 1912 and found their way into Lake Superior in 1946. During the 1970s, they were the most abundant fish in Lake Superior. This boom in Smelt started the tradition of the "Smelt Run." Fisheries experts aren't sure exactly why, but the Smelt population crashed in 1979 and has stayed low ever since. Some believe the crash was due to predation of Lake Trout and Pacific Salmon. Undaunted, smelters still brave the cold Superior nights to net them as an annual rite of spring. To many in the region, it is a tradition, part of local culture, a sense of place instilled through informal education.

How do we use the Lake Superior watershed to build cultural connections for Anishinaabe youth? How will these connections assist us as educators to build relationships with our students?

Building Cultural Connections

The Anishinaabe being the first inhabitants of the Lake Superior watershed have a special connection to it. Understanding and appreciating these connections will help anyone going into environmental education in the region. The Anishinaabe have many teachings to offer as they lived as one with the earth. A famous saying by Chief Seattle goes, “We are part of the earth and it is part of us... for all things are connected.”

Lowenstein, Martusewics, & Voelker (2010) assert that European colonizers defined the indigenous people they came into contact with as “savages” or “like animals” (p. 99). These metaphors have had devastating effects that are still felt today. Ecojustice Education examines the negative effects of a worldview organized by a mindset of domination, and offers teachers and students ways of responding in their own communities (Lowenstein, et al, 2010). Ecojustice Education teaches us to care for our community’s well-being and the well-being of all the living systems within it (2010).

Everything on this earth is connected and interrelated. According to Ojibwe oral teachings, all other forms of life were created before humans and therefore humans are dependent upon them. Other forms of life are not dependent upon us. All living things have a spirit including rocks, water, and air. Ojibwe philosophy shows respect for Mother Earth and the Great Spirits that guide and teach. We as a people must work towards protecting our natural environment. We need to understand and respect all backgrounds and traditions to support each

other and our united goal of leaving this earth better than we found it. Currently there aren't environmental education practices in our state standards; however, since the enactment of the Indian Education Act of 1972 we have a platform in which to imbed them.

By combining the environmental commons and the cultural commons we are paralleling traditional Anishinaabe education to some degree. These practices focus on our relationships to the land, water, air, and all living creatures while encompassing traditions, relationships, well-being, and sustainability. They engage students in learning that is intellectually rigorous, emotionally engaging, ethnically charged, and spiritually fulfilling.

Research on teacher effectiveness, by Woolfolk & Davis (2006), shows that as teachers engage in challenging learning both in and out of the classroom; teachers acquire a sense of their own efficacy. Nakkula & Toshalis (2006) add that in their new role, teachers must learn how to guide inquiry, let questions emerge from students, see themselves in co-development with students (p. 4) and community partners, and generally learn to be more comfortable with complexity and uncertainty (Lowenstein, et al, 2010). One way to co-develop with students to build a partnership is to take on the task of learning to speak their native languages.

Language is a cultural connection important to the Anishinaabe. According to Morgan (2005):

“Indigenous languages are powerful symbols of self-determination and sovereignty for tribal communities in the United States. The survival of Indigenous languages into the 21st Century despite the active repression on the part of states and the national government has transformed these languages into powerful symbols that serve as the basis for larger discussions related to identity, self-determination, and sovereignty” (p. 96).

This curriculum will look to incorporate a language component into each lesson. It will provide some challenges for educators, putting them in the role as student, building efficacy. In return, students will observe that we are all lifelong learners and can learn from each other. Students will also appreciate and bond with their educators who are taking themselves, maybe “out of their comfort zones” to show interest in their students’ cultures. This is critical as formal education has not been an all-inclusive environment for native youth.

Knowledge and understanding of Anishinaabe culture is lacking in formal schooling, restraining opportunities for youth to become capable, self-determined individuals and leaders for their community or tribe. As Freed and Samson (2004) note, “despite high numbers of students leaving the school systems before completion, the school systems have shown little evidence of changing to meet the human and academic needs of the Indigenous student clientele.... The process of inflicting an educational system conceived and implemented completely by outside forces appears to be a foundational cause of alienation by Native student toward school (p. 84). According to Manuelito (2005), “The inclusion of Indigenous epistemologies in public education can only strengthen the development of self-determination, empowering Natives and non-Natives alike. The challenge for educational practitioners and anthropologists is to promote the Indigenous epistemologies that are essential for self-determination and appropriate education for all Indigenous youth” (p. 84).

For the Anishinaabe the road to self-determination through formal schooling has been a long, tough road but one which they deem necessary. In the words of Tierney (1991), “At the same time as federal Indian policies continue to trigger these negative repercussions, Native American Nations - and especially their college-age youth voice strong desires to maintain their sovereignty, cultures, and languages through formal education” (p. 73). Corson concludes

(1999), “Community-based schooling, still ‘a new idea for mainstream education’ provides a means for Indigenous people to become active participants in shaping their own future through education. Knowledge gathering is considered a lifelong journey among tribes” (p. 74).

The road to self-determination experienced its first successful tribally controlled schools among five south-eastern tribes: the Cherokee, Choctaw, Chickasaw, Creek, and Seminole as documented by Noley (1992, p. 75). Students attending the tribal schools had a 90 percent literacy rate. This is far higher than that of others students, including non-native students, in the surrounding communities. Many of these Anishinaabe youth went on to attend college and received advanced degrees. Noley (1992) believes the educational success of the five tribes is credited to them having local, tribal control over their educational systems and community-based bilingual educational programs (p. 75).

In 1990, Congress passed the Native American Languages Act. “The Act provides the opportunity for Native American nations to reaffirm their identities through programs designed to maintain, promote, and protect their languages and cultural systems” (Manuelito, 2005, p. 76). We are seeing the great importance of this in Minnesota and others states in the Midwest with the recent trend of immersion schools, language camps, language tables, and tribal colleges.

The Ojibwe, the third largest tribal entity in the United States, believe that oral tradition is the foundation of teaching and learning. According to Grover and Keenan (2006), “It is the means by which knowledge (stories of origin and the creation of the world; how to act in an appropriate way that reflects the values of the indigenous culture; how to perform and master skills and work needed for the survival of the group) continues to be passed down from one generation to the next” (p. 392). Benton-Banai (1988) adds, “Teaching and learning have always been the prime importance to the Ojibwe Indian people” (p. 394). Teaching was done with the

idea that those who learned would remember and would become those who would perpetuate the knowledge and culture, making it possible for the people to survive another generation.

Learning was done with the feeling of responsibility, of knowing that it was necessary to do this, that one day the learner would become the teacher to the following generation (Grover, 2003, p. 394). Children were happy to learn from the wisdom of elders in their communities. Children valued the wisdom that insured the survival of their culture. This makes sense because, as Aragon suggests (2001), “people are intrinsically motivated to do what they value” (p. 397).

In the United States, there are estimated to be fewer than 1,000 living speakers of Ojibwe, a Native American Indigenous language, and most of these speakers are elderly, according to Treuer & Paap (2011, p. 125). Hermes & King (2013) add, “Ojibwe is an Algonquian language, and belongs to one of the largest Indigenous language groups within North America” (p. 126). The Ojibwe language has been recognized as one of the hardest languages to learn. There were Ojibwe code talkers from World War II who have just recently been honored. Language revitalization is at the forefront of education for the Ojibwe people. Hermes & King (2013) note, “there is a sense of encouragement thanks to language tables, language immersion camps, widespread second language or heritage Ojibwe classes, and recently, Ojibwe immersion schools. Yet, second language learners of Ojibwe are still struggling to find effective ways to learn a language that they rarely, if ever, hear spoken in everyday conversations” (p. 127). It is an even greater challenge for schools to acquire fluent teachers of the language.

Thomashow & Kessel maintain that, as educators, we must attend to the multitude of perspectives on stewardship and restoration by culturally diverse audiences (2015). I agree with this perspective wholeheartedly. Spending the vast majority of my life on the Fond du Lac Reservation (Nagaajiwanaang) and working with students from this reservation, I have an

obligation to preserve culture, language, and appreciation for diversity. The Ojibwe culture and language is at risk of extinction as the elders pass on. We are trying to rebuild and go back to the ways of our ancestors. Elders were taught to honor and appreciate Mother Earth. I believe the words of Chief Seattle should be instilled and ingrained in the hearts and minds of all. I also feel it is important for me to understand the backgrounds of all of my students, colleagues, and community members in order to best connect with them and understand their views and histories. We are here as one people and together we must support each other to thrive.

Learning Styles of Anishinaabe Youth

Athman & Monroe (2004) believe; “education focused on the natural environment is valuable for motivating students’ intellectual discipline and desire to learn” (p. 5). For example, scholars have documented that students who participate in environment-based education have a greater achievement motivation, disposition toward and skills in critical thinking than their peers who do not participate in environment-based education. Ernst & Monroe (2004) add that “this connection is even stronger among Ojibwe youth as it rebuilds that lost link that went missing during the onset of formal - education during the boarding school years, from 1880 – 1940’s, and as we know it today” (p. 5).

Community Based Organizations (CBOs) are another way of teaching to our youth. McLaughlin points out that, research on adolescents involved in Community Based Organizations found that a decade after their involvement, they had a greater sense of hope and agency, more positive ideas about the future, and the knowledge and confidence to plan for it, compared with their peers who were not involved with CBOs (2000). According to Anderson & Gurnee (2016), teachers often model their classroom agreements after the U.S. Constitution, outlining the rights and responsibilities of the teacher and the students. In this way, the teacher is protecting the

rights of the class. This is one of his/her responsibilities. During class meetings, students learn how to voice concerns, listen to others, brainstorm solutions, and evaluate outcomes (p. 73).

As schools, we strive to prepare our students for their academic and career endeavors, but if we neglect to prepare them to be involved and active in their communities, we have missed an important part of their development, contends Anderson & Gurnee (2016, p. 75). Developing solid cultural connections for Ojibwe youth is vital to increasing a strong community commitment and future stewardship. Castagno & Brayboy (2008) found that culturally responsive pedagogy increased Indigenous youth's school engagement (p. 217). With greater engagement comes the opportunity for greater stewardship. The purpose of this curriculum is to do just that; be a culturally responsive curriculum geared towards place-based stewardship.

Inspiring Stewardship

Professor Wangari Maathai once said, "You cannot protect the environment unless you empower people, you inform them, and you help them understand that these resources are their own, that they must protect them". We must look at how we got here, who we are within all of this, and what we can do to address the situation and work towards sustainability. (Lipton & Bhaerman, 2009, p. 45).

Kalvaitis & Heffernan believe cultivating a climate of watershed stewardship in our classrooms begins with awareness, active inquiry and positive action (n.d.). Additionally, Gally, Marckini-Polk, Shroeder, & Flanagan (2016) add place-based stewardship education (PBSE) can expand students' aspirations for the kind of world they want to live in and the roles they might play in it. We explore this rural resource and argue that by engaging in place-based stewardship, students develop an identification with their local place, a belief in their capacity to effect change in that place, and aspirations to contribute to and sustain the commons that they

and fellow citizens share (2016). Flanagan, Kim, Collura, & Kopish (2014) further support this idea stating; Students engaged in some form of community service display higher levels of positive bonding, harmony, and community support.

Hall & Bauer-Armstrong (2010) believe teams of teachers who draw on many resources and talents within a school community are essential for full implementation of a restoration-based curriculum across disciplines and grade level. In addition, partnerships with environmental organizations and agencies, master gardeners, universities, parents, and local businesses can bring credibility and resources to the restoration project. Give students opportunities to have a real connection with the earth. Let them play in the dirt, explore around the pond, follow a stream, or build a fort with sticks, moss, and other natural elements. All of these experiences will have a positive impact as students do real work and create something they can be proud of. Hall & Bauer-Armstrong state, “Native plants can actually improve the ecological functioning of the school grounds, for example, preventing runoff pollution and enhancing the health of the landscape and water quality beyond the schoolyard boundaries” (2010). Leopold (1949) eloquently sums it up with, “When we see the land as a community to which we belong, we may begin to use it with love and respect” (p. 212). Students become agents of change for their communities. Students apply their learning to address community issues.

One stewardship initiative based in the Great Lakes is the Southeast Michigan Stewardship Coalition (SEMIS). It is part of a state-wide Great Lakes Stewardship Initiative (GLSI) that established regional “hubs” for community-based education across the state of Michigan. According to Lowenstein et al. (2010), the primary goal of SEMIS is to develop students as citizen stewards able to understand and promote healthy ecological and social

systems affecting the Great Lakes basin and their communities. What does it mean to be a steward in the 21st Century? Getting out into places that matter to physically do work that is meaningful and connected to rigorous concepts and a relevant curriculum. Through this process both teacher and students blossom. More, they begin down a path of political activism and stewardship that is the foundation for healthy sustainable communities (p. 4). Wealth is measured in one's membership and contribution to the community.

A program similar to SEMIS would be a great asset to Minnesota and students all around the Lake Superior watershed. The goal of this curriculum is much like the goal of SEMIS. This curriculum is meant to support place-based education within the Lake Superior watershed to motivate Anishinaabe youth to continue as stewards of the land. It will include watershed lessons that focus on stewardship while incorporating Ojibwe connections through language and culture.

Our communities can thrive if they are educated and committed to community health, nutrition, reducing crime, reducing drug activity, reducing dropout rates, decreasing unemployment, managing rivers, sewers, and roadsides. Life skills such as cohesion, self-esteem, integration, diversity, immigration, belonging, respect, care, empowerment, and stewardship need to be written into the curriculum. The combination of these objectives attribute to the urban environmental education trend/lifestyle. In this trend, individual and community development are linked because empowered people are more likely to create positive change in their communities according to Russ and Krasny (2015).

Duncan-Andrade found, by creating a sustainable community, centered on a school that gives students and families' security, nourishment, care, and education, we can create a model of success and revitalization that reverses decades of disinvestment (2013). Human behavior

changes require two important outcomes; short-term and long-term. Short-term outcomes are critical as they are attainable and lead to a feeling of satisfaction and pride. They are the driving force to reach for long-term outcomes as they show us immediate results encouraging our continued efforts. Long-term results are the ultimate prize. That is where our transformation to environmental dedication is met through positive behavior change. According to Russ, the future of our planet rests on widespread, long-term behavior change (2014). Education is the key to building awareness. Starting at home, with place-based education, will spark interest and produce results that are needed to reach for long-term results.

Place-Based Education

Withrow-Clark, Konrad, & Siddall describe a sense of place as “the interplay between the level of connectedness that individuals feel to specific places, and the meanings or descriptions associated with these places” (2015). Place-based education (PBE) immerses students in local heritage, cultures, landscapes, opportunities and experiences, using these as a foundation for the study of language arts, mathematics, social studies, science and other subjects across the curriculum (Promise of Place, 2015). Youth who typically do not spend a significant amount of time in natural settings when participating in nature-based programs experience change that is short-term and does not guarantee continued participation when they return home. Therefore, place-based education to me is the starting point, the first stop on our youths’ journeys, adventures, and explorations of life.

Anderson & Gurnee (2016) found place-based learning prepares students to be productive contributors to their communities. It is democracy in action, an effort to grow citizens who will be both interested and active in their communities (p. 72). We want students to

drive towards academic achievements but we also want them to be invested in their communities and have the leadership to take action. Anchoring our curriculum in local history, people, and issues through field trips, guest speakers, and service-learning projects will encourage students to fulfill their civic duties.

Anderson & Gurnee (2016) found that the “think global, act local” philosophy inspires citizens to apply love of their place to other places in the world. During class meetings students learn how to voice concerns, listen to others, brainstorm solutions, and evaluate outcomes (p. 73). In today’s society people too easily forget to ask what they can do for their community rather than what their community can do for them. According to Anderson and Gurnee (2016), “As schools, we strive to prepare our students for their academic and career endeavors, but if we neglect to prepare them to be involved and active in their communities, we have missed an important part of their development” (p. 75).

Another strategy of effectively teaching environmental awareness is to use active learning techniques. Research and experiments should be hands-on to allow manipulation and exploration. They should also be place-based so that the results can be observed and assessed for impacts within the community. People care about the areas in which they reside; therefore showing how our actions affect our community can have the greatest impact on long-term behavior change. One example of such an activity would be to have students build their own watershed giving them a sense of their “watershed address.” Additionally, Donahue, Lewis, Price, & Schmidt, found that through the authentic investigation of their own community landscape, students develop the skills of active inquiry, act as scientists, and are able to see clearly the impacts of human interactions on watersheds (1998).

Other activities include performing water quality tests, investigating possible causes, and formulating scenarios. Endreny (2007) offers an example: when testing for water quality a scientist might get a positive indicator for coliform bacteria, this bacteria comes from animal waste. They suggested that the dog waste on the land would wash into the water and affect its water quality. They were beginning to connect that water quality relates to what happens on land - a key conceptual idea for watersheds (p. 23).

Berry defines a community as the mental and spiritual condition of knowing that the place is shared and that the people who share the place define...the possibilities of each other's lives (2012). Berry's definition is supported by Avery & Hains' findings that children intuitively and intellectually recognize that cultural and social processes are connected to their habitat, that they themselves are dependent on habitat, and that they are active participants within their communities and broader ecosystems. Place-based educational practices allow for holistic cognitive processing, fusing familiar non-formal cultural knowledge with scientific theory (2016, p. 133). Kassam reiterates that it recognizes that cultural and social processes are connected to, and not devoid of, the local habitat (2009).

According to Bequette (2014), using a culture-based model with a place-based pedagogy immerses mostly white educators in an Indigenous society's heritage language and ways of knowing, in turn, heightened many students' engagement with and appreciation for the place they live and the peoples living there for millennia . Adams, Bell, & Griffin (2007) found, culture-based arts integration (CBAI) is one path to making more engaging places for Indigenous youth and spaces for furthering anti-oppressive education to achieve social change (p. 215). The creators of the project envisioned using integrated place-specific Indigenous knowledge as a meaningful entry point for culturally responsive student-centered teaching (Gay, 2000; Sobel,

2004; Vellegas, 1991). The project was founded by the University of Minnesota and implemented throughout the state. As a participant of the program I can speak to its success. It is one of the driving forces behind the idea for this proposed curriculum. I further implemented it in a rural school environment bringing to light the need for rural environmental education.

Rural Environmental Education

“Children’s sense of being emerges from their engagement with their environment, revealing a deep understanding of complex, diverse, and yet co-existing relationships to their habitat” (Kassam & Avery, 2013, p. 131). Avery & Hains (2016) further state that the interconnectivity of organisms, ecosystems, and humans to place or habitat—the *oikos* of rural children and people – is paramount to the survival of the planet as well as fueling the resistance to educational standardization and corporatization (p. 159). Formal education will only benefit from youth developing a sense of water stewardship in rural environments through place-based education and environmental education.

Olsson & Folke (2001) introduce Local Ecological Knowledge (LEK) as knowledge held by a specific group of people about their local ecosystem and a meld of scientific and practical knowledge, being site-specific and often involving a belief component (p. 132). Local Rural Knowledge (LRK) asserts that most children learn at home, in their community, and in their local ecological environment. The holistic concepts of local knowledge and local learning include family settings, places of play and work, organizational venues, community settings, and other local ecological environments where children glean scientific knowledge from the contexts of their rural life (Avery and Kassam, 2011, p. 132).

The ultimate aim of environmental education (EE) is to convey the knowledge, skills, attitudes, motivations, and commitment by working individually and collectively towards solutions of current problems and prevention of new ones (Monroe and Krasny, 2015). This can be conveyed via the knowledge that EE is to motivate citizens to be environmentally responsible by engaging in sustainable practices. According to Giddens (2009), “environmental degradation is arguably the greatest civic challenge facing younger generations, and the realities of climate change alone demand a fundamental reimagining of those things that give human life purpose and meaning” (p. 156). Semali and Kinsheloe (1999) found rural schools face many challenges—most notably their small sizes, limited budgets, and remote locations. Rural students’ cultural, historical, socioeconomic, and Indigenous perspectives are frequently dismissed when compared to the standardized curriculum of today, resulting in feelings of disenfranchisement (p. 130). These very challenges, according to Bauch, can be opportunities to engage rural students with community partners in learning that focuses on local place (2001). Small population increases likelihood of knowing each other, having a strong sense of community, and less bureaucracy. Rural communities depend on volunteer efforts to preserve and protect the environmental commons.

Avery & Hains (2016) have noted that recent scholarship is changing the conversation. In doing so, local and indigenous knowledge are now at the forefront, and are deemed necessary ingredients for tackling unprecedented issues of global climate change, food sovereignty, diminishing freshwater resources and the like (p. 130). It is time for the native community to be heard, for the teachings of their ancestors to be shared.

Avery & Kassam (2011) also shared results from a recent study with rural children which indicated that when describing science and engineering in their community, rural children

illustrated a complex connectivity with their environment. These students were more easily able to articulate complex science concepts because their knowledge was drawn from their interactions with and connections to familiar rural socio-cultural and ecological contexts (p. 131). Kassam and Avery (2013) later added, their sense of being emerged from their engagement with their environment, revealing a deep understanding of complex, diverse, and yet co-existing relationships to their habitat (p. 158). In conclusion, “advocates of place-based learning have observed, the dignity of a human life inheres to the positive impact one can have on the lives of others, and education has a major role to play in cultivating such communal dimensions of the aspirations of younger generations” (Theobald, 2006, p. 157). One objective of this curriculum is to spotlight this role for our Ojibwe youth.

Summary

This research so far has focused on helping educators use the Lake Superior watershed to build connections with Anishinaabe youth and inspire work towards stewardship. It also addressed the key components such as the importance of water, watersheds, and appreciation for cultural diversities, environmental education through place-based education, and a focus on the rural communities of the Northland.

In the next chapter, I will integrate these concepts into the curriculum. I plan to build a culturally inclusive watershed curriculum. I will address the setting and intended audience that would benefit from the curriculum. I will talk about the resources and models I intend to utilize and provide rationale as to why they were chosen. Lastly, I will reflect on how I intend to implement the curriculum in formal and non-formal settings.

CHAPTER THREE

METHODOLOGY

Introduction

How can we use the Lake Superior Watershed to connect to Anishinaabe youth and inspire them to continue as stewards of the land? Here in Minnesota we are fortunate to live in a water rich environment. In the land of 10,000 lakes, Lake Superior stands out above the rest, as the largest of the Great Lakes. Lake Superior is full of history, geology, and culture. It opens the door for non-fictional texts, mathematics, folk lore, and more. It is an honor to be an educator in such a rich environment.

The sense of place is strong amongst the people who reside in the Lake Superior watershed. The rural communities of the “Northland” are intrinsically connected to this great body of freshwater. It supplies water to our homes for all of our needs. It blesses us with fish for eating. The lake gives us a place to meet as a community to play, swim, and relax. Most of all, it sustains life by providing safe drinking water. It is the heart of our community and therefore should be at the heart of our teachings.

The Anishinaabe, also known as the Ojibwe or Chippewa, have resided in the Lake Superior region since the time of the great westward migration. (I have learned the Anishinaabe prefer Ojibwe to Chippewa, using Chippewa only for purposes of documentation.) As it has been told to me, they were traveling to find the food that grew on the water for this is what the Seven Fires prophecies had told them. They found it here, on the shores of the Great Lake Superior. Manoomin, wild rice, quickly became a staple for the tribe. They would call this place “home” and stay. All history and culture of the area is rooted in and ties back to the ways of the

Anishinaabe. I believe it is our job as educators to recognize the Anishinaabe in our teachings and present the correct history of the region.

The ultimate goal of this curriculum is to use environmental education with a place-based focus (Lake Superior Watershed) to engage all youth, with an emphasis on Anishinaabe youth, to become stewards of this great region. I chose to emphasize the Anishinaabe youth as they face challenges others do not, like assimilation, loss of language, and relocation. (Other challenges felt throughout the community, indifferent to ethnicity include: growing up in foster care, in a juvenile detention center, or as a ward of the court, drugs, crime, and poverty.) Their graduation rates are the lowest in the country. Yet, the seven teachings run deep within them, and given the right guidance, love, and support these children will become the future leaders. They will teach sustainable practices and stewardship to the young ones that come after them, for that is their way.

The education of our Anishinaabe youth exists deep in my heart. I am a mother and an elementary teacher. My three sons are all tribal band members. I want them to know their culture, history, and language. I want them to be proud of who they are. I want them to know that they can excel, they can graduate, and they can be anything that they want to be. I also want them to feel a connection to the earth, to nature, and all of its beautiful offerings. My passion in life is for environmental education. I am most at peace when I am camping, hiking in the woods, fishing, or simply on a nature walk exploring. I want to pass this love onto my children. I wish the same for my students. I call them my children too. I am dedicated to giving my students experiences which will connect them with their natural environment, motivate them, and inspire them. This curriculum is designed to do just that. This chapter discusses the following: setting and participants, curriculum kits, the curriculum development model, and implementation.

Setting and Participants

I teach in a rural school just north of a northern Minnesota reservation. Although a public school, the close proximity to the reservation brings in a number of Anishinaabe/Native American students. This makes it the second highest population in the school.

The community is within the Lake Superior watershed and rich with water resources. Farming and mining are the leading industries. The school is the heart of our community. It is a PreK-12 school with approximately 532 students (288 students in K-6 and 244 students in 7-12). Our free and reduced population is just over 50 percent. This being said, many of our students have not had life experiences outside of the community or neighboring cities.

Every year I teach my students about the Lake Superior watershed and phenology of our area. At the end of the year, I take my students to a local aquarium and out on an excursion of the harbor. The charter company gives a narrated boat cruise around the harbor on Lake Superior. It always amazes me at the number of students who have never seen the lake before. It is a powerful experience for them and one that widens their lens on life. Their respect and appreciation for the lake and the land that feeds it cannot be missed. It is something I hear about for years after they graduate from my class.

The curriculum in this capstone project uses the Lake Superior Watershed, environmental education practices, and American Indian Learner Outcomes to meet state standards. It is intended for students all around Lake Superior and would benefit schools in Minnesota, Wisconsin, Upper-Michigan, and into Canada. The focus is on the younger elementary years from first to third grade. It can be used by educators from all divisions of schools whether they are public, private, or tribally run. The more students we have aware of and connected to our watershed the better chance we have at conserving it through stewardship.

Curriculum Kits

I chose traveling trunks as the curriculum design so that they can be checked out and shared between districts by all educators interested in using outdoor place-based instruction. Each kit includes all required materials both reusable and refillable. Consumables are monitored by the organizations housing the kits. The lesson plans utilize a wealth of proven teaching strategies including whole group, small group, partner pairing, think-pair-share, investigations, and hands-on manipulatives.

The curriculum kits have a dual purpose: environmental education (EE) and cultural connections. Therefore, the lessons within the curriculum have EE standards as well as the American Indian Learner Outcomes (AILOS). These two features support teachers in fulfilling state standards in social studies and science in addition to the embedded reading and math.

The curriculum kits are comprised of four units as four is a sacred number in the Ojibwe culture. It represents many things, the four seasons being one of them. The curriculum kits have four lessons for each of the four seasons. There is benefit to this because kids will be getting outdoors in all seasons during which they will be exploring and observing phenology changes. The kits will also be culturally sensitive and meet the needs of our Anishinaabe youth. Each unit includes an Ojibwe language component. The idea is to build connections, strengthen relationships within communities, and support their sense of place.

Sample Unit One: This unit is written for the fall season when the Anishinaabe of the Lake Superior region harvest wild rice. Students learn the importance of the rice within the region, the cultural significance, and the process of harvesting.

Sample Unit Two: This unit is written for the winter season when storytelling and tracking are important activities for the Anishinaabe. Students analyze stories of the animals and trees of the Lake Superior region and learn how to identify animal tracks in the snow.

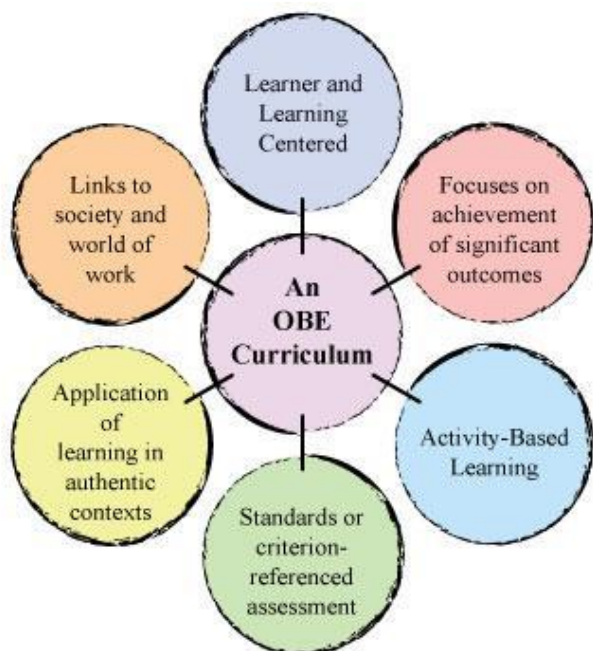
Sample Unit Three: This unit is written for the spring season when the Anishinaabe are collecting maple sap in the Lake Superior region. Students learn the process of identifying sugar maples, tapping trees, collecting sap, and boiling sap to make maple syrup.

Sample Unit Four: This unit is written for the summer season when the Anishinaabe of the Lake Superior region are harvesting birch bark to make baskets, canoes, and jewelry amongst other things. Students learn about the birch tree, how to properly harvest birch bark, and how to create a basket.

Curriculum Development Model

The curriculum is designed using a cognitive approach to environmental education. The Reasonable Person Model (RPM) is a framework that suggests that within any given situation or context, there are common characteristics that enable people to act in a “reasonable” manner (Oxarart & Monroe, 2015, p. 95). In this way people act responsibly, sensibly, and appropriately. Concept maps are one tool used to organize thoughts before, during, and after activities. They offer a visual of the mission beforehand and a reflection afterwards. Learning is hands-on through experiential learning, activity theory, inquiry learning, and constructivism. It is most effective when participants feel they are contributing to a meaningful action, a resolution to a problem.

The curriculum offers an additional design; Outcome Based Education (OBE) Design.



(The Exchange, 2017)

Outcomes-based education is a student-centered, results-oriented design premised on the belief that all individuals can learn. This program has a clear focus with scaffolding activities, which culminates in a desired end result. I believe the two models are a nice comparison and complement each other.

Implementation

The first step to implementing this curriculum will be to use it with my own students. We will use each of the lessons within our School Forest. This will demonstrate accessibility for all educators and allow for reflection and fine-tuning.

The second step will be to share the kit with my colleagues. I will use one of our staff meetings to introduce the kit to all staff members. I will follow through with a presentation of the lesson during one of our PK-2 Professional Learning Committee meetings. During this time my peers can act as students participating in the lesson. This will give them another perspective of the curriculum. I feel it is important for my fellow teachers to understand the objectives behind the lessons, and how to implement them, to receive their buy-in to using it.

The third step will be to share the kits within our district and beyond our district. I will be looking for nature centers, school forests, state parks, and aquariums willing to participate by housing kits and checking them out to educators. A local aquarium currently has a lending library that I frequent; I plan to give back to the aquarium by providing kits to add to their library.

Finally, the kits have reusable, refillable, and non-reusable materials. A checklist accompanies each kit that indicates which materials are present and which need replacement. Teachers will fill out the checklist upon returning kits so that they may be prepared for the next lending.

The curriculum is designed for any and all PK-2 educators interested in teaching Lake Superior watershed place-based environmental education and building cultural connections to its first inhabitants, the Anishinaabe.

Human Subjects Review

The human subject review is not applicable to this curriculum development. This curriculum was not written for any particular school or teaching staff. The curriculum is designed for any and all PK-2 educators interested in teaching Lake Superior watershed place-based environmental education and building cultural connections to its first inhabitants, the Anishinaabe.

Summary

My dream is to engage students in hands-on outdoor activities that give them a new lens on their environment. All children should feel a connection to the land, water, and all that surrounds them. I want students to know the history of the land and the people who first settled on it. I want all students to feel a connection to the place they call “home.” They should take

pride in and feel a responsibility to care for it. Youth need opportunities to feel a sense of civic duty and achievement. Closer to home, it's my dream that the Anishinaabe youth of this region are taught with a similar framework built off of this concept. I believe this curriculum kit will be a building block to help rebuild stewardship on and around the Lake Superior Watershed. My dream is to inspire future stewardship of the Lake Superior Watershed.

The curriculum kits I have created are easy to implement, adaptable, and engaging. Throughout the lessons, the children discover their watersheds, and explore ways to conserve and protect it. It is my hope that they will bring these concepts home and teach them to their families. Over time, these curriculum kits will educate the community as a whole and change society's behavior toward stewardship. This capstone is intended to educate children on the importance of protecting the Lake Superior watershed through fun, hands-on activities. The next chapter will provide the step-by-step process of building the kits, the detailed curriculum, how the curriculum will work, and additional considerations and possible modifications.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

How can we use the Lake Superior Watershed to connect to Anishinaabe youth and inspire them to continue as stewards of the land? The Anishinaabe were the inhabitants of the Lake Superior Watershed and the first to learn from it. The water, air, soil, and animals taught them many things. They learned how to sustain life while connecting to their environment. Their lessons were taught mostly through oral traditions. History and culture were passed down through generations by way of storytelling. Pictographs were another form of communication that told a story. With the onset of European contact much of these teachings were lost due to forced assimilation. Our Anishinaabe youth found themselves lost, hurt, and unable to connect to the new ways of education that weren't their own. The effects of this are still felt today with low graduation rates, high dropout rates, and a shortage of Anishinaabe in the workforce.

This curriculum is designed to help educators reach Anishinaabe youth through rebuilding connections to the land in our teachings. By using environmental education centered on the Lake Superior Watershed, we are able to make strides towards the traditional way of teaching. These lessons are intended to get students back out into the natural environment, developing connections to the watershed, building respect and appreciation for the land, while instilling a sense of urgency towards sustainability and stewardship.

It has been my experience that incorporating outdoor education into the public school setting has helped me to connect to my students, all students regardless of race. Many of my past students have indicated in letters to me that they like school more because they learning outdoors in their natural environment, and they plan to continue caring for the land.

Major Findings

This capstone has been a learning process for me. I felt driven with my topic from the beginning because I knew what I wanted to produce. However, finding the right words, tying each piece together, and accomplishing the objective was far more challenging than I had predicted.

The literature review was a true learning experience. Researching the scholarly works of others is invaluable. There are many avenues to take once you are investigating a topic. The wealth of knowledge out there can take your own paper on a “wild horse ride” so it is up the author to corral and control where it should go. This was an overwhelming experience for me but one that I will forever be grateful for.

While researching section by section through my literature review I discovered that there is much more for me to learn. There are many organizations that I had never heard of that are invested in stewardship efforts of the Great Lakes. There are fewer organizations working to build the cultural connections to the watershed, yet there are some, and the materials they have developed are invaluable resources that should receive academic recognition. It is my hope by including them in my kit more teachers will become familiarized and utilize the resources on their own. Lastly, I hope my curriculum kit becomes a resource for other educators to use and expand their content knowledge on the Anishinaabe and the Lake Superior Watershed.

Project Description

My capstone project is designed to help answer the question, *How can we use the Lake Superior Watershed to connect to Anishinaabe youth and inspire them to continue as stewards of the land?* To accomplish this goal I have created a curriculum kit that incorporates the four seasons; fall, winter, spring, summer. I have created four lessons for each of the seasons. Each

season focuses on one activity culturally relevant to the Anishinaabe within the watershed. The lessons were designed to build upon the previous one. Each lesson has an aspect of environmental education, cultural education, and Ojibwe language.

I designed one kit, but produced two copies of it. The kits include all materials needed to teach the lessons effectively. Audio components have been added for the Ojibwemowin language component.

Limitations of the Project

There are aspects which will limit the usability and/or effectiveness of this curriculum. The first being buy-in from teachers and administrators. Education in this day and age is focused on teaching to the test. Environmental education (EE) and teaching outside of the classroom are not seen as fitting this mold; they are looked at by many as extra-curricular. This is not the case and it is my belief that the more we educate about EE practices, the sooner we can eliminate this misconception.

A second limitation is educator ease with teaching a cultural component. Although this is a Social Studies standard, it is not a comfortable topic for many to teach. A lot of hurt goes along with Native American history especially as it relates to Minnesota people and cultures. Building awareness and collaboration is key to having healthy relations. I believe by providing a resource that supports the educator while addressing the historical components of the curriculum we will be working towards overcoming this barrier.

A third limitation is that it will not reach all audiences. It is geared toward the younger elementary ages, grades 1-3. All lessons could be adapted to fit older elementary with some adjusting done by individual educators. Further, it is designed for educators within the Lake Superior Watershed, limiting its demographic use.

Possible Implications

The first implication of this curriculum is to build relationships with the students, particularly Anishinaabe students who historically don't have strong ties within formal educational settings. Getting to know and respect diverse cultures builds a stronger community.

Another implication is developing stronger connections to our environment and the natural resources it provides. By participating in lessons that investigate the natural environment and our history, practices, and effects upon it we will build more informed, stronger citizens and stewards.

Finally, students will take their love of the land, the watershed, cultures, sense of community, and stewardship home with them to share with others. Fueled with knowledge, students will spread the word and we will come together as stronger communities who are invested in protecting, conserving, and sustaining life around our Great Lake.

Author's Reflection

This project is the culminating product of many adventures throughout my life. It represents my love and appreciation for the Anishinaabe culture which I have spent a great deal of my life learning from. It is my service-learning payback to all of the elders who have taken me in along the way and showed me the ways without judgement or prejudice that I am not personally of Anishinaabe descent. Losing my parents at a young age left me without a connection to a community or a heritage to learn from. That void has since been filled by my husband, kids, family, and friends on the Fond du Lac Reservation.

My love of the great outdoors and the Lake Superior watershed is another journey of my life that led me here. This passion developed in my younger years playing in the creek by my

house, and grew with help from numerous mentors in my life. Preserving our freshwater systems is near and dear to my heart.

Combining these two recurring themes in my life is what drove my capstone project. I am hopeful that other students will relate to one or both of my themes and it will encourage them and drive their passion.

Future Research

This is not the end of the journey for me. I have just begun to dive deeper into the topics that drove this project. There is still much to learn. In the future, I will be adding to this capstone project and developing more educational kits. I believe in what it stands for and my passion for the topic grows daily.

I plan to research direct effects on the estuary from the introduction of invasive species to effects of mining in the region. With the help of local STEM camps on the reservation, I will have a platform in which to present my ideas and lessons. The local aquarium and my school district are other means of sharing research and resources that I intend to use.

I believe others should follow this model and create curriculum that is relevant to their communities, cultural needs, and natural environments. Awareness and understanding for diversity will bring people closer opening the doors for collaboration. This in turn will benefit the environment as we form a united goal of sustainability, preservation, and stewardship.

Conclusion

As a student of life, I have discovered my role of learning from Mother Earth and our ancestors who came before us. Keeping traditional practices alive and participating in acts of stewardship are what drive my practices. I have learned a great deal through my capstone development that will continue into the future. My wish is for all people to find their niche

within their culture, community, and natural environments and partake in acts of caring, kindness, and respect for the well-being of all. Mino-bimaadiziwin! Let's all live a good life!

Season: SpringDay: 1

Sugar Bush

Title of Lesson: Introduction to Anishinaabe Sugar Bush

Topic or Main Idea: The process of collecting maple sap

Objectives: Students will gain a cultural perspective and understanding of the sugar bush here in the Lake Superior Watershed.

MN Standards Used:

Science 1.1.1.1.1, 1.1.3.2.1, 1.3.1.3.3

Social Studies Geography 1.3.2.3.1, History 1.4.1.2.2, 1.4.2.4.1

English Language Arts 1.1.2.2, 1.1.7.7

American Indian Learner Outcomes (AILOS): Respect, Gratitude, Generosity/Sharing, Honor, Cooperation, Work, Contributions, Family Life, Harmony & Balance

Materials: Song/Video file, Memengwaa Wii-wiidookaage Iskigamizigewin book, Ojibwe Four Seasons – Ningo Gikinonwin – Spring Program

Activity:

1. The teacher will introduce the Sugar Bush song either by showing the file or demonstrating in person. Four is a sacred number in Anishinaabe culture, practice with four repetitions.
2. The teacher will again play the file, or sing independently, and add movements to the song. (Movements are displayed in file.)
3. Have the students join in as you sing and move to the Sugar Bush song for four repetitions.
4. Tell the story of Memengwaa Wii-wiidookaage Iskigamizigewin.

- 5. Ask the students if any of them have ever collected maple sap. Listen to their stories.**
- 6. Watch the Sugar Bush Video from Ojibwe Four Seasons – Ningo Gikinonwin DVD**
- 7. Repeat practice of the song and movements.**

Assessment: Students will journal through pictures or writing what they have learned from today's teachings.

Homework: Have the students illustrate a picture about something they learned today.

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