

**WATERSHED RESTORATION THROUGH CULTURE-
BASED EDUCATION AND COMMUNITY OUTREACH**

By

MARGARET ROSE STEVENS

Submitted to the graduate degree program in Global Indigenous
Nations Studies and the Graduate Faculty of the University of
Kansas in partial fulfillment of the requirements for the degree of
Master of Arts.

Chairperson Ray Pierotti

Gerald Mikkelson

Kelly Kindscher

Date Defended:

The Thesis Committee for MARGARET ROSE STEVENS
certifies that this is the approved version of the following thesis:

**WATERSHED RESTORATION THROUGH CULTURE-
BASED EDUCATION AND COMMUNITY OUTREACH**

Chairperson Ray Pierotti

Date Approved:

Abstract

In this thesis I will examine the relationship between watershed restoration and my own traditional teachings. One of my goals is to demonstrate how understanding Indigenous ways of knowing can help others understand the importance of watershed restoration, and also how getting local people involved is an essential aspect of effective conservation and restoration. I will use my tribe, Onkwekwe: People of the Standing Stone, otherwise known as the Oneida Nation of Wisconsin, as a case study¹. The Upper Wakarusa watershed in Lawrence, KS will be used to compare how different strategies in watershed restoration are employed in non-Indian community.

¹ The term Onkwekwe: and Oneida are used interchangeably. The Oneida are part of the Iroquois Confederacy. The Iroquois Confederacy is comprised of six Nations: Oneida, Mohawk, Onondaga, Cayuga, Seneca and Tuscarora. They are Algonquin speaking Peoples. They once occupied the entire state of New York.

Abstract

1	Table of Contents
2	Acknowledgements
3	Prayer
4	Chapter 1: Indigenous Philosophy
	1.1. OnΛyoteʔa·ka Philosophy
	1.1.1. Oneida Stories
	1.1.2. Oneida Language
	1.1.3. Oneida Ceremonies
5	Chapter 2: Upper Wakarusa Watershed Restoration
6	Chapter 3: Duck Creek Watershed Restoration
7	Chapter 4: Conclusion

Acknowledgements

Thank you Ray Pierotti and Cynthia Annett. Your dedication and compassion are unmatched. You believed in me from the beginning and guided me along my journey.

Thank you to my parents for being positive role models and setting a good path for me to follow.

Thank you to my husband, Mirac Ellis and daughter, MarjaRia. Your patience, continuous support, and most of all, love, kept me inspired and motivated.

Ohnekanusho·kú

Ta· o·nÁ lawe·lú ayothnekahtÁtyúhake?. Né·n thou· yukwahawítha?

Now he intended for the waters to be flowing. From there we've taken from

né·n Ákákwe·ní· ayakwaha?tana·wÁ·te?, né·n she·kú yukwatkathuháti

it will be possible for us to moisten our throats, now still we are seeing it

né·n yothnekahtÁti né·n yohnawelo·tú· né·n kahnekowa·nÁ·se? niyo·lé·

the running waters the springs the large waters (oceans) as far as

nikaníhale?. Kato·kÁ latilákwhase? né·n kahwatsilayÁ·tú· O·nÁ né·

it extents to. It's certain they're gathering it the many families. Now then

sÁ ÁtwawÁni·sÁ·te? né·n tho shakotkÁhlá·tu né·n kÁtsi?shúhá. Né·n

also we will mention he has placed them here the fishes. Now

lawe·lú yukwatÁná·tsli? ÁkÁhake. Ta· o·nÁ úskah Átwahwe?nu·ní·

he intended our meal for it to be. So now as one we will join

né·n yukwa?nikú·la? yahethwanehela·tú· né·n tho lawe·lú

our minds we give him thanks that there he intended

ayothnekahtÁtyúhake? né·n tsi?nu loyanakwÁhtale?. Né· ya?te·kú

for the waters to be flowing where he's laid down his tracks. A variety

tho lotkahlá·tu né· katsi?shúha, né·n tho yukwalakwaháti né·n skΛ·nÁ·

there he's placed the fishes, there we are gathering it peacefully

ahunuhtúnyu né·n kahwatsilayΛ·tú·. Né·n she·kú yukwatkathuháti

should they t/f the many families. Now still we're going along seeing

né·n yotlihwahatyé·tu. Ta· tho niyohtúhak né·n yukwa?nikúhla?.

it's carrying on its responsibility. This is how it shall be our minds.

Introduction

One of the Natural Laws is that you've got to keep things pure. Especially the water. Keeping the water pure is one of the first laws of life. If you destroy the water you destroy life." (Oren Lyons, faithkeeper of the Turtle Clan of the Onondaga Nation, cited in Hall and Arden 2006)

In the preceding statement Oren Lyons indicates that without water we will not survive, and not just any water, pure water. In order to provide our children with a healthy and stable environment we must address one of the most pressing issues facing our world, water quality. In this thesis I address the issue of water quality in a number of ways, through regulation, policy, law and education. To make a lasting impact we must change the way people relate to water. In order for people to realize they have an impact on water and thus can help improve water quality we must help them build a relationship with water. This is done through outreach and education concerning local watersheds and watershed restoration. Focusing simply on water quality will not have as much importance as focusing on the whole watershed, which brings the ecosystem and its resident people into the picture. For the Upper Wakarusa Watershed in Lawrence, Kansas, watershed restoration entails educating and involving landowners in local volunteerism. In Lawrence, Kansas there are a number of resident

private landowners whose holding surround the main water body, Clinton Reservoir. Considering climate change and the predictions of increasing periods of drought in the region, monitoring precipitation engages landowners in watershed restoration by educating and involving them in a topic that is close to home. Landowners, who may or may not own a farm, have an interest in rainfall predictions because this can influence the productivity of their land, as well as possible flooding and erosion. The methodology chosen for the Upper Wakarusa watershed was a rain gauge project partnered with CoCoRaHS, a non-profit community-based organization that solicits volunteer observers nationwide to allow better understanding of precipitation on a local scale. This program involved outreach to landowners within the watershed, for which I developed a rain gauge installation video as well as a volunteer workshop.

It is essential to keep in mind that each community has its own “personality” and different methodologies should be employed for different areas. In order to accomplish this task, the cultural and/or ideological backgrounds of the community should be incorporated into outreach and education. For the Duck Creek watershed on the Oneida Reservation in Wisconsin, the community valued their culture, history and language as a result important cultural and historical components were incorporated in outreach

and education. One approach I employed involved a curriculum for school children adapted from various watershed outreach lesson plans. The other approach was a water resources inventory that presented an overview of the status of the water on the reservation on a watershed by watershed basis. This methodology takes into account Indigenous philosophy and how we look at the interconnectedness of the natural environment as a living breathing, growing entity, or process.

Water is one of the most important resources to all life forms. Our Mother Earth is 70 percent covered by water, bodies of living organisms are composed of 60 to 80 percent water, depending on age and amount of fat. (Bartholomew, 2010). Accordingly, most of the food we eat, which is also made up of living or formerly living beings, consists mainly of water. Without water, life on Mother Earth could not exist, and this can be illustrated through the realization that before we humans (as mammals) come into this world we exist in a womb filled with water for nine months. As human beings we rely heavily on water so our connection and appreciation for it must be strong. As the transport system and medium in which many essential processes take place, water is the blood of our Mother Earth and so we are connected to the water in a strong and irrevocable way. For this

reason, we must restore, protect and maintain the health of our waters.

Chapter 1: Indigenous Philosophy as it relates to Watershed Restoration

What is Indigenous Philosophy and what does it have to do with watershed restoration? Indigenous philosophy is the ideologies and beliefs that create the foundation for their ways of living. It is important to remember that all Indigenous tribes or nations do not share the same general philosophy that can be categorized as “Indigenous Philosophy”. Each tribe, nation or group has a set of their own principles that guide their ways of living. Alternatively, there is a shared philosophy that can be identified among all Indigenous Peoples. I believe there are values and ways of living that are shared amongst many and perhaps amongst all. Of course, each Indigenous group is unique, but there are common fundamental principles. One of these is that we are all connected spiritually, physically and emotionally to the natural world. This ideology differs from the spiritual traditions of Euro-Americans. Despite considerable discourse concerning values, the United States of America does not really seem to have a national philosophy or agreed upon set of values. This lack of a national philosophy or set of agreed upon values may be why Euro-Americans throughout history seem to be hypocritical in the way they interact both with other cultures and even with their fellow

members of Western culture in that they often behave in a way that contradicts their stated values and ethics (Pierotti, 2011).

One of those most precious life forms is water. So, what does Indigenous Philosophy have to do with water and watershed restoration? Within this thesis I will explore how Indigenous people relate to water and the processes in which water is involved according to a clearly defined set of principles. In contrast most people from the Euro-American religious and philosophical traditions have treated water as a commodity that can be sold, or as a resource to be exploited, rather than as an essential part of life that must be protected and respected. (Pierotti, 2011). There has been a spiritual disconnect between Euro-American culture and water.

One fundamental principle of Indigenous philosophy is the concept of interconnectedness (Waters 2004; Cordova 2007). Indigenous peoples assume that the source of our connection is the spirit, which implies that we are all connected, all beings, human and non-human alike. An Indigenous way of living involves spiritually connecting to all of creation, which unlike the Western tradition, includes nonhumans and even physical and geological entities (Pierotti 2011, Chapter 2). Such connections are established through extensive experience and knowledge of other entities and codified through prayer, stories, and ceremonies. We

are taught to pray for all living things, and through our prayers and ceremony we create that connection and thus create a respectful relationship with nature and all beings (Cajete 2003). To strengthen these relationships one must experience the natural world through personal interactions which involves behaving carefully and respectfully in the way you deal with other life forms and living your life as though the lives of other beings and parts of the landscape had meaning on their own terms (Pierotti and Wildcat 2000, Pierotti 2011).

One aspect of dealing with other entities that is also essential to maintain healthy and well functioning communities involves caring for and protecting water and watersheds. Oren Lyons, indicates that water is one of the first laws of life so it is fitting that we begin with water and watersheds when dealing with environmental concerns. A watershed is defined as the geographic area within which all of the water flowing into a particular stream or river is located. Watersheds can be damaged, and they can be affected at every point in their structure, from the smallest ephemeral streams to the main body of water such as a river or lake. It is often necessary to do a lot of work to try and restore a damaged watershed. It should be emphasized that such restoration is difficult and often cannot restore the system to the condition in which it existed prior to the disruption. Once a watershed is

damaged or destroyed it is likely that there are certain aspects of that ecosystem that can never be recreated, especially the small organisms that make up the soil and water microflora and fauna. This is one skill and ability that human beings lack despite any technological advances. We cannot recreate what Mother Earth has spent millennia creating. However, this does not impede people from attempting to restore damaged watersheds throughout the nation.

An example of this can be seen in the Haskell Wetlands, where students at Haskell Indian Nations University have worked to protect and maintain a wetland that is threatened by development within the city of Lawrence, Kansas. This wetland has both spiritual and ecological significance to Indian peoples from many tribes, who are students at Haskell. These wetlands were one of the only places where students could perform traditional ceremonies and feel close to nature during the boarding school period of Haskell's existence. The student, staff and faculty at Haskell understand that the activities taken place during the boarding school era at Haskell, no matter how recent, gives the wetlands a sacred identity and it is worth protecting. An older, Caucasian, gentleman gave me his opinion on the wetland situation. He said, "They are making a big deal about the wetlands, but don't they know that the area was a farm before

anyway.” My first instinct was to explain that prior to it being a farm it was probably a wetland or field, which consisted of native plants and species. However, the point is that the Haskell wetlands have become a sacred place over the recent decades and serves as an “altar” if you will, for student, staff, faculty and local residents. The community believed so much in these wetlands that they stopped a road from being constructed that would have destroyed the current wetlands. The community felt that destroying these wetlands would not only destroy a spiritual area, but also have a detrimental impact on the environment. This stop to destroying the wetlands and having a negative impact on the Upper Wakarusa watershed as a whole was made possible through community education and outreach.

Watershed restoration is an important task that must be accomplished at the local and grassroots level. To even approach success, this task must address the relationship that community members have with their watershed and nature in general. It is vital that community members understand that they have an impact on their land, as well as the entire watershed that occupies their land, and thus every living being in it. We can pass laws and put policies in place to protect our watersheds, but laws can be bent and policies can be overwritten or ignored.

It is essential to always keep in mind that an ecosystem or watershed is an ever-changing entity. One problem with definitions developed from a Western European perspective is that it is misleading to use a noun like watershed to describe such an entity, which is in actuality a process that must be considered as dynamic and active and to interact with other members of the local community. Therefore, watershed restoration must also involve a process of behavioral change combined with an understanding of process.

To look at the active process-driven aspects of Indigenous thinking, it is useful to consider that the concept of "creation" has a very different meaning in the spiritual traditions and knowledge bases of certain Indigenous peoples and can be thought of primarily as a verb describing a process that is ongoing. In many Indigenous languages verbs can be employed to express ideas that require entire sentences in European languages. Hence verbs are much more important (and much more abundant) relative to nouns in the majority of Indigenous languages (Pierotti 2011). For example, when we are given our Oneida names, we are given more than a word that has no meaning. We are given names that describe what kind of person we are or will be. In a way, they shape the person we will become.

One aspect of Indigenous ways of thinking is that dynamic process-oriented thinking involves how impacts will take place over seven generations (Cajete 1994). One implication of such thinking is that in order to change the behavior of a community one must begin with the children. Children are similar to wetlands, because they are ready and willing to soak up information and use it for to benefit the world. This concept of thinking seven generations ahead is a fundamental principle of Lotinuhshyu·ní² (the people of the longhouse, otherwise known as the Iroquois Confederacy) philosophy.

"In our every deliberation, we must consider the impact of our decisions on the next seven generations."

- From The Great Law of The Iroquois Confederacy

When considering this proverb and the state of our waters today, it's hard to grasp what our waters might be like seven generations ahead. However, if each community can embrace a philosophy such as this one, they can do their part to restore, protect and maintain their watershed. My watershed is the Duck Creek Watershed and is home to OnΛyote?á·ká· (People of the Standing Stone) otherwise known as the Oneida Nation of Wisconsin.

² Lotinuhshyu·ní means "the people of the standing stone. It is another version of Haudenosaunee. Tom Porter, Bear clan member of the Mohawk Nation, explains that the Mohawks and Oneidas use the term Lotinuhshyu·ní.

Water plays an important role in Oṉayoteʔa·ká stories and ways of living, at a spiritual as well as a practical level. Like many Indigenous societies, the Oneida people lived in such a way that they functioned as a part of the ecosystem (Pierotti and Wildcat 2000, Pierotti 2011). They were one factor in the process by which that ecosystem functioned and at times, thrived. This philosophical approach stems from the foundation of who we are as Oneida people. Our culture and traditional practices teach us to respect our relations, which does not include only human beings, but rather included every life form on earth (see also Pierotti 2011, Chapter 2). It is through our ceremonies, stories and language we realize our connection to our Mother Earth. Our stories teach us our morals and values in living in balance with our environment. Our ceremonies bring together the people in a good way and teach us to be thankful for our surroundings. Our language teaches us about animals, plants and other life forms and our relationship to them. In the sections that follow I elaborate on these three points.

Oneida Stories

Our creation story begins with the Sky World and Sky People. One of these sky people is a pregnant young woman named, “Mature Flower”. Mature Flower, otherwise known as Sky Woman, is searching for a special root under the celestial tree or

the tree of life. After uprooting this special tree she finds a big hole beneath. She peers in, reaching further and further, until she falls into the hole. She grabs a hold of some plants to try and catch herself, but it is too late and falls into darkness. As she is falling she notices all of the water creatures. There are water birds, water mammals and fish. The Water birds come up to catch her as a giant snapping turtle emerges from the water. The water birds place Sky Woman on turtle's back. Skywoman is appreciative of the turtle and the water birds. However, she is troubled because she cannot survive without earth. The turtle tells everybody that there is a substance called mud that is at the bottom of the sea and that he is willing to place some of this substance on his back for Sky Woman. Turtle can reach the bottom, but his claws cannot grasp the mud. Beaver, Otter, and Muskrat said they would retrieve some mud. The beaver tries first. With his strong tail he swims as hard as he can, but his body floats up and he has drowned before he could reach the bottom. Otter is the next to try. He dives down and with the quickness of his tail he swims as fast as he can. He also floats up and has drowned before reaching the bottom. Muskrat is not the fastest or strongest swimmer, but he is clever and determined. He dives in and swims as fast and as hard as his little body can. His body floats up soon after. As his body is floating there, lifeless, the animals and Sky Woman notice that his

little paw is full of mud. She took the mud and placed it on turtle's back. She began to walk and sing around the turtle in a counterclockwise direction. The turtle's back began to grow and it grew until it she could no longer see the water in any direction.

This is only the very beginning of our creation story. There are many teachings contained within this story. When it talks about the animals diving down to the water, this shows sacrifice for a greater cause. This woman, who is with child, needs a place that will be comfortable to give birth and raise a child. These animals make a sacrifice so that this woman and her unborn child can have a place to live. Also, within that same part of the story it talks about Muskrat, who is not the fastest or strongest swimmer, retrieves the mud. This shows us that it's not always who is the strongest or fastest that succeeds, it could very well be the most humble and kind hearted animal.

Our creation story is the foundation of who we are. Our way of living in balance with nature finds its roots with this story. It's not one event in our history, but rather a series of events over a long period of time. This is the difference between Indigenous ways of knowing and Euro-American ways of knowing and understanding the world and their relationship to it. Our stories don't take place at a specific time in history, but rather a place and are thus linked to the power that emanates from that place. (Deloria

and Wildcat, 2001). For the Onayote?a·ká· that place is Turtle Island. Unlike the Euro-American Christian religion, our creation story doesn't claim to explain the entire world, but only a specific part of the world in which we live. Turtle Island is North America. Here is an excerpt from the Oneida Museum website about this story and what the turtle represents.

“In the Creation story, the Earth began to grow after the muskrat brought mud from the bottom of the sea and placed it on the back of the Turtle. Life was created from the Earth. The Earth is a representation of what we refer to as the World and the Turtle has the Earth on its back. North America is referred to as 'Turtle Island' because of this. The Turtle has all the responsibility of the shifting Earth and the cycles of the moon. It is the Turtle Clan's responsibility to look after the environment. The Turtle represents the Earth, as well as all the gifts that the earth provides the people. The Turtle teaches patience and to never give up with the use of strength and solidarity; the Turtle is old and wise and well respected. Turtle Clan people need a strong base where they can live and grow roots. They move slowly to teach patience; lessons learned are not forgotten. Although Turtles may appear slow, their determination allows them to obtain their goals. The Turtle is a creature of two elements -- earth and water. Because of this, the people of the Turtle Clan share a bond with both of these. They enjoy helping things grow -- plants and people, yet enjoy their freedom just as a Turtle would in the water. ”
(Oneida Nation of Wisconsin, 2011)

Ceremonies

Our ceremonies teach us to respect and be thankful for all of creation. This is represented by beginning our ceremonies with

the Kanehelatuksla or thanksgiving address. In our thanksgiving address we give thanks for all of creation, starting with our creator all the way down to the earth, back up to the moon and stars and everything in between. Our ceremonies also bring us closer to nature by making us pay attention to Mother Earth's changes. Changes in the weather, certain moons of the year, and plants and animals tell us when it is time for certain ceremonies. With some of our ceremonies we have a drink that is a mix of berries and water, which serves as a medicine for cleansing our bodies. Water is a vital part of this medicine, and acts as a cleanser and purifier.

If the water we are putting in our bodies is contaminated, however, how does this impact the purity and sacredness of our ceremonial medicines? Is the spirit of that water contaminated as well? I believe that the spirit or energy of that water is like a person who has been mistreated, abused by many and for the majority of their lives. So, the spirit or energy of water is depressed. Dr. Masaru Emoto argues that water responds to words or prayer. His study on ice crystals under a microscope proved to give the anticipate results. The ice crystal that was given prayer and kind words was a beautiful crystal, whereas, the other that was given unkind words was distorted and unattractive (Bartholomew, 2010). He believes there is a connection between language and water. This is true, according to many Indigenous cultures. For

example, during the oil spill of 2010 in the Gulf of Mexico, I was at the International Summit on Indigenous Environmental Philosophy. One of the participants was a lady from the Houma Tribe of Louisiana. She was disturbed by the event because the oil spill will impact her home. She requested that we all join hands in a circle and pray for the waters in the Gulf of Mexico. She asked us to look at the picture of the disaster and to imagine ourselves over the area and taking our hands and cleaning the oil away. She believed in the power of prayer.

Language

“She continuously presses her lips up against your cheek”

The Oneida language is beautiful and each word has so much meaning. The first time I experienced the beauty of our language, I was twenty-six years old. There are two reasons why this happened so late in my life. The first reason is the Oneida Language is endangered. The Oneida Nation of Wisconsin has only two fluent speakers, whose first language is Oneida. One of these speakers is my great grandmother, Maria Hinton. There are more speakers in Oneida, Wisconsin and Oneida, New York; however, the language is dwindling on those reservations as well. The second reason is that I was taught the language in a western

context at our tribal school. This means I learned my language, but was taught the English translations to words rather than their true meanings. For example, the word “Oskanλtu” was translated as “deer”. The literal translation in our language is “he breaks through the brush”.

Learning the language in a western context resulted in a lack of understanding of certain animals, plants and other life forms as they are understood in tribal traditions. The more in depth meanings would have created a deeper understanding and thus a deeper appreciation for these life forms. Not only does our language teach us our connection to the natural world, but to each other as well. For example, the root word for mother and seed are the same. It represents the act of bringing life to the world. My first experience of these in depth meanings was when I learned the true translation for “akhsot” and “lakhsot”. These are the words we use for grandma and grandpa. They actually translate to “she/he continuously presses their lips up against your cheek”. It is a characteristic of grandparents and is a wonderful example of the deep meaning and beauty behind words in our language. These translations were not taught to us as kids in our tribal school because of the lack of speakers available to teach.

When I was young there were only a handful of speakers and only a few of those were active in teaching the language. This

lack of speakers led to loss of many of our precious words. For example, we no longer have a word for dragonfly in our language. There are plenty of examples of words that we have lost through time. There is an upside to this dilemma. The language is documented and those first language speakers have created other speakers. There are a few who can speak the language whose first language is not Oneida. We have a language house that is dedicated to learning and teaching the Oneida language. This is important because if we lose our language we can no longer call ourselves Oneida. Without the language we become a minority instead of an Indigenous Peoples. Without our language the creator does not know us. It is said that when we pray we use our Oneida names. If we do not use these names given to us then the creator does not know who we are.

History of our land

Our homelands are in New York. The map (Figure 1) shows our original lands. During the period from 1820-1880 Oneidas were “influenced” by Eleazor Williams³. Eleazor was a smart and vindictive man. He knew that the Oneida people were matriarchal and that the women, clan mothers in particular, influence the men’s decisions. In 1817 Chief Skenandoah⁴ allowed Eleazor to move into his home in Oneida Castle, NY. Soon after, Eleazor established a school for the children. He would talk to the woman for hours about Christianity. (Metoxen, 2010) In addition to talks with the children and women of Oneida, Eleazor was also talking with the U.S. government, the New York government, the Ogden Log Company and the church to find the easiest way to get the Oneidas out of New York and to Wisconsin. His strategy proved to be effective. In 1821, a Christian group of Episcopalians traveled to Wisconsin. Through the treaty of 1821⁵, the Oneida’s acquired eight million acres of land from the Menominee Indians⁶. The land was purchased with money paid for land sold in Oneida, New York. This move proved to be

³ Eleazor Williams was a Christian leader who was said to be a descendent of the Mohawk people. He was raised catholic, but converted to Episcopalian. (Metoxen, 2009)

⁴ Chief Shenandoah was a leader during the revolutionary war. He and his warriors fought alongside General Herkimer in the Battle of Oriskany. He died in 1816 and was said to have been 110 years old.

⁵ The Treaty of 1821 was between Menominee, Ho-Chunk and Oneida Nations. However, the Oneidas that came over to negotiate were not, chiefs or official representatives. This treaty gave Oneida eight million acres of land.

⁶ The Menominee Indians are an Algonquin speaking people. They are the only tribe with origin stories that place them in present day Wisconsin. Today, the Menominee Tribe lives 30 miles north of the Oneida reservation.

detrimental to the Oneida People. A group of Oneidas branched off and traveled to Thames, Canada. Other Oneidas stayed in the homelands. The map in Figure 2 shows the route the Oneidas took. Today there are three Oneida reservations: Oneida, New York; Oneida, Thames in Ontario, Canada; and Oneida, Wisconsin. All three reservations have their own governmental entities with little or no association. However, the Iroquois confederacy still maintains a relationship. Within the Lotinuhshyu·ní tribal chiefs, faithkeepers and clanmothers travel to other tribal reservations to travel Eleazor Williams played a pivotal role in the splitting of the Oneidas.

“My personal feelings was that Eleazor was a scoundrel because he used the U.S. Government, the NY government, the Ogden Land Company and the church to get the Oneidas to move west and he took money from all of these entities unknown to the Oneida chiefs of the time. We didn’t truly have any knowledge of it until about 30 years ago.” (Metoxen, 2010)

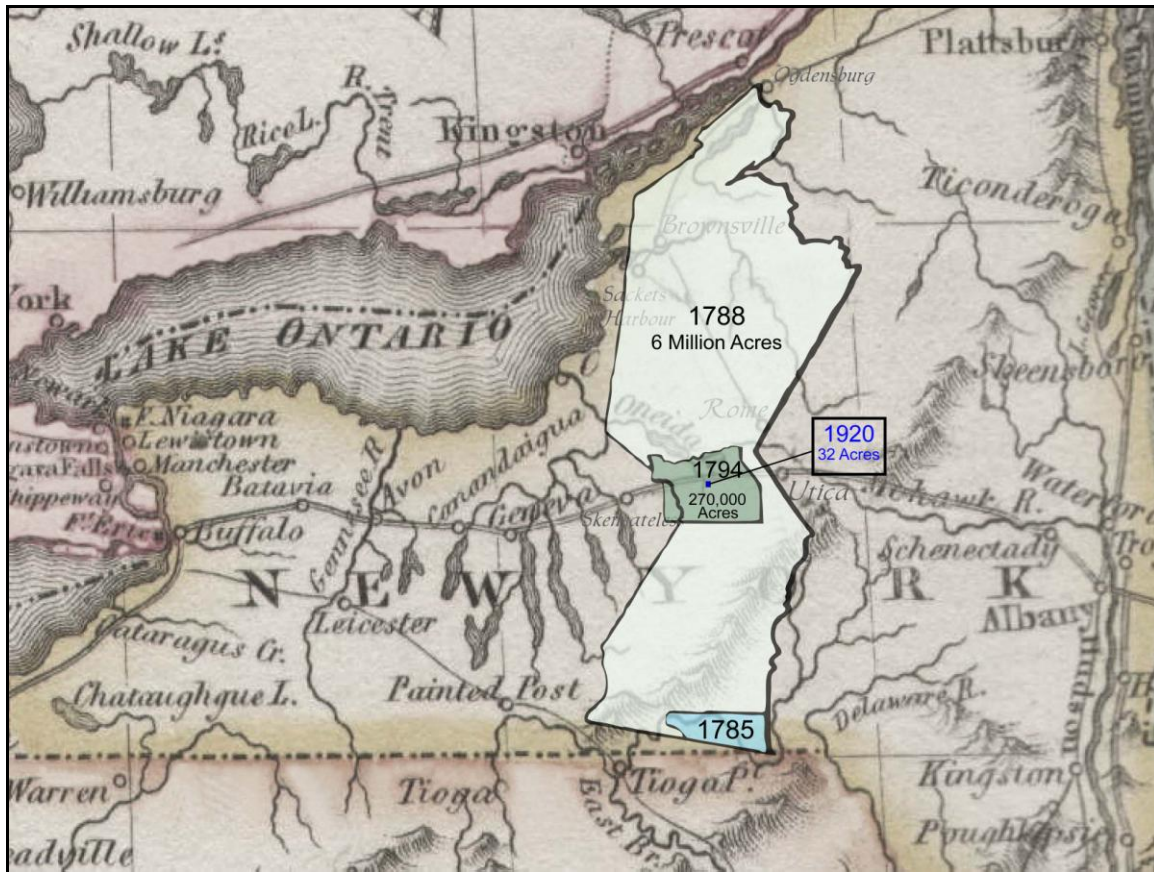
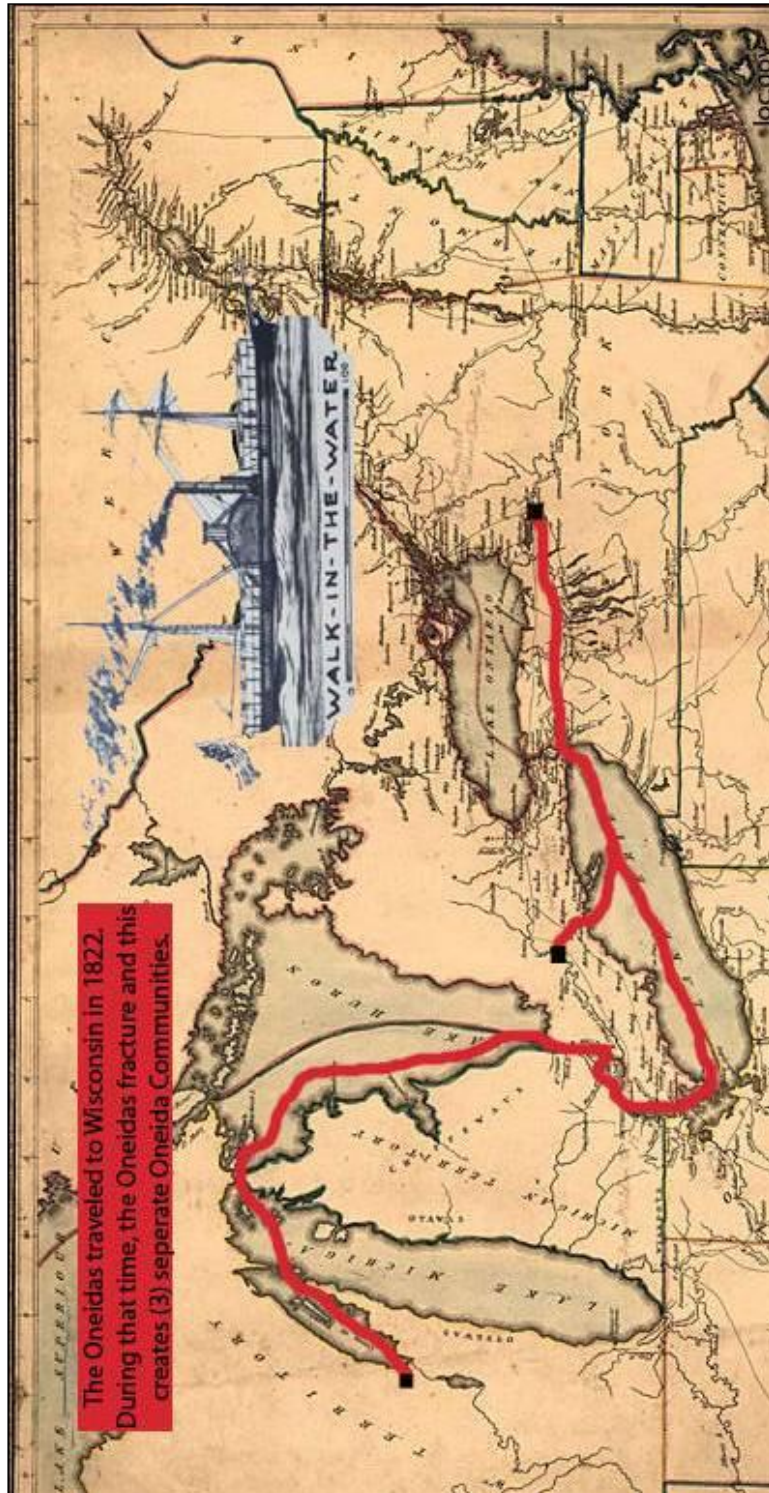


Figure 1.1: The homelands of the Oneida people. This huge parcel of land was illegally purchased from the Lotinuhsyu:ni People by Euro-American settlers. As you can see the Oneida land went from 6 million acres in 1788, right after the American “Revolution” to 32 acres, a mere dot on the map in 1920.

Figure 1.2: The red line shows the route the Oneidas took to Wisconsin and the three black dots represent the three different Oneida reservations.



The Oneida people encountered a number of conflicts on their new lands. As with many treaties between tribes and other governmental entities, the details of the treaty weren't made clear and understandable to the tribe. Sometimes the confusing terms were used in very conspicuous ways. In 1822 the treaty was renegotiated because the Ho-Chunk (Winnebago) nation was not satisfied with the terms. The Treaty of 1822 was changed to allow only rectory use of Menominee lands by the Oneida. The Menominee did not agree to the terms of this treaty. They lobbied for their lands in Washington D.C. and in 1831 were successful in reducing Oneida land mass from 8 million to 500,000 acres. The Oneidas had no say in the details of this treaty. The Menominee tribe was still not satisfied with the details of the treaty and in 1838, through the Treaty of Buffalo Creek⁷, the current reservation was established by a 1838 treaty, which following the logic of the Dawes Allotment Act gave each member of the tribe 100 acres per individual. At the time there were 654 Oneidas, which resulted in 65,400 acres of shared land. Figure 1.3 shows the land mass change.

⁷ The Treaty of Buffalo Creek was signed just south of Buffalo, New York, hence the name. The treaty stated that all of the tribes of the six Nations and their friends (ie. Brotherton and Stockbridge, etc) would be moved to Kansas on 1.7 million acres that were set aside for them. The treaty was eventually amended. We had an additional treaty that stated that we could stay in Wisconsin on the 8 X 12 mile tract.

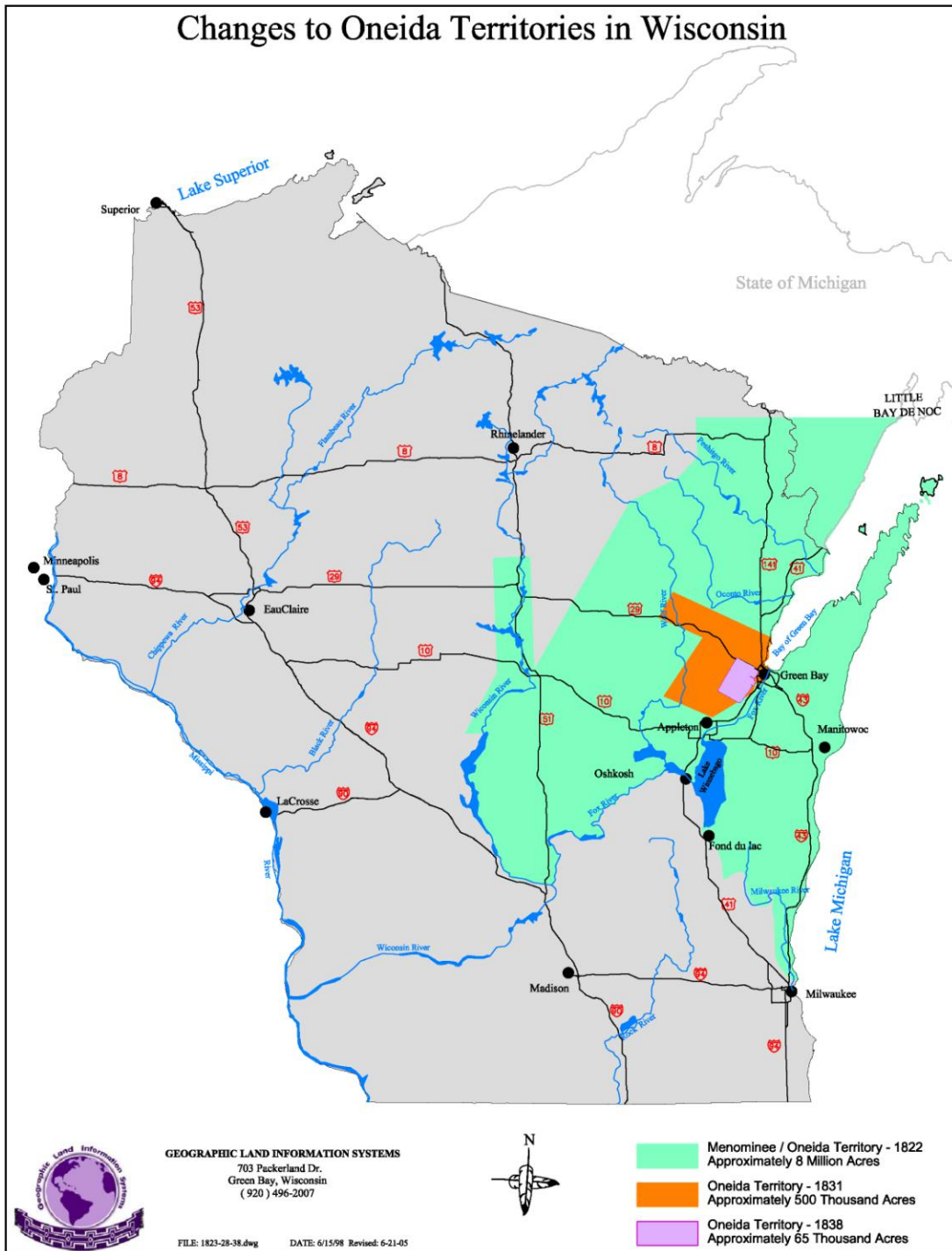
Environmental History

The new area was abundant in natural resources similar to those upon which the people had depended in New York. Trees covered the entire reservation and a number of creeks and streams ran through the lands. These waterways helped to provide a stable ecosystem for a high quality lifestyle with an abundance of fish, wildlife, plants and trees. During early settlement times the river and surrounding wetlands on the Reservation were filled with wild rice, which attracted a number of ducks, thus giving the place its name of Duck Creek. The land was also rich in berries, nuts and plants that could be used in medicine.

This wealthy lifestyle did not last in the face of Euro-American “progress”. During the time period between 1860-1970, major changes occurred, virtually all of which had a negative impact on the environment. Oneida people rely heavily on their natural environment for survival, therefore, this damage to the environment had a negative impact on their lives as well. One major factor mentioned above, was that in 1891, the U.S. Congress enacted the General Allotment Act or Dawes Act, which was presented as an attempt to “civilize” Indigenous people, by making them private landholders because it allotted individual tribal members tracts of land on which they were deed holders.

Figure 1.3: Oneidas land mass change 1821 – present day.

Keep in mind the current reservation boundaries, in pink, is checkerboard with tribal and non-tribal land alike.



The Dawes Act was enforced throughout the U.S. Each male head of household was given 160 acres of land, or one quarter section (a section is a square mile) that was to be used for farming and agriculture. During this time period many acres of Indian land was lost to non-Indians because any land not allocated to tribal heads of households was then made available for sale or for land claims by non-Indians.

In Wisconsin, the logging industries took advantage of this opportunity to take possession of many stands of highly-valued timber, mostly White Pine⁸, within the boundaries of the former reservation. As a result, vast amounts of forest area were cleared. The land loss also resulted in non-Indian use of chemicals, including pesticides and fertilizers, commercial farming and land use practices, which severely altered the Oneida reservation. The most severely impacted areas were our waterways.

“Fencing soon occurred and every farmer pastured his cattle and horses contingent to Duck Creek or its tributaries. These domestic animals confined to certain areas ate the young wild berry plants, including the red and black raspberry bushes and the entire territory of their limitations, trampling the young shoots of the blueberry and hazelnut. There ceased to be any underbrush in the pastured areas causing a major shift in the wild animal habitat that had existed there for centuries before. The water table was significantly affected because of the lack of tree roots to retain

⁸ White Pine is highly valued because it grows tall and straight.

water. Free flowing springs diminished in flow or eased in flow, altogether.” (Metoxen and Cornelius 2010)

The other issue tied to land loss is the resulting “checkerboard” layout of the reservation. Checkerboard is a term commonly used for the layout created from the intermixed tracts of tribal and non-tribal land within reservation boundaries. When addressing water quality within a checkerboard reservation, major regulatory issues may surface. For example, The Oneida Nation of Wisconsin can only implement and regulate activities within their jurisdiction. In Wisconsin riparian water rights is the governing law. Under riparian water rights all landowners whose property is adjacent to a body of water have the right to make reasonable use⁹ of it. These rights cannot be sold or transferred other than with the adjoining land, and water cannot be transferred out of the watershed. The Oneida tribe can only regulate land use on tribally owned trust or fee land. Since, the property status varies alongside tribal waterways, the tribe has limited power in regulating what runs off into our water.

Living in Two Worlds

Growing up in a checkerboard reservation entails close interaction with non-Indian people, predominantly Euro-American. Oneida is surrounded and intertwined with Euro-

⁹ Reasonable use may include right to access for swimming, boating and fishing.

American society. Many of our neighbors, teachers, co-workers are not tribal members. Many of the Oneida children go to predominantly Euro-American schools. No matter how much parents instill their traditional values and morals in their children this constant interaction with Euro-American society has an impact. However, this impact is not necessarily negative. Oneida children are strong willed because they have learned to live in “both worlds”. Dr. Daniel Wildcat, President, Haskell Indian Nations University, says, “*There is only one world*”. I agree with him in the sense that there is only one physical world in which we all coexist. From a cultural perspective, however, Indigenous and Euro-American Peoples are two very different Peoples with very different views of nature and water.

Our backgrounds and histories define who we are as separate nations. Indigenous ways of thinking are different from Euro-American ideologies. I will share an experience I had in one of these high schools. During my sophomore year, in biology class, we were asked to dissect a baby pig. This was somewhat confusing to me. I opted out of the assignment. Our instructor understood my concern and I was given a written assignment instead. In retrospect, the instructor may have understood my position better than I. At the time, I didn’t realize that my teachings as an Oneida woman taught me be respectful to all of

creation and especially of life forms in their death. I don't recall having a solid reason for not dissecting. I simply felt that I couldn't do it. Experiences such as this one taught me to be confident in carrying out my responsibility as an Oneida woman. This was frequently a subconscious instinct.

The Oneida concept of living differs from the Euro-American belief that humans are the superior beings and all other life forms were created for our consumption and use. The ideology stems from monotheistic religious traditions such as Christianity. Christianity and its followers believe that humans were given dominion over the earth and that humans are the ultimate stage of evolution (Pierotti and Wildcat 2000). As a result, these traditions attempt to spread their belief system through conquest because it is assumed that this religion is everybody's destined belief. The events upon which this religious tradition is based are assumed to still have relevance in the contemporary world even if they occurred thousands of years in the past. Time is the important factor because events have an assumed date and thus they occur in a linear progression that is assumed to represent "progress". As a result, this superior religion represents a progressive view of humanity and is therefore, the only religion that we all should be following.

Another example of how the two ideologies differ is how land is viewed. Oneida people view the land as something sacred. The words for Mother Earth and ground share the same root word. Therefore, land, Our Mother Earth, is a sacred entity. History tells us that the Euro-American view of land is that of property which can be owned as a commodity. Land is something that can be bought, sold and exploited for human benefit. This ideology stems from Catholicism. This is the same way animals and other non-human entities are viewed in Catholicism in that they are considered to not have souls, and thus are denied access to heaven and eternal life. Everything in the world is for the benefit of man.

Environmental historian Donald Worster calls this ideology, “Christian pastoralism”, the view that man is not a part of nature, but separate from and greater than nature. Man is indifferent and maybe even antagonistic toward nature so therefore needs to control nature. (Worster, 1994) We have seen how this ideology has played out in our economy. Today, people are realizing that we cannot control the natural world. We cannot exploit the natural resources without consequence. As a young adult I believed that all Euro-American religions believed in this same concept. However, Christian Pastoralism is not the only Euro-American view. The other is the Arcadian view, which embraces the concept of living in balance with nature. The

Arcadian view began with Gilbert White¹⁰ (1720-1793) and his writings of Selbourne. White saw the interrelatedness of the natural world and he didn't have to travel all over the world to realize this. He simply examined his own surroundings. Worster says, "*This was precisely his own life's program: to see how many creatures the Selbourne parish contained and to understand how they were all united in an interrelated system.*" (Worster 1994) This is where the Arcadian view is introduced. It is the belief that man should live a simple, humble life in which he peacefully coexisted with nature. White wrote that: "*Nature is a great economist for she converts the recreation of one animal to the support of another.*" (Worster 1994) Worster took the title of his book, "*Nature's Economy*", from this quote, which is a simple explanation of how the earth works, or the earth's economy works.

Such thinking influenced the naturalistic school of thought and thus begins the ecological movement. The Arcadian view found at Selbourne was a driving force of the ecology movement and holism, vitality and organicism are major ideas that emerged from this view. The ecological movement goes through all these phases and eventually comes full circle and finds itself back at its foundation, the Arcadian view. This Arcadian view may seem

¹⁰ Gilbert White was a clergyman and naturalist born in Selbourne, London (1720-1793). He is most famous for his writings, "*The Natural History of Selbourne*", which is a series of letters, based on his journal kept between 1768 and 1793.

similar to an Indigenous viewpoint on the surface, but it differs greatly. The Arcadian viewpoint “assumes that nature exists to show man the glory of the mind of God.” (Pierotti, 2010). The indigenous viewpoint is actually quite different. Nature and all her components are truly amazing and may seem that she is meant to show us the true power of God. However, nature is a living entity and exists whether human kind exists or not. Therefore, the indigenous viewpoint embraces the notion that nature teaches human kind many things about life and through these teachings we understand her greatness. Rather than viewing this as an act of God and we understand the natural environment as a living entity, which we call our relative and rely on for survival. This understanding teaches us to live in balance with your surroundings and realize that no matter how small, you have an impact on the world. Since, we see the natural environment as our relatives every small impact ultimately has an impact on ourselves. Western viewpoints have caused a great imbalance in the world because they failed to embrace this ideology. As a result of these western ideologies we have seen a major decline in our natural resources. Nature is seen as a commodity to be used and exploited. Now, we are at a tipping point where we have depleted the majority of our natural resources. One of the most important of those resources is our water.

Today, we see that our actions have had a detrimental impact on our bloodline, our water. In order to restore our water we must embrace western science (not western ideologies) and technologies as well as Indigenous view towards restoration. Depending on which community the restoration is taking place, the approaches can be different. In an Indigenous community western science and technologies and Indigenous ways of living would be employed. I have employed different strategies in the two different communities. Both communities, like most lands in the United States, have been ditched tiled and converted into agricultural land. Certain agricultural land use characteristics are polluting the waterways in the Upper Wakarusa Watershed in Kansas and creative ways of addressing this issue must be employed. This involves engaging the local community through education and participation.

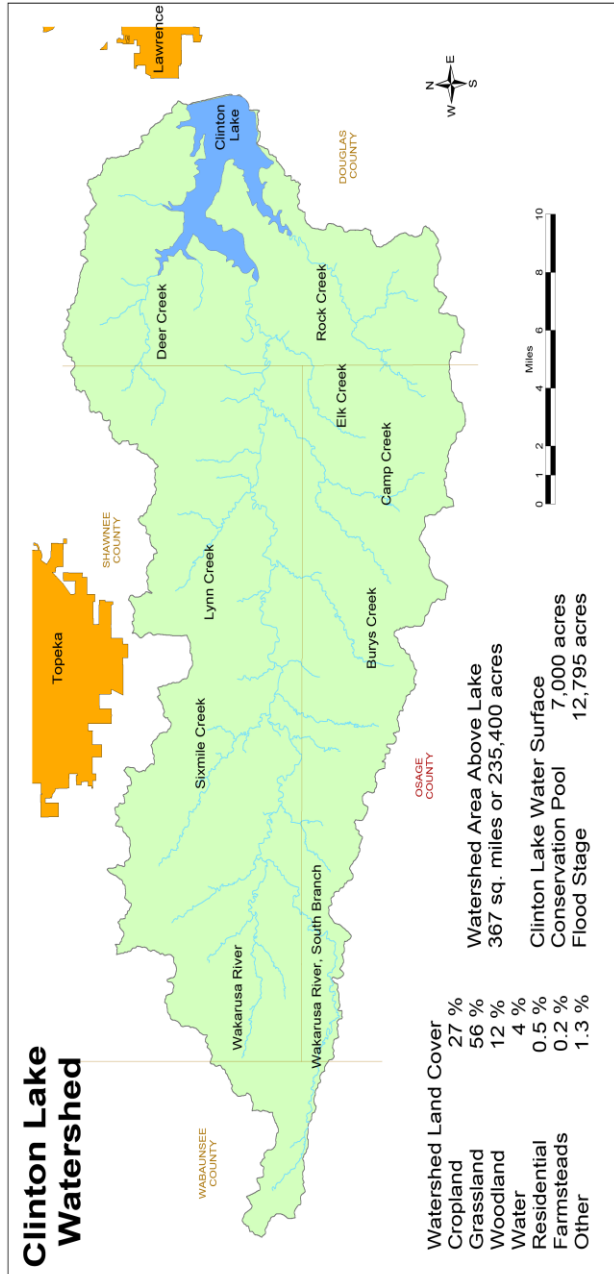
Chapter 2: Watershed Restoration in the Upper Wakarusa Watershed

The Upper Wakarusa Watershed is the area that drains into Clinton Lake in Douglas County Kansas and includes the Haskell Wetlands. The watershed covers three counties in North East Kansas. Figure 2.1 shows a map of the watershed. Clinton Lake is a federal reservoir that was built on the Wakarusa River in the early 1970s to help control flooding along the Missouri River. Four main benefits attributed to Clinton Lake today are:

- a) Controlling flooding in the lower Kansas (Kaw) River and the Missouri,
- b) Serving as a Municipal and industrial water supply for the city of Lawrence,
- c) Recreation and tourist attraction,
- d) Fish and wildlife benefits,
- e) Maintain minimum stream flow in Wakarusa and Kansas Rivers.

It was understood that conservation practices and protection measures would have to be taken to sustain the Lake and its water quality. These steps were not approached in a well thought out fashion. Today, the health and well being of the surrounding community has become an important aspect of sustaining the lake.

Figure 2.1: Upper Wakarusa watershed map (Kansas Alliance for Wetlands and Streams)



Current water quality issues in Clinton Lake are a result of sediment and contaminants washing off land and going into the lake. Sediments washing off and are an issue for a number of reasons. Increased siltation will eventually decrease the capacity of the reservoir, thus shortening its functional lifespan. In addition these sediments increase nutrient levels causing algal blooms. Algal blooms reduce oxygen both in the reservoir and into its backed up tributaries. In addition, as blooms spread much of the algae dies and decomposes, creating taste and odor issues, which in extreme cases can lead to shut down of water supply. Algal blooms are also detrimental to other aquatic species because the decrease in oxygen levels in the water that results from excessive algal growth reduces the survival of other species, especially fish and aquatic invertebrates that are important components of the ecosystem.

Primary sources of sedimentation are runoff from fields, pastures, construction sites, and other barren (unvegetated) lands during storm events, combined with erosion of streambed banks due to removal of native plants and grasses. (Kansas Alliance for Wetlands and Streams 2011) Bacterial contaminants are also an issue in Clinton Lake and the Upper Wakarusa Watershed. The primary sources of bacteria are fertilizers, fecal runoff from livestock near the lake, and confined livestock and household

runoff. (Kansas Alliance for Wetlands and Streams 2011) The major issues involved in sedimentation and bacteria in the water are a result of careless land use characteristics, which might be mitigated through education and outreach. The majority of land use in the Upper Wakarusa Watershed is cropland and pasture.

There are several similarities in water quality and land use characteristics between the Upper Wakarusa Watershed in Kansas and the Duck Creek Watershed in Wisconsin. To state the obvious, however, the two areas are very different culturally, economically, socially and politically. As a result, different strategies must be employed to engage the local communities.

It is necessary to employ a number of different methodologies because of the unique circumstances surrounding each community. Thus, a different manner must be employed with which we approach each objective and each community. For the Upper Wakarusa Watershed community participation is important because of the number of landowners and farmers in the area, thus appeals to their economic wellbeing and safety are essential. To increase community involvement in water issues in this area, I created the framework for a rainfall data network pilot project.

Besides rainfall data, a rainfall data network collects information on the perceptions of landowners in watershed

restoration and conservation practices. Participation level and motives for joining the network are important, and could lead to changes in perception and/or behavior as a result of understanding how individual parcels of land contribute to runoff with a shared goal of increased water quality and knowledge of local patterns of precipitation. As a result, project success relies heavily on landowner participation. The quality of our relationship with the landowners will reflect on the quality of data recorded and amount of participation in project.

Methodology and Resources:

The overall theme in creating such a cooperative network is to build relationships and share information at the local level, which empowers community members and allows them to realize that they can generate important input, which can lead to decisions and policies based upon consensus. The primary focus of this project is to improve water quality, which is a goal that almost all individuals recognize as important and worthy.

A key approach to building such consensus is documenting hydrologic processes to determine amount of runoff and presence of contamination and sediments (WRAPS). Networks of this nature are made possible through working with CoCoRaHS, the Community Collaborative Rain, Hail and Snow Network

[\(CoCoRaHS\)](#). CoCoRaHS is a non-profit community-based organization that solicits volunteer observers nationwide to allow better understanding of precipitation on a local scale (CoCoRaHS). The network serves as a resource that provides volunteer training, rain gauges and hail pads for active participants.

Objective: Creation of a Rainfall Data Network.

This Rainfall Data Network will be largely composed of landowners within the watershed. Other participants may include local government officials and local weather anchors, who can make use of more detailed information concerning precipitation patterns. Building personal relationships with landowners is an important part of this project.

In order to build a dynamic network that is responsive to the changes in interests and needs of WRAPS program and participants, it is necessary to emphasize trust, responsible management, and effective communication. This is achieved by being honest and open with landowners and always keeping in mind that the landowner knows their land the best.

Task 1: Relationship building with CoCoRaHS representatives.

This first step involves conducting conference calls and meetings with individuals such as: Mary Knapp – Kansas State CoCoRaHS Coordinator, Drew Cresswell – the CoCoRaHS coordinator for

Douglas Country, and Zach Schwalbe – National CoCoRaHS Headquarters. This task will create relationships with CoCoRaHS representatives to learn the background information, determine the best strategies for implementing the Rain Gauge Network and locate current rain gauges in watershed.

Task 2: Interview Stacie Minson, Kansas Watershed Specialist.

This task was intended to create a relationship with an experienced individual and better understand how watershed restoration works. It was also a way to gain insight into strategies for contacting and working with landowners.

During this meeting Stacie shared with us her experience in working with landowners as volunteers in watershed restoration. In her experience there have been volunteers who have taken the gauges, but after a short while stopped reporting. Her suggestion was, “If they don’t monitor then take the rain gauge back.” This way the free rain gauges are an incentive for monitoring and reporting. In her opinion, older volunteers tended to participate at a higher level compared to their younger counterparts. Through this interview we gained insight on the level and depth of rain gauge volunteerism with a similar outreach project.

Task 3: Meet with Tom Huntzinger, Upper Wakarusa WRAPS coordinator, for a brainstorming session. During this meeting we went over the timeline of the project. At this point, it would have

been beneficial to set a weekly or bi-weekly update meeting.

Based on my experience with these meetings and tasks, bi-weekly is adequate. It is good to have flexibility, but a set day and time may have improved turn-around time for task completion. These bi-weekly meetings can also serve as deadlines.

Task 4: Create a Google website for the volunteer observer network. A web based information system is consistent with CoCoRaHS and allows greater collaboration between landowners and CoCoRaHS. Since the network includes a variety of people, effective communication is important. Web based information system must have precise and clear requirements and the website must be easily navigable. User feedback is necessary for ongoing system coordination and efficiency. We will have a variety of members who have a variety of levels of experience with the internet. The Google website is free and easy to navigate to accommodate to all users. [Rain Gauge Website](#) provides the basic information on the rain gauge project for easy reference. It also provides a link to the CoCoRaHS website for volunteers to access for recording data.

Task 5: Organize a public outreach/grassroots campaign to recruit volunteers. Once a network of CoCoRaHS representatives and local coordinators are committed to supporting our efforts, project details are finalized, we move to a public outreach campaign. This

entails creating materials such as brochures, posters, flyers and factsheets. The outreach materials serve as communicators in places we cannot be. The following materials were created:

- Three panel brochure (See Appendix A)
- Postcard (See Appendix B)
- Video on rain gauge installation: [Rain Gauge Installation](#)

The brochures are a good piece of information to have on hand at events and workshops. These brochures “speak” for the project when team members cannot. The postcards are the first step in contacting the landowners. They will be sent out to 147 landowners within the Lynnburry and Deer Creek subwatersheds to contact those who live closest to the lake. Today’s world is dominated by internet and multimedia, therefore, the rain gauge video is the best piece of outreach material besides face to face contact. Viewers get a sense of who they will be working with and makes it more personal than a brochure or postcard. It is also easy to access saves on paper and time. The video was created to provide prospective and current volunteers with a visual training of rain gauge installation. The current CoCoRaHS website has training slides, but no video. The video was created using a simple flip video. Jim Weaver, the Douglas County Conservation District

Program Director, volunteered to host the video at his homestead in Douglas County.

We will measure the success of our campaign on our personal relationships with landowners and other interested parties. Therefore, face-to-face contact is important. Hosting various workshops and events and participating in WRAPS advisory board meetings will build our personal image with landowners and solicit participation, emphasis being on “targeted” landowners. Targeted landowners are those closest to the watershed. Continuous contact with landowners will build trust and improve our success in ongoing participation of our Rain Gauge Network. In order to maintain contact various workshops, events and get-togethers will be ongoing throughout the project.

We will use provision of free rain gauges as incentives to participate and will also encourage recipients to use them to continue recording data. Those participants who record data can keep their rain gauge. There are various ways in which data can be collected and options on when to record. The best time is in the morning and for best results, recording data should be done at the same time every day (www.cocorahs.org). If a volunteer is out of town for a period of time, they can still record precipitation for that time period. This flexibility is one great aspect of the CoCoRaHS organization. The other is the various options for recording data.

Volunteers can call, e-mail, Facebook, Twitter. If there are volunteers without computers or who have limited experience with them, project team members can host training events or record for them.

Task 6: Training with Mary Knapp.

This task will train landowners in rain gauge installation, maintenance and data collection. This is also an opportunity for relationship building with landowners. Having meetings during dinner time and providing food brings more people.

The first rain gauge workshop was held June 11th, 2011 and was a great success. There were a total of 33 participants including: three representatives from the Upper Wakarusa Watershed Restoration and Protection Strategy, one representative from CoCoRaHS, and two representatives from Douglas County Health Department, and 27 land owners. The majority participants were married: 11 married couples and 5 attended by themselves.

This tells us that

Chapter 3: Watershed Restoration in the Duck Creek

Watershed

Today, the Oneida reservation is 102 mi² and includes 52% agricultural land, 18.8% urban land, 13% forested land, and 8.5% wetlands. Figure 1.4 shows the Oneida reservation and its land use patterns. The main watershed on the reservation, Duck Creek, runs from southwest to northeast through the entire Oneida reservation until it drains in to the Lower Fox River Basin¹¹. Figure 1.5 shows the watersheds within the reservation. Its tributaries include: Thornberry Creek, Lancaster Brook, Beaver Dam Creek, Dutchman Creek, Silver Creek, Trout Creek, Fish Creek, and Oneida Creek.

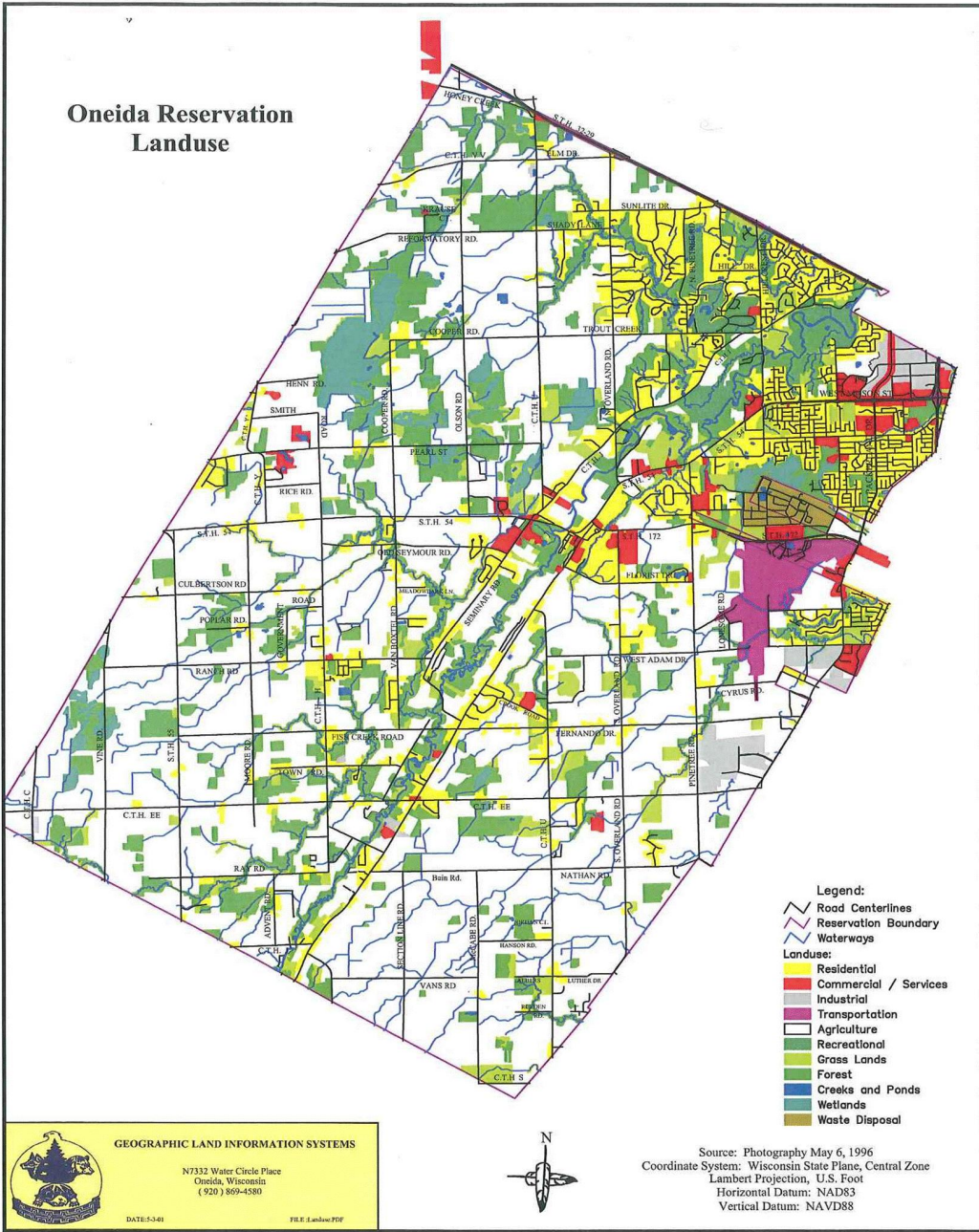
At present, this watershed is listed on the impaired waters list under section 303d of the Clean Water Act¹². As in Clinton Reservoir, the major water quality issues are sedimentation from agricultural and residential construction along with nutrient runoff from agriculture, suburban lawns, and golf courses.

As a result of loss of hydrologic function from tilling and ditching, there is reduced flow in Reservation waters. The most impaired watershed is Dutchman Creek, because of the lack of forested land and the abundance of adjacent agricultural land..

¹¹ The Lower Fox River Basin drains a 1,654 km² basin and is the Bay of Green Bay's largest tributary.

¹² Section 303d required all bodies of water to be listed as "impaired waters" that do not meet designated uses (fishing, swimming) because of pollutants.

Oneida Reservation Landuse



- Legend:**
- Road Centerlines
 - Reservation Boundary
 - Waterways
- Landuse:**
- Residential
 - Commercial / Services
 - Industrial
 - Transportation
 - Agriculture
 - Recreational
 - Grass Lands
 - Forest
 - Creeks and Ponds
 - Wetlands
 - Waste Disposal



GEOGRAPHIC LAND INFORMATION SYSTEMS

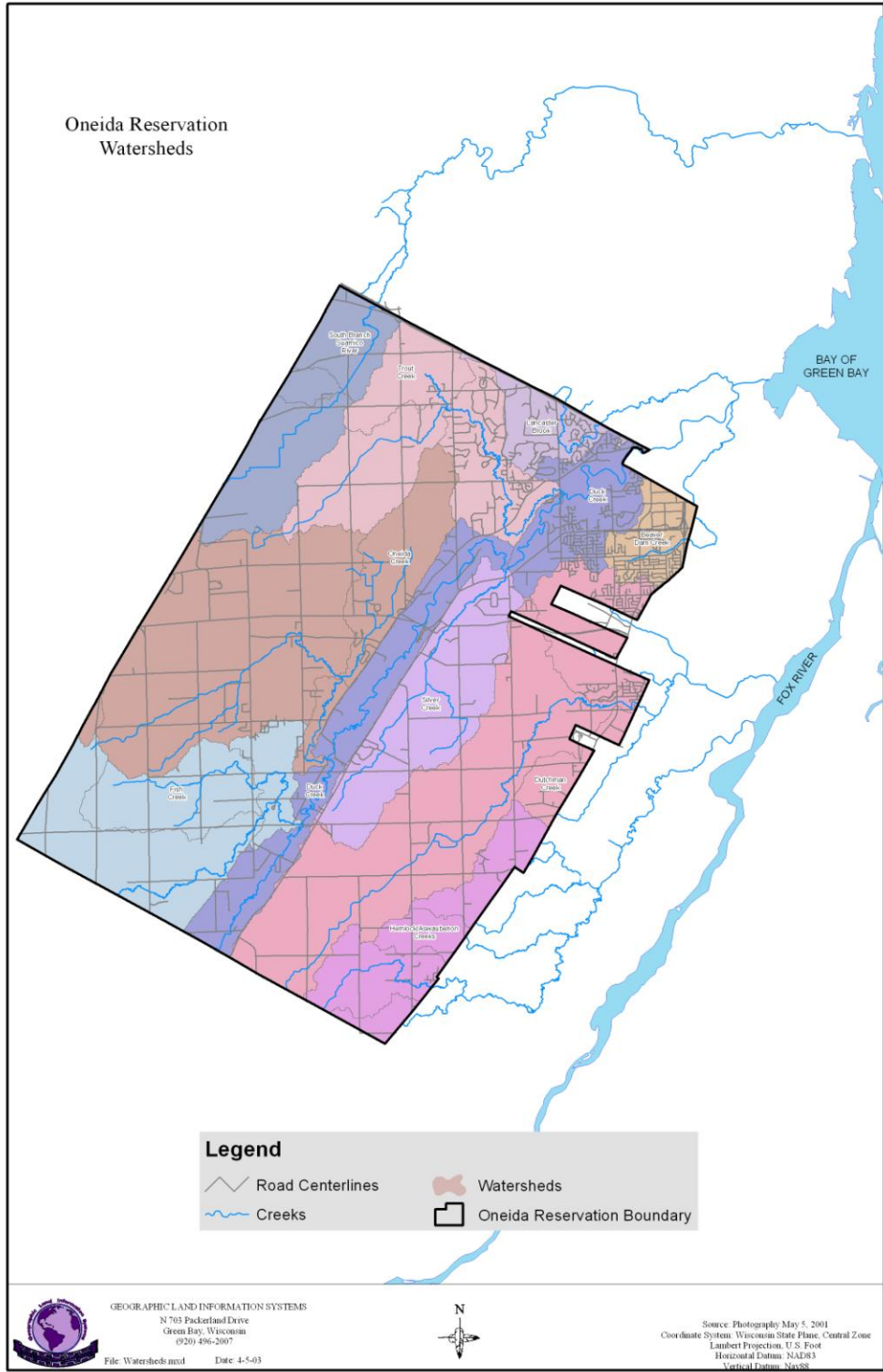
N7332 Water Circle Place
Oneida, Wisconsin
(920) 869-4580

DATE: 5-3-01

FILE: Landuse.PDF



Source: Photography May 6, 1996
Coordinate System: Wisconsin State Plane, Central Zone
Lambert Projection, U.S. Foot
Horizontal Datum: NAD83
Vertical Datum: NAVD88



Thornberry Creek and Lancaster brook have the highest quality water. This is a result of good land use practices, abundance of forested area and restoration projects done within the watershed

The Oneida Nation of Wisconsin began addressing water quality issues in 1978. The components of the tribal Water Resources Division are outreach and education, regulatory, water quality, biological (fish surveys and benthic macroinvertebrate) monitoring, and invasive species monitoring.

The Oneida Nation has historically monitored the waters of the Reservation creek by creek and lake by lake. Stacy Gilmore, Water Resources Specialist (2008-2010) for Oneida, believed that the waters of Oneida should be looked at on a Watershed by Watershed basis (Personal communication, 2010). I agree with this strategy. Understanding the watershed is important in restoration. In order to understand the entire watershed and its process the subwatershed processes must be understood as well.

A similar philosophical approach is discussed by Fritjof Capra discusses in his book, "*Web of Life*". When looking at any ecosystem, we must look at the whole in order to understand its being. This is because the whole is a process as opposed to simply being an object. We must look at the waters of the Oneida Reservation subjectively in order to understand how it functions.

To begin we think of the process that led to the current status of the water quality. It wasn't one single event that led to diminished flow and degraded water quality, it was an ongoing process and the ecosystem we have now has evolved over time.

Since, it was a process over a long period of time that created the current water quality issues it is necessary to undergo a process of change to make it better. This entails the integration of modern science and technology and traditional ways. The Oneida people are embracing this philosophy by using modern technology in monitoring Oneida's water. Oneida is also incorporating the language and culture into environmental education activities.

Currently, I am an intern for the Oneida Nation of Wisconsin's Environmental Health and Safety Division in the Water Resources Program. My duties are to assist in water quality monitoring, biological monitoring and community outreach. My personal goal is to help establish processes by which the culture and language can be integrated into watershed restoration education.

Methodology: Watershed restoration through culture-based education and outreach events. This entails the integration of language in culture into every outreach event, presentation and/or activity that I am involved in. I've notice a consistent group of

kids throughout all youth group events. When they hear the language over and over it will stick with them.

1. Outreach events:
 - a. Summer Recreation Program – This program was already set in place. The environmental program meet once a week with a group of kids who are participating in a summer youth program. Presentations, demonstrations or activities on various Environmental Health & Safety subjects are done with the kids.
 - b. School education events – the Environmental Health & Safety division is called upon to conduct outreach events at the Oneida Nation Elementary School (Grades K-8) and Oneida Nation Tribal High School throughout the year.
 - c. Making a Splash at your Library – this program is held at Oneida’s main library in the center of the reservation, sometimes called, “downtown Oneida”. (See more details on page 50)
2. Outreach materials – these outreach materials are used at the various events, presentations and activities. Each one incorporates the language and culture wherever possible.
 - a. Rain Garden brochure (Appendix C) and sign (Appendix D)
 - b. Lake Posters (Appendix E)
 - c. Water Report (Appendix F)

Making a Splash at your Library

The Water Resources program was requested, by the Oneida Community Library, to conduct environmental education for the youth during a summer reading program. It consisted of outreach at the Oneida Community Library every Wednesday from 1-3pm during a period that started July 7th, 2010 and continued until August 11th, 2010. The summer youth program consists of children ranging from age 3-12, who are all members of the Oneida Nation of Wisconsin. The program focuses on a different theme each year. In 2010 the theme is “Making a Splash at Your Library” and every week involved a different sub-theme. Their incentive for participating was to receive library coupons after every session. The coupons are used to allow the participants to purchase small gifts from the library store.

My portion of the project was to demonstrate the importance of water conservation, water quality and our relationship to water as Onoyote?a:ka people. It is crucial to place emphasis upon our relationship with water, and how our attitudes and perceptions have an impact on we treat water and also to encourage their relationship to the Duck Creek Watershed.

The goal in doing this project was to encourage the kids to create a respectful relationship with water. My method was to conduct activities and share stories that coincide with each sub-

theme, and to educate the children on the water cycle and their role within this cycle. The lessons consisted of a mixture of basic environmental science education, biology, and Oneida language.

Timeline of Activities

The students participated in the following activities as part of this program.

Week 1: July 7th, 2010 – Ducks/waterfowl

Week 2: July 14th, 2010 – Beachy Keen

Week 3: July 21st, 2010 – Make Waves, Make Changes

Week 4: July 28th, 2010 – Yellow Sub, Sound Waves – Music

Under Water

Week 5: August 4th, 2010 – Swamped at Your Library

Week 6: August 11th, 2010 – WOW! Wonders of Water/Fin

(another word for end)

Week 1 – Ducks and other Waterfowl

Activity 1: Migration and Habitat Loss (This activity was based upon an exercise suggested by the US EPA website)

Overview

Students played the roles of migrating water birds that were assumed to travel between nesting habitats and wintering grounds. Each of the “birds” are subject to hazards at either end of the

migration path and along the way. This allows the students to think about and “experience” the environmental and human factors that contribute to habitat loss and degradation.

Background

There are many types of migrating birds, ducks, geese, swans, cranes, herons, egrets, gulls, terns, and shorebirds that require the presence of wetlands in their breeding and wintering grounds. These two regions are often thousands of miles apart. As a result, the birds also need to utilize wetlands not just as endpoints but also along their migration routes (also called flyways) to provide them with the food and rest necessary to complete their journey. The Platte river in Nebraska and Cheyenne Bottoms in central Kansas are good examples of flyway stopovers that are essential habitat for many species and many thousands of individuals. The restored wetlands in Oneida, Wisconsin also serve as flyway stopovers for these migratory birds.

The primary threat to the survival of migratory water birds is the disappearance and degradation of wetlands, especially those along migration routes, which is why Cheyenne Bottoms is so important, as the only remaining wetland of substantial size in central Kansas. Before regulations such as the Migratory Bird Act were imposed, hunters in the 19th century decimated flocks of

migrating birds, but an equally if not more important issue was that thousands of acres of wetland habitats were converted to farmland, roadways, and settlements.

The Haskell Wetlands issue in contemporary Lawrence, Kansas is a classic example of how wetlands are devalued by communities who feel that they can alter or destroy them to further their own economic and social interests. Today, agriculture and development continue to reduce the wetlands available as habitat for these migrating birds.

Materials

One plate for each student. The plates should be clearly marked to differentiate top (wetland drawing) from the bottom, which is marked with an X to indicate extinction.

Procedure

1. Select a large space where students have enough room to run.

This activity can be done indoors or outdoors . Place the paper plates in two patches on either end of the room or playing field. One of the patches will represent the wintering grounds and the other the potential nesting habitat. Remember to include enough plates at each end of the playing field to accommodate all players.

2. Tell the students that wetland habitats used by migratory birds are being destroyed for a variety of reasons. Ask students to generate ideas about the probable reasons for 1) habitat loss 2) habitat degradation and 3) wetland conservation. Factors to consider are listed in Table 1.
3. Explain to students that each of them represents thousands of water birds migrating back and forth at your signal across the playing field. Tell them that the paper plates represent their wetland habitats, and that each plate can accommodate only two people at a time. If they cannot find a plate to land on, then they have to die because there is not enough suitable habitat available for them to use. These students represent extinct populations and must move off to the sidelines and watch.

Table 1. (*Migration Headache, US EPA, 2010*)

Factors Limiting Survival of Migrating Birds	Factors Favoring Survival of Migrating Birds
Wetland drainage	Preservation of wetlands
Drought	High rain fall
Pollution and contamination of water	Restoration of habitat
Conversion of wetlands to farmland	Regulating of hunting
Urban expansion	Wetlands purchased as conservation land
Illegal hunting	
Lead shot in food supply	
Disease	

4. Have all the students line up at one end of the playing field, two students for every wetland plate. Tell them that they will be flying to their wintering grounds, and at your signal have them start out at half-speed. Practice this until the students get used to it.

5. Get two or three of the students to take the role of hunters who will tag only one bird each per migration. Occasionally have the hunters sit out on the sidelines to allow those birds that have died to enter back into the game.

6. With each migration cycle, begin to remove and occasionally replace wetlands at each end of the playing field, giving one of the above-listed reasons as you do so. For example, you can explain that a large scale farm is draining wetlands for their future site and

will replace four regional wetlands and remove four of the plates at one end of the field.

7. When students have no plates on which to land, they must go to the sidelines; they have died from loss of suitable habitat. Explain to these students that they will have a chance to get back in the game when favorable conditions restore more wetland habitat.

8. By the end of the game, there should be fewer wetland plates at each end of the playing field than you started with. Gather the students into a group and discuss the process they just went through. Ask the following:

- What did they learn about migration?
- Can they think of any wetlands in their community that might be affected by the above factors?

Important Findings

1. My original plan was to start with the Darby Duck Activity (below), but when asked to join us the kids were reluctant. We told them they were going to learn about ducks and other waterfowl and do an experiment, but the interest wasn't there. So, I decided to start right away with this activity since it involved going outside and running around. Eventually we got ten kids to join us and the majority stayed with us through the two hours. The group consisted of kids of different age groups from 3-12.

2. I asked the kids if they knew what a wetland was. One answered that she knew it had something to do with water. That was her same answer when I asked if they knew what wetland restoration was. They remained interested and participate in discussion mainly because they wanted to play the game. I discussed wetlands and wetland restoration.
3. During the game I explained wetland restoration, habitat loss, the effects of draining a wetland, etc. The little ones didn't quite understand. However, I noticed at age 7 or 8 is when the understanding is deeper. Throughout the game I would incorporate the Oneida language for certain birds. I would also use the Oneida language to get the kids attention. I would say, "swatahusatat", which means all of you pay attention. This is a commonly used term and they recognized the word. They also tended to listen better when talked to in the Oneida language. This game is a good way to get the kids involved and help them understand habitat loss and its impacts on wildlife.

Oneida language words used for this activity were: talu?kó "duck", ohne·kánus "water", otsi?táha?shuha "many birds", numbers 1-10.

Activity 2: Darby Duck, the Aquatic Crusader (Activity adapted from US EPA Nonpoint Source Pollution website)

Sink or Swim?

Overview

Sometimes detergents get into creeks or lakes. This could happen if people use too much soap to wash their cars or if their washing machines drain directly into streams or creeks. Then the water washes down the street into street drains and into a creek or lake. Once in the creek or lake, detergent could destroy the surface habitat.

Materials

Clean bowl (free of detergent)

Paper clip or sewing needle

Fork or tweezers

Liquid dish detergent

Procedure

1. Fill the bowl with water.
2. Put a paper clip or needle on the tines of the fork, or hold it with the tweezers. Gently place the paper clip or needle on the surface of the water. It may not seem like you can make it sit on the surface, but it will. You should also be able to see the surface tension bend under the paper clip?
3. Add one or two drops of detergent to the water near (not on top of) the paper clip and see what happens

How it Works

The paper clip was resting on top of the surface tension. This “skin” supported the clip and kept it from sinking. When you added detergent, the soap being made up of lipids, which are hydrophobic (water avoiding) molecules, weakens the attraction the water molecules had for each other. This caused the surface film to disappear and be replaced by hydrophobic lipids. As a result the paper clip sank.

Findings

- I explained what surface tension was and how animals and insects are impacted when too much soap is in the water. The kids were able to grasp this concept and were interested in the experiment.
- I read a few books to the kids about different waterfowl. I asked them if they remembered how the water birds can float on the water without sinking. One young man (age 10) remembered from my previous lecture that the surface membrane, combined with their waterproof feathers helps them float. If their feathers become coated with oil, they lose their waterproof qualities and the birds may sink, or at least ride lower in the water as their plumage becomes waterlogged.
- The kids seemed uninterested when I started reading, but they were paying attention. I also noticed that the kids perked up when I incorporated the Oneida language. Some kids knew a few words while others didn't know much. This happens often and I've seen

in all the presentations I have done. The majority of the groups are unfamiliar with their own language. This is not uncommon in a community that is losing their language. However, majority of the students know traditional Oneida stories. Therefore, there is a need for language incorporation into our traditional stories. Even if it is a few words it is important for the kids to hear something in a repetitive manner before it sticks with them. Regardless of the level of Oneida experience in each student's lives, they were all eager to learn more language. They showed this by making eye contact with me when I spoke the language and when I asked them to repeat the words. They also showed this interest by asking for more Oneida language words.

Oneida language words used for this activity were: Taluko "duck", Ohnekanus "water", the numbers 1-10.

Week 2 – Beachy Keen

Activity 1: A Drop in the Bucket (Project WET page 238)

Objectives:

- Calculate the percentage of fresh water available for human use.
- Explain why water is a limited resource.

Introduction:

Water covers more than 70 percent of the earth's surface. Water is in the oceans, rivers, lakes, ground, and is also a water vapor in the air that we breathe. The earth's temperature is regulated by water. The land absorbs and releases heat from the sun.

The continuous movement of water in and around the earth is called the hydrologic, or water cycle. When rain or snow falls on oceans and land as precipitation, the soil will soak up some of the water. Plants will take up some of this water through their roots. Some water will move down deep into the soil and become ground water. Some of the water will also run across the land into streams, marshes, lakes, and oceans. The water that remains on top of the earth is called surface water. Surface water will return to the atmosphere through evaporation. Water vapor in the air may form clouds that cause precipitation (rain or snow) to occur again. The precipitation then returns water to the earth's surface. This is the hydrologic cycle. Just like water life is a continuous cycle.

Life is not possible without water. Water is in every living thing. Our body is nearly 65 percent water. An ear of corn is nearly 70 percent water, a potato is about 80 percent, and a tomato is about 95 percent. In order for living things to carry out life processes, we must keep our water supply clean and healthy. We can live without food for two months, but we cannot live without water for more than a week.

Many people believe there is not enough water to meet all the needs of the people throughout the world. Yet, the Earth will always have the same amount of water because of the water cycle and because new water is not being created only recycled.

However, the world's water is unevenly distributed. Some places that have plenty of water go through a drought at times and other places go through a constant drought. We must manage our water quality and supply carefully so it remains safe and plentiful to use.

Many conservation problems are a result of careless use or mismanagement of our water supply. Over many years, people have dumped untreated sewage and other wastes into lakes and rivers. This contaminates the water, which means that it must be treated or go through the water cycle again before it is clean enough to be used by most organisms. More and more people now realize we have to take special care of our water to ensure its quality, not only for now, but also for the future.

Although 70 percent of the earth's surface is covered by water, nearly 97 percent of this water is in the oceans. Ocean water is too salty for drinking, manufacturing, and farming. The fresh water available for us to use is about three percent of the earth's water supply. Three-fourths of the three percent of fresh water is unavailable because it is stored in icecaps and other glaciers. Climate Change can impact this because as glaciers and icecaps

melt, the water often flows into the sea, especially around the Antarctic. This water, like all ocean water, then becomes salt water which results in a net global loss of fresh water.

Materials Needed:

1000ml beaker

Graduated cylinder

2 tubes

As a student-assisted demonstration, have a student measure 1000 ml of clean tap water into the transparent containers. Encourage the students to suggest what this water quantity might indicate (all the water on the Earth's surface).

Encourage another student to pour 970 ml of the water into another clear container. Have students suggest what this amount of water indicates (all the salt water on the Earth's surface).

Have the students suggest what should be added to the 970 ml of water to make the model more real (e.g. adding salt). Have the students suggest what should happen to the remaining 30 ml of water.

A logical suggestion would be to pour 20 ml of water into a clear plastic container and freeze the water. The remaining 10 ml of water indicates usable water.

Findings

- The kids seemed interested in this demonstration. They were surprised to know that so much water is not useable. Some of the little ones didn't quite understand that the 5 ml of water wasn't the actual amount of fresh water. The older ones were surprised and seemed somewhat confused that so many people have to share such a small amount.
- I explained the importance of water conservation and water quality. After the demonstration some of the kids asked what I was going to do with the water that I used. This showed me that they were thinking about water conservation immediately after my presentation to them. So, we watered the library plants to show them water conservation in practice!
- I also told the kids that the 5ml of water is also composed of polluted water as well. It is important to remember that although we are fortunate to have such a plentiful amount of fresh water surrounding us here in Wisconsin, we experience water quality issues. Generations ago white settlers moved into the area and began ditching tiling and draining the natural areas. Soon, big cities were constructed and natural resources were exploited. These were two major acts that led to poor water quality in and surrounding our Great Lakes.

Activity 2: Sea Water vs. Fresh Water

Why Is the Seawater Salty?

Most of the salt comes from rocks on land that got washed into the oceans by the rivers.

Materials:

- Sea salt
 - Distilled water
 - Measuring spoons
 - Identical see-through glasses or bowls
 - Fresh egg
1. Make sea water at home. Add about 2 tablespoons (30ml) of sea salt to a quart (1.1l) of distilled water.
 2. Fill one glass or bowl three-fourths full with sea water. Put the same amount of plain distilled water in the other glass or bowl.
 3. Gently put an egg in the distilled water. Notice how far it sinks or floats.
 4. Next, put the egg in the sea water. What happens?

The egg should float higher in the sea water because there is more matter per unit of volume in the sea water. Scientists say this is because the sea water is denser than the water. A material's

density when compared to distilled (pure) water with no contaminants of any kind is its specific gravity.

Findings:

- The egg floated up in the salt water and sank to the bottom in the distilled water. The children were able to see how objects in salt water and fresh water reacted differently. This intrigued their minds and began asking questions about density and how it works.
- The kids were able to recognize the different between fresh water and salt water. The salt water was much foggier. This portion of the experiment was good for the littler kids (ages 3-5).
- When I asked the kids if they wanted to taste the salt water they all made gross out faces and said “No!” This indicates that they understand that salt water is not drinkable, which helps instill in them the importance of conserving our small amount of fresh water and also shows that they understand the idea of water that is not drinkable because it is not pure.

Activity 3: Ocean Bottle

Materials:

- Plastic water or pop bottles,
- Blue or green food coloring,
- Baby oil or vegetable oil,

- Tiny shells,
- Sparkles or gold glitter for sand.

Fill the water bottle 2/3 full with water and tint it with the food coloring and add oil. Fill bottle to about 1/2 inch of the rim. Add tiny shells, glitter, or other sea-related items. Glue the bottle shut and place tape around the top to seal the bottle to prevent the oily liquid from leaking out. When you tip the bottle it will look like rolling ocean waves.

Findings:

- The kids really liked this activity. They wanted to take the wave bottle home with them. I believe the kids liked this activity because it was hands on and they were able to create something that turned out beautiful. They were intrigued by the colors and the movement of the waves.
- I believe they were intrigued because as opposed to an activity where I demonstrating something, this one was hands on and they were able to keep their creation. This is a good demonstration of the power of energy and how it flows from one object to another. As, the kids were creating their wave bottle energy was being transferred from them to the object. Also, as the kids were working close together energy was being transferred from child to child. This could be interpretive as a “romantic” viewpoint of Indigenous Philosophy. This notion that we are all connected

spiritually. However, this is also scientifically correct. The law of energy states that energy is never created or destroyed rather transferred from one entity to another. So, as we interact with other objects, whether it is another human being, animal or “non-living” object, our energy or spirit is being transferred and absorbed between one another.

Week 3 – Make Waves, Make Changes!

Activity I: Fashion a Fish

Materials:

- Construction paper (variety of colors)
- Glue or glue stick
- Scissors
- Crayons
- Glitter, pipe straws
- Any other crafts that can be used to make fish

Findings

This activity was a hit. The kids loved the hands on experience. Since, there was a mix of older and younger kids, ranging from three to eleven years old, I paired up an older kid with a younger. The older kids, although in many cases they tried to hide it, enjoyed the responsibility of helping a younger sibling or friend. I explained the process of evolutionary adaptation to the

kids and would ask them periodically throughout the activity what they remembered. The older kids caught on quick. The younger ones (3-5) didn't quite grasp the idea of adaptation, but had fun making a fish!

In addition, I also discussed the importance of keeping water clean and conserving water for all these wonderful and unique fish. When it came time to show your fish and explain its characteristics and adaptations the younger kids were so proud to stand and show off their fish. The older kids were shy and typically chose to let their younger partner stand up. I incorporated the following Oneida words into the activities and books that were read: K[^]tsi (fish), Ohnekanus (water), Taluko (duck).

Week 4 – Yellow Submarine/Sound Waves – Music Under Water

Activity I: Molecules in Motion (project WET page 47)

Objective

Students will model the effects of heat energy on the state of water.

Materials:

- Pictures of the three states of liquid
- Pictures of molecules in the three states of liquid

Findings

First we discussed the three different states of water and how the molecules are distributed in each state. To demonstrate this we did an activity in which the kids were molecules in each state of water. They started in the liquid state by standing close to each other, but not touching representing the condensed state of the molecules. They were given a scenario and based on our discussion they had to change into either a solid or gas and demonstrate how the molecules react. The first scenario was a dropping temperature and therefore heat is being taken away from them. The children reacted by moving closer to each other becoming shoulder to shoulder, which is the correct reaction. They were able to recognize that this is the solid state. The following two scenarios involved heat being added. The children went back to liquid state (close to each other, but not touching) and then to gas state farther apart.

This is a great activity for younger kids ages 3-6. Through this activity they were able to understand the complexity of water and its different forms. Once again it was a hands-on activity that connected the kids to the subject at hand and to each other. It is important to understand the complexity of water not only on a spiritual level, but also on a scientific level as well. This will better prepare them for the future of Indigenous science, that is the integration of Indigenous knowledge and western science.

Activity II: Making Music with Bottles and Water

Objective: Students will understand how water impacts vibrations and sound.

Materials:

- Five or more empty 20 oz. soda bottles
- Water

Procedure:

1. Line up the bottles next to each other about an inch apart.
2. Fill each bottle with water. The first bottle should have the smallest amount of water and each one after should have a little more than the previous.
3. Demonstrate how to blow at the opening of the bottle to make music.

Findings

The kids were anxious to try their luck with the bottles. They didn't want to stop when it was time to go. A few kids even played some familiar melodies with the bottles. This is an important activity because it relates water to another aspect of our culture, music. Music is a very important part of our culture. Our songs carry knowledge from generation to generation. Not only do they serve ceremonial purposes, they hold social relevance as well. Music is meant to uplift the spirits and bring together the people.

In retrospect, this section of the program would have been improved by adding a traditional social dance song of the Oneida people using a water drum. A water drum is an instrument used for social dance song and for ceremonial dances and songs.

Week 5 – Swamped at Your Library

Activity I: Capture, Store and Release

Objective: Understand the dynamics of a wetland and its importance to water quality.

Overview

Wetlands serve as Mother Earth's natural cleansers and protectors. They are home to a variety of plants, birds, bugs and animals. Wetlands also are protectors because they have the ability to control flooding. If flooding occurs the wetlands store and absorb excess water from floods just like a sponge. This absorbed water is then cleansed through the wetland's natural infiltration system. Once the water is filtered it is seeped into the groundwater and recharges the groundwater aquifer.

Materials:

- 9x13in baking pans
- 6-8 sponges
- Spray bottle with water

Procedure

1. Make a slit down the middle of a few sponges to represent streams, creeks or rivers.
2. Place sponges in baking pans
3. Lift the baking pans at a slight angle and start spraying the pan and sponges. (Or let the kids spray with the bottle)

Findings

The kids enjoyed the hands on experience with water. To my surprise they were in awe of how the sponge soaked up all the water and were intrigued that it represented a wetland. They understood that the strips represented streams. Before I could tell them one kid said that the water that gathered at the bottom of the pan looked like a pond. That's exactly what the activity intends to show. How the water runs off into a pond, lake, stream, or other body of water and that other water is absorbed by the sponge like soil in a wetland.

Week 6 – WOW! Wonders of Water

Activity I: Video, “Lorax” by Dr. Suess The last session with the program we awarded the kids with a 25 minute video; “*Lorax*” by *Dr. Suess*. This movie is about a town that is beautiful and plentiful until a money hungry business man comes into town. He begins making clothes and other random products with the town's natural resources. This continues to escalate until the town is

completely polluted and there are no more resources. So, all the animals and people leave the town. The moral of the story is to be thankful for our natural resources such as trees, plants and water and not to exploit them. It also shows the kids how important our natural resources or rather our relatives are to well being.

After the video we had a small discussion on what the kids seen. They were able to recognize how the problem began and how it escalated. They could relate the story to real life situations. For example, one student was able to relate the story to the situation with Oneida waters. He understood that because of past land use characteristics the water in our main waterway, Duck Creek, isn't adequate for swimming. I think this is an important point because today we are able to say that because of past actions of white settlers, for the most part, our waterways are polluted. However, if we choose to do nothing about water quality and other environmental issues the next generation will not have white settlers to "blame" for our environmental issues.

Activity II: Discussion on Watershed Protection and Enviroscope® (adapted from Project WET)

What is a Watershed? A watershed is an area of land where all the water that is under it (groundwater) or drains off of it (surface water) goes into the same place. (River, stream, lake, ocean) No matter where you live, there is a watershed

A healthy watershed provides the following:

- Habitat for fish and other life
- Food sources for animal and people
- Temporary living spaces for migratory birds
- Clean drinking water

We are all connected to our watershed and have an impact on it.

Our actions as humans along with natural forces shape and create our watershed. Here are some questions to get kids brains stirring.

1. Can you think of examples of natural forces that interact with watersheds?

- Rain storm, wind, flood

2. Can you think of something we might do that impacts our watershed?

- Bad: fertilizers, dish soap, waste, roads
- Good: rain gardens (see appendix C 1&2), wetland restoration, growing organically

Sometimes what benefits one person may negatively impact another.

1. Can you think of an example?

- Farms use fertilizers to grow bigger and “better” crops. These crops contain more nutrients. They also use pesticides to keep bugs and other pests away from their crops. However, when it rains these fertilizers and

pesticides are often washed off the land into our waterways. This can then have negative impacts on fish, wildlife and us either through production of algal blooms or even of poisoning living beings.

After our discussion about watersheds we brought in the **Enviroscape®** to show the kids what a watershed looks like and some of the things that happen on a watershed.

Enviroscape® demonstration

The Enviroscape® is a table-top environmental education watershed model. It provides an interactive learning experience through hands on demonstrations. Participants learn about pollution and pollution prevention. It demonstrates how connected we are to our environment and that our actions have an impact on environmental quality.

The children were fascinated by this project. They were able to have a hand in the situation by either playing, “rain storm” by spraying the envirospace with water to simulate a rainstorm. They could also play “community planner” by arranging house, cars, farms, cows, etc in the community.

The enviroscape was a great activity for the kids to engage in watershed education. I believe that having an enviroscape that is an actual outlay of the reservation will captivate the minds of

these young Oneida kids. Indigenous children are more hands on and creative thinkers. This goes back to our ways of living and teaching, through experience.

Chapter 4: Conclusion

Outreach is an important tool in educating people and making a difference one person at a time. It is a grassroots approach to improving water quality within a watershed. This approach focuses on the source of the issue, humanity. It is our past actions and decisions that led us to the situation we find ourselves in now, a degrading natural environment. It is our responsibility to make the change needed so that our children have a home and the resources to survive. Without outreach and education on watersheds the process of degradation will continue and our children will not have a home. The resources needed to survive will be gone or too polluted to utilize. This is the case with water. Water is our most important resource. It is the blood veins of our Mother Earth. If our waters are unhealthy we are unhealthy. Therefore, it is important to clean our waters and maintain their health.

My experience in these two communities has led me to believe that a community, no matter what the ethnic background,

understands the importance of watershed restoration. This was shown by the watershed outreach and monitoring activities of each community. However, there is always the small group of people who will detest any change. Certain landowners don't want to change their ways because they have been doing things a certain way for years and it's never done them wrong. This is an individualistic way of thinking and is prominent in western society, but it isn't unique to them. This has also been shown in my community as well. In both communities there was at least one situation where a landowner's land use characteristics were "overlooked" because of the status of that landowner. In the Upper Wakarusa watershed there was a situation where a board member of a certain organization that was geared towards protecting the watershed, in fact engaged in land use characteristics that were polluting the watershed. Within the Oneida Nation Reservation there is an individual who is not currently polluting the creeks, but has a structure that is a hazard and potential polluter. This is unfortunate, but is also something that we must deal with no matter what community we are in.

On a more positive note, I noticed in both communities that the strategy of "working with landowners" is valued more as opposed to utilizing regulatory power. Within the Oneida Nation Reservation the strategy of collaborating is valued at the

governmental level. Within the Upper Wakarusa Watershed the grassroots arena is where collaboration is strong. However, the Oneida Reservation, as mentioned before, has no regulatory power over non-Indian on non-Indian land within the Reservation boundaries. Therefore, are unable to regulate land use characteristics. If the situation was different and Oneida had regulatory power over all land within the Reservation boundaries Oneida would still favor cooperative agreements over regulatory. It is a part of who we are as Haudenosaunee. We have embraced the Great Law of Peace and through that we maintain peaceful relationships. In order to keep peace all parties must agree.

It is true that both communities are making an honest effort in watershed restoration. However, through my experience in working with the two communities I realize that the Oneida reservation is more advanced in the area of watershed restoration. They have been working with the local landowners, on an individual basis, to educate and make aware the issues of certain land use characteristics. Oneida began addressing water quality and water resources issues in the early 90's and has continuously improved their efforts and increased their knowledge on the subject. The Upper Wakarusa watershed isn't quite at the level of Oneida as far as landowner participation. This is interesting considering the Upper Wakarusa watershed is not a

“checkerboard” land mass and can be regulated by the powers that be. This shows the power of indigenous ways of living and knowing and how those values guide our actions and relationship to Mother Earth. That even though, Oneida doesn’t have the regulatory power over all lands within its territorial boundaries they are still able to work towards a cleaner, healthier watershed for the benefit of our children and seven generations to come. With the rain gauge project and the level of participation at the rain gauge workshop, the Upper Wakarusa watershed is on its way to a more collective approach to watershed restoration. Community awareness and involvement.

Literature Cited

- Bartholomew, Alick. 2010. *The Spiritual Life of Water: Its Power and Purpose*. Park Street Press. Rochester Vermont.
- Baumgart, Paul; Cibulka, Daniel; Fermanich, Kevin. 2010. *Temporal Assessment of Management Practices and Water Quality in the Duck Creek Watershed, Wisconsin*. University of Wisconsin Green Bay, Department of Natural and Applied Science and Environmental Science and Policy Graduate Program.
- Cajete, G. 1994. *Look to the Mountain: An Ecology of Indigenous Education*. Kivaki Press, Durango, CO.
- Capra, F. 1996 *Web of life: A New Scientific Understanding of Living Systems*. Anchor Books, New York.
- Clinton Lake Project Office. (2009, December). *U.S. Army Corps of Engineers*. Retrieved May 20, 2010, from <http://www.nwk.usace.army.mil/cl/TheDam.cfm>
- Cordova, V.F. 2007. *How it is: Native American Philosophy*. K.D. Moore, K. Peters, T. Jojola, and A. Lacy, eds. University of Arizona Press, Tucson, AZ.
- Deloria, V. Jr. and D. Wildcat. 2001. *Power and Place: Indian Education in America*. American Indian Graduate Center and Fulcrum Resources. Golden, CO.

Kansas Alliance for Wetlands and Streams. *Upper Wakarusa Watershed Restoration and Protection Strategy*. (2011) [Updated 2011; cited November 2010] Available from <http://www.kaws.org/upper-wakarusa-watershed>

Metoxen, L. A. (2010). *Oneida Tribe of Indians of Wisconsin*.

Retrieved May 20, 2010, from

<http://www.oneidationation.org/culture/page.aspx?id=5242>

Metoxen, L. A., & Cornelius, D. C. (2010). Duck Creek: A Way of Life!

Oneida Cultural Heritage Department, 1-8. Oneida Nation of

Wisconsin: Oneida Museum. *Oneida Clans*. Available from:

<http://www.oneidationation.org/museum/clans.aspx>

Oneida Tribe of Indians of Wisconsin, Environmental Department. (2010).

Chapter D: Wetlands, Streams, & Surface Waters. Oneida:

Oneida Tribe of Indians of Wisconsin.

Pierotti, R. 2010. *Indigenous Knowledge, Ecology and Evolutionary*

Biology. Routledge, Taylor and Francis Group, New York &

London. 264pp.

Pierotti, R. and D. Wildcat. 2000. Traditional ecological knowledge: the

third alternative. *Ecological Applications* 10:1333-1340.

Reber, A. (2009, November 24). *Kansas River Watershed Examiner*.

Retrieved February 1, 2010, from Examiner.com, Topeka:

U.S. EPA. *Polluted Runoff (Nonpoint Source Pollution). Darby Duck, Aquatic Crusader*. Updated 13 October 2008; cited 12 July 2010].

Available from

<http://www.epa.gov/owow/nps/kids/sinkorswim.html>

U.S. EPA. *World in Our Backyard: Chapter IV: Threats to Wildlife.*

Migration and Habitat Loss. [Updated 21 January 2010; cited 12 July 2010]. Available from

<http://www.epa.gov/region1/students/pdfs/wetaccp4.pdf>

Waters, Anne. ed. 2004. *American Indian Thought*. Blackwell Publishing

Watershed Restoration and Protection Strategy. (2009). *Water Quality,*

Rainfall, and Runoff Sampling and Monitoring in the Upper

Wakarusa Watershed. Proposed Work Plan, Lawrence.

Watershed Restoration and Protection Strategy. “*Water Quality, Rainfall,*

and Runoff Sampling and Monitoring in the Upper Wakarusa

Watershed.” Draft of Proposed Work Plan, Lawrence, 2009.

Worster, Donald. 1994. *Nature’s Economy: a history of ecological ideas*.

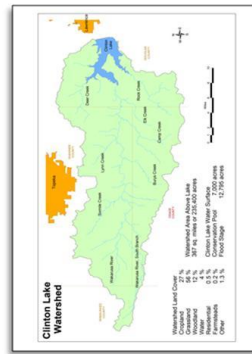
2nd ed. Press Syndicate of the University of Cambridge.

Hall, Steven and Arden, Harvey. 1996. *Wisdom Keepers: Meetings with Native American Spiritual Leaders*. Atria Books/Beyond

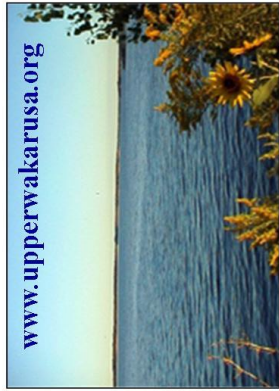


Quick Facts about Your Watershed

The Upper Wakarusa watershed is defined by the area that drains into Clinton Lake. This covers about 370 square miles in parts of Douglas, Shawnee, and Osage counties. Clinton Lake is a water supply for more than 100,000 people in Lawrence and several rural water districts. Clinton Lake is also a recreational destination that has recorded the most visitors of any federal reservoir in the state. It is important to protect this valuable resource.



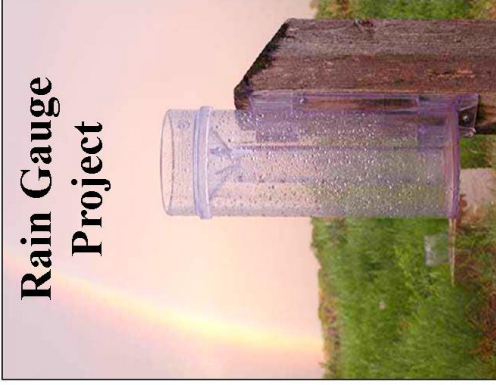
WRAPS
www.kswraps.org



Tom Huntzinger
WRAPS Coordinator
thuntzinger@sunflower.com
(785) 766-6717



Heidi Mehl
Research Assistant
Kansas State University
heidim28@gmail.com



Upper Wakarusa Watershed Restoration and Protection Strategy WRAPS



Upper Wakarusa Watershed



We are initiating the Rain Gauge Project within the Upper Wakarusa Watershed. This grassroots effort is a two part project:

Volunteer Observer Network

The first part of our project is aimed at monitoring and recording of precipitation and storm events from the local level. We are partnering with the Community Collaborative Rain, Hail and Snow Network, otherwise known as CoCoRaHS.

Conservation Practices

The other portion of our project is to encourage conservation practices that will improve water quality. As we all know, the landowner knows his/her land better than anyone. We hope to learn from you and also share ideas on watershed protection.

Monitoring and Sampling

We provide the rain gauges for you! We will also provide the training.

All you do is start measuring and recording! This is in the comfort of your own backyard. All we ask is that you record in the morning around the same time. If you are out of town for a few days or weeks, we have a recording process for that as well.

Your rain gauge will be a part of a network of sites in the watershed and you will have access to a map of their location and their data as well.

Volunteer measure precipitation in their own backyards for the benefit of their local communities!



Benefits of Sampling

- Precipitation is the source of stream flow and inflows to lakes.
- If you are a landowner, farmer or just a concerned citizen you might value accurate rainfall data, especially storm events that determine runoff to streams and inflows to Clinton Lake
- Participation gives volunteers first hand information and an opportunity to help the community by making a beneficial contribution to the knowledge about the watershed
- Conservation goes a long way towards improved water quality. Your efforts toward water conservation will help not only your land but the entire watershed.
- Be involved in a network with other rain gauge participants and landowners, city and county officials, organizational representatives, and other concerned citizens.



www.cocorahs.org

Appendix B

Upper Wakarusa Watershed Restoration and Strategy



The Rain Gauge Project

The Watershed Restoration and Protection Strategy is implementing a Rain Gauge Project in the Upper Wakarusa Watershed. This is a two part project, which consists of a volunteer observer network and a conservation practices project. The observer network is in conjunction with the grassroots organization, CoCoRaHS (www.cocorahs.org). Our mission is to create a network of landowners who will measure and record precipitation (rain, hail and snow) and storm events of the Upper Wakarusa watershed.

We will be in contact with those who live closest to Clinton Lake.

If you have any questions contact the Rain Gauge Project at (785) 766-6717



Rain Gauge Project

E-mail: rain.gauge.project@gmail.com

www.upperwakarusa.org



Appendix C (page 1)



Rain Garden
Kahnkehawitha?

It brings the water (rain).



Tayethinuhwela-tú
Ohnkekanushokúhla

We give thanks to them
All of the waters

She-kú úskah ísi? aetwahwe?nu ní
Still as one that for all of us to unite
yukwa?nikú la? tayethinuhwela-tú
Our minds we give thanks, greetings,
and love to them
ohnkekanushokúhla, ísi? she-kú
All of the waters, that still
yukwastátháyelese? Tá- thó
niyohthák
We're going along continuously using it.
This is how it shall be
né- yukwa?nikúhla?



Oneida is fortunate enough to be connected to one of the largest fresh water systems on earth. Unfortunately, the health of our water is threatened.



20% of the world's fresh surface water is in the Great Lakes

How did this happen?

When rain and snowmelt flow off our yards, roofs, sidewalks, roads and parking lots, the resulting stormwater runoff washes pollution into our streams, rivers and lakes.



Up to 70% of the water pollution in our region is carried there by stormwater. Much of the pollution comes from things we do in our yards and gardens!

Water wasn't meant to run off the land. Mother Earth's intention for rain was to soak into the soil, replenish groundwater supplies, be taken up by and filtered by plants, and enter our surface waters as clean, cool groundwater.

What can we do?

Build a Rain Garden! Rain gardens soak up rain water, mainly from your roof, but also from your driveway and lawn. They are landscaped areas for wild flowers and other native vegetation.

Sources:

- Rain Gardens of West Michigan <http://raingardens.org/>
- University of Wisconsin –Extension <http://clean-water.uwex.edu/pubs/>
- Wisconsin Department of Natural Resources <http://dnr.wi.gov/runoff/>

Oneida Environmental, Health & Safety Division
Oneida Planning Department
P.O. Box 365
Oneida, WI 54155
Phone: (920) 869-1600
www.oneidamanation.org/environment
www.oneidamanation.org/development

Sponsored by: Oneida Environmental, Health and Safety Division, and Oneida Planning Department

Funding provided by Oneida Water Resources Program through EPA Clean Water Act Grant




Appendix C (page 2)

Native Plants and Their Uses



Kabatitabae?
 "Stinky Plant"
 Number 6, Wild
 Bergamot

Medicinal uses: Leaves, flowers edible, colds, flu, insomnia, nausea.
 External tea for acne.



Teyunizya?kulu?
 "It Makes One Sneeze"
 Brown-eyed Susan
 Medicinal uses: flowers dried for colds.



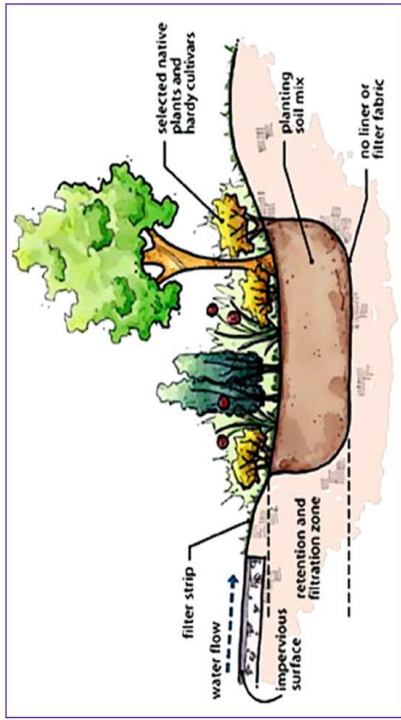
Chiyay? Niyotai?aya?
 "Blue Flowers"
 Great Blue Lobelia
 Medicinal uses: kidney remedy, tea for fever in babies.



Teyandabawezeta?
 "It Pierced the Leaves"
 Common Boneset
 Medicinal uses: tops for stomach and side aches, Broken bones.



Awa?daga
 "On the Water"
 Blueflag Iris
 Medicinal uses: Poultice of root for wound or burns.



After a rain event water runs off roof, driveway or lawn into the garden. The garden fills with a few inches of water and is slowly filtered into the ground rather than running into a nearby storm drain.



First year garden located at Oneida VFW building.



Second year rain garden located at Oneida conservation.

By creating a rain garden on your property, you can keep rain on your property where it naturally belongs. You can help be part of the solution to stormwater pollution. In addition, you gain a lovely garden.



Create your own rain garden!



- Garden must be located where runoff can be diverted into it, away from building foundations and utilities.
- A shallow saucer-shaped depression is created in the garden to hold rain as it soaks in.
- Soil replacement and additional preparation are sometimes needed for success. A good soil mix for rain gardens is 50-60% sand, 20-30% topsoil, and 20-30% compost.
- Species of perennial plants native to this region are recommended, as they are adapted to local conditions and will not need extra care once they are established.
- A mulch of shredded hardwood is an integral part of your rain garden. It keeps the soil moist and ready to soak up rain, and makes your garden low-