Ganawendan Ginibiiminaan (TAKE CARE OF OUR WATER!):
Community Water Stewardship with the Bad River Ojibwe

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A dissertation submitted in partial fulfillment of
the requirements for the degree of

Doctor of Philosophy
(Environment and Resources)

at the
UNIVERSITY OF WISCONSIN – MADISON

2015

Date of final oral examination: 4/10/2015

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Acknowledgements

Chi miigwech, humongous thank you, to Bad River tribal members who were project contributors: Professor Joe Rose, Sr., Edith "Bardo" Leoso, Mike Wiggins, Jr., Esie Leoso, Hilary “Juney” Butler, Dana Jackson, Erv Soulier, Sue Lemieux, Cherie Pero, Wendy Corbine, Jill Hartlev, Phoebe Kebec, and Ed Wiggins.

Chi miigwech to Bad River Youth Outdoors 2013 participants: Paige Wiggins, Tia Burns, Maddie Wiggins, Krightness Wolf, Willy Bearskin, MacKenzee Livingston, Aaron Pitman, George Roundwind, and Vanessa Scott.

Miigwech for help with logistics to: Eldred Corbine, Barb Smart, Milisa Corbine, Lloyd Hartwell, Ed Leoso, Steve Prusse, Joe Corbine, Faye Maday, Tammy D'Acquisto, Tony Gilane and Mike Morrissey.

Thanks to Bad River Natural Resources Department's Naomi Tillison, and thanks to Great Lakes Fish & Wildlife Commission's Peter David, Miles Falck, Ben Michaels, and Charlie Rasmussen.

Thank you to Tanya Buckingham of the UW Madison Cartography Lab, and to Jaime Stoltenberg of the UW Robinson Map Library.

Dr. Margaret Pearce, chi miigwech, for help with Ojibwe cultural cartography.

Thank you Henry Bauman, for the support through graduate school.
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ABSTRACT

Community-based research with the Bad River Band of Lake Superior Ojibwe in northern Wisconsin illustrated that water stewardship is an organizing practice, value-laden, that brings together tribal and non-tribal people. The lead author collaborated over five years with tribal members to create a network of university, natural resource agency, and indigenous experts. We worked in community water stewardship from concept to the dissemination of durable products of which the tribe took ownership. These were a youth program and a map project. Collectively, we designed and implemented *Bad River Youth Outdoors* (BRYO), a cross-cultural watershed education program for tribal youth. The program included cultural teachings, outdoor skills, and environmental education about the watershed. Tribal community members were co-researchers, and interviews with adults helped to design the research instruments for the youth program. Impacts of the program include empowerment of youth to consider themselves stewards of the watershed of their homeland. I apply, and subsequently critique, place-based education tenets for their application in indigenous communities. Participatory watershed mapping in the Bad River Ojibwe community involved elders and youth, and resulted in the multi-media *Bad River Water & Culture Maps Project*. Countermapping sheds light on Ojibwe spatial narratives that are an undercurrent to understanding of place, and the immense importance of water, in the Bad River watershed and the Lake Superior Basin. Participatory cartography that emphasizes cultural “storymapping” is appropriate for work in an indigenous community, as it engages collective leadership and modes of narrative communication. This dissertation focuses on methodology for outsiders working in Indian country, emphasizing indigenous research methods, and culminating in a case study of water stewardship that incorporates native and western science. A local *Anishinaabemowin* version of traditional ecological knowledge (TEK) is highlighted: *mino bimaadiziwin*, “living in a good way.” Interviews with Bad River adults and Talking Circles with youth indicated that Ojibwe identity and value systems are bound to water, shedding light on intangible dimensions of TEK. Water-based harvests, stewardship, sovereignty and worldviews constitute an Ojibwe water schema, *water TEK*. We demonstrate that the vulnerability and resilience of water and cultural traditions are intertwined.

**Key words:** Anishinaabe; Bad River Ojibwe; Bad River watershed; countermapping; experiential education; Lake Superior Basin; *mino bimaadiziwin*; Native American education; Native Science; place-based education; spatial TEK; story mapping; Traditional Ecological Knowledge; water stewardship; water TEK
PROLOGUE

I’m a water person. Early in life, I imprinted on rivers at my childhood home on the Westfield River in the Berkshires of western Massachusetts. Tubing down rapids with my inner tube tied to my ankle (That was the 70’s—risk management was not so much a thing!). My mother was from Long Island, so we spent our summers at the ocean. I learned to navigate very large waves as a very little person, swimming in conditions that I would balk at now.

Water, nibi in Anishinaabemowin, Ojibwe language, immediately became a common ground when I initiated work with the Bad River Ojibwe on Lake Superior in northern Wisconsin. As a sea kayak instructor, I had worked for seven years in the Apostle Islands, and fallen in love with a place that reminded me of the sea back east. My “aha” moment came when I was kayaking with two of my paddling buddies in the sea caves on the northern end of Devil’s Island, a perfect vortex of water, rock and sound. My inner voice: “These islands are the most beautiful place that I have ever paddled, and why do I never see any Indian people paddling out here?”

During the summer months, I’d see boy scouts and city kids kayaking in tandems with their chaperones and instructors, so I knew that it was possible to take youth out on the lake. (My students on the Lake had all been adults, college students). I resolved to work toward making it happen.

In my search for an advisor in the application process to the Nelson Institute, Dr. Patty Loew was the first one to call me back. “You could work in Bad River,” she said, “and here are numbers of some contacts there.” It was on. I called Bad River elders Butch Stone and Sylvia Cloud, and after a couple riveting conversations about water protection and ceremonies, the taconite mine, and the work of MashkiiZiibi Ogeechidaa, the Protectors of the People, I was committed.

Fast forward nine months, and I’ve started classes in the Nelson Institute. Patty again: “The Three Fires Ceremonies will be in June. You could go?” No directions accompanied the suggestion. I called my friend Maryellen Baker, cultural healer in Lac Courtes Oreilles. Her daughter Karen answered and told me what road to drive down to find Three Fires. From my time spent in the Teaching Lodge at Maryellen’s cultural healing center, Abinooji Aki, I had some idea of what to expect, and I knew to wear a long skirt. In June of 2011, I travelled up to the Bad River reservation for the first time. After camping down the road in Cedar, Wisconsin, I headed west on US Highway 2. As I looked for the turn, I saw a marten run over the shoulder and into the trees, the first of many wildlife sightings on the reservation. As I pulled into the throng of parked cars, I saw license plates from Canada, Minnesota, and Michigan. Three Fires was an intense introduction to the people of Bad River, a people who are fiercely protective of their land and waters, and their traditions.

This prologue is a reflection on working for water with Bad River over 5 years, 2011-2015. The act of reflection is very familiar to me as a crucial part of the experiential learning cycle; it integrates experiences and new learning. Extend reflection to reflexivity, which is a form of validity in qualitative research (Creswell 2003, cited in Kovach, 2009). Many white scholars who work as outsiders in tribal communities include reflexive sections in their papers. “I’m a white researcher working on the Bois Forte Reservation…. This is a convention of cross-cultural
writing. It’s a way to explain and justify positionality in complex cross-cultural worlds embedded with historic traumas of tribal peoples, and guilt of settler society. This is important, complicated, inner work and needs to be unraveled, so I do not belittle the process in any way. In my situation, to account for word limits for journal articles, I have necessarily avoided being overly-reflexive. So this is my chance! Here goes….

I had never thought of paddling as a science, until I read an article for my stream ecology class about hydrological effects on bank erosion/stability, written by a team of academic experts. Their findings were already known to me, as a result of my observations being a paddler for 27 years. Not to be sappy, but I have learned about the world via close, sustained participation in landscapes and waterscapes, and that is undeniably a native way of knowing.

People often ask me, “Isn’t it difficult working with the tribes? Indian time?! How do you work on that timeline?” My response, “The hard part is leaving and coming back to Madison—this world is the discordant one!” Bad River Ojibwe welcomed me in, and were generous with their time and knowledge. Frankly, working on Indian time works better for me that rushing between 30 minute blocks and multi-tasking continuously. “Good things come in time,” shows an attitude of patience, and also resilience.

Ojibwe people are excellent at taking the long view of conservation and politics. With the political climate the way it is now in Wisconsin under Governor Scott Walker’s administration, the long view is a comforting one. Thankfully, the Obama administration has made good decisions about environmental conservation, and has made some unprecedented strides toward working with the tribes. Obama hosted his sixth annual Tribal Nations Conference in fall of 2014 and expressed his commitment to honoring trust agreements, commitment to native women, and future generations. At the federal level the political climate is more supportive of tribes and environmental work. Locally here in the Nelson Institute, the administration is committed to working in more effective alliances with the Wisconsin tribes around environmental issues. In March of 2015, the Nelson Institute hosted the UW-Native Nations Summit on Environment and Health, and I served on the executive planning committee for a year to help make it a success.

Multi-layered politics are what Edith “Bardo” Leoso, Bad River Tribal Historic Preservation Officer and Midewiwin, member of the Ojibwe Medicine Lodge, calls the “layers of baklava of work in Indian Country.” It takes hard work and resilience to navigate these layers, and community leaders in Bad River do the work of many every day. Seeing and experiencing this, I learned firsthand how cultural trauma affects people personally and as a tribe. I observed how people in leadership do the work of so many, for the community members who are unable to advocate for themselves.

Bad River elders and other community leaders have taken considerable time and effort to guide me, a white researcher from outside, in beginning to understand Ojibwe Traditional Ecological Knowledge and education traditions. I am deeply grateful for their trust and generosity. Any shortcomings in my presentation of elders’ or others’ local knowledge are the result of my lack of understanding, and do not reflect any lack of knowing or effort on the part of Bad River collaborators. To the best of my knowledge and ability, I use a tribal lens and feature Bad River
voices front and center. My time with Ojibwe people has been a doctoral education in its own right. Miigwech.

Did white guilt creep in? Yes, and it was a motivator, mostly to listen about what is wanted and needed in Indian communities; and to be humble, honest and transparent. As a privileged white woman with a world class education and extensive support networks, I have karmic obligations on the part of white settler society to do something, many things, right by Indian people. I accept that, and I get to work. In working with indigenous people, I circumvent the problem of the “clueless white gaze” by immersing myself in community-based work with tribal members as co-researchers. My work with Bad River has taught me about working effectively across cultural boundaries, mobilizing around water, traditional knowledge, language, traditions, elders’ wisdom, and youth education.

So, two questions: 1/ how am I particularly well-situated for this work? And, 2/ which of my methods are generalizable?

Reflecting on question 1:

- I am a woman, which makes me less intimidating for other women, and possibly also for men.
- I am married, which makes me less of a threat.
- I am a mother, which makes the work more real for a community that deeply values family and future generations.
- I am an outdoorswoman. My expertise in outdoor skills of paddling, navigation, and wildcrafting plants helped me earn credibility.
- I am an outdoor educator. Tribal and non-tribal people alike worry that their kids spend too much time indoors—so these skills are desirable.

What works and is transferable to individuals who are not mothers and outdoor educators?

Reflections on question 2:

- Bring skills to the table, not an agenda. (Patty Loew; Dr. Margaret Pearce, University of Kansas)
- Listen, don’t prescribe.
- Be deferential to elders.
- Recognize the diversity of expertise.
- Be funny, or try to, even if you’re not good at it.
- Have extremely good manners, and keep your eyes and ears open for nuances.

I overheard Paige, one of my students in Bad River Youth Outdoors, say to her little sister, “You have two ears and one mouth, so listen twice as much as you speak.” I add that to our list of methods.

Water touches us all. Work for water is urgently needed, and interdisciplinary scholars in environmental studies help push the conversation forward. Work with tribes must be guided by reciprocity, with durable benefits of research remaining in communities. On the other end, by bringing this work into academy, we indigenize research protocols, curriculum, and campus climates.
INTRODUCTION

*Ganawendan ginibiminaan* is an imperative. Translated from *Ojibwemowin*, Ojibwe language, *Ganawendan* means “take care of,” “watch over,” “keep safe.” And it’s a command: “Take care of it!” *Ginibiminaan* means “our water,” all of us, tribal and non-tribal people.\(^1\)

Water connects us all. Bad River Tribal Historic Preservation Officer and member of the *Midewiwin*, Edith Leoso says, “Water is a living being stretched all around the world. Water works for us all, stays its course, and maintains its purpose.” To reciprocate, we must work for water too, right?

Water is central to Ojibwe identity, culture, traditions, and value systems. My dedication to water stewardship as a paddler and outdoor educator meshed well with Ojibwe values about water. It was reciprocal: I brought technical skills to the table that tribal members perceived to be helpful: mapping and GIS, experiential education, and certification by the American Canoe Association in paddling instruction. In exchange I received an Ojibwe education about *nibi*, water. Water stewardship and youth education became a *middle ground*\(^2\) of shared values and motivations for community based research in Bad River. I initiated this project in 2011 with the Bad River Band of Lake Superior Ojibwe\(^3\) whose reservation hugs the Lake’s south shore in northernmost Wisconsin.

After two years of visiting, listening, and planning, (and kayaking), Bad River community leaders and I had developed some lasting partnerships. Water stewardship was our *middle ground*, but we also needed to organize around research methods that would be both culturally-appropriate and contribute to academy. To resist colonizing, extractive research paradigms that have been a status quo for university researchers in indigenous communities, Bad River and I made a collective commitment to co-lead the projects, use indigenous research methods, abide by consensus and community feedback, and culminate with durable results / products that would remain in the Bad River community.

Indigenous and decolonizing research methods drove the work. I had excellent guidance through this process, beginning with my advisor Dr. Patty Loew, then following in the steps of indigenous research experts: Margaret Kovach (2009), Baegele Chilisa (2012), and Rosemary Ackley Christensen with Lisa Poupart (2013). Indigenous research methods are not understood through readings, though. One has to experience them.

I committed to an extended timeline in Bad River to make time and space for these relationships and plans to develop. This process supported a new shared space, Baegele’s *third space*, to critique the colonized and colonizer paradigms, and seek alternative pathways for collaboration. My first talk with Leoso was a two hour debate. Her stance clarified the pitfalls of university research and the bulls*** that Indian people put up with from outsiders who are trying to “help.” My stance was that it was possible to do this well if I committed to the people and place, and agreed to collective feedback and leadership. Again, caring for water was what we ultimately

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\(^1\) Wesley Ballinger, Ojibwe language specialist for the Great Lakes Indian Fish and Wildlife Commission, came up with this phrase. He gave me permission to use it, and offered the translation as well.

\(^2\) Philip Deloria, 2006.

\(^3\) *Anishinaabe* is the original name for The People. Ojibwe, Ojibwa, Ojibway, and Chippewa are other names commonly used for *Anishinaabe* people. I use Ojibwe because it is the name that I hear most often in both formal and informal conversations with Bad River Ojibwe people.
agreed upon as a starting place. Leoso became one of my main collaborators for the youth education and mapping projects, and ultimately agreed to be a co-author. Guided by elders and other community leaders, we collaborated around Traditional Ecological Knowledge (Berkes, 2012; Whyte, 2013) and Native Science (Cajete, 2000) to highlight capacities in Bad River for addressing pressing threats to the watershed: taconite mining, climate change, and aquatic invasive species. Bryan Brayboy’s Tribal Critical Theory (2005) urges that we need to examine and deconstruct institutions of embedded colonial power and ways of knowing. Bad River and I tackled three of these institutions: education, mapping, and western science.

This dissertation is comprised of three articles that I will ultimately submit for publication in academic journals. The first is Bad River Youth Outdoors, a cross-cultural watershed education program piloted in 2013. The second, Bad River Water & Culture Maps Project, presents story maps in multiple media that feature Ojibwe perspectives on the Bad River watershed and Lake Superior, and invite the public to contribute their own. The third is a culmination of the work, the ‘title track’ so to speak, Ganawendan Ginibiminaan. This examines Ojibwe water stewardship traditions, and is co-authored by Leoso.
BAD RIVER YOUTH OUTDOORS: LAYERED PEDAGOGY OF PLACE IN OJIBWE COUNTRY
Conaway, J.

Abstract

Outdoor education of youth is potentially a shared value between tribal and non-tribal people; this in turn can be an organizing force for researchers doing community-based research (CBR) in Indian Country. On the Bad River Reservation in northern Wisconsin, I worked with Ojibwe elders, educators, and natural resource agency employees, forming a broad educational network around water education and stewardship. Collectively, we designed and implemented Bad River Youth Outdoors (BRYO), a cross-cultural watershed education program for tribal youth. The program included cultural teachings, outdoor skills, and environmental education about the watershed. Tribal community members were co-researchers, and interviews with adults helped inform the research instruments designed for the youth program. This was a mixed-methods study supplemented by indigenous research methods and pre- and post-program sketch maps. The primary research goal was to determine how participation in the BRYO program affected watershed and cultural literacy. As a durable product of CBR, BRYO continues to be implemented in the Bad River community. Impacts of the program include empowerment of youth to consider themselves stewards of the watershed of their homeland. I apply, and subsequently critique, place-based education tenets for their application in indigenous communities.

Key words: Bad River Ojibwe, Bad River watershed, environmental education, experiential education, Native American education, Native Science, paddlesports education, place-based education, Traditional Ecological Knowledge

Introduction

Lake Superior Ojibwe (Anishinaabe, Chippewa) have a longstanding relationship with water and boating. According to Lac du Flambeau Ojibwe boat builder Wayne Valliere, “Canoes carry culture” (and T. Frandy, T. DuBois, personal communication, February 27, 2015). A Bad River Ojibwe tribal member clarifies, “Our people are water people,” (P. Kebec, personal communication, November 14, 2013). “Our identity is with the Lake and as caretakers of the rice,” says Aurora Conley of Bad River legal department (Personal communication, May 28, 2013). The rivers and lakes are the original highways. Ojibwe traditionally travel by smaller canoe for hunting and harvesting on inland tributaries, and for trade and warfare on GichiGami, Lake Superior, the 30-foot “navy” boats were used. “We fought the Sioux for a thousand years,”
recalls tribal education director Dana Jackson (Personal communication, May 30, 2013). Anishinaabe and L(D, N)akota⁴ had a moving boundary between territories in northern Wisconsin, Minnesota, and southern Canada. During the treaty era of the mid-1800’s, Ojibwe leaders travelled by boat for negotiations with other tribes and with the US government. In 1852, Gichiwaishki, Ojibwe Chief Buffalo, launched a birch bark canoe with his delegation from Madeline Island, heading to Washington to negotiate with President Fillmore on behalf of his people. Lake Superior Ojibwe identity is bound to GichiGami; traditional teachings are deeply place-based, woven into water and land. Boating is a form of cultural education, reinforcing ancestral ties to water-based activities of harvesting and stewardship.

Current Ojibwe leadership prioritizes connections between water and cultural traditions. Bad River Tribal Chairman Mike Wiggins, Jr., says “100 percent of our DNA is paddling on Lake Superior,” (Personal communication, October 10, 2011). Water-based activities, values and teachings sustain the connection of Ojibwe people to their homeland. Cultural renewals of water-based indigenous communities have occurred in the context of paddling and activities that are traditionally done by boat (Sullivan, 2000). In 1989 with Canoe Journeys, Pacific Northwest tribes revitalized shared cultural ties to ocean boating and honoring of family canoe roots (Johansen, 2012; Washington Tribes Canoe Journey, 2014).

Traditionally an open-water people, Ojibwe migrated many generations ago to the Great Lakes from the Atlantic Coast via the St. Lawrence River. Following the prophecies of their Origin

⁴ Dakota, Lakota, and Nakota are branches of the Sioux Nation. Dakota Territory is in what is now western Minnesota and eastern North and South Dakota. Lakota people are in far western North and South Dakota. Nakota are in northern regions: Montana, North Dakota, and into Canada.
Stories, Anishinaabe ended their journey in western Lake Superior at Moningwaaningkaaning Minis, Madeline Island. This southernmost island in the Apostle Islands archipelago is across a channel from the Bad River-Kakagon Sloughs, “the place where food grows on water,” describing manoomin, wild rice (Benton Banai, 1988). The Ojibwemowin (Ojibwe language) name for the Bad River is Mashkii Ziibi, “Wetland Medicine River.” French explorers experienced navigational difficulties during their first boat trip up Mashkii Ziibi from Lake Superior, named the river “Mauvaise,” and it came to be known as the Bad River.

The lower portion of the Bad River watershed is occupied and stewarded by the Anishinaabe Mashki Ziibi, the Bad River Band of Lake Superior Ojibwe (Figure 1). The 124,655 acre Bad River Indian reservation was created under the terms of the 1854 Treaty of La Pointe, and lies within the Ojibwe Ceded Territories (Figure 2), secured in the 1842 Treaty as lands and waters on which the Ojibwe reserve hunting fishing and stewardship rights (Loew, 2013). As of 2015, 1096 tribal members live on the reservation (Bad River Enrollment). The tribe has their own tribal government, natural resource department, early childhood education, and health care.
Figure 1. Bad River Ojibwe reservation and watershed boundary, Lake Superior’s south shore.
Today, the Bad River watershed is one of Wisconsin’s most celebrated and contested watersheds. Ecological highlights are diverse high quality aquatic ecosystems and mixed northern forests. The Bad River-Kakagon Sloughs comprise 40% of the remaining wetlands on all of Lake Superior, and the largest natural wild rice bed in the Great Lakes (TNC, 2011). The watershed has multiple designations indicating its quality and importance. Current threats to water in the Bad River watershed and the Lake Superior Basin include mineral mining,\footnote{During my research with the Bad River Ojibwe, a proposal to mine taconite in the headwaters of the Bad River watershed was being developed by Gogebic Taconite, a subsidiary of the multi-national Cline Mining Corporation. This was considered by both tribal and non-tribal people to be a significant potential threat to water quality and quantity, cultural health and environmental health. The threat of this mine provided context for much of the discussions about environmental protection during my research period. As of March 2015, G-TAC closed its doors in northern Wisconsin and withdrew their intent to mine in the Bad River watershed.} climate change.
impacts on water quality and quantity, aquatic invasive species, and concentrated animal feeding operations (CAFO’s) (Grady, 2007; Huff & Thomas, 2014). For the Bad River Ojibwe (Bad River), whose ancestral home encompasses the Bad River watershed and Lake Superior Basin, questions about water stewardship and native sovereignty are urgent.

Bringing tribal youth into water-based harvest traditions is a priority for tribal leadership—exemplified in programs hosted by the Bad River Ricing Committee and Bad River Natural Resources Department (BRNRD) both under the governance of the tribe; and the Great Lakes Indian Fish and Wildlife Commission (GLIFWC), an intertribal agency that governs harvest, environmental research, and management in the Ceded Territories of the Lake Superior Ojibwe.

In 2011, I began collaboration with Bad River around watershed education and stewardship for tribal youth. To a community with an established history of mobilizing for water protection, I brought the technical skills of paddlesports instruction, mapping/GIS, and place-based/environmental education. I designed the community-based research (CBR) (Strand et al, 2003) to incorporate decolonizing and indigenous research methods, and pedagogy of place as an educational model. The conceptual frameworks of Native Science (Cajete, 2000) and traditional ecological knowledge (TEK) scaffold the collaboration (Appendix_Terms). Drawing on indigenous methods and pedagogy of place, and supported by native science and TEK, we laid the groundwork for cross-cultural water stewardship (Figure 3).
Pedagogy of place (also called place-based education) was our starting point for collaborative youth program design in Bad River. Acknowledging that there are no Pan-Indigenous models of leadership and education, I agree with Mohawk indigenous education expert Gerald Taiaiake Alfred (2009), who purports that although indigenous communities are unique in their stories, cultures and philosophies, they do share similar concerns about conventional dominant culture, education of youth, and enduring native traditions. Native American education is deeply rooted in place and tradition (Basso, 1996; Deloria & Wildcat, 2001). Because of Bad River’s strong loyalty to homeland and water traditions, pedagogy of place (POP) seemed like it might resonate well. This education model includes practices of: teaching by elders, fostering relationships with nature, and engaging youth in community projects (Smith, 2001). Although contemporary models of education cannot claim to have the same breadth and scope as indigenous traditions, pedagogy of place shares some of the goals and frameworks with indigenous values about education.
The conceptual frameworks of Native Science (Cajete, 2000) and Traditional Ecological Knowledge (TEK) (Berkes, 2012) guided a deeper evaluation of Bad River educational values and cultural relationships to water within larger contexts of sustainability and sovereignty. The shared value of water stewardship constituted a third space (Chilisa, 2012), into which we incorporated indigenous and decolonizing research methods. Elder epistemology (Ackley Christensen & Poupard, 2014) collaborating around TEK (Whyte, 2013), Talking Circles, collective leadership, and community as co-researchers (Chilisa, 2012) were practices that we weaved into a mixed-methods approach. Interviews, surveys, sketch maps and immersive fieldwork resulted in data from three generations of Bad River tribal members. I analyzed Bad River narratives using emergent coding for traditional education methods and values, and assessed youth data for evidence of program efficacy.

I highlight here the research process and durable local outcomes. Bad River and I worked for four years in collaborative design and implementation of a place-based watershed education program, Bad River Youth Outdoors (BRYO). Piloted in 2013, BRYO incorporates native and western experiential education about nibi, water. Curricula include: 1) Ojibwe cultural water traditions, 2) respect and reciprocity, 3) hydrology, 4) aquatic ecology, and 5) monitoring waterways and stewarding wild rice. In this paper I demonstrate how, in the Bad River Lake Superior Ojibwe community, cultural knowledge and activities about water are conveyed from elders to youth using traditional teachings and methods, and how experiential place-based pedagogy contributes to this process. This article presents methods that are replicable in other communities, and features Bad River Youth Outdoors as a case study of a cross-cultural approach to enhancing tribal youth’s awareness of water traditions and watershed ecology. BRYO offers
tribal youth an opportunity to “paddle in two worlds,” with both tribal and non-tribal educational facilitators, in the familiarity of the home place—the Bad River watershed.

Literature

“As we experience the world, so are we also experienced by the world” (Cajete. 2000.p.20). Cultural geographers (Wylie, 2005; Ingold, 2000) delineate an emergent affective relationship between people and place. Indigenous people have a unique relationship to homelands described as “depth of place” (Pearce and Louis, 2008). Aldo Leopold drew connections between love for and understanding of the land and internalization of a stewardship ethic (1949/1966). Contemporary pedagogy of place (POP) provides an educational model to leverage these connections between people and their places in formal and informal educational settings. I begin the discussion with educational dimensions of native science and TEK, as foundational to indigenous education. I then explore similarities between pedagogy of place and indigenous education, incorporating critiques. I conclude with a summarization of native learning and teaching styles.

Educational dimensions of Native Science and Traditional Ecological Knowledge

Tewa ecologist Gregory Cajete presents guiding concepts of Native Science, a complex system of science, philosophy, and spirituality that integrates self with community, and Nations with nature. Educational dimensions of Native Science include ways of knowing that incorporate direct experience and observation, elder knowledge, and cultivation of an ethical relationship to the natural world (2000).
Traditional ecological knowledge (TEK) is local, intergenerational, environmental knowledge of indigenous people that is embedded in greater wholes of landscape management, social systems and worldviews (Berkes, 2012). Relevant to education, there are common threads in the ways that traditional knowledge is gained and shared. TEK is “… a cumulative body of knowledge and beliefs, evolving by adaptive processes, and handed down through generations by cultural transmission” (Berkes 2012. p8). Native science and TEK incorporate content - a body of cultural ecological knowledge, and process – participatory methods by which it is taught and learned.

Indigenous education scholars and practitioners shed light on cultural pedagogy, emphasizing elder knowledge and experience, native teaching and learning process (Barnhardt, in Gruenewald & Smith, eds, 2010)

Ojibwe Midewiwin ⁶and educator Eddie Benton-Banai establishes elder transmission as a relationship that began with the Origin Stories,

The teaching of the first Midewiwin ceremony…established the relationship that should exist between elders and youth among all people. This relationship provides a link between the knowledge that must flow between generations. It provides the links for an unbroken string of lives all the way back to our origin as a people (Benton-Banai, 1988. p72).

Ojibwe scholar Rosemary Ackley Christensen explains that oral teaching and learning are at the center of indigenous education methods: “Oral traditional Elder teachings… are a way to extend, expand and elucidate a proper education” (Ackley Christensen & Poupart, 2014 p5).

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⁶ I use the term Midewiwin to describe both a Lake Superior Ojibwe spiritual life path (sometimes referred to as the Medicine Lodge or Society) and to members of the Lodge.
That which Swisher and Deyhle (1989) call the “what” and the “how,” applies to not only what skills and concepts are taught, but how they are taught. Ackley and Poupart describe “participation learning” as a traditional technique still used by elders. Students participate as active listeners, engaging “body, mind, and spirit” when elders are teaching (2014. p18).

**Pedagogy of Place**

Pedagogy of place, also called education of place, place-based education, or bioregional education, is an educational framework in which the local natural environment is the foundation for curriculum development, integrating self, others and place. POP has its conceptual roots in the philosophy of Aldo Leopold (1949), was hinted at by David Orr in 1990, and was structured for contemporary application in education by Gregory Smith (2002). It includes ecological, economic, multigenerational, and multicultural elements (Smith, 2002). Leopold (1949/1966) argued for the preservation of ecosystems for the purpose of study. POP advocates are rediscovering these ideals, and applying them today (Knapp, 2005; Sobel, 2004).

Intergenerational learning and collective stewardship responsibilities build relationship to place (Reid et al, 2011). In POP, teaching methods include interviews, storytelling, and family history research. Time with elders is integral to youth’s learning about place: geographically, but also cultural and ethical obligations to place. This knowledge comes from an awareness of history, coupled with first-hand experiences in making an impact for the health of community and land.

Learning from elders and learning from the land are methodologies shared by both pedagogy of place and indigenous education. In pedagogy of place and indigenous education, direct
interactions with nature are requisite for learning. *Nature is both the context and the teacher* for the development of individual skills and relationships to the natural world. In experiential place-based education, nature provides the educative experience, and the teacher’s role is more of a facilitator (Knapp, 2005). “Power flows from nature,” (Alfred, 2009, p85). For indigenous people, land and place are central to traditional education. “Connection to place plays a powerful role, starting with the Origin Stories” (Ryan Comfort, personal communication, 5/16/12).

**Native learning and teaching**

In teaching tribal youth, it is important to engage what native education scholars identify as native learning styles: visual and collective (Swisher & Deyhle, 1989), and spatial (Loew, 2012). Spatial learners can engage in story mapping to learn their native culture and homeland watershed hydrology (Conaway, forthcoming). Collectively-led projects have proven to be successful in TEK/STEM collaborations for Ojibwe youth education (Tynan & Loew, 2010).

Particularly with regard to learning science, navigation of multiple epistemologies is more effective for native students than being asked to adopt a singular non-native epistemology (Bang, M. & Medin, D., 2010). The community based approach advocated by Bang and Medin brings in the importance of place, identity, and community in teaching native students.

The most effective teaching style is the “warm demander,” displaying cultural and humanistic understanding and high standards (Swisher & Deyhle, 1989, p9). This teaching style fits with what Marashio calls “a welding of humanistic and utilitarian learning,” using teaching
techniques of questioning, stories, songs, plays, playing and mimicking, and observation (1982, p.6).

Indigenous and non-indigenous youth alike benefit from pedagogy of place largely because of the diverse educational methods: learning outside, working with elders, and practicing responsibility and stewardship. POP contributes to development of ecologically-minded youth leaders who have stewardship ethics, communication and teamwork skills, and knowledge of local cultural and natural history (Conaway, 2006).

**Native critiques of pedagogy of place**

Culture, knowledge and power take on new meaning when examined through an indigenous lens. Tribal critical theory, TribalCrit, recognizes the pervasiveness of colonization as endemic to society (Brayboy, 2005). Place-based and environmental education have their roots in western culture. Bang et al critique place-based education for furthering colonial perceptions of uninhabited space and discovery, while neglecting deep indigenous histories and experiences of places (2014).

Contemporary proponents of POP advocate inclusion of multi-generational and multicultural dimensions to round out programming and lay the foundation for compassion, fairness, and tolerance (Knapp, 2005). This is a step in the right direction, although POP needs to incorporate histories and present experiences of place and diaspora of indigenous people, whether in urban or non-urban settings (Bang et al, 2014). Mapping is good for teaching about layered place knowledge and experience, as geographic data is represented and visualized in layers. Story
mapping depicts place narratives. Done ethically and collaboratively, it is well-suited for mapping indigenous knowledge (Conaway, forthcoming).

Methods

The project had three phases: 1) developmental work and study design, 2) data collection with adults and program design, and 3) data collection with youth and BRYO program implementation.

1/ Developmental work, study design
For two years beginning in summer of 2011, I travelled to Bad River four times a year for week-long visits. This phase included informal conversations with Bad River community leaders, educators, and natural resource employees. Goals were to build relationships, understand community capacity and needs with regard to youth watershed education, and build domain knowledge about culturally appropriate research methods, stewardship and education.

2/ Data collection with adults, program design
Beginning in spring 2013, I conducted semi-structured face-to-face interviews of adults in Bad River with maps. I used 40’ by 60’ maps that I had made of the lower Bad River watershed and Ceded Territories.

Interviews with adult research participants included questions about water traditions and teaching/learning (Appendix_Water interview questions). Adult participant responses and map
data contributed to the next phase: 1) curriculum development for BRYO, 2) the youth survey questions, and 3) guidelines for the youth sketch maps.

3/ Data collection with youth, program implementation

Work with Bad River youth lasted from June 2013 to May 2014. On day 1 of the BRYO program, the youth individually completed the pre-tests: BRYO survey, sketch map, and Talking Circle.

The youth surveys asked about cultural practices, language, hydrology, aquatic ecology, stewardship, and outdoor careers in order to ascertain cultural and ecological knowledge about water and the watershed. The survey consisted of nine questions asking for lists or short answer responses (Appendix_BRYO Survey).

For the sketch maps of the BRW, I provided written instructions and a list of 18 places, an 11 x14 sheet of cardstock and a pencil (Appendix_BRYO Sketch maps). I asked the youth to do a free recall sketch map (Weigand &Stiell, 1997; M. Wiggins, personal communication, June 28, 2011) of places on the list with the Ojibwemowin and English place names. On a whiteboard, I drew a very basic demonstration map of my home, the Madison Isthmus, which included a point, line and polygon features with labels.

For the Talking Circle, I had given asema, ceremonial tobacco, to Edith Leoso, the Bad River Tribal Historic Preservation Officer (THPO) and member of the Three Fires Midewiwin Lodge, asking her to facilitate. It is against cultural mores to record ceremony, so I recorded notes afterward.
The surveys, sketch maps, and Talking Circle, were repeated as a post-test on the last day of the BRYO program. I collected youth data pre and post BRYO program to assess changes that resulted from their participation.

**BRYO program implementation.** For four weeks in the summer of 2013, tribal youth participated in BRYO, modelled after a day camp, Monday-Fridays, 9am-3pm. Activities included cultural teachings, paddling, GPS, map use, and storymapping, making field guides of cultural uses of riverine and wetland plants, tracking activities, fisheries visits, wetland ecology “walk and talk.” Elders and members of the Midewiwin joined us at boat landings to do ceremonies and share teachings. Staff from the BR NRD and GLIFWC presented about their work and natural resource careers. Once day a week, we worked on stewardship projects that had been requested by the tribe: water monitoring, invasive species mapping and removal, and beach cleanup.

At the end of each program day, we gave prompts/questions for reflection, and BRYO participants used hand-held recorders to do individual or paired reflections. In the evenings, I recorded notes about participant observations and their reflections.

**Analysis**

Analysis for this study consisted of coding adult interview data for emergent themes about teaching and learning, and mixed-methods assessment of youth data modes. I analyzed the interview data from adult participants using emergent open coding. I assigned numeric scores for the BRYO surveys. To ensure inter-evaluator reliability, an external evaluator scored the BRYO Surveys independently using a key. I then met face-to-face with the external evaluator and we
went through the surveys to ensure that we were in agreement about the scores. Our level of agreement was 100%. I ran comparisons of average pretest and posttest scores. I analyzed the sketch maps for change between the pre and the post maps for each individual, including changes in number and types of features sketched, and accuracy of relative locations (Weigand and Stiell, 1997).

Results
I summarize study results as: 1) emergent themes from adult interview data about TEK, teaching and learning, and 2) pre and post-program results from youth participants about BRYO program efficacy.

Interview results
13 adults participated in interviews, eight women and five men, resulting in 13.75 hours of interview data. Preliminary analysis of initial interviews used inductive open-coding (Creswell, 2007). Twelve education codes emerged from the interview data. I aggregated these into five themes: 1) contexts, 2) TEK, 3) traditional teaching methods, 4) learning from nature, and 5) community organizing around youth education.

1/ Contexts
Context-setting is a strategy in oral tradition for “starting at the beginning,” particularly when speaking with an outsider. This informed me of relevant history about experiences of being “educated the white way” (Esie Leoso, May 31, 2013). Contexts for talking about education in the Bad River community were assimilation by Missionary educators, and resulting generational
gaps in traditional knowledge and loss of language. “My parents only used the [Ojibwe] language when they didn’t want us to understand. It wasn’t often though, so we didn’t learn it. I understand though, that my mom’s parents did speak Ojibwe” (Sue Lemieux, June 1, 2013).

My mom went to St. Mary’s Indian School here, and saw how the nuns and priests beat her classmates if they spoke the language….She grew up seeing kids captured in the bush if their families were out doing sugar camps, and federal agents would get the kids and they would be beaten right in front of them as an example of what would happen “if you are going to act like a pagan savage” (Esie Leoso, May 31, 2013).

“I was cut off from traditional teachings in my family because of systematic efforts to assimilate our people…influential institutions (schools, churches, government officials) engaged in teaching people here that their traditional culture was wrong” (Phoebe Kebec, November 14, 2013).

2/ **TEK**

TEK reveals Bad River water traditions, and the importance of intergenerational teaching within families, as “old, old ways of being” (Dana Jackson, May 30, 2013), and using water as a context for teaching values.

“We are highly dependent on water quality….Changing waters, water levels and water quality, long term observations…you’re talking about generations talking and sharing about how things were and are” (Dana Jackson, May 30, 2013).
Water traditions incorporate ceremony and water-based harvests. During the youth wild rice harvest, “we started with a Midewiwin coming, talking about the history of the wild rice, and doing a small ceremony for the children to show them that you need to give thanks before you do anything else” (Hilary Butler, November 15, 2013).

“There is still the generational: uncles teaching nephews, dads teaching their sons, grandmothers teaching their granddaughters” (Jill Hartlev, May 30, 2013). Traditionally, someone takes them out—dad or uncle. For my boy, his uncle took him and he hunts all over the res (Ervin Soulier, May 28, 2013).

Ancient teachings about water are passed between generations to instill The Seven *Anishinaabe* Values.

A lot of teachings emerged from the water a long time ago. Those teachings about the water enabled people to teach their children about respect, love, humility, wisdom, bravery, truth, and honesty. Those are our Seven Values and you can use the understanding of water, the relationship with water, to teach those Seven Values (Edith Leoso, June 1, 2013).

**3/Traditional teaching methods**

Traditional teaching entails doing things “the old way,” (Hilary Butler, November 15, 2013) or “the tribal way.” (Dana Jackson, May 30, 2013). Methods most commonly mentioned as being effective were: observation, hands-on learning, and fun.
Adults, many of whom were parents, grandparents, and/or educators, mentioned observation as the best way to learn. “Ojibway bimaadiziwin. Ojibwe lifestyle is observing nature” (Dana Jackson, May 30, 2013). “My grandma would point things out and say Wabam. Look” (Edith Leoso, June 1, 2013).

For teaching water science and ecology,” Hands on is best” (Cherie Pero, May 30, 2013). “For the wild rice harvest, we like to do that hands-on whenever possible….We want them to learn it right and we want them to learn it in our tribal way” (Dana Jackson, May 30, 2013). Sue did not grow up on the reservation, but learned ricing in the sloughs when she came up as a teenager in the summers: “I have siblings that came up here too but they didn’t go ricing. My older brother and I did, and I remember that experience. I can describe the landscape and the sky, you know, how it was” (Sue Lemieux, June 1, 2013).

Bad Rivers point to fun as the best way to learn. Kids love the macro invertebrate surveys for testing water quality. “There’s nothing like kids playing in the water…. they were playing with the water, and we were showing them bugs that live in the water, and they loved it” (Cherie Pero, May 30, 2013).

Sharing cultural/spiritual/traditional teachings are best done in a safe, comfortable setting. You want to ensure the environment is inviting … welcoming. The way we learn today is different than generations ago. They didn’t have the distractions; like TV, cell phones and electronic games. Yet, today this generation are able to navigate through it and still observe and do hands on learning and truly get it. Its important information
so we try to keep it fun, we don’t want to lose their interest and connection of who they truly are as Anishinabe. It’s called living a balanced life (Sue Lemieux, June 1, 2013).

4/ Learning directly from nature

Teaching and learning outdoors involves learning by harvesting and hunting, and “child to environment knowledge” (Mike Wiggins, Jr., May 28, 2013). “That knowledge is learned from the environment itself, whether it’s a good harvest for wild rice…. (Jill Hartlev, May 30, 2013).

Bad River traditional education is learning by harvesting, with nature as the teacher:

We know about water as it relates to our wild rice regarding sunlight, depth, water clarity….From a harvesting perspective, there’s the mode of transmission - human-to-human, teaching harvesting skills and all of those bodies of knowledge that come with being able to obtain food….After all is said and done and you have everything-what you’re grandparents and your dad and your uncles taught you about harvesting, and what you’ve learned from the land growing up, living a life connected to the soil and to the water, is an ongoing learning educational process that never stops. When your hands are digging down into mesh and you’re pulling fish into a boat, you have a very unique teacher as it relates to the fickleness of the river providing food… (Mike Wiggins, Jr., May 28, 2013).

“The different seasons taught us everything from how ice forms on the creek, how to move along the creek, to when we were apt to find lots of mature leeches to be able to use as bait…. the environment itself, our land and waters being the teacher” (Mike Wiggins, Jr., May 28, 2013)

5/ Community organizing for youth education
Bad River elder Joe Rose, Sr., expresses support for community education: “It's important to educate our young people and I'm willing to donate my time to do it” (May 29, 2013).

“A lot of the kids are involved in the mining issue. And I think it's been a catalyst for passing down this traditional knowledge. Parents are talking to kids about it and there's also a lot of community education that's going on. And some of its youth-oriented (Phoebe Kebec, November 14, 2013).

Youth programs, elder volunteers, tribal wardens, GLIFWC, UW Extension are all mentioned as having helped with the youth ricing and fishing workshops. “They’re all professional ricers, they’re not getting paid, they’re just there to help the kids out” (Hilary Butler, November 15, 2013).

This community education prepares young leaders: “With the youth and environmental issues, they’re going to be the leaders of the future. When we’re too old to get around like we do now, it's going to be up to them to take on that responsibility” (Joe Rose, Sr., May 30, 2013).

**BRYO survey**

Six youth completed the pre and post surveys. Average score for the pretest was 10.6/30. Average score for the post-test was 18.7/30, showing an increase of 8.1 in average scores. Participants’ scores showed the most improvement from pre to post for question #2, with an average score of .67/3 for the the pre-test, and an average of 2.6/3 for the post. This question asked about wetlands in the Bad River watershed.
Youth sketch maps

Six youth completed the pre and post sketch maps. I compared 1.) the sketched features of the built environment: towns, neighborhoods and roads with 2.) the sketched hydrology features: rivers and lakes. I organized the results of the sketch maps according to the presence and relational accuracy of each type of features (Weigand & Stiell, p15).

Sketch maps in the pre-test scored higher for presence of built features than hydrology, 4 versus 3.7. The trend was reversed in the post-test maps 4.7 for built features versus 5.8 for hydrology. (Table 1).

Table 1. Bad River Youth Outdoors participants’ sketch maps results, summarized

<table>
<thead>
<tr>
<th></th>
<th>Pretest average, built features</th>
<th>Post-test average, built features</th>
<th>Pretest average, hydro features</th>
<th>Post-test average, hydro features</th>
<th>Pretest average, total</th>
<th>Post-test average, total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence</td>
<td>4</td>
<td>4.7</td>
<td>3.7</td>
<td>5.8</td>
<td>9.3</td>
<td>14.3</td>
</tr>
<tr>
<td>Relational accuracy</td>
<td>3.5</td>
<td>4.5</td>
<td>3.2</td>
<td>3.8</td>
<td>8</td>
<td>10.5</td>
</tr>
</tbody>
</table>

Relational accuracy for hydrology features improved from an average score of 3.2 in the pre-test to 3.8 in the post-test. Group averages for map scores totals improved from pre to post. Tia’s pre and post maps provide good visual examples of improvement of spatial knowledge about water hydrology. (Figures 4 and 5).
Figure 4. Bad River Youth Outdoors participant’s pre-program sketch map illustrates spatial knowledge of built features on the Bad River reservation.

Figure 5. Bad River Youth Outdoors participant’s post-program sketch map illustrates new spatial understanding of Bad River watershed hydrology, and locations of two islands.
Youth Talking Circles

During the pre-program Talking Circle, participating youth said very little. After the oldest teenager spoke, others then repeated what he had said—variations on “It’s important to take care of Lake Superior.” During the post-program Talking Circle, the kids shared more openly about how their perspectives of water had changed:

“I think differently about the water. I want to take care of water, respect it, not throw litter in it” (Tia, December 7, 2014)

“I used to just think about the Bad [River] down here, but now I think about the Bad starting at Caroline Lake.” (Paige, December 7, 2014).

“I have a different perspective than other kids on the res—they don’t go out on the water and know about all these places like I do. We’ve been out there” (Kreighton, December 7, 2014).

Themes of the post-program Talking Circles were valuing water more highly, increased spatial understanding of watershed hydrology, and appreciating the wild places of the reservation.

Discussion

Approaches to research in Indian country necessitate inclusion and synchronization of both social and environmental processes, beginning with acknowledgement of capacities and strengths (Chilisa, 2012). In Bad River, water protection and youth education are priorities, and there is tremendous cultural capital within the community. Bad River ogeechidaa/kwe, warriors, have a history of mobilizing for water protection against unsustainable development and industrial pollution. Elders and other community leaders in Bad River take their roles as educators very seriously. 22 community members helped with instruction for the BRYO program during summer of 2013. Ojibwe TEK about water is an organizing force for educational collaboration within the community, and with me as an outsider.
Ojibwe and water share deep history, and place-based education in Bad River has this
intergenerational knowledge to draw on to help tribal youth grow their roots and “learn to love
their home” (M. Wiggins, personal communication, June 28, 2011). Bad River youth face
similar problems to other youth, but there are additional issues that are “uniquely Indian”
(Tynan, T., personal communication, October 12, 2012). Social issues in Indian country are
complex webs: generational gaps in practice of cultural traditions, assimilation, loss of language,
childhood obesity, alcohol and drug addiction, and gang violence. For tribal land-based cultures
and economies, these human challenges are inextricably linked to environmental justice issues:
loss of tribal lands, forest cutover, extractive industry, and diminished water quality and quantity.

There are traumatic histories of white education practices of assimilation in Indian communities,
and deep-seated divides between native and western educational views and practices. This work
affirms that it is possible to develop third spaces (Chilisa, 2012) that resist extractive research
paradigms of a colonizing academy, and strive to provide space for indigenous people to step
into a new relationship with research in a context of self-ascribed reality (Kovach, 2009). In our
collaborative space of Bad River Youth Outdoors, we carefully incorporated native and western
techniques, honoring distinctions between the worldviews.

Paddling skills are a link to the outdoors, and a means to teach water stewardship and other
Ojibwe cultural values and activities around water. On a reservation that is dominated by aquatic
features, paddling skills enhance participation in traditional subsistence activities of ricing,
fishing, and trapping. Water-based harvests are an integral part of water stewardship (Conaway
Harvesting off-reservation in the Lake Superior Ojibwe Ceded Territories asserts tribal sovereignty via exercise of treaty rights.

Community context-based teaching of sciences is more authentic to indigenous knowledge frameworks (Bang and Medin, 2010). Layered pedagogy of place in Bad River began with, and continued to collaborate around, TEK. Before our first program launch on the Kakagon River, Midewiwin guided us in a water ceremony. Elders taught regularly about the importance of water respect and stewardship. These teachings were salient to youth participants, evidenced in comments during the post-program Talking Circle.

To teach aquatic ecology, we used methods of inquiry shared by Native Science (Cajete, 2000), and experiential education: participation, observation, creative work, and reflection. Paddling the waterways of the Bad River watershed, youth had direct experiences of hydrology, flora and fauna. Youth sketch maps revealed increased awareness of the origins and confluences of rivers in the Bad River watershed. Youth surveys showed improvement pre to post for listing aquatic features, wetland types and locations, and fish and plants that live in the watershed. Story map work and oral reflections were ways to integrate what they had seen and experienced, and develop personal relationships with the waters of home.

Studies that are culturally sensitive yet academically rigorous (Brayboy, 2000) appropriately employ mixed-methods approaches that are iterative in nature. To the field of Native American education, I add mixed-methods research pursuant of answers to qualitative research questions that address particular challenges in specific communities. A place-based education program that
emphasizes technical skills and cultural values and activities, achieves both an educational systems critique and an exploration of methods that engage native students in environmental sciences experientially, and in their own communities.

**Conclusion**

When I asked Bad Rivers about “observing and learning from nature,” many laughed out loud at the question, responding with variations of, “That’s just Life.” Bad River teaching and learning traditions are networks of elders, places, language, lifeways—*Ojibway bimaadiziwin*, Ojibwe lifestyle (Appendix_Terms). These ways of knowing emphasize relationships and responsibility, and inform experiential education and pedagogy of place. Diversity is strength. If native communities want to collaborate around TEK for youth education, place-based education offers methods that intersect well with native teaching and learning styles. To the practice of place-based education, indigenous *depth of place* (Pearce & Louis, 2008), contributes layers of historical and present experiences. This strengthens and diversifies curricula, and makes our work more inclusive, and more accurate.

In collaborative community-based research with Bad River Ojibwe, my goals were to help advance native and western scientific literacy that is rooted in culture and the homeplace, and technological literacy that is grounded in traditional knowledge. To contribute to the fields of outdoor education, specifically paddlesports and place-based education, the outcomes of the current study are geared toward the production of curricula for teaching paddlesports in a cultural
context of Native American communities, as well as teaching place-based education programs with attention to indigenous issues and native learning styles.

When working with tribal youth, it is essential to consider native learning styles in program design and implementation. The educational system from primary to secondary levels is failing to serve native students effectively (Tynan & Loew, 2010). It is essential to implement teaching styles, techniques, and feedback that have shown success in native communities. Programs for native youth that encourage science learning resonate well when they are context-based—in the homeplace, whether on the reservation or in urban Indian communities; and leveraging native science along with western techniques.

The BRYO program is ramping up for its third year in summer 2015. Bad River tribal council is looking to expand this model into an intertribal program, incorporating non-tribal youth in neighboring watersheds along Superior’s south shore. They have invited me to be a member of a team to envision this next step.
References, Bad River Youth Outdoors


COUNTERMAPPING WATER AND CULTURE WITH THE BAD RIVER OJIBWE
Conaway, J.

Abstract
The Bad River watershed of northern Wisconsin is a natural boundary that encompasses both tribal and non-tribal communities who have mobilized around protection of water against threats of mineral mining, climate change, and aquatic invasive species. The watershed provided a space for community-based research (CBR) that shed light on the importance of water quality to the integrity of the place. Countermapping, which is use of western cartography tools for indigenous purposes (Peluso, 1995), illuminates Ojibwe spatial narratives as undercurrents of relationships to the homeland and the immense importance of water in Ojibwe culture. Participatory mapping that emphasizes cultural “storymapping” is appropriate for work in an indigenous community, as it engages collective leadership and modes of narrative communication. Participatory watershed mapping in the Bad River Ojibwe community involved elders and youth, and resulted in the multi-media Bad River Water & Culture Maps Project. The maps remain in the Bad River community as a durable product of CBR, for use in education, outreach, and policy efforts about water stewardship and sovereignty.

Key words: Bad River Ojibwe, Bad River watershed, countermapping, indigenous place names, Lake Superior, participatory mapping, spatial TEK, story mapping

Introduction
There was a time when Anishinaabe were poor and hungry, and had lost their way. Nigig, otter, dove into the water and then surfaced and called out to the People. Nigig began in the East, and then swam South, West and North to teach the People the powers of the Four Directions (summarized excerpt of “The Seven Grandfathers,” from Benton Banai, 1988, p 64-5).

Rock pictographs that dot the Lake Superior shoreline, birch bark scrolls that are passed between generations, songs, dances, and stories, all exemplify traditional Ojibwe maps of their homeland and culture. Traditional indigenous cartography of Gichi Gami, Lake Superior, employs multiple media—copper, rock, birchbark-- as well as performative techniques of storytelling and dance. Ojibwe, Anishinaabe, Ojibway, Chippewa cartography is traditionally participatory. Ojibwe people traveling by canoe created and subsequently added to rock pictographs that both aided in navigation and contributed to place-knowledge. A collaborative mapping project with the Bad River Ojibwe illustrated that community participation, intergenerational knowledge-making, and employment of multiple media are useful and effective today, albeit with careful attention to the ethics of cross-cultural cartography. To this end, participatory mapping and countermapping
proved to be appropriate frameworks for collaboration with the Bad River Ojibwe to map water and culture in the Bad River watershed of northern Wisconsin (Figure 1).

Placed side by side, historic indigenous and European maps point us in diverging directions. Indigenous mapping frameworks draw on relationships between landscape observation, participation, and place knowledge, all inherent to collective survival. This contrasts sharply with colonial European mapping conventions. Indigenous spatial frameworks reflect landscapes of lifeforce (Thornton, 2008) and survival, with relationships at the center. Historical European maps reflect landscapes of conquest and economies of extraction (Harley, 1990).

Maps have been used historically in indigenous communities to perpetuate colonial attitudes and aspirations (Harley, 1989, 1992; Herman, 2008). These historic power imbalances were perpetrated by both maps and underlying epistemologies that were imported from Europe (Rundstrom, 1995) and resulted in land and resource grabs. Because of the history of interactions between Lake Superior Ojibwe and Europeans exploring and immigrating to Ojibwe homelands, contemporary mapping efforts must necessarily look both backward and forward to avoid reproducing dysfunctional power relations. Fraught histories raise the stakes for contemporary cartographers. To avoid reenactments of painful histories around use of maps as tools of conquest, cross-cultural projects must be tribally-led and adhere to mutually agreed-upon ethics. Transparency, authentic collaboration, and use of indigenous research methods (Kovach, 2009; Chilisa, 2012) potentially result in decolonizing power shifts around mapping.

Use of GIS in native communities is linked to sovereignty and self-determination (Smith, 2008). Respective indigenous communities, guided by elders and culture keepers, decide for themselves what is considered traditional or cultural knowledge, and what gets mapped. Preservation and
protection of cultural knowledge is an aspect of tribal sovereignty, in terms of self-definition. Dr. Margaret Pearce, a Citizen Potawatomi geographer, cultural mapping expert, and inspiration for my work with the Bad River Ojibwe, asserts that cultural survival and sustainability of indigenous groups may be fortified by utilizing contemporary mapping technologies (Pearce & Louis, 2008). Maps as products of collaborative cross-cultural processes contribute to indigenous communities’ communication about native education, cultural preservation, and, specific to this study, water stewardship, within and beyond community borders.

Beginning in October of 2011, I conducted community-based research in water stewardship with the Bad River Band of Lake Superior Chippewa (Bad River). Being a white researcher working in Indian country, my intent was to build relationships and trustworthiness, and, as Native elders often advise, “do things in a good way” (Personal communications; Kovach, 2009. p19). I worked with Bad River tribal members to determine how cross-cultural cartography could both serve the local tribal community as well as enlighten academic practice. Using an iterative data collection process over three years, I worked with both adults and youth in Bad River. I interviewed 13 adults using two maps, one of the Bad River watershed (Figure 1), and one of the Ceded Territories (Figure 2). I asked about Ojibwe water traditions and places (Appendix_Water Interview questions).

The Bad River adults’ contributions about waterways were the basis for design of a watershed education program for tribal youth that incorporated GPS, navigation, and story mapping (Conaway, forthcoming). Youth paddled and hiked throughout the reservation, and added their personal stories about water to the basemap that we had started with the adults. Implementing ongoing map workshops and community feedback sessions, I continued to work with youth and adult participants through June of 2014, when we launched our story maps: the Bad River Water
and Culture Maps. Throughout this project, we explored possibilities for cross-cultural collaborations that would a.) result in maps that the Bad River tribe could use in outreach and education about threats to the watershed and their reservation, and b.) contribute to the development of protocols for university people/outsiders engaging in participatory cartography with indigenous communities.

I advocate for collaborative cross-cultural cartography, whereby indigenous stories, traditions, and values are represented using contemporary mapping platforms in a tribally-led process. Cartographic language is a potential interface for these two traditions (Pearce & Louis, 2008). Indigenous spatial knowledge can be collaboratively mapped (McCall, 2002). This *geocollaboration* (Roth, 2013) can facilitate intergenerational knowledge exchange between Bad River elders and youth, as well as cross-cultural discourse between Bad River and non-tribal communities about watershed resources, values, and policies. Traditional ecological knowledge with spatial components—*spatial TEK*—in Bad River was our conceptual framework for application of participatory mapping and countermapping to public education and water conservation. In this work with Bad River, I aimed to reconceptualize how water gets mapped, and assert how *spatial TEK* both informs geographies of water as socio-ecological systems, and perpetuates water stewardship and water sovereignty.

**Bad River watershed, ecological context**

Ecological highlights of the Bad River watershed are diverse high quality aquatic ecosystems and mixed northern forests. Wetlands, estuaries, and shorelines are habitats that support diverse wildlife, as do the mixed hardwoods and conifers of the Bad River reservation. The Penokee Range, at the headwaters of the Bad River, is a source for high quality groundwater that supports
the headwater wetlands and trout streams. The Bad River-Kakagon Sloughs comprise 40% of the remaining wetlands on all of Lake Superior, and the largest natural wild rice bed in the Great Lakes. They are home to many rare wildlife species, such as the wood turtle and ram’s-head lady-slipper orchid. The Bad and Kakagon Rivers also support walleye, and the Bad River is the largest producer on Lake Superior of lake sturgeon (TNC, 2011).

The Bad River-Kakagon Sloughs have earned international recognition for their water quality and biodiversity. Designations that denote their ecological and cultural importance include: Ramsar Wetland of International Importance, National Park Service National Natural Landmark, Wisconsin Land Legacy Place, Wisconsin Coastal Wetland Inventory Primary Site, Wisconsin Bird Conservation Initiative Important Bird Area, and The Nature Conservancy Priority Conservation Area.

Cultural context

The lower portion of the Bad River watershed is occupied and stewarded by the Anishinaabe Mashki Ziibi, the Bad River Band of Lake Superior Ojibwe. Lake Superior Ojibwe people migrated to the Great Lakes Basin from the Atlantic Coast via Moneang Ziibi (Kohl, 1860, p. 118), now known as the St. Lawrence River/Seaway. Following the prophecies and signs of their origin stories, Anishinaabe ended their journey at Moningwaaningkaaning Minis, Madeline Island. The island is across a channel from the south shore of Superior, Manomikan, (Kohl, 1860, p 117), “the place where food grows on water” (Benton Banai, 1988). This describes the wild rice beds of the Bad River-Kakagon Sloughs. Manoomin, “the good berry,” wild rice, has immense spiritual, cultural, and economic significance for Ojibwe people. They fought “for a thousand years” with L(D,N)akota people over the territories where rice grows (D. Jackson,
pers.comm.). In the mid-1800’s during treaty making with the US government, Ojibwe leaders reserved rights for their people to hunt, fish, and gather rice and other plants upon the land and waters of the Ceded Territories (Loew, 2013).

Created under the terms of the 1854 Treaty of La Pointe, the 124,655 acre Bad River Indian reservation (Loew, 2013) includes the lower Potato, Bad, Marengo, White and Kakagon Rivers, the Bad River–Kakagon Sloughs, and thirty miles of Lake Superior shoreline. The reservation of the Bad River Band of Lake Superior Chippewa is in sight of Madeline Island, which remains the spiritual and cultural hub of Anishinaabe, a people who are now in a diaspora that spans two countries and four states (Joe Rose, Sr., pers.comm.). The reservation has 1,096 tribal members living on it, as well as non-tribal members (Bad River enrollment, 2015). Bad River has a sovereign tribal government, its own natural resource department, early childhood education, and health care, among other administrative infrastructure. Tribal members reside primarily in four community hubs, which are, from east to west: Birch Hill, Frank’s Field, New Odanah, and Old Odanah (“Diaperville”).

**Literature**

Indigenous geographies are both ancestral and experiential, incorporating complex frameworks of context, space, and time. Depth of place (Pearce & Louis, 2008) describes generations of knowledge and experience that conglomerate and integrate into indigenous homelands. This depth of spatial knowledge constitutes a powerful cartography for indigenous communities to leverage as capacity for cultural and ecological protection. Maps continue to be used by outsiders to exploit indigenous communities and their resources. Decolonizing cartographies are needed to equalize power relations in collaborative practice between indigenous and non-indigenous
mappers. Ongoing critiques of embedded power dynamics in geographic information systems (GIS) and cartography are more likely to assure respectful practices for their implementation in indigenous communities. Participatory mapping and counter-mapping (Peluso, 1995) that use indigenous research methods (Kovach, 2009) and collaborate around TEK (Whyte, 2013) more appropriately represent indigenous values systems and priorities, so nurture and advance cross-cultural praxis.

**Indigenous geographies**

There is no “pan-indigenous geography,” but there are common threads running through global indigenous representations of space, and the ways in which they are leveraged. Pearce describes indigenous cartographies as dynamic assemblages that include place and time, stories, traditions, movement, and the traveler (2014). Regarding indigenous cartography, navigational and mapping methods are diverse and dynamic. In Meso-American indigenous mapping, time and space are both projected (Harley, 1992). Song, dance, and ceremony are also used (Pearce, 2014; Leoso, L. pers.comm.) to visualize and depict spatial stories. *Songlines* are song maps, sung by young Australian Aboriginal men on Walkabout, a reenactment of walks of ancestors (Chatwin, 1986).

In indigenous geographies that are lived and participatory, the navigational knowledge is internal to the traveler or wayfarer (Turnbull, 1993; Ingold, 2000). Indigenous epistemologies employ strong creative and spiritual elements (Cajete, 2000), and this applies to their cartographies. Ojibwe healers dream routes (Tanner & Erdrich, 1994), and Tsa’dane (Beaver) hunters dream maps (Brody, 1981). Mapuche dream sacred sites (Hirt, 2012). On the Great Migration to western Lake Superior, Ojibwe were guided by prophecy, and navigated by observing natural
phenomena -- birds, plants, water currents (Benton Banai, 1988; Turnbull, 1993. p 22). “We followed the signs of life to navigate here. Wild rice is one of those sign posts,” (Oral tradition; M.Wiggins, pers. comm.). Indigenous spatial knowledge, navigation and mapping practices push understanding and definitions of maps that have been the status quo in western paradigms, even in critical cartography.

**Western cartography’s tipping point**

Empire-building has been a historical driver for western cartography, exemplified early on in the *centuration* grid system that Romans imposed on Europe (Edgerton, 1987, cited in Turnbull, 1990). In the Middle Ages when Europe turned its gaze westward, conquistadores ultimately would come to extract indigenous spatial knowledge from “the Americas” as they did gold and other resources. These indigenous geographies constitute an invisible layer of the maps of the European conquest, which contain “…oral geography of Indian knowledge as much as the inscribed geography of the Europeans…” (Harley, 1990, p xii).

Western cartography not only subsumed indigenous spatial knowledge into its maps of the Americas, but also acculturated indigenous geographies with its own. Western cartography was “…both a tool and a product of the colonial era” and its underlying knowledge systems, boosted by the new assumed rationality of science, were tools of assimilation of native geographies globally (Herman, 2008, p73). Maps were and are sources of political power and leverage. “Maps are sovereign” (Crampton, 2010,p. 9). As representations of colonial epistemologies, western cartographies were hierarchical, with a powerful elite controlling what was mapped and how.
After propping itself up for centuries on alleged rationality, scientific truth, and neutrality, western cartography’s power structure has come to be the focus of critique, particularly in its applications with indigenous communities. Critical cartographers problematize maps, asserting that even western maps are “indexical,” so culturally situated in both production and relevance (Turnbull, 1993, p20). Maps are both scientific and artistic (Harley, 1989), so incorporate creative elements in addition to observed information. Maps are value-laden, and constructed to serve interests which are not always transparent or ethical (Wood, 1992).

Questions of historical complicity of western mapping traditions need to continue to be deconstructed. Tribal Critical Theory, TribalCrit, recognizes that colonization is pervasive in society, and calls for use of an indigenous lens to examine institutions of the dominant society (Brayboy, 2006), including cartography. In cartography, there is a need for decolonizing attitudes and methodologies (Louis, 2007; Pearce & Louis, 2008). To respectfully engage with and represent indigenous knowledge, we need to re-envision mapping power dynamics (Pearce, personal communication, 2014) and revisualize decolonized maps (Huggan, 1989).

Decolonizing cartography that looks at indigenous spatial knowledge-making and relationships to non-human worlds provides orthogonal pathways out of colonializing western spatial epistemology (Rundstrom, 1995).
Decolonizing cartographies

Reframing power relations and valuing indigenous knowledge systems are part of a decolonizing process and ultimately assert sovereignty. Decolonizing happens between insiders within communities and can also happen across cultural contexts (Kovach, 2009). Bringing tools, not schemes or agendas, are among the first steps toward ethical practice for outsiders mapping in indigenous communities (Krishna, 2007; Pearce, 2014). Outside cartographers working in Indian country also need to acknowledge intellectual property of tribal people (Madsen, 2008), and commit to authentic reciprocity between tribal communities and universities, agencies, and NGO’s.

Decolonizing research methods can guide cross-cultural cartographic practice, and are often framed in spatial terms. Third space (Turnbull, 2000; Chilisa, 2012) cartography entails creating a differentiated, shared space for native and non-native stakeholders to collaborate around indigenous spatial knowledge. Philip Deloria describes “a middle ground” (2006) where alternatives to colonized/colonizer paradigms can be examined and implemented. Berkes advocates for “co-creation of learning communities” (2012) where leadership is collective and expertise is shared reciprocally across cultural boundaries. Elder epistemology (Ackley Christensen & Poupart, 2014), the Tribal four R’s: respect, reciprocity, relationships, and redistribution/ responsibility (Louis, 2007, p133), protocols, ethics (Kovach, 2009) and partnerships (LT Smith, cited in Smith 2008) are indigenous research methods that are also appropriate for cross-cultural collaborative mapping.
Mapping indigenous place names is decolonizing in that it affirms connections between power and place for native people (Deloria & Wildcat, 2001) and begins a healing process for loss of language and culture (Pearce, personal communication, 2014). Indigenous toponomy (Rambaldi et al, 2006) has been a focus of mapping projects for language preservation (Hoffmann et al, 2013) and for tribal sovereignty and treaty rights (GLIFWC, 2007). Ojibwe spiritual leader Josephine Mandamin asserts that waterways must be given back their indigenous names because the place names have instructions for stewardship (Ashawasegai, 2011). Place names and caretaking goes both ways. Apache elders told Basso that their youth needed to know native place names “so that the land can work on them” (1996, p 38).

The power of stories

Participatory mapping is useful for collaborative community projects with a broad base of leadership and expertise at the table, and provides methods for collecting and representing TEK. Countermapping, cultural mapping, and story mapping are all potential processes/outputs for qualitative mapping in indigenous communities. Countermapping is a strategy that uses western cartography tools for indigenous purposes (Peluso, 1995). Meso-American indigenous communities used maps to assert territory and duration of occupation in resistance to early European conquest (Harley, 1992). These are among the first records of countermapping. Countermaps feature counter-narratives, perspectives of the groups that have been historically silenced or pushed to the periphery. Cultural mapping (Pearce & Louis, 2008) describes a process in which place knowledge and place histories are mapped into their respective locations. Cultural mapping happens in multiple media, with narratives depicted as text, iconography, photographs, and video. Story mapping is part of the democratization of mapping, and enabling
more GIS users to tell their stories (Artz, 2011). Participatory photo-mapping (Dennis et al, 2009) is a visual story mapping media.

Stories are real, legitimate sources of data (Brayboy, 2005), and “mapping is listening” (Pearce, personal communication, 2014). Mapmaking is broadly constructed by indigenous people as both practice and process (Hirt, 2012). Participatory GIS (PGIS) (Kwaku Kyem, 2001) developed in response to critiques of GIS, as well as to meet community mapping needs. Collaborative models such as PGIS are issue and process-driven, rather than technology –led (Dunn, 2007).

Participatory mapping is appropriate for gathering and mapping qualitative spatial information, such as narratives (Buckingham & Dennis, 2009). A qualitative approach is well-suited for creating collaborative networks around spatial representation of TEK. Stories as sources of personal and cultural stories contribute to meaning-making (Creswell, 2007), and support other types of data about place, water, and culture. Qualitative GIS succeeds in representing multiplicity in spatial data (Yao & Jiang, 2005) so is more able to reflect holisms of TEK.

**Cross-cultural cartographic ethics**

Ethics is a research method (Kovach, 2009). All sites, all waters, all lands are sacred (Armstrong, 1996; E. Leoso, pers.comm.). Disclaimers are one way to handle disconnects between TEK and western cartographic representation (Appendix B). There is fear in indigenous communities of culturally significant sites being abused (Smith, 2008). The use of community feedback and consensus process about what should get mapped (Jankowski, 2009) help
cartography to ethically portray TEK. *Portray* and *protect* are the double-edged sword of cross-cultural cartography.

**The Bad River Water & Culture Maps Project**

Mapping water and culture with the Bad River Ojibwe entailed community-based research that employed cross-cultural collaboration and indigenous research methods. Formal research methods included 1) two years of developmental work and 2) two years of data collection, synthesizing, map drafting, and community feedback sessions. I gathered and processed spatial data from Bad River adults and youth in an iterative, organic process. Data from adults and youth at Bad River were featured in culture maps in multiple media. I incorporated indigenous research methods and qualitative analysis, holding Talking Circles and using emergent coding.

**Participatory mapping with the Bad River Ojibwe: process and methods**

The process of this community-based research was as important as the products. The process included orienting to the people and the place, and relationship-building around watershed education and mapping. I traveled to Bad River four times a year for four years, scheduling week-long visits each time to allow for arrangements to develop for meetings and visits. When I met with people, I made an effort to be sensitive to community duties, such as leadership demands and constraints, caring for children and foster children, answering phone calls, and talking to other visitors and co-workers. Meetings always lasted at least one hour, and often much longer. This time together with tribal members was crucial for understanding more about community values, interactions, and challenges. I also met with Bad River tribal members in Madison, Wisconsin, and communicated via email and phone. This developmental work was
essential for articulating community-based research needs, and building relationships with people who wanted to collaborate on the mapping project. Bad River tribal members and I found common ground in water stewardship and protection, youth outdoor education, and the potential role of maps in illustrating cultural ties to the waterscapes, water-rich landscapes, of the Bad River watershed and Lake Superior.

Researcher

I am a white researcher in the Nelson Institute of Environmental Studies at the University of Wisconsin with a background in experiential education. To the middle ground of stewarding and mapping water, I brought the skills of cartography/GIS, environmental education, and paddlesports instruction.

Our participatory mapping progression went as follows:

1) developmental interviews

2) semi-structured interviews with Bad River adults with interactive maps

3) use of adult spatial outputs in development of Bad River Youth Outdoors (BRYO) program

4) BRYO implementation which included gathering raw data for story maps

5) BRYO story map workshops in computer lab, 6/ production of Bad River Water & Culture Maps (Bad River Maps)

6) outreach, education and politics with the Bad River Maps.
This workflow is organized into layers of spatial data that comprise the Bad River Maps.

*Layer 1: Place data of community leaders in Bad River*

Developmental interviews. In October of 2011, I did developmental interviews with five tribal members. I used photocopied maps, and asked people to show me some of the places that have significant water stories associated with them. I also asked about protocols and terminology. Once I was more culturally informed about values and language, I was able to draft the semi-structured interview questions to be responsive to current capacities and concerns within the community. Bad River community leaders Joe Rose Sr. and Edith Leoso joined on project co-leaders.

*Layer 2: Place data of elders, educators, spiritual leaders, grandparents and parents in Bad River*

Semi-structured interviews. For formal data collection between May of 2013 and April of 2014, I started with community leaders, and used a “snowball” sampling method of connecting with people through word of mouth references (Biernacki & Waldorf, 1981). I also worked with the tribal administrative secretary to send out a community-wide email to invite people into the interview process, which resulted in two more participants. The majority of participants became involved through recommendations and contact information being shared with me by people who had gone through the interview.

Interviews with thirteen adult research participants included questions about places, culture, and water in the Bad River watershed and Ceded Territories (Appendix_Water interview questions). Within the semi-formal interviews, I used two maps that I had created in ArcMap of the reservation and Ceded Territories (CT). These extents were represented in two large format
“table” maps, 40” by 60.” Map 1 of the reservation and lower Bad River watershed was at a scale of 1:100,000. Map 2 of the CT used the same extent as the GLIFWC Cultural Atlas at a scale of 1: 500,000 (2007). I used Mylar, a clear polyester sheeting, cut-to-size and laid over the large format maps with the corners of the sheeting marked to the corners of the map extents for georeferencing.

To avoid intimidating participants with the large maps, if timing allowed, I emailed/mailed them 8.5” x 11” preview maps so they could become familiar with them before the actual interview. Often there was not time to email/mail these previews because the interviews would be scheduled with short notice, or happen spontaneously. Because I had been visiting the community for two years, people were somewhat familiar with the project, and so were generally comfortable with interacting with the table maps without having previewed them.

During the semi-formal interviews, I invited tribal members to mark the maps using stickers and Sharpie markers. They marked and numbered their points, sharing narratives about water and culture that are associated with those places. The numbers on the points served to match them with the audio file and interview notes.

I scanned the Mylar transparencies containing adult data using a Contex Magnum XL 54 large format scanner. The scanner outputs were tiff files, which I then georeferenced for analysis in ArcMap 10.1. I added the tiffs to the basemaps, using known latitude and longitude for the corners for georeferencing.

The interface: bringing indigenous spatial data into ARC GIS

To minimize steps for transfer of participants’ data to GIS, I used ArcMap tools to represent the data exactly as they had placed it. I assigned point symbology for the sticker points. Using the
Create Features tool, I traced the lines and polygons that tribal members had drawn. Each participant had their own data layer. When all layers were visible in ArcMap, I visually determined where participants’ points, lines and polygons were aggregated.

This aggregated adult data translated into a list of places for the Bad River Youth Outdoors “campus.” The next iteration of the project was working with the youth.

*Layer 3: Place data from youth in Bad River Youth Outdoors (BRYO)*

GPS/mapwork. During the BRYO program in July 2013, we paddled and hiked to places in the watershed that the adults had identified as important. Youth participants learned technical skills of mapping in the field: map reading, compass use, and GPS use. We used Garmin E-Trex 10 GPS units to capture waypoints. BRYO participants used a Garmin Montana 650T GPS with a camera, to take photographs for use in their story maps. Elders and community members met with us during the program days to share cultural perspectives about the watershed. Youth incorporated these into their story maps.

*Story map workshops with Bad River youth*

After the BRYO program pilot, we followed up with a series of three map workshops held in November 2013 and January and April of 2014. To construct their story maps, youth worked in Arc Map in a computer lab on a nearby college campus. They brought in waypoints from the three GPS units, and chose which places that they wanted to story map for their webmap. The youth waypoint data and associated story maps were collective- each place’s story map represented the whole group who had participated in the summer program.
Layer 4: Interviews of adults and youth together

In spring 2014, I designed and taught an environmental studies capstone course in which undergraduate students at the University of Wisconsin-Madison worked with the Bad River Ojibwe as a community partner. Under my supervision, three undergraduates conducted face-to-face and phone interviews of Bad River community leaders and Bad River Youth Outdoors participants, and added this text to the basemap. This data layer contributed to the cultural atlas.

Qualitative spatial analysis

For the map data, I did a visual assessment of the aggregation of adult spatial data, focusing on the number of points that three or more people referenced as important. I aggregated the data across the participants’ layers and observed patterns in what people had identified as important.

I triangulated the geographic data using: 1/ the adult participants’ map data, 2/ the adult participants’ narratives, and the 3/ Gidakiiminaan Atlas (GLIFWC, 2007).

For the interview data, I did two rounds of coding in NVivo 10. The first cycle was attribute coding for place names that Bad River adults identified as important. Associated activities, stories, values were included as attributes to those place name attribute codes. The second cycle was pattern coding (Saldana, 2009) to cross-reference place name attribute codes with emergent social networks and patterns of relationships (Miles & Huberman, cited in Saldana). This consisted of identifying in what ways water-related places were associated with water values, traditions, and/or activities.
Results

Eight women and five men (n=13) participated in the interviews with maps, resulting in 13.75 hours of interview data. Of the 13 adults that I interviewed, ten interacted with the maps. One interview was cut short for personal reasons before we got to the map questions. Two participants chose not to look at/comment on the maps. The majority of Bad River tribal members were comfortable interacting with the maps at all phases of the research and sharing the history of the places. The maps were an icebreaker and conversation starter, and a storytelling centerpiece. Elders used the CT map to tell stories of how people traditionally move around using the lakes and rivers for transportation. This large map of the extent of Lake Superior highlighted the tradition of Ojibwe as seafaring people. The map interviews resulted in two forms of spatial data, narratives and shapefiles, the latter including points, lines and polygons.

Relevant emergent themes in the narratives correlated to space, place, and boundaries. Twelve spatial themes emerged in interview data. The code matrices for these themes were 1/ spatial TEK and 2/ territory and boundaries. Spatial TEK included the Migration Story, place relationships, and Ojibwemowin place names. Territory and boundaries included contested reservation boundaries, treaty lands, and territorial warfare with the Lakota. Here I highlight the spatial TEK about waterways, water places and water traditions that emerged in the interviews.

Bad River elder Joe Rose, Sr. tells the story of the Great Migration of Ojibwe people:

The Anishinaabe Migration Journey, according to oral tradition there were seven stopping off places. 1. Island (St Lawrence River). 2. Niagara Falls, 3. Detroit, 4. Manitoulin Island, 5. Sault Ste. Marie, 6. Duluth (St Louis River), and 7. Madeline Island.
There were signs that were given to them in prophecy. When they came to Sault Ste Marie, one group went north and one went south. And traveled on Lake Superior all the way to the St. Louis River, Duluth Minnesota, and they were to look for “the food that grows on water.” They found it on these inland Minnesota lakes. They knew that they wouldn't be back home again until the megis and the other signs appeared for the seventh time. So they went to high ground, a place called Spirit Mountain to fast. They fasted and received a vision to double back to a place called *Moningwaaning kaaning Minis*, Madeline Island (Joe Rose, May 29, 2013).

Bad River *spatial TEK* includes deep relationships to place indicated by directional knowledge that is highlighted in ceremonies-- orientation on the land and in the cosmos:

“When I do pipe ceremonies I pray to the Seven Grandfather Spirits, i.e. to the four directions, to Ojibway Gichi Gami, to Mother Earth and to the Great Spirit, who created all the other spirits and set everything in motion in a state of harmony and natural balance” (Joe Rose, May 29, 2013); and cyclical knowledge of seasons and eras, “The doorway of our ceremonial lodges faces the East. We look to the place where the Sun is reborn each morning, and we give thanks for that new life, the four seasons, for the new day, for new beginnings, for new generations” (Joe Rose, May 29, 2013).

Map interview participants demarcated and named 53 places as important, and I stored these as points, lines and polygons. 16 places were referenced by three or more participants, so we considered these to be the most salient for Bad Rivers in talking about connections between water and traditions, stories, water activities (Table 2).
Table 2. All places in the watershed are important. Places listed below, identified by 3 or more Bad River adults, tell an especially significant story about water.

<table>
<thead>
<tr>
<th>Place</th>
<th>Sources</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Superior</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>Bad River</td>
<td>9</td>
<td>31</td>
</tr>
<tr>
<td>Kakagon River</td>
<td>9</td>
<td>24</td>
</tr>
<tr>
<td>Honest Johns</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Potato River Falls</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Bad River Sloughs</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Odanah</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Penokees</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Bad River Falls</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Long Island</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Tyler Forks</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Elmhoist Bridge</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Madigan</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Copper Falls</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Madeline Island</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Bad River Mouth</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

We included these places in the BRYO program, if logistics of getting there were possible for the group.

I highlight five of the places here with quotes from the interviews. The Ojibwemowin place names are GichiGami, MashkiiZiibi, Ogaakagonike, Odanah and PenoAki.

*GichiGami, Lake Superior*

“Ojibway Gichi Gami, is translated as the Great Lake of the Ojibway,” (Joe Rose, May 29, 2013).

*MashkiiZiibi, “Wetland Medicine River,” Bad River*

*Mashki* is relative to mashkiki, which is medicine. Some people say marsh or swamp, but you have to remember that a marsh or a swamp is where the medicines are found. At certain times
of the year you can find every medicine that there is to heal your body or your mind. *Mashki Ziibi* is what they called it. (Edith Leoso, June 1, 2013)

*From the youth’s story on the BRYO webmap:* Bardo taught us about how the French couldn't get up the Bad River because of the falls. So they named it "Bad River" in French. In the late 1600s, Radisson and Grosseilliers saw Ojibwe Indians on the Bad getting their gardens ready (Bad River Youth Outdoors, 2014; Retrieved on 4/8/15 from http://bryomapsite.com/).

*Ogaakagon’ike, Kakagon River*

That was the Seventh Stopping Place of the journey. They sent their scouts across the channel between Madeline and Long Islands- there used to be a cut right here, they came into the Kakagon sloughs, where they found the food that grows on the water growing more profusely than they'd ever seen anywhere else. That’s *manoomin*-- wild Rice. And so it was declared sacred because it was a very strong part of the Migration Story (Joe Rose, May 29, 2013).

*Odanah, Odanah*

*Oday* is heart. *Odanah* it's translated to “town.” It's where this heart is here. And you think about how a heart works, and you see all these river systems all the way through here, and it's just an acknowledgement that the town-- the people, it’s where we all come together. There's also a system of rivers and waters. It's not just dirt and water, it's a living place. And this is the heart of the people. (Phoebe Kebec, November 14, 2013)

*Peno Aki, Penokees*

A dream I had of the Penokees was about this old woman…. And she told me about the
Mishomis, Mishomis being Grandfathers, the rocks of the Penokees. The woman said, just like the Creator can ‘turn’ kinninckinnick [traditional Indian smoking blend], that’s what the Mishomis do for the water in the Penokees. Just like the Creator can take your prayer, and in that first breath you take to say it, He’s got everything that you have ever wanted to say—and He turns it. The old woman repeated, ‘That’s what the Mishomis do for that water’ (Mike Wiggins, Jr., quoted in the cultural atlas).

Cartographic decisions

Questions of boundaries and sovereignty

To honor the sovereignty of Lake Superior Ojibwe, and because they were made available to me, I used the shapefiles for the Ojibwe reservations and Ceded Territories, shared by the Great Lakes Indian Fish and Wildlife Commission. For the Bad River watershed boundary, I used the BR NRD shapefile for the Bad River watershed (BRNRD, 2014).

Authentic cultural representation for map features

For place labels, we used the GLIFWC cultural atlas of the Ceded Territories as a starting point, and worked with the Bad River elders to zoom in on place names within the smaller extent of the Bad River watershed. We used Ojibwemowin and English toponomy. Because we were mapping stories, we opted for a simple, uncluttered basemap. Our maps emphasized water and wetlands,

\[^7\] Shared in March 2014 by Bad River GIS department with this explanation: “The Bad River Tribe and the Wisconsin DNR modified the boundary of the Lower Bad River watershed (10-digit HUC) to include the Beartrap Creek subwatershed. Ecosystem management decisions are based on this revised watershed boundary, such as the Bad River Tribe's Non-point Source Management Plan. For more information, please see: [http://dnr.wi.gov/water/watershedDetail.aspx?key=924673](http://dnr.wi.gov/water/watershedDetail.aspx?key=924673)
so we simplified the National Land Cover Data into wetlands, forested and non-forested. We used the online WI DNR watershed viewer (WI DNR, 2014) coupled with stream data for the watershed shared by GLIFWC GIS staff.

Bad River elder Joe Rose, Sr. suggested that we use the Ojibwe Medicine Wheel for our map compass, with Ojibwemowin for the names of the directions. Bad River tribal member and artist Ed Wiggins did the artwork for the map header.

Disclaimers

One of the dangers of spatial representation of water for Bad River is that, in labeling certain waterways or water bodies, certain places are highlighted over another.

Because I’m Midewanikwe, every place is important. There isn’t one that is less important. Everything is important, even the smallest stream, and the smallest lake (Edith Leoso, June 1, 2013).

To resolve this conflict in representation of place values, we included a disclaimer about this traditional relationship to place. We included two other disclaimers: one for language about spelling and local variation, and one for boundaries of reservations and Ceded Territories (Appendix_Disclaimers).

Bad River Water & Culture Maps: four maps, four media

This work resulted in four maps, the Bad River Water&Culture Maps Project. I made the basemaps in collaboration with the UW Cartography Lab, and featured the same extents for the four maps. While the wall map, cultural atlas, and webmap all feature Bad River Ojibwe, adult
and youth, perspectives on water and culture, and the floor map is a “blank slate” for public story maps.

Wall map

This is 40” by 60,” entitled *Mino Nibiwan, Mino Bimaadiziwin: Good Waters, Good Life. A story map of Bad River Ojibwe water values, culture, identity, and place* depicts stories of Bad River adults about the water of their homeland. Taking the basemaps from ArcMap into Adobe Illustrator, I placed the stories into the northwest region of Lake Superior, with the idea that the viewer’s eye would begin there. I mapped stories of identity with Lake Superior into the waters of the Lake. The map features both the *Ojibwemowin* and English place names integrated into the stories of the places. Dr. Margaret Pearce was a reviewer for the final drafting of the wall map.
This is a 42 page booklet entitled *Mashkii Ziibi Nibikaaning Babaamaa’jimowin Aki-Mazinaa’igan, Story Maps of Bad River Waterways*. This participatory atlas features story maps of adults and youth in Bad River juxtaposed on zoomed-in extents of 18 places in the BRW and
Madeline Island. The cultural atlas opens with a map depicting all of the Ojibwe reservations/tribal lands that lie within the Ceded Territories. The atlas was drafted in Adobe InDesign by the capstone undergraduates, and finished by myself and Tanya Buckingham of the UW Cartography Lab.

Figure 7. Two-page spread from the cultural atlas of *Bapateyaashkaang*, Waverly Beach

The BRYO youth created 18 story maps for their webmap. I provided their content to a website designer who built the webmap bryomapsite.com. To guide the youth in ordering places for their
webmap, Bad River THPO Edith Leoso advised, “Begin in the east and work your way clockwise from there” (Personal communication, January 24, 2014). The webmap is interactive; viewers can scroll through the Bad River watershed, click on place labels to view the story maps, and toggle between Ojibwemowin and English place names. Viewers cannot add content to the webmap. The simple design of the map accommodates varying internet speeds and degrees of web literacy. (View webmap at bryomapsite.com)

*Interactive Floor Map of the Bad River Watershed*

Printed on billboard material, this 20’ by 30’ map rolls out in indoor or outdoor spaces. At outreach and education events, people are invited to walk onto the map and write a personal story on it with a Sharpie marker. These publicly-sourced story maps consist of place labels, favorite waterfalls, backpacking and paddling routes, family traditions, etc.
Figure 8. Participants on the floor map at a Watershed Literacy workshop in Madison, WI, October 2015.
Impacts of the Bad River Water & Culture Maps

The *Bad River Water & Culture Maps* both depict the Bad River communities own water narratives, and invited the public to share their own. Three generations of map project participants were present when we launched the project in June 2014 at the Pow Wow Grounds on the Bad River Reservation. The maps have been featured at 15 events to date; 12 facilitated by me with BR project collaborators, and three events in which the tribe used the maps independently.

Events in the first year after the project launch have included public outreach and education, and several conferences. At our event in Ashland, Wisconsin, people from Canada, Germany, Japan
and Tasmania all contributed their personal stories about Lake Superior’s south shore to the floor map. These public conversations about the Bad River watershed and Lake Superior affirmed their eco-tourism value as high quality watersheds for recreation and sustainable economic development.

In response to requests from educators who attended our map events, we produced curricula to teach with the maps in the classroom. (Available on the BRW&CM website: http://badrivermaps.nelson.wisc.edu). Target audiences are middle and high school, and undergraduate. Subject areas include geography, history, and Native American issues. The curricula use the Wisconsin Department of Instruction Model Academic Standards for Social Studies, and the Wisconsin Act 31 Statutes. This curriculum was made in partnership between the Bad River tribe and the Nelson Institute of Environmental Studies Bad River Capstone 2015 class.

The Bad River Maps are registered as the intellectual property of the Bad River Band of Lake Superior Ojibwe. The tribe has ordered a second printing of the wall maps, atlases, and floor map. In 2014, members of the Anishinaabe Environmental Protection Alliance took the maps to Indian Summer, a gathering of First Nations in Milwaukee, WI; and to the Lake Superior Binational Forum in Red Cliff, WI. Bad River Tribal Chairman Mike Wiggins, Jr. and tribal council have used the maps in internal meetings, and with the local county boards. The community has embraced the maps as their own, and continues to use them for public and policy outreach regionally and statewide.

The feedback from tribal members and the general public has been overwhelmingly positive. “These maps are a starting point for discussions on many levels,” says Chairman Wiggins
(personal communication, November 11, 2014). In addition to tourists and educators, our event audiences included watershed managers and citizen groups, who acknowledged the maps as potential citizen science tools. This work was an eye-opener for many to the fact that qualitative data is so valuable to studies of watersheds, as it represents the social pulse, and historical and cultural connections. Watershed boundaries present a unique way to think about neighbors and Nations.

**Discussion**

Water, dynamic and cyclical, is not as readily mapped as land, which is relatively static. Landforms are privileged in maps. Water, typically lower in the visual hierarchy, recedes to the background. When open water is charted, the bathymetry and channels are the main features, not the water itself. The term “watershed” describes the land under which a waterway or water body gathers its water. Landmarks - historical sites, battlegrounds - are visibly demarcated on land. Other than buoys, what are the markers that delineate important places in water?

Indigenous place names are signposts for waterways and water bodies (Pearce, 2014), so are a starting point for mapping water. Watery places in the Bad River watershed, *MashkiiZiibi Nibikaaning: MashkiiZiibi Zagaagigan* and *Ogaakagon’ike* constitute *intense centers* where forces come together (Deleuze & Guattari, 1987, p. 321). Waters of the homeland are storied places for Ojibwe people, and culture mapping is appropriate for depicting these water narratives. Bad River Ojibwe personal and cultural stories are anchored in places, but are transcendent of time; they are both personal snapshots and depictions of cumulative knowledge.
Places are saturated with the history and culture of the peoples that tread within and upon them (Ingold, 2000; Wylie, 2005; Thornton, 2008). For Ojibwe, Lake Superior and its tributaries are central to the story of culture in both lived and esoteric ways. The people identify with their place, and share a name with their homeland: *Anishinaabe GichiGami*, The Great Lake Ojibwe. Water supports practical aspects of Ojibwe culture – the rivers and lakes are the original highways (Oral tradition; Cochrane, 2009). In Ojibwe tradition, water is used in teaching tales to instill *Anishinaabe* values (Benton Banai, 1988; E. Leoso, personal communication, June 1, 2013). These practical interactions with place are inextricably linked with ceremonial relationships (Roth, R. 2002, p. 210). Ojibwe use ceremony to honor water seasonally, and for stewardship and protection. Ojibwe water is a socio-ecological framework that is central to the physical, spiritual and cultural survival of the people.

Cultural survival is bound up with water quality and resilience, and culture is perpetuated by participation in place-based traditions that both teach water stewardship and assert water sovereignty. With Robin Roth’s insight, “the social relations and resource management institutions of indigenous communities produce different spatiality” (2009, p.209), overlaid with Berkes’ dimensions of TEK that place local knowledge within the contexts of management systems and social institutions (2012, p.17), a framework for *spatial TEK* emerges. This knowledge system incorporates indigenous place names and traditions, and a vital ethic of participation.

*Spatial TEK* takes participatory mapping to a new level of interaction. Indigenous cartography frameworks that include place, time, stories, traditions, movement, and the traveler (Pearce, 2014) are necessarily participatory. Indigenous mappers in Bad River participated not only in
making the *Bad River Water & Culture Maps*, but in the case of the BRYO program, also travelled in real time to the places that we were mapping. Travelling to storied places in the Bad River watershed, BRYO youth gathered waypoints, photographs, and video to produce and contribute their own story maps. For the tribal youth in BRYO, map and mapper were comingled in a dynamic assemblage of *spatial TEK*, both present and personal, as well as cumulative and ancestral.

Mobilizing around *spatial TEK* for mapmaking in the Bad River homeland involved youth participation in waterscapes, stewarding wild rice, and monitoring water to assert sovereignty in the Ceded Territories. Collaborative representation of *spatial TEK* involves the mapping of place-based seasonal cultural practices. For *spatial TEK* to be mapped, it has to be lived and spoken, similar to Ingold’s *dwelling*:

> Contrary to the assumptions of cartographers….life is not contained in things, nor is it transported about, rather it is laid down along paths of movement, of action and perception. Every living being accordingly, grows and reaches out into the environment along the sum of its paths. To find one’s way is to advance along a line of growth, in a world which is never quite the same from one moment to the next, and whose future configuration can never be known (2000, p242).

How are *dwelling spaces* (Roth, 2009) in indigenous communities mapped? These places and associated traditions are linked to cultural resilience. Generations of tribal youth must continue to participate in the places of their home territory, learning from elders and the environment (J.
Rose, May 29, 2013; M. Wiggins, Jr., personal communication, May 28, 2013). Partnering to focus on restoration of damaged or diminished cultural practices around participation in places is a necessary component of indigenous cartographic work.

Use of Ojibwemowin place names binds together placemaking, stewardship and sovereignty, and is an integral method for representing spatial TEK. Speaking the Anishinaabe place names is part of participating in and stewarding the place. Place names give the narrative a label, an anchor (Basso, 1995). The maps represent indigenous epistemologies and serve as conversation starters, spaces for sharing. Maps end up being tools for storytelling and language preservation, relevant both in and outside Indian communities.

**Conclusion**

Mapping water in an indigenous community brings underprivileged features and voices front and center. The Bad River Water & Culture Maps shift cartographic focus from land to water, and from privileged voices to those that are historically acculturated, quieted and subsumed. Indigenous cartography and countermapping challenge power and domination by being egalitarian and collective, and leveraging native epistemologies and aesthetics. This project exposes hidden cartographies that are ancient, affective, and informative. The intergenerational map-building process takes interactivity to an experiential, landscape-based level of participation. This process promotes cultural practices around water, and leverages spatial TEK for stewardship, sustainability and sovereignty.
This is cartography guided by the four Tribal R’s: *relationships* -- listening, taking ample time to share and do the work; *respect* -- of elders, local power of people and places; *reciprocity* -- offer *asema*, ceremonial tobacco, and skillsets in exchange for opportunities to earn trust and learn/teach/work together; and *responsibility* -- abide by consensus process and community feedback, and honor tribal intellectual property for data and product ownership.

The *products*, *Bad River Water & Culture Maps* make visible what had been invisible -- indigenous water geographies-- and make these cultural water transcripts available for use by the *tribe* in community education, outreach to non-tribal communities, and leverage in legal and political settings. The *process* of cross-cultural cartography that employs indigenous and decolonizing research methods honors the power and capacity of tribal communities and indigenizes and diversifies academy.
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GANAWENDAN GINIBIIMINAAN (TAKE CARE OF OUR WATER!) MOBILIZING FOR WATERSHEDS-AT-RISK WITH THE BAD RIVER OJIBWE
Conaway, J and Leoso, E.

Abstract
Community-based research with the Bad River Band of Lake Superior Ojibwe in northern Wisconsin illustrated that water stewardship is an organizing practice, value-laden, that brings together tribal and non-tribal people. The lead author collaborated over four years with tribal members to create a network of university, natural resource agency, and indigenous experts. The Ojibwe co-author provided expertise in protocols and traditional knowledge. We worked in community water stewardship from concept to the dissemination of durable products of which the tribe took ownership. This article focuses on methodology for outsiders working in Indian country, emphasizing indigenous research methods, and culminating in a case study of water stewardship that incorporates native and western science. A local Anishinaabemowin version of traditional ecological knowledge (TEK) is highlighted: mino bimaadiziwin, “living in a good way.” Interviews with Bad River adults and Talking Circles with youth indicated that Ojibwe identity and value systems are bound to water, shedding light on intangible dimensions of TEK. Water-based harvests, stewardship, sovereignty and worldviews constitute an Ojibwe water schema, water TEK. We demonstrate that the vulnerability and resilience of water and cultural traditions are intertwined.

Key words: Anishinaabe; Bad River Ojibwe; Bad River watershed; Lake Superior Basin; mino bimaadiziwin; Native Science; Traditional Ecological Knowledge; water stewardship; water TEK

Introduction

“Water is the first medicine,” Bad River Tribal Chairman Mike Wiggins, Jr., quoting Ojibwe elder Tony de Perry, 2013.

Anishinaabe (Ojibwe, Chippewa) cultural traditions are inextricably linked to water, in daily and ceremonial life, as well as ancestral experience. Ojibwe Origin Stories guided the people on a Great Migration to western Lake Superior, “the place where food grows on water” (Benton Banai, 1988), which describes the rice beds of this wetland and water-rich region. Manoomin, “the good berry,” wild rice, Zizania palustris. . (Meeker et al, 1993) is central to the culture, ecology, and spirituality of Lake Superior Ojibwe people. (Ojibwemowin, Ojibwe language, is in italics throughout). Bad River elder Dana Jackson explains that the Ojibwe fiercely protected the rice beds of northern Wisconsin and Minnesota: “We fought the Sioux for a thousand years”
Harvest of *manoomin* was integral to treaty negotiations with the US government in the mid 1800’s, during which the Ojibwe reserved rights to hunt, fish, and gather off-reservation in the Ceded Territories (Loew, 2013) (Figure 1). The Bad River Ojibwe are one of 11 bands that harvest in the water-rich Ceded Territories (CT) on the US side of Lake Superior.

Degradation of water quality threatens indigenous water traditions, treaty rights, and water sovereignty. Freshwater is no longer considered a renewable resource (Younger, 2013). Although Lake Superior is the largest freshwater lake in the world by surface area, industrial, agricultural, and municipal drawdowns and discharge comprise threats to its water quantity and quality (Grady, 2007). *MashkiZiibi,* “wetland medicine river,” later named the Bad River, is a tributary of Lake Superior and home of the Bad River Indian Reservation (Figure 2). Taking the long view of Lake Superior preservation, Bad River tribal Chairman Mike Wiggins, Jr. asserts, “We are the keepers of a stronghold” (Personal communication, August 8, 2012). In 2011, the Bad River Ojibwe established their own water quality standards under the Clean Water Act “treatment as states” policy (EPA, 2011). In its current state, the Bad River watershed (BRW) contributes high quality water to Lake Superior. Contemporary threats to water and Ojibwe cultural practices in the BRW include mineral mining, concentrated animal feeding operations, climate change, and aquatic invasive species.

Collaboration by native rights-holders and non-native stakeholders have potential as effective means to steward and protect water. In the Ojibwe CT of northern Wisconsin, tribal and non-tribal people formed alliances to protect Ojibwe traditions and treaty rights during the Walleye
Wars of the 1980’s (Bresette & Whaley, 1999; Nesper, 2002). In the mid-90’s, Ojibwe were joined by non-tribal fishermen and river guides to protect the Wolf River against a proposed copper mine (Reynolds, 2003). Investing in relationships and reciprocity builds social capital (Gunderson and Holling, 2002), resulting in cross-cultural coalitions.

Watersheds are potential shared spaces (Harris & Wasilewski, 2004); and water stewardship is a potential “middle ground” (Deloria, P.) for community-based research (CBR) initiated by outsiders in Indian country. Cross-cultural perspectives that incorporate native and western science (Appendix_Terms) potentially serve to augment local efforts by native communities to protect watersheds. Community-based research fosters “learning networks or communities of learning” (Robson et al, 2009, cited in Berkes, 2012, p 191). Watersheds also constitute an appropriate scale for investigation of social-ecological systems (Berkes & Folke 1998). Given that western scientists are increasingly giving weight to Traditional Ecological Knowledge (TEK), indigenous knowledge about water stewardship is locally and globally relevant for continuing to expand scientific and cultural understandings of water quality, via modes of outreach, education, and policy influence. In this study, we implement a cross-cultural, intergenerational approach, rooted in decolonizing research methods (Kovach, 2009; Chilisa, 2012), using water and watersheds as organizing contexts.

The authors, one a university researcher, and one a tribal member and local expert, collaborated for CBR on water stewardship in Bad River. Conaway is a white researcher in Environment and Resources from the University of Wisconsin – Madison. Conaway’s approach to environmental studies is interdisciplinary, incorporating experiential education, participatory GIS, and
environmental ethics. Edith Leoso is a Bad River Tribal Member, Bad River Tribal Historic Preservation Officer (THPO), and member of Niswi Ishkodeg Midewigamig, the Three Fires Midewiwin Lodge. Midewiwin philosophy and practice encompass the traditional spiritual, teaching, and stewardship of Lake Superior Ojibwe. Leoso contributed to study design, provided feedback throughout the project, and co-authored this article.

It is imperative that research in indigenous communities prominently feature native perspectives and process, and benefit the local community (Louis, 2007; Kovach, 2009). This study challenges the extractive research paradigm by committing to durable benefits for the Bad River community. Insights into the interface of native and western science for water stewardship aim to move the discussion forward toward two goals: providing more effective frameworks for integrated water stewardship in and beyond indigenous communities, and indigenizing the study of water in academy. This work is also a template for community-based research in Indian Country, from concept to dissemination, highlighting TEK as a collaborative process (Whyte, 2013), and featuring Ganawendan Ginibiminaan in Bad River as a case-in-point.

Methods

Water stewardship work in Bad River creating “new social spaces for shared learning” (Harris & Wasilewski, 2004; p. 13). Contacts (by Conaway) with tribal members entailed listening, being open-minded, a sense of humor, an awareness of environmental and cultural traumas, and the history of relationships between the tribal community and university researchers. Humility and compassion, and commitment to collective leadership and shared expertise, were pivotal. Indigenous research methods that we (Conaway and Leoso) employed for this work included
elder epistemology, Talking Circles (a Native American ceremonial focus group), community feedback sessions, and using a cultural lens for design and implementation. Conaway’s icebreaker for this work was “bringing skills, not an agenda to the table” (Loew, P., Pearce, M. Personal communication, November 21, 2014).

This community–based research had four main phases: 1.) visiting, listening and orientation 2.) implementation and stewardship fieldwork 3.) project launch and community follow-up 4.) analysis and co-authorship. Initial interviews were about places in the waterscape (waterways, water bodies, water-rich landscape) that told a story about Ojibwe water and culture. I offered ceremonial tobacco, asema, clumsily at times, and the conversations began.

**Phase 1**

*Developmental interviews*

Beginning in June 2011, I (Conaway) started the orientation phase, which lasted two years. During this time, I traveled to Bad River four times yearly for visits that lasted a minimum of one week. This involved getting acquainted with Bad River people and becoming oriented to the watershed. The developmental work with Bad River community members had three aspects: interviews, mapwork, and dialogue about environmental terminology. The interviews were informal face-to-face and phone conversations. I used informal maps of the Bad River reservation as conversation starters. The maps facilitated storytelling, and interviewees marked the maps to indicate places within the Bad River reservation and watershed that told significant stories about water protection, community values, and history. To learn about Ojibwe environmental terms and concepts, I laid out note cards with phrases in English such as
“environmental ethic” in front of tribal members, asking which might be best to use. *Minwendan,* “good way of being,” and *mino bimaadiziwin,* “living in a good way,” were *Ojibwemowin* terms that people shared during this developmental work. During this phase I also spoke informally with tribal political leaders, and employees of the Bad River Tribal Natural Resources Department (BR NRD) and Great Lakes Indian Fish and Wildlife Commission (GLIFWC), about current community capacity, and threats to watershed health.

*Getting acquainted with the Bad River waterscape*

To access the sites that had come up in developmental interviews, and prepare for continued work with the Bad River Ojibwe community around water stewardship, it was necessary to become acquainted with the *waterscape* of the reservation. On a case-by-case basis with tribal members who lived adjacent to waterways, I requested access to paddle on the rivers of the reservation. In December 2012, I Skyped into a tribal council meeting to formally request access to the boat landings on the reservation for research. (This was the first time that Skyping in had been permitted, and was initially met with some trepidation, but it then worked out to the Council’s satisfaction). Presenting my work to the Tribal Council at this time was the Bad River equivalent to, and also required by, the Internal Review Board at the University of Wisconsin. I also traveled in parts of the BRW that lie in Ceded Territories. I gathered baseline water quality data on the Tyler Forks River, a large tributary of the upper watershed, for physical, chemical and biological characteristics.

After meeting with community members and natural resource agency staff, I did informal values coding (Saldana, 2009) of the developmental interviews to become more familiar with Bad River
environmental terms, concerns, and perspectives. I incorporated these into formal interview questions, which Leoso helped me to draft.

**Phase 2**

*Formal interviews*

From May 2013 through April 2014 I completed the formal fieldwork. I began by interviewing 13 Bad River elders, community leaders, harvesters, and parents; eight women and five men. In these semi-structured interviews, I asked about community water stewardship, as well as places on the reservation and in the CT that tell a particularly significant story about water and culture (Appendix_Water Interviews). Tribal members chose the locations for the interviews -- offices, homes, coffee shops, and the community center. I recorded the interviews with a small audio recorder and took notes. I chose to use audio instead of video because it is less obtrusive and distracting. I created and used large maps of the BRW and CT to further the conversation and record spatial data about Bad River water and culture (Conaway, forthcoming).

*Fieldwork*

Beginning in June 2013, I worked with elders to incorporate the data from the 13 interviews into development of *Bad River Youth Outdoors* (BRYO), a summer watershed education program (Conaway, forthcoming). We initiated BRYO with ten tribal youth in a Talking Circle facilitated by Edith Leoso. A Talking Circle is a ceremonial group discussion and indigenous research method. Recording of ceremonies is forbidden, so I summarized Talking Circle participant observations in notes afterward.
Midewiwin women guided us in a water ceremony before our first launch of canoes and kayaks on the Kakagon River. BRYO was a cross-cultural experiential education program. Working together with Bad River community members, BRNRD, and GLIFWC employees, we co-instructed environmental education and native science.

During the four-week program, BRYO participants took part in several community water stewardship actions. Elders had requested that the youth be visible doing work for water off-reservation in the Ceded Territories, so BRYO participants monitored water quality weekly on Tyler Forks, using the Water Action Volunteers Level 1 protocol (Water Action Volunteers. Retrieved on 5/12/15 from http://watermonitoring.uwex.edu/wav/monitoring/index.html). BRYO participants also cleaned up trash on the reservation beaches and removed invasive cattails from the wild rice beds with BR NRD, and collected waypoints for aquatic invasive species for GLIFWC.

**Phase 3**

*Analysis*

Using Dragon Naturally Speaking software, I transcribed 13.75 hours of interview data, and imported the transcripts into NVIVO 10 for analysis. I coded interview transcripts, field notes, and Talking Circle notes. First cycle coding included attributes and holistic coding, followed by a second round of values coding (Saldana, 2009). 24 codes emerged. I grouped these into three code matrices: 1/ water, 2/ culture, and 3/ western science -TEK.

*Community follow-up*
Between summer 2013 and spring 2014, I held two community feedback sessions with tribal members who were involved in the BRYO program and mapping project (Conaway, forthcoming). I also used regular email and phone communication to elicit ongoing feedback. I did member-checking with individuals whom I had interviewed. Via mail and email, I sent transcripts of interview quotes as well as the contexts. They could then choose to edit their quotes before publication.

**Phase 4**

*Co-authorship with a tribal member*

Inviting Edith Leoso to co-write was the next step in the collaborative process. (Here and throughout, Leoso’s passages are in Franklin Gothic Book font, italic typeface).

_I appreciated you asking me to be a co-author because I’ve helped so many people in their academic endeavors worldwide. So I was glad to help. I respect the academic community and feel that I can contribute to something that might become a new trend or standard in academia. In Indian Country, you can rarely find a Native person who doesn’t know something about their heritage or culture, no matter how trivial it may appear to them. However, there are few Native people who have the ability to articulate that in writing. I’m just an ordinary person. Even though I only have an Associate of Arts Degree from a Community College, I am in the 3rd Degree of a 5th Degree Midewiwin Lodge. I feel that I can, without jeopardizing the integrity of our inherent teachings, provide insight into generations of knowledge that has become acculturated. If I have an opportunity to provide Native people with some sense in a nonsensical time, then I am doing my work as a Mide*

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8 Randy Stoecker of the University of Wisconsin-Madison suggested these protocols for member checking.
ikwe. The reason I do this is for the People. This is an opportunity to help people understand a different way of thinking. This is an opportunity to help Native people acknowledge what is in their blood memory. I am adamant about doing something about the way non-Native people understand Native people. This is well worth my time, because I am so tired of the romanticized version of being Indian.

CASE STUDY: WATER STEWARDSHIP IN BAD RIVER

“In the Ojibwe tradition, women are the Keepers of the Water” (Mandamin, J. Personal communication, July 9, 2012).

Water is first examined at birth. Water breaks and we know something good is coming. Water is an indicator. It tells us what’s coming. And today when we do scientific examinations of water, we know what might be coming for the People. This “thinking out of the box”- people need to start thinking this way again. And bringing it back to life, all people.

Ecological and Social Contexts

Bad River watershed

The Bad River watershed (BRW) is within the Lake Superior Basin in the northernmost reaches of Wisconsin, USA (Figure 2). The headwaters of the BRW are in the Penokee or Gogebic Range, with an average elevation of 567 meters (1800 feet) above sea level. Out of its origins in Caroline Lake, amidst diverse headwater wetland types, the Bad River runs north into Lake Superior, an elevation of 180 meters (591 feet) above sea level. At its meeting with Lake Superior, the Bad is hydrologically linked with the Kakagon River; they join to make the
Kakagon-Bad River sloughs (BRNRD, 2014). These sloughs form the largest in-tact coastal estuary on all of Lake Superior, and the largest in-tact wild rice bed in the entire Laurentian Great Lakes system. The mouth of the Bad River is across the channel from Madeline Island, the largest of the Apostle Island archipelago.

Mashkii Ziibi nibiikaaning

Mashki Ziibi is what we called the Bad River. Mashki is relative to mashkiki, and mashkiki is medicine in general. Some people say marsh or swamp, but a marsh or a swamp is where the medicines were found. At certain times of the year you could find every medicine that there was, to heal something on your body or your mind. And if you go up here by Mashkii Zagaa’igan, you will see a lot of marshes. And the Peno Aki is the home of the Binessiwiwassimowajiw, translated as bird-energy-mountain. This is the Thunderers.

Imagine being out on Lake Superior looking back at the Penokee Hills, and seeing a storm coming out of the south up over those hills. To people a long time ago, that would be an indicator that this is a special place. And the round stones? The stones on the beaches of Bad River are Thunderbird eggs. Bad River is one of two places in the world where these concretions are found. The sloughs are where the Mashki Ziibi and Ogaakagonike come together in the manoomin beds, the “place where food grows on water.” The coast of our reservation is in sight of Moningwaningkaaning Minis, which is the seventh stopping place on the Great Migration of the Anishinaabe.

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9 Bad River watershed boundary shapefiles were shared in March 2014 by Bad River GIS department with this explanation: “The Bad River Tribe and the Wisconsin DNR modified the boundary of the Lower Bad River watershed (10-digit HUC) to include the Beartrap Creek subwatershed. Ecosystem management decisions are based on this revised watershed boundary, such as the Bad River Tribe’s Non-point Source Management Plan. For more information, please see: http://dnr.wi.gov/water/watershedDetail.aspx?key=924673
Bad River Watershed is: approximately 2590 square kilometers (1,000 square miles) (BRWA, 2015). Ecological highlights of the BRW are diverse high quality aquatic and wetland ecosystems: spring-fed perennial coldwater streams, ziibiins, waterfalls, artesian wells, and large rivers. The headwaters of the Bad River includes nine wetland types (Wisconsin Wetland Association, 2010). The lower Bad River watershed constitutes the 16,000-acre Kakagon-Bad River Sloughs, which includes 12 wetland types. Adjacent to the sloughs is Long Island, which hosts the federally endangered Piping Plover, *Chaladrius melodus*. The Bad and Kakagon Rivers support an ogaa, walleye, *Sander vitreus*, fishery, and the Bad River is the largest producer on Lake Superior of name, lake sturgeon, *Acipenser fulvescens*.

**Bad River Ojibwe Reservation**

The reservation of the Bad River Band of Lake Superior Chippewa is located in the lower portion of the Bad River watershed. The 120,000 acre Bad River reservation was created under the terms of the 1854 treaty (Loew, 2013). 1,096 tribal members live on the reservation, and 6,865 live off-reservation (Bad River Enrollment, 2015).

**Results**

Here we highlight seven themes that emerged from interviews, Talking Circles, and field notes. Full length quotes are in Appendix_Full length quotes.

The first two themes are contextual, consistent with indigenous oral traditions of “starting with the beginning,” particularly when speaking with an outsider.

1/ Cultural vulnerabilities
Due to assimilation policies of the US government and the Christian church, cultural traditions were lost or damaged. Elders showed their grandchildren how to put *asema* down for water, but did not share the associated stories and/or teachings, because they feared retribution for themselves or their families (Esie Leoso, May 31, 2013). “We couldn't practice our own way of life. We couldn't speak our language” (Esie Leoso, May 31, 2013). Boarding schools forbade *Ojibwemowin* to be spoken.

*Everyone in Indian Country knows that every Indian experiences historical trauma every day – environmental degradation to the land – whether it is, or was, degraded on or off-reservation.... If the families, grandparents, parents– don't share traditional knowledge with their children, then it's not given, so it's not known. But because of our intrinsic values, our inherent values, we know that we're missing something, and when we hear it, we know that's it.*

2/ Cultural resilience

Assimilation policies resulted in generational gaps in traditional water knowledge and practices. Bad River Ojibwe overcome these cultural vulnerabilities in part by returning to generational teachings about outdoor traditions: uncle to nephew, grandmother to granddaughter. “Cultural knowledge is a shared resource,” so families share pieces that they have with the rest of the community (Dana Jackson, May 30, 2013). This mosaic of traditions has been recreated and fortified since the initiation of the American Indian Movement in the 1970’s, at which point “Indian people had had enough” (Esie Leoso, May 31, 2013).
“Things will always change. If they don’t change, they die” (Jill Hartlev, May 30, 2013). Cultural resilience is illustrated in a willingness to adapt and change, incorporating new technologies and including new allies. The Walleye Wars brought a gross cultural misunderstanding of native rights and traditions to the surface. Ojibwe spearfishermen had to assert that use of new technologies—a motorboat, battery-powered headlamp, a metal spear—are logical adaptations of ancient traditions. “Living in modern times, we use modern methods as well as traditional methods” (Dana Jackson, May 30, 2013). **Culture is fluid.** Communities adapt their methods, but a core of traditional teachings remains constant. For example, **Midewiwin teachings have to be shared verbatim.**

3/ **Water reflects culture and worldview**

For Bad Rivers, water protection and cultural resilience are inextricably linked. According to our Anishinaabe perspective, the health of an ecosystem is connected to the health of the people who live in that ecosystem” (Phoebe Kebec, November 14, 2013). “If the water quality is bad, we’re going to starve” (Dana Jackson, May 30, 2013). In a culture that looks forward Seven Generations, environmental values are compared to parenting values. “People not caring about the environment, not caring about their children” (Wendy Corbine, May 31, 2013). When parenting values wane, environmental values seem to correspond.

*When it’s being harmed, water is like a child that is being beaten. We know that there are toxic barrels in the bottom of Lake Superior, and that pollution is leaking out. That’s like poisoning that child. So it’s simple: as far as water quality goes, our water should be as pure as a baby is. Water shows you everything that is there, but the choice of what to do is with humans.*
The next two themes elucidate the tangible and intangible aspects of traditional water stewardship in Bad River. Relationships to water and waterways are viewed through the lenses of survival and interdependence. *This is not work. It’s our life: to take care of the environment, to take care of all living things, out of gratitude.*

4/ Tangible aspects of traditional water stewardship

Tangible aspects of stewarding water include intergenerational teachings about: water respect, personal safety, and understanding water quality through a “filter of food” (Mike Wiggins, Jr., May 28, 2013).

Spring ceremonies are family events, and teach respect and responsibilities for water. “Elders teach the young people how to maintain and respect [water], and we also ask for safety of our fisherman and our swimmers” (Dana Jackson, May 30, 2013). These gatherings have tangible impacts on community education about the safety and health of both water and people. “It’s all part of the cooperative communal society” (Joe Rose, Sr., May 29, 2013). Each year this reciprocal relationship is affirmed.

Bad River Ojibwe “are users of the water, and harvesters of plants and animals that live in the water” (Dana Jackson, May 30, 2013), so care is taken to ensure on-water safety. Water travel is dangerous, particularly on Lake Superior, which creates its own weather systems. “Water can give life, but water can take life too” (Sue Lemieux, June 1, 2013).
Our respect for the water is reciprocal: we respect the water and the water respects us, we love the water and the water loves us.

This reciprocity and respect are extended to harvests, which have tangible impacts on stewardship. Water-based harvests depend on local knowledge, gained through active participation in the waterscapes of the reservation and CT. When uncles are teaching nephews about water, “…it’s primarily taught through a filter of food: where certain species of fish are, at what times of year, water clarity, water temperature. All of these things give the harvesters a unique understanding of the water resources of their home” (Mike Wiggins, May 28, 2013). Bad River Ojibwe water stewardship is hands-on, participatory.

5/ Intangible aspects of traditional water stewardship

Intangible aspects of Bad River water stewardship traditions include actions that assert water sovereignty, and facets of water ceremonies that illuminate and perpetuate Ojibwe worldviews about water. Protecting water to sustain harvest traditions is part of asserting sovereignty: “We have to have constant vigilance for water” (Sue Lemieux, June 1, 2013). Bad River elder Joe Rose, Sr. explains:

You can't hunt, gather, and fish if you don’t live in harmony and balance with the four orders of Creation. That's that the very foundation of native spirituality: to live in harmony and balance with all things in the natural environment, with Mother Earth, with plants, animals, and other human beings. That's a different worldview than the anthropocentric world view of “man's dominion.” That's where the two worldviews clash. (May 29, 2013)
Water ceremonies are part of living in balance. In Ojibwe tradition, women are keepers of the water (Joe Rose, May 29, 2013). Midewiwin women have unique responsibilities to maintain community respect, reciprocity and relationships to water. “In the Three Fires Midewiwin Lodge… I learned my spiritual and cultural place with water” (Esie Leoso, May 31, 2013).

*Ceremony is not religion. It’s our way of life. We incorporate it into our life. It’s not just on Sundays. Respect comes from understanding our way of life.*

For Bad Rivers, ceremonies have direct influence on water: “Water quality is maintained by respect…and continuing with the culture, spirituality, and ceremonies that have happened for many many, many generations” (Jill Hartlev, May 30, 2013). Ceremonies also prepare people for direct action for water protection. Joe Rose, Sr. explains,

> We maintain water quality by spending a great deal of time and energy defending ourselves against those forces that would pollute and destroy. And in that process we go back to our ceremonies. Our Midewiwin people do water ceremonies for the Bad River, Kakagon River, as well as Lake Superior. This is one of the strongest defenses of our battle against those that would threaten the water both qualitatively and quantitatively (May 29, 2013).

These water-based traditions are intergenerational, encompassing a vast scope of experience. This cumulative knowledge has contemporary value for water governance and sovereignty:

A holistic approach gives us context and a perspective, and an understanding of what we need to do in real time to acknowledge the threats and work to protect water resources…. an Ojibway cultural view isn’t just through a filter of what does this mean for human beings? Or what is this mean for Anishinaaabe people? It’s merited in and evaluated through a holistic perspective of everything from centipedes to hummingbirds to loons to
humans …. It’s about everything that exists in an ecosystem, no one being more important than the other (Mike Wiggins, Jr., May 28, 2013).

6/ Traditional Ecological Knowledge about water

There are so many values associated with water. Water is life. We know that from our relationship to the water –it begins at conception within our mother’s womb- we are surrounded by water there. We know from conception that we need water in order to survive. If you know that you need something, there is a certain amount of respect that you should provide for that something, if your life is contingent upon that. We value water, we value it with our lives.

Tangible and intangible aspects of Bad River Ojibwe’s relationship to water constitute a holistic framework of water-based harvests, stewardship, and sovereignty. This framework also incorporates Ojibwe worldviews: identity with water, and valuing water as a person, “a living being” (Mike Wiggins, Jr., May 28, 2013).

Bad Rivers identify deeply with the waters of their homeland. The people and Lake Superior share a name, Anishinaabe GichiGami.

“The lake is part of our identity, and water is part of our identity. We are caretakers of the water and the rice, told to us in our Creation Story and our Migration Story” (Aurora Conley, May 28, 2013).

“We are a water-oriented people, with all of our activities: hunting, fishing, crafting, and gathering. We still practice that lifestyle; it's not dead, it's very much alive. That's a part of who we are and what we do” (Joe Rose, Sr., May 29, 2013).
“The Anishinaabe Nation—our people are water people. The great strength of our Nation is the ability to move through water, the ability to support our communities through harvesting in the water” (Phoebe Kebec, November 14, 2013).

In the Ojibwe water schema, identity with water extends to consideration of water as both a person and a relative. “We are all related. And it doesn't just mean humans. It means all people, and by people, I mean all living things” (Dana Jackson, May 30, 2013). Ojibwe relate to animals and plants as people: “the two-leggeds, the winged people, the plant people,” and so extend respect as one would to a relative. Ojibwe also extend this respect to water. For Lake Superior Ojibwe, water has personhood status.

Is water alive? Does it breathe air? Yes. There is exchange of oxygen with the air. It carries nutrients in it to help everything else live. Water is not a thing or a resource. Water is a person. Our lives are reliant upon that person. Because of what it does, the work it does for all life. Water has stayed on the path, and maintained its purpose. We choose to put things in the water. Create events. If we would think of water as a person, than we would consider more carefully what we do to that person? First you think of it that way. It’s about whether you incorporate that into your culture: that thought of water as a living entity. Then you would have that reciprocal relationship.

Think of the water not as in this well, that well, that well….it’s a huge being. We are all reliant on this huge being. We maintain water quality by recognizing it for what it is, for the life that it is, a living entity, nibi, nibikaaning. Ojibway have incorporated it into our culture that we think of water as a person, and the loss of this person would be devastating. This person is not in one place, it’s stretched around the world. If we harm the water here, it will be felt around the world.
When we look at Nibi from this perspective, we understand a very small part about who Nibi is: It is the first living being on Earth. Several times Nibi completely covered our Mother-the Earth, healing her. Other living beings were birthed by Nibi, and a part of Nibi would remain with them for the rest of their time in this life. When the first human came to the Earth, a part of Nibi was within that first human. Anishinaabe. Today, that part of Nibi continues to flow in every blood vessel.

The ‘ni’ in Anishinaabe is the same language root as the ‘ni’ in nibi, illustrating a primordial connection between people and water.

7/Integrating TEK and western science for water stewardship, successes and challenges

Western science is another resource for Anishinaabe stewardship. Historically, Anishinaabe people had scientists and philosophers. I know about this from the teachings that were given to me, and the extensive effort and thought that were placed into those teachings that came from so far back.

Contemporary water stewardship in Bad River incorporates Ojibwe traditions and western science methods.

“There’s historical Bad River and modern Bad River, and they blend really well together. Historically, Bad River Ojibway people feel that water quality is self-sustaining. It's the perfect harmony of the whole environment, with the wetlands and the Lake. Modern Bad River, we as the tribe, have our own water quality department, and take a lot of care in that area” (Jill Hartlev, May 30, 2013).

If NRD wants us to do work for them, they ask us with tobacco. People will give tobacco and ask us to come do that in a sincere way. That exchange goes both ways. When we do our water ceremony, sometimes I’ll even ask, “Has there been any indication in any of the

streams of challenges, elevated levels of something?" And then well keep in mind those places. This team approach is infused throughout the department. At the Fish hatchery, first thing in the morning, they put tobacco down before they put the boats on the water.

Western science tools and data are useful for Bad River water stewardship, but the attitudes and values do not always mesh well. “Scientists need to come down to the person level and look at things as a human being rather than just as this computer-like mind” (Dana Jackson, May 30, 2013).

Discussion

In Ojibwemowin, TEK is summarized as mino bimaadiziwin, “living in a good way,” living right by personal and communal relationships (Dana Jackson, Joe Rose, Sr., Esis Leoso). Mino bimaadiziwin describes an ethic of reciprocity and respect, expressed in spring water ceremonies; and in relationship, expressed by participation in harvests of manoomin and ogaa (See Appendix_Terms). These relationships to water are about interdependence and survival. “This is about respecting water as lifeblood” (Mike Wiggins, Jr., May 28, 2013). Ojibwe water-based harvests engage seen and unseen aspects of water stewardship. Beginning with ceremony, they engage worldview, then connect the tangible act of the harvest to water stewardship through participation. Ojibwe harvests in the Ceded Territories also assert sovereignty and Treaty Rights. Tangible and intangible aspects of Bad River Ojibwe’s relationship to water constitute a holistic framework of water-based harvests, and water stewardship, sovereignty, and worldviews. This is water TEK (Figure 10).
Intangible aspects of traditional water stewardship include upholding spiritual traditions as an integral part of the personal, participatory, and creative aspects of native philosophy (Cajete, 2000). Ojibwe expressions of respect and reciprocity are a way of knowing, not a belief. We recommend that in discussions about the intangibles of native science and TEK, the terms “know,” “knowledge,” and “ways of knowing,” replace “believe,” “beliefs,” and “belief systems.” We aim to shed light on spiritual, unseen, aspects of water traditions as being part of knowledge systems, part of native science, and thus more approachable by western scientists. Tribes leverage western science techniques and data in water stewardship, demonstrating that native and western science can be integrated successfully in certain situations. For example, native and western science share the method of observation for gathering information. There has to be a mutual respect for differences though, that are not currently reconcilable. Ecology resonates fairly well with native science, but still grapples with the intangibles.

_all life has a balance. Everything has its opposite. In order to have that balance in life, if there is a tangible side, then there has to be an intangible side. By dismissing that side, you_
are losing out on half of the knowledge. Recognize the personhood of water, an example of that intangible component.

Methods of western science include observation, testing, developing methods, coming to conclusions based on results. The scientist wants a result, and they do the experiment until a result occurs.

Here’s what is missing: They might not ask, “What else does it do?” Until there’s a recall in the drug, for example. The knowledge making stopped because they acquired that result.

Indian people always keep looking. There is always room for improvement. Why put a mine in without having the full understanding of what a mine will do, and how far that action will extend in space and time, into the universe.

Native science encompasses a holistic perspective that includes observation, but also relies on nurturing relationships with community and nature (Cajete, 2000). Ethics are integral to native scientific method (Cajete, 2000) and to indigenous research methods (Kovach, 2009). Bad Rivers determine that water TEK gained from observation and participation is not an end result, but one step in the process of understanding water. Water TEK is dynamic, and one person’s observation of a water phenomenon is but an infinitesimal aspect of an enormously complex system; so humility and receptivity are necessary.

Many people have failed to recognize or accept an intangible component. You have to ask for it. Feel it, experience it. It has to be in your heart. That connection is made through your heart, voice, mind—your being.
Bad River *water TEK* describes participatory community ethics that encompass tangible impacts of safety and sustainability, and intangible aspects of orientation in territory and place, time and cosmos. The Ojibwe Seventh Fire teaching is about the approach to a fork in the road: one fork is technological, the other is natural (Benton-Banai, 1988; Joe Rose, Sr., personal communication, February 7, 2015). What fork will we choose? Partnerships with native experts in native contexts, and commitment to growing indigenous scholarship (Kovach, 2009) could open up possibilities for new collaboration around *water TEK*.

**Conclusion**

For _Ganawendan Ginibiminaan_, the Bad River watershed was a shared ground for collaboration that employed indigenous research methods, highlighted indigenous voices and values, and sought to depict water through an Ojibwe lens. Vulnerabilities of water and culture are entangled; solutions promoting resiliency of Bad River water and people demonstrate a symbiosis of people and place.

Ojibwe cultural health and identity are firmly bound to harvest traditions within the matrix of *water TEK*. There is a need to consider cultural values in water quality metrics, and integrate native science into western water stewardship theories and practices. Water stewardship in Bad River demonstrates that native science is fluid, and can incorporate the tools of western science. To reciprocate, the western scientific community could strive to better understand indigenous knowledge as an ancient counterpart to its own understanding of water. Water resilience is potentially furthered by interdisciplinary and cross-cultural efforts.
This study is a template for research by outsiders in Indian country. Successful collaboration between indigenous communities and university researchers has global applications. Tar sands extraction in Canada and mineral mining in the Lake Superior Basin are current examples of conflicting land use notions and misunderstanding of sacred sites. Individuals in academy are needed to serve as allies, translators, and educators that help foster cultural understanding of water and water rights.

Consideration of cultural value systems such as mino-bimaadiziwin moves us collectively toward an intercultural water ethic, locally defined and globally relevant. Intangible aspects of Ojibwe water TEK – respect, humility, relationship-building - potentially advance western scientific practice of water stewardship, conservation, and management.

_We couldn’t communicate effectively in the 70’s, 80’s, 90’s. Now it’s better. There is yearning for a different understanding. Non-tribal people are willing to accept native philosophy as a viable resource. It’s been through trial and error that they’ve come to that conclusion. We said, “There’s a better way of doing things,” but they didn’t listen to us, so they went through trial and error, and then found out that the way that we said to do worked._
References, Ganawendan Ginibiminaan


BRNRD, Bad River Natural Resources Department. Bad River watershed boundary shapefiles.


CONCLUSION

When I first visited Bad River, I began by talking with elders—they are the culture keepers and knowledge gatekeepers. Each time I visited the Bad River reservation to work, it was a new beginning, reminding me to “Walk softly and listen carefully.”

Research has historically been a tainted process in Indian Country, contributing to power imbalances that elevate university researchers while failing to honor local expertise and indigenous knowledge. If we abide by the ecological paradigm that “diversity is strength,” then we make the move to embrace multiple epistemologies, including indigenous management systems for ecological participation and preservation. Research that is collaborative and community-based provides a pathway out of extractive research methods that perpetuate colonial attitudes and aspirations. This is potentially decolonizing if done deliberately, with listening and responding. In Bad River this is called “doing things in a good way.”

Research that is done in a good way honors relationships over results and protocols as research praxis. A commitment to collective leadership requires that academics be willing to bring skills, not an agenda, to the table, and to share power and knowledge making. Bad River tribal members were involved in all stages of this research: design, implementation and writing, with community feedback invited at all stages of the work. This fostered relationships of mutual respect. Traditional ecological knowledge incorporates both process and content. This research focused on the processes of working respectfully and effectively in an indigenous community.

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List of Appendices

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Appendix_Terms

1 through 4 on this list represents a schema of academic terminology about knowledge of First Nations people, placed in order from the most over-arching/general to the most specifically Ojibwe.

1. **Indigenous knowledge, Indigenous knowledge systems (IK, IKS)** includes content as well as process, ways of knowing, and problem solving (Yunkaporta & McGinty, 2009). This encompasses all knowledges of an indigenous group: social, political, ecological, time, place.

2. **Traditional ecological knowledge (TEK)** “… a cumulative body of knowledge and beliefs, evolving by adaptive processes, and handed down through generations by cultural transmission” (Berkes 2012. p8).

3. **Native science, Indigenous Arts and Sciences (IAS)** Native science describes ways of knowing that incorporate direct experience and observation, elder knowledge and include respect for, and reciprocity relationship, responsibility to, the natural world. Personal and community ritual are among actions that perpetuate native science (Cajete, 2000). I use this term to talk about native scientific methods, implementation, and representation. I use this as a hands-on, applied, term. I also use native science in juxtaposition with western science for ease of reading.

4. **Mino-Bimaadiziwin** is simply, to live a good life. The concept of Mino-bimaadiziwin encompasses a holistic perspective of living a human life that considers past and present human activities, and the effects of those activities on all forms of life in the future, prior to any concrete decision-making to conduct an activity. It is, in essence, living a life that gives extensive contemplation to model impacts of a decision, whether positive or otherwise, upon the physical, intellectual, emotional, environmental, cultural and spiritual activities in the immediate and distant future. This is like placing yourself in the future to experience the long-term result of your own decision, while also considering the impacts of decisions being made by other people. Mino-Bimaadiziwin is contemplation of the outcome, and be comfortable enough to live with that result several generations into the future; because it is recognized that a person’s blood memory will flow into future generations and, that extension of one’s life, will have no alternative but to live with the outcome of the decisions made by those today. It is comparable to a “ripple effect,” however, one not only causes the ripple – they also stand at the end of the chain of events. The questions in applying Mino-Bimaadiziwin is: Can you live comfortably with what you decide to do today, knowing you will experience the full impact of that decision? If you are fearful, dreadful, worrisome, or, feel badly about the outcome of your decision, you may not be living a good life (Edith Leoso, January 28, 2015)

5. **Western science** is the dominant paradigm with roots in European history and the scientific model is the tenet. Strives for objectivity and replicability. Sets human apart from the natural world, as unbiased, non-participating, passive observer.

6. **Social-ecological systems (SES).** These are integrated systems in which humans are part of nature (Berkes, F. & Folke, C., 1998). Via the field of ecology, academics have recently come to understand what native people may have always known: people and
environment are intimately linked. Native science scholar Gregory Cajete makes this link, “Humanity has an important role in the perpetuation of the natural processes of the world” (2000. p65).
Appendix_ Water Interview questions

Conaway baseline research
Water Interview questions
Methods: These participant interviews will be semi-structured, face-to-face interviews that are one-on-one.
Supplies:
  o consent forms- 2 copies per participant
  o interview schedule - 2 copies per participant
  o notepad
  o pens
  o Conaway Map 1: including Bad River reservation, Apostle Islands,
  o Conaway Map 2: Ceded territories
  o Gazetteer, Road atlas, Cultural map book
  o transparencies: 2 per person
  o colored stickers
  o sharpies
  o audio equipment
  o extra batteries

Intro to interview process:
Thank you for your help with this research project. The purpose of this interview today is to gather information about places in the Bad River watershed, Apostle Islands, and ceded territories that are important to tribal members for uses and values associated with water. My goal is to map this information, and to help create cultural mapping activities for tribal youth to complete over the course of a year, beginning this summer. This program is called Bad River Youth Outdoors. The program includes outdoor skills, canoeing and kayaking, mapping, environmental education and storytelling.
I have some questions that I would like to ask you, and I have brought some maps along so that you can mark these places. I would like to write down your answers to the interview questions, and record audio of our interview to be used in my research.
Before we begin, I would like to get your formal permission. Please review these consent forms. I will give you the time that you need to read and ask questions about this form. When you sign, this means that you understand that these interview responses are also being used for my graduate school research for a degree in Environmental Studies.

1. Are you a registered tribal member of the Bad River Band of Lake Superior Chippewa?
   a. Yes } GO TO QUESTION 2
   b. No } SAY: Unfortunately, you are not eligible to participate in this study. Thank you nonetheless for your time today.

2. To participate as an adult, are you 20 years or older?
   a. Yes } SAY: you are eligible to participate in this research study.
b. No \} SAY: Unfortunately, you are not eligible to participate in this study. Thank you nonetheless for your time today.

Participant Interview questions:

1. Let’s start with an easy question. Please introduce yourself.

2. Do Bad River Ojibwe have values that are associated with water? Please explain.

3. Please explain Bad River cultural knowledge and views about water quality.
   a. What is the Ojibwemowin phrase for water quality?
   b. What makes water quality good?
   c. What makes water quality bad?
   d. How can you tell?

4. Does cultural knowledge require community consensus to be considered traditional knowledge?

5. According to Bad River tradition, how is water quality maintained?
   a. Is there a person or people that have that responsibility?

6. How is knowledge about water quality gathered over time to learn about the health of a river, thank youlake or watershed?
   a. What is the Ojibwemowin phrase for observing nature, and recording, sharing those observations?
   b. How do people understand water quality?
   c. How do people know the water quality?

7. How are uses and values about water shared in the Bad River community?
   a. Are stories and songs used? How?
   b. Is it oral tradition only, or are other methods used? How?
   c. Are visual guides used? How?

8. In the Bad River community, is it common to care about the water and water quality?
9. I want to ask you about places in the Bad River watershed and Ceded Territories that are important for cultural values about water. For Bad River Youth Outdoors, we will be going to some of these places during the coming year. I have some maps to look at, but first: what are some places that you think about when I ask about important waterways and lakes?

10. Here is a map of Bad River. Please show me 5 places on this map that are associated with water activities, water quality, or cultural values about water.
   
   a. Would you be willing to share a story or description about why these places that you chose are important?
   
   b. Is this place important because of a personal memory?
   
   c. Is there a story about this place? Is there a tradition about this place that was passed on to you?
   
   d. Do you do ceremonies at this place?

11. Here is a map of the Ceded Territories. Please show me 5 places on this map that are associated with water activities, water quality, or cultural values about water.

   a. Would you be willing to share a story or description about why these places that you chose are important?
   
   b. Is this place important because of a personal memory?
   
   c. Is there a story about this place? Is there a tradition about this place that was passed on to you?
   
   d. Do you do ceremonies at this place?

12. How do Bad River youth learn about the landscape and waterways?

   a. Why is it important for them to have this knowledge that you are sharing on the map?
   
   b. How much do they know about these places that you are marking on the map?
   
   c. Why is this? OR If they do not know these places, then why not?
   
   d. What are some of the challenges to land/water education of Bad River youth today?
13. What are some other ideas that should be included into the Bad River Youth Outdoors program?

14. To summarize the results of this project, I would like to make a display map for the tribe that includes this information that you shared, as well as contribute to an online map that another student at UW is making. Is public access to this knowledge acceptable, or is this knowledge for Bad River use only?

15. Is there anything else that I should be asking you about?
Appendix_BRYO Survey

Conaway baseline research
BRYO Survey questions_youth

Please write answers to the following questions. There is no time limit. Take as long as you need.

1. List 5 different types of water features that are in the Bad River watershed? Example: rivers.
   a. 
   b. 
   c. 
   d. 
   e. 

2. List 3 different types of wetlands that are in the Bad River watershed.
   a. 
   b. 
   c. 

3. List 3 fish that live in the Bad River watershed. Write the Ojibwemowin and English names.
   a. 
   b. 
   c. 

4. List 3 plants that live in the Bad River watershed. Write the Ojibwemowin and English names.
   a. 
   b. 
   c. 

5. List 3 threats to the health of the Bad River watershed.
For questions 6 and 7, please write at least 3 sentences for each answer.

6. In Bad River Ojibwe culture, are there traditional activities that are done in or near water? Please write 2 examples that explain your answer.

7. Please explain what you know about Bad River Ojibwe traditions about taking care of water, and protecting water.

What is the Ojibwemowin phrase for “good water.”

8. In the Bad River community, what are some of the careers that people do to help take care of water? List 3 careers.
   a.
   b.
   c.
Appendix_Sketch Map instructions

Conaway baseline research
BRYO Sketch maps_youth

MAP ACTIVITY

Jessie will give a map drawing demo on the whiteboard.

16. Read the full list of places before you start drawing your map. Using the separate piece of paper that is provided, please draw a map. On your map, draw and label the following:

- Lake Superior
- Bad River reservation boundary
- Bad River watershed boundary
- Old Odanah/ Powwow grounds
- New Odanah
- Highway 2
- Ashland
- Birch Hill
- the Bad River and falls
- Kakagon Slough
- Potato River and falls
- Tyler Forks
- Honest Johns
- Long Island
- Madeline Island
- Penokee Hills
- Caroline Lake
- Ceded territory

Pick 5 of the places (besides Odanah) that you labeled on your map. Write the Ojibwemowin next to the English name for the place on your map. If you run out of room on your map, write the Ojibwemowin name next to the English name on the list on this paper.

Name: ______________________________
Date: _____________________
For Jessie's use: _____________
Appendix_ Disclaimers for the Bad River Water & Culture Maps

Language disclaimer:
Disclaimer about Ojibwemowin place-names: Regarding the orthography for phonetic spellings, some Ojibwemowin place names in this atlas may be written down for the first time using the double-vowel system. As such, we want to respect the local names and spellings. In featuring the places, we included all of the Ojibwe place-names and English translations that project collaborators gave to us.

Bad River Tribal Historic Preservation Officer (THPO) disclaimer:
Places indicated in these maps represent a small portion of locations that are significant in the living history of the Bad River Tribal membership. The entire Treaty Ceded Territories, Apostle Islands and Lake Superior are recognized as Traditional Cultural Properties and are held to be highly significant to the Lake Superior Tribe of Chippewa in both the United States and Canada. A significant number of sacred and historic sites, and ancient and historic burial grounds, have been omitted from these maps to protect the integrity of those areas, and to prevent disturbance of traditional cultural practices implemented by the Anishinaabe at those places.

GLIFWC disclaimer:
Tribal reservation and ceded territory boundaries are representations and may not be the actual legally binding boundaries.
Appendix_Full length quotes

“Water is the first medicine,” Bad River Tribal Chairman Mike Wiggins, Jr., quoting Ojibwe elder Tony de Perry, 2013.

“We are keepers of a stronghold.” (Mike Wiggins, Jr)

“We couldn't practice our own way of life. We couldn't speak our language” (Esie Leoso).

“Cultural knowledge is a shared resource,” (Dana Jackson)

“Indian people had had enough” (Esie Leoso).

“Things will always change. If they don’t change, they die” (Jill Hartlev)

“Living in modern times, we use modern methods as well as traditional methods” (Dana Jackson)

“According to our Anishinaabe perspective, the health of an ecosystem is connected to the health of the people who live in that ecosystem” (Phoebe Kebec)

“If the water quality is bad, we’re going to starve” (Dana Jackson)

“People not caring about the environment, not caring about their children” (Wendy Corbine).

understanding water quality through a “filter of food,” (Mike Wiggins, Jr)

Bad River Ojibwe “are users of the water, and harvesters of plants and animals that live in the water” (Dana Jackson)

“Water can give life, but water can take life too” (Sue Lemieux)

“Elders teach the young people how to maintain and respect [water], and we also ask for safety of our fisherman and our swimmers” (Dana Jackson)

“It’s all part of the cooperative communal society” (Joe Rose, Sr.)

, “…it’s primarily taught through a filter of food: where certain species of fish are, at what times of year, water clarity, water temperature. All of these things give the harvesters a unique understanding of the water resources of their home” (Mike Wiggins, Jr)

“The difference in taste of Kakagon Rice is because of the inflow, the ‘tide’ that comes in from Lake Superior…. So the change of the water makes the quality of the rice” (Hilary Butler)

“Some years we almost cried when we saw the rice devastated by the low water…. I took some elders down there, and they couldn’t believe that the water was so low that you could see the bottom of the rice plants” (Hilary Butler)

“You can't hunt, gather, and fish if you don’t live in harmony and balance with the four orders of Creation. That's that the very foundation of native spirituality: to live in harmony and balance with all things in the natural environment, with Mother Earth, with plants, animals, and other human beings. That's a different worldview than the anthropocentric world view of ‘man's dominion.’ That's where the two worldviews clash.” (Joe Rose, Sr.)

“We have to have constant vigilance for water” (Sue Lemieux)

“We have celebrations at certain times of the year, very often having to do with harvests, that are dependent on water” (Dana Jackson)
“In the Three Fires Midewiwin Lodge… I learned my spiritual and cultural place with water” (Esie Leoso)

“Water quality is maintained by respect…and continuing with the culture, spirituality, and ceremonies that have happened for many many, many generations” (Jill Hartlev)

“We maintain water quality by spending a great deal of time and energy defending ourselves against those forces that would pollute and destroy. And in that process we go back to our ceremonies. Our Midewiwin people do water ceremonies for the Bad River, Kakagon River, as well as Lake Superior. This is one of the strongest defenses of our battle against those that would threaten the water both qualitatively and quantitatively.” (Joe Rose, Sr.)

“water-oriented people” (Phoebe Kebec)

“The lake is part of our identity, and water is part of our identity. We are caretakers of the water and the rice, told to us in our Creation Story and our Migration Story” (Aurora Conley)

“We settled here because of the water, because of the water quality” (Dana Jackson)

“The Anishinaabe Nation—our people are water people. That was the great strength of our Nation was the ability to move through water, the ability to support our communities through harvesting in the water” (Phoebe Kebec)

“We are water oriented people, with all of our activities: hunting, fishing, crafting, and gathering. We still practice that lifestyle; it's not dead, it's very much alive. That's a part of who we are and what we do” (Joe Rose, Sr.)

That holistic approach gives us context and a perspective, and an understanding of what we need to do in real time to acknowledge the threats and work to protect water resources…. an Ojibway cultural view isn't just through a filter of what does this mean for human beings? Or what is this mean for Anishinaabeg people? It’s merited in and evaluated through a holistic perspective of everything from centipedes to hummingbirds to loons to man …. it’s about everything that exists in an ecosystem, no one being more important than the other (Mike Wiggins, Jr)

“We are all related. And it doesn't just mean humans. It means all people, and by people, I mean all living things” (Dana Jackson)

“There’s historical Bad River and modern Bad River, and they blend really well together. Historically, Bad River Ojibway people feel that water quality is self-sustaining. It's the perfect harmony of the whole environment, with the wetlands and the Lake. Modern Bad River, we as the tribe have our own water quality departments, and take a lot of care in that area” (Jill Hartlev)

“Scientists need to come down to the person level and look at things as a human being rather than just as this computer-like mind” (Dana Jackson)