# ANISHINAABE PERSPECTIVES ON WATER RESOURCES IN NORTHERN MICHIGAN

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*Growing human demands are threatening the sustainability of global water resources. The development of proactive water policies requires a thorough understanding of human-water relationships, especially in the water-rich Great Lakes basin, as conservation becomes an increasingly important management objective. However, few researchers have examined residents' perspectives on water resources, including underlying values, beliefs, and attitudes related to conservation. Native American perspectives on water have received even less attention in the scientific literature. To help fill this void, I used semi-structured interviews to examine Anishinaabe perspectives on water resources across the Keweenaw Bay Indian Community of northern Michigan. While water holds tremendous cultural significance to interviewees, most feel that traditional views and values are not widespread in contemporary lifestyles and few are concerned about water conservation. This research provides a rich foundation for follow-up quantitative research using an established theoretical model to explain household conservation intentions.*

*Keywords: Anishinaabe, conservation, Great Lakes, water*

## Introduction

North America's Anishinaabe ("First People", also commonly referred to as Ojibwe or Chippewa) have resided in the Great Lakes region for countless generations largely because of the sacredness and life-supporting attributes of water. While traditional Anishinaabe values related to water are well-documented, little is known about potential relationships between modern water-related views and water conservation behaviors. This paper examines the intersection of water-related values and behaviors in the Keweenaw Bay Indian Community (KBIC) of Northern Michigan.

### Water and 'Lifeways'

Anishinaabe lifeways – contemporary ways of being that incorporate traditional cultural values – are inexorably linked to the region's abundant water resources. For instance, the location and abundance of various fish species historically determined the seasonal movements and semi-nomadic lifestyles of many Anishinaabe tribes to ensure critical sustenance throughout the year (Ettawageshik, 2008; Gagnon, 2016; McGregor, 2012) and are still revered as a valuable food source today. Wetlands provide critical habitat for many plants critical to Anishinaabe lifeways; *giizhik* (northern white cedar), *aagimaak* (black ash), and many others are sacred for ceremonial or medicinal purposes or for making a wide range of goods (Danziger, 1979; Densmore, 1979).

Water is also a unifying theme in creation and migration stories and in cultural traditions and ceremonies. For example, the traditional seven fires story includes a prophecy instructing the Anishinaabe to migrate westward until reaching the place and where food grows on the water – a reference to *manoomin* (wild rice) historically abundant throughout the Great Lakes (Benton-Banai,

1988; Danziger, 1979). Reynolds (2003) described that for the Sokaogon Ojibwe Tribe of Wisconsin, "wild rice was also the cultural fabric that bound the people together, as the foundation of their legends, songs, and ceremonies" (p. 147). Like fishing, the harvesting of wild rice remains an important tradition to many Great Lakes Anishinaabe.

In traditional Anishinaabe worldviews, Earth is said to be a woman whose water purifies and nurtures all life. Its purifying attributes are emphasized in the traditional story of the great flood that the Creator brought about to rid the world of evil and usher in an era of renewal (Benton-Banai, 1988; Johnston, 1976). Benton-Banai (1988) further stated "Water is her life and blood. It flows through her, nourishes her, and purifies her" (p. 2). Reynolds (2003) explained the feminine symbolism traditionally associated with water, as its "…life force was symbolized by its rush from the mother preceding birth" (p. 148). Women were the traditional water-gatherers and the ones to lead ceremonies intended to protect it. This tradition continues to be recognized through women being the "keepers of the water", and is expressed through the revival of water ceremonies and leadership of Anishinaabe women (Gagnon, 2016; Kozich, 2016; LaDuke, 2017; McGregor, 2005, 2012, 2013; Szach, 2013; Whyte, 2014; Woboditsch, 1994).

**Contemporary Water Issues**

Because of the immense value of water to the Anishinaabe, traditional culture and contemporary lifeways alike can be greatly impacted by the destruction or degradation of water resources. There are abundant instances of Indigenous environmental injustices due to industrial contamination, disregard of treaty rights, and effects from pipelines (Ettawageshik, 2008; Gagnon, 2016; LaDuke, 1999, 2017; Whyte, 2017). Despite challenges, however, many Anishinaabe tribes are simultaneously rediscovering traditions and exercising treaty rights to resources in ceded territories, including reviving traditions such as spear-fishing (Ettawageshik 2008; Gagnon 2016). The annual planting and harvesting of *manoomin* is once again becoming a sacred tradition despite habitat declines in many areas (Reynolds, 2003; Great Lakes Indian Fish and Wildlife Commission [GLIFWC], 2007, 2008; Kimmerer, 2013). Across the Great Lakes region, tribes appear to be increasingly expressing sovereignty through their own natural resource management, particularly involving water resources (GLIFWC, 2018). Furthermore, the importance of water and the related injustices facing Indigenous communities garnered substantial mainstream attention through the "water is life" movement that united tribes in response to the Dakota Access Pipeline (Whyte, 2017).

While the Great Lakes region is one of the most water-rich areas of the world, there are reasons to be concerned about water's local-scale sustainability in light of contamination events, increasing human demands, and climate change (Great Lakes Information Network [GLIN], 2018; International Joint Commission [IJC], 2016; United States Environmental Protection Agency [USEPA], 2014). And at the same time that the scholarly literature shows increasing attention to Indigenous environmental issues, there appears to be voids in our understanding of contemporary Indigenous perspectives on water-related values and conservation. This is important because unlike many non-Native Great Lakes residents, members of Anishinaabe communities will likely face disproportionately negative impacts from reduced water availability (GLIFWC 2007). This paper highlights Anishinaabe perspectives on the management and conservation of Great Lakes water, which is critical considering the immense value of water in Anishinaabe lifeways. Increasing our understanding of water-related values, beliefs, attitudes, and conservation behaviors across all Great Lakes peoples

will benefit broad policy efforts calling for conservation (Floress, Aakamani, Halvorsen, Kozich, & Davenport, 2015; IJC, 2016).

**Household Water Conservation**

In times of water scarcity, households play an important role in regional conservation planning because they are typically the first targets for reductions of use. Furthermore, conservation is now emphasized as a key component of the 2008 Great Lakes-St. Lawrence River Basin Water Resources Compact. The Compact is a state and federal law prescribing how regional stakeholders will work collaboratively to ensure the sustainability of Great Lakes water resources (Council of Great Lakes Governors, 2015; Great Lakes-St. Lawrence River Basin Water Resources Compact, 2008). States and provinces bounding the Great Lakes are required to develop and submit water conservation plans every five years (Great Lakes-St. Lawrence River Basin Water Resources Compact, 2008). Insight on residential water use is therefore critical for agency personnel tasked with developing and implementing these plans.

Mainstream examinations of household water use reveal few consistent trends describing who conserves and why. Studies often report conflicting relationships between water use and traditionally-examined demographic variables such as income, age, or gender (Hurlimann, Dolnicar, & Meyer, 2009; Jorgensen, Graymore, & O'Toole, 2009). For instance, some researchers have found higher-income households likely to use more water, while others have found them likely to use less because they can afford to install water-saving appliances or fixtures (Millock & Nauges, 2006; Lam, 1999). Older residents are typically more inclined towards conservation but they also spend more time in the home, leading to higher household water use (Lyman, 1992; Russell & Fielding, 2010). Women tend to be more environmentally-conscious than men, but they often use more water by taking longer and more frequent showers (Domene & Sauri, 2006; Willis, Stewart, Panuwatwanich, Williams, & Hollingsworth, 2011). It seems that clarity on this research topic is greatly needed.

The inconsistency of traditional demographic variables to explain household water use has led to the call for research frameworks that instead examine socio-psychological variables such as beliefs, norms, and attitudes (Farrelly & Brown, 2011; Floress et al., 2015; Heberlein, 2012; Randolph & Troy, 2008; Russell & Fielding, 2010). Constructs from the field of psychology, such as the Theory of Planned Behavior (TPB), have shown promise in explaining household water use based on attitudes, perceived behavioral control, and perceived norms, although no published TPB-based studies appear to have been conducted with Indigenous participants.

The TPB proposes that intentions to perform a behavior are determined by three variables: 1) attitudes towards the behavior, 2) perceived social norms surrounding the behavior, and 3) perceived control over the performance of the behavior (Ajzen, 1991). Intentions to perform a behavior will be high if these three factors all support the performance of it (Ajzen, 1991; Fishbein & Ajzen, 2010). Regarding household water conservation, the TPB predicts that conservation behaviors will be the most likely for individuals who perceive the ability to conserve, perceive that important others approve of conservation, and have a positive attitude towards conservation. All TPB variables have been shown as effective predictors of household water conservation, although most studies have occurred in water-stressed contexts (Clark & Finley, 2007; Lam, 1999, 2006; Trumbo & O'Keefe, 2001).

## Research Questions and Objectives

The broad objective of this research is to more fully understand the range of variables that could influence intentions to conserve household water among Anishinaabe residents. It is a novel approach in that it is based on a theoretical framework not known to have been applied to a water-rich context or in an Indigenous community. Qualitative findings will serve as a rich foundation for potential follow-up quantitative studies based on the TPB, with the additional ability to compare and contrast Anishinaabe and non-Anishinaabe perspectives. The specific research questions are:

- How do the region's water resources influence lifeways in the area?
- To what extent are traditional Anishinaabe values involving water still prevalent?
- Are community members taking personal steps to conserve water, and do they perceive others to be doing so?

This research serves additional roles besides providing a foundation for follow-up studies. Qualitative research can provide richness and depth not possible through surveys or other quantitative methods, which can be particularly valuable with Indigenous participants (e.g., storytelling). This research reflects the efforts of a tribal college researcher and student assistants to conduct community-based research supported by, and to provide valuable insight for, Keweenaw Bay Indian Community (KBIC) tribal leadership. It also enhances the scholarly literature by sharing insight from an under-represented population.

## Methods

Semi-structured interviews were conducted with KBIC residents of Baraga County, Michigan, between June and October 2017. Interviews were chosen as the data-collection method due to their ability to capture initial, wide-ranging perspectives that are assumed to exist across the community (Babbie, 1995; Becker, 1998). Before conducting interviews, the research methodology was co-developed by Anishinaabe advisors, KBOCC faculty and students who participated in pilot interviews.

Table 1
*Demographic characteristics of interviewees (N=17).*

| **Demographic category** | **Number of interviewees** | **Percent of interviewees** |
|---|---|---|
| Male | 8 | 47% |
| Female | 9 | 53% |
| **Age** | | |
| 18-39 | 5 | 30% |
| 40-59 | 6 | 35% |
| 60 or older | 6 | 35% |
| Tribal Elder | | |
| **Education** | | |
| Some high school | 0 | 0% |
| High school diploma | 4 | 24% |
| Some college | 10 | 58% |
| Bachelor degree or higher | 3 | 18% |

| Demographic Category | Number of interviewees | Percent of interviewees |
|---|---|---|
| **Household annual income** | | |
| Less than $20,000 | 4 | 24% |
| $20,000 to $40,000 | 3 | 18% |
| $40,000 to $60,000 | 7 | 41% |
| $60,000 to $80,000 | 2 | 12% |
| $80,000 to $100,000 | 1 | 6% |
| more than $100,000 | 0 | 0% |
| **Home type** | | |
| House or mobile home | 14 | 82% |
| Apartment, condo, or similar | 3 | 18% |
| **Home water service type** | | |
| Municipal (city) water | 10 | 59% |
| Well water | 7 | 41% |

A combination of convenience and snowball sampling was used to garner interviews. A research assistant (enrolled KBIC tribal member) helped promote the research project across the community to recruit potential interviewees, many of whom later suggested other neighborhood acquaintances to be approached. In recruiting interviewees, the only demographic variables controlled for were gender and age. Interviews occurred in participants' homes and at KBOCC. Researchers conducted seventeen interviews and summarized demographic traits in Table 1. While findings from this sample are not intended to be generalizable to the larger population, the mix of interviewees provided a snapshot of the range of perspectives across the community (Babbie, 1995; Becker, 1998).

Table 2

*Interview questions.*

**Water and life in the Great Lakes**

1. How long have you lived in the area?
2. How close do you live to any water body? What is it like? How often do you see it?
3. Do you enjoy spending time around water? What do you like to do? How often?
4. What comes to mind when you think about the Great Lakes area?

**Concerns about our water resources**

5. Do you have any concerns about water in our region?
6. Do you think the government is doing enough to protect our water? If not, what do you think should be done?

**Water and Anishinaabe culture**

7. What are your thoughts on traditional Native American values involving water?
8. Do you see the same values being expressed by people in the area today?
9. Do you participate in any cultural activities involving water?
10. What would you share with the general public about what water means to you?

**Perspectives on household water conservation**

11. Do you do anything in particular to try to conserve water in your household?
12. Do you use water for outdoor activities like watering the lawn, gardening, washing cars, and so forth?
13. Do you plan to take any steps to conserve water in the future?
14. Do you think other people in the area are doing anything to conserve water?

**Conclusion**

15. Is there anything you would like to add? Do you have any questions?

As Table 2 shows, interview questions were grouped into four broad themes: 1) water and lifeways in the Great Lakes region; 2) concerns about our water resources; 3) water and Anishinaabe culture; and 4) perspectives on household water conservation. Questions designed to enrich potential follow-up quantitative research were linked to key elements of the TPB, including water-related values, beliefs, norms, attitudes, and conservation behaviors and intentions. The semi-structured format welcomed interviewees to share stories, elaborate on topics of interest or concern, and raise points not addressed by our pre-determined list of questions. Interviews averaged 26 minutes long and were recorded and transcribed verbatim. Transcripts were first analyzed and coded at the item level; upon completion of item-level coding, similar codes were grouped into themes and sub-themes to identify important patterns across interviews, following established social science research protocol (Babbie, 1995; Becker, 1998; LeCompte & Schensul, 1999). Patterns are reflected in the key themes described in the subsequent sections.

## Results

The following paragraphs summarize the broad themes that emerged from the synthesis of the 17 interview transcripts. Key findings are grouped into three themes correlated to research questions: (1) water and lifeways, (2) traditional and contemporary values, and (3) water conservation. Where appropriate, numbers and percentages of interviewees expressing similar views are included for clarity.

### Theme One: Water Strongly Influences Lifeways in the Area

Interviewees view and interact with water on a frequent basis. Describing the nearest water body to their home, 13 of 17 interviewees (76%) stated that they live either "about a mile" or "less than a mile" from the nearest water. All 17 said they view this water body every day, typically on their way to work or school. All described Keweenaw Bay as the nearest water body, although two additionally mentioned a smaller water body such as a stream or pond on their property.

Interviewees spend a lot of time near the water, typically through leisure activities or as part of their job. When asked what they like to do around water, most interviewees responded with abundant examples of water-related activities (see Table 3). Most commonly, interviewees described the water as a place to go for relaxation, while roughly half also mentioned fishing or exercise-related activities such as walking, running, or swimming. Fourteen interviewees were asked how often they visit the water for any activities they mentioned, and 10 stated that they do so multiple times per week. Responses to these questions indicate that most interviewees are very familiar with nearby water resources and regularly take advantage of their proximity for personal enjoyment. Notably, several older interviewees elaborated on physical activities they used to do near the water, such as swimming and fishing, and remarked that they no longer do these things "as often as they used to" or "as often as they'd like."

Table 3

*Interviewees' water-related activities. Most reported more than one.*

| Activity | Number of interviewees | Percent |
|---|---|---|
| Viewing/sitting/relaxing near water | 12 | 71% |
| Walking/running near water | 9 | 53% |
| Fishing | 9 | 53% |
| Swimming/wading | 8 | 47% |
| Taking dogs to water | 5 | 29% |
| Boating/canoeing | 4 | 24% |
| Interact with water as part of job | 4 | 24% |

Interviewees provided a broad range of responses when asked what comes to mind when they think about Great Lakes water resources (an intentionally broad question). Responses fell into one or more of the six categories summarized in Table 4. Interviewees typically described multiple things that come to mind, including the abundance, cleanliness, and soothing effect of the water. Interviewees, such as the one below, suggested that this combination of factors results in the character and uniqueness of the Great Lakes region:

> I think that just all the water is the number one thing that comes to mind. No place has the water like we have here…whether you're talking about big lakes, rivers, swamps, snow…we have it all and I think it's what makes this place what it is. And to me that means it's really clean here and really pure. I think that soothing quality of being around cool, clean water is really important. And how it cleans the air too. That's what I think of.

Table 4

*What comes to mind when thinking about the Great Lakes region? Most interviewees provided multiple examples.*

| Response | Number of interviewees | Percent |
|---|---|---|
| Abundance of water | 8 | 47% |
| Scenery/beauty/serenity | 8 | 47% |
| Fishing/food resources | 5 | 29% |
| Importance to Anishinaabe culture | 5 | 29% |
| Cleanliness/purity of water | 4 | 24% |
| "It's home" | 3 | 18% |

Interviewees elaborated at great length about their concerns for Great Lakes water, indicating its high value in their lives. Interviewees typically provided several examples of concerns (see Table 5). The most common theme among responses, shared by 14 of 17 interviewees (82%), involves pollution. Some interviewees elaborated by providing specific examples of pollution sources, such as mining. Remaining concerns were fairly evenly spread across several other categories (see Table 5). Notably, only three interviewees mentioned concerns related to water supply, and one interviewee stated no concerns whatsoever.

Table 5

*What concerns do you have about Great Lakes water resources? Most interviewees provided multiple examples.*

| Response | Number of interviewees | Percent |
|---|---|---|
| Pollution (in general) | 14 | 82% |
| Treaty rights/environmental justice | 4 | 24% |
| Pollution from mining | 3 | 18% |
| Health of fisheries | 3 | 18% |
| Climate change | 3 | 18% |
| Invasive species | 3 | 18% |
| Excessive withdrawals/transfers | 3 | 18% |

Confidence in the government to protect our water resources is low, as all but one interviewee stated that the higher levels of government are not doing enough to protect our water. Several noted in their responses, however, that local agencies such as the KBIC Natural Resources department are doing important work to protect water. Many interviewees, like the one below, linked their concerns about government oversight with impacts to Anishinaabe culture:

> Water is life. I believe that's why we have so much sickness too. You know, not only what we eat, but what we live in. Years ago, when were brought up on the fish, everything was clean, that's what we were brought up in. It's not clean anymore, some of our stuff, our traditional foods can't grow, and that's due to the disregard of the United States government and the dollar bill.

**Theme Two: Traditional Versus Contemporary Water Values**

The following paragraphs describe findings from this two-part research question designed to gain insight on traditional values versus current values. The first interview question related to this topic was intentionally broad ("What are your views on traditional Native American values regarding water?"), and interviewees' responses tended to be wide-ranging. The open-ended nature of this question was designed to allow interviewees to lead the discussion into topics most relevant to them. Follow-up questions directed the focus toward interviewees' perceptions of community members' contemporary views on water. Three key sub-themes emerged from this segment of interview discussions.

**Water is life.** The first notable sub-theme relates to the notion that "water is life", with five interviewees using that phrase verbatim. Overall, eight interviewees provided broad responses that related to this perspective. These responses tended to describe traditional views of the inter-connectedness of the natural world, the reliance on water among all living things, spirituality related to water, and the corresponding need for humans to be respectful of water. The interviewee below provided a response that touches on many of these traditional values:

> Natives just had so much respect for everything in our environment. Everything was family – the trees, birds, rocks, plants, water, the sun – it was all family and because of that we had the upmost respect for it all. You don't want to harm your family, and because they give to us, we rely on everything in the natural world for us to live. When we would take we would always give something back –tobacco – because we knew we

> were dependent on it all. Water doesn't depend on us, but we depend on it to survive. So do all the other living things in the world. So we value the water, we love the water, we need to pray for the water, the water gives us life, and the water has a spirit. Without water we would not have life. There was always that reverence and respect for it, and we wouldn't ever take it for granted.

Several interviewees further linked the necessity of water for all life with its important role in Anishinaabe cultural identity. The passage below reflects this connection, and includes phrasing about cultural identity that similarly occurred in other interviews:

> Water is a big part of our stories. And all the stories are about life and what it is to be Ojibwa. So that means that our life revolves around water, which is part of the land, and so it's all kind of tied together. All life comes from water. That's why we worry so much about taking care of it and showing that we respect it and will look after it. We need it. And the fish and everything else that rely on it…and even the rice and other plants…. they're a big part of who we are and they need water. So, I really believe that without water, we wouldn't be the people we are. It's part of us and we're part of it. That's what I was always told and I think it's really good ways to bring up people still.

**Traditions and stories.** While related to the "water is life" sub-theme, seven additional interviewees focused on water's role in Anishinaabe stories, traditions, or lifeways and provided specific examples to illustrate their points. Many discussed topics such as the Anishinaabe migration and the importance of fish or wild rice. As highlighted below, many interviewees made clear links between the abundance of water in the region and its role as a gift from the Creator and a life-provider for the people:

> This is where our people have been for countless generations. We came here because it is the place where food grows on the water. The water makes up the life in our bodies and supports the rice and the rice nourishes us. Everything is connected and it all starts with water. Water is everywhere here and it's everywhere in our traditional stories, our ceremonies, our songs, and our prayers. This water is our life and it's a gift from the Creator. We have to take care of it. We have to not pollute it and not waste it.

> Water is everything to us. We came here for the rice…you know our teachings say that we were supposed to find the food that grows on the water. Everything about life revolved around water. I was watching a film recently that talked about even the sugarbush has water, like the tree's sap is the water that flows through it like the water that flows through us. And everything involving fishing…you know we always had different places to catch fish, depending on the time of year. So yeah, pretty much everything about our traditional life here is all about water and how we need to respect it and take care of it.

**Women as water-keepers**. A third sub-theme involves the traditional Anishinaabe role of women as keepers of the water. Five interviewees, including the ones below, specifically included references to this tradition in their responses:

> The women were the water-keepers; we were the ones to care for the water. I'm happy that we have so many women doing important work nowadays at the NRD [Tribal Natural Resource Department], but I think overall our women need to get

> together more to care for the water. Whether it's just getting together for water ceremonies or walks or praying for the water or being the ones to speak up and be community leaders, that's what we need to do. It's the women that need to lead the way.
>
> I grew up very traditional as a woman of this tribe. We are the keepers of the water, our job is to watch the water and it's kind of interesting because traditionally that's what I should be doing, [being] a keeper of the water. I take it very seriously, and traditionally I'm doing what I should be doing.

As a summary question on this topic, we asked interviewees what they would like to share with non-Natives about the importance of our water resources if they had the opportunity to do so. Many interviewees, as indicated by the passage below, emphasized the importance of cultural identity, traditional worldviews regarding the inter-connectedness of all life, and the importance of thinking about future generations:

> I think the biggest thing is that water is a really big part of who we are. Don't take that away from us. Don't foul up our water. Don't kill our fish. I think most people don't have the same kinds of connections to the world around them that we do. I know some do, but I don't think it's as big of a part of who they are. I think that's why they don't think as much as we do about future generations, because they don't become part of their environment the way we do. They don't have the same attachment. But we do. This part of the world, with all the water we have, this is our traditional country and even though it's not all ours anymore, it's still a part of us. Just be respectful and thankful and take care of it so it's there for all of us.

We also asked interviewees if they felt that traditional Anishinaabe values regarding water are still being expressed in the community today. Only one of 17 interviewees confidently replied "yes". Six stated that traditional views are not being followed, with responses that typically included references to disregard on the part of the young generation or comments such as, "we've lost our way." Responses from the remaining 10 interviewees can be described as mixed, with phrasing such as "it depends on the person" or "some people do and some people don't." A key finding is that few interviewees expressed confidence that traditional values and perspectives related to water are still common across the community, despite the fact that concerns for pollution-related issues appears strong.

**Theme Three: Few interviewees plan to adopt conservation Steps in the Future.**

In this segment of interviews, questions were asked with the goal of inferring a relationship between water-related values and water-related behaviors (with conservation as the example). A key finding in this area is that interviewees provided few straightforward responses when describing their own household water conservation behaviors or plans for potential future conservation.

When asked about current conservation behaviors, responses varied greatly between indoor and outdoor uses of water. The majority of interviewees (nine) provided vague explanations of their own indoor conservation efforts, using phrases such as "I try not to waste it" or "I do what I can" instead of listing tangible examples of conservation behaviors they have adopted. Among those who clearly provided examples of conservation, four explained that their home has water-saving appliances or fixtures, four claimed to take short showers, two said that they limit toilet-flushing, and two said that

they collect and re-use rain water for their gardens. Only one interviewee flatly stated that she does not put forth any effort to conserve. Despite interviewees' lack of details about indoor water use, all 17 interviewees stated that they use very little water for outdoor purposes such as lawn-watering or car-washing:

> You know, I have some flowers that I might have to water every now and then when we don't get enough rain. But besides that, I just don't think we really do much more than that. We get enough rain to keep the grass green and the cars clean so I can probably count on one hand the amount of times I'll even hook up a hose in any year.

Regarding plans for future conservation efforts, responses were again vague overall. Six interviewees expressed interest in conservation strategies but did so only using phrases such as "I'll do what I can" or "I should do better." Eleven indicated that they are already doing what they can to conserve or that they do not know how to use less than they already do – which may be supported by the fact that interviewees use very little water outdoors. Only one interviewee responded with a simple "no" when asked about plans for future conservation.

Interviewees largely shared the impression that most people in the area are not concerned with water conservation. When asked if they think others in the area are doing anything to conserve water, 14 of 17 (83%) responded "no" or "probably not." However, like the interviewee below, many followed with remarks on the abundance of water in the area as a likely explanation for conservation views in the community:

> I just think most people around here are like us -- they don't use a lot of water to start with, but they probably aren't too worried about running out either. I'm no expert but I don't think we have to worry about running out of water. I just think we need to keep clean what we have and we'll be fine. Just be respectful with how much you use and don't pollute it.

Overall, interviewees' responses indicate that water conservation simply is not as salient of a contemporary topic in the community as water pollution. Interviewees appear consistent in their views that water is abundant in the region and that traditional Anishinaabe values regarding water are very important. Results indicate that across interviewees, perhaps the most important stewardship behaviors with water involve preventing the degradation of it, as supported by the widespread concern for pollution (see Table 5) and the abundant comments about pollution-related current issues (e.g., DAPL). Expansion and clarity on these topics is an ideal focus for future research.

## Discussion and Conclusion

This research provides several implications for the broader literature on water issues, including potential links between traditional Anishinaabe values and conservation behaviors. Regarding regional planning under the Great Lakes Compact, for example, Indigenous communities may not be ideal targets for conservation if our interviewees' responses are representative of the greater Indigenous population (Great Lakes-St. Lawrence River Basin Water Resources Compact, 2008). We found very limited instances of outdoor water use, which can be among the most consumptive of household water uses. Another common response among interviewees was that they "don't know how to use less water than they already do", again supporting the notion that water managers might be wise to look elsewhere for conservation targets. Despite these intriguing findings, however, the

author suggests a cautious interpretation considering the research methodology used and the possibility for alternate explanations to interviewees' conservation behaviors.

### Applications of the Theory of Planned Behavior

The sample size of this research does not support analyses of demographic patterns in terms of water use, but the rich findings can provide foundational insight for follow-up studies based on the TPB. For example, interviewees' attitudes toward water conservation could likely be described as positive, which would support pro-conservation behaviors. However, interviewees' limited plans for future conservation could be explained by the findings that 1) perceived control (i.e., perceived ability to conserve) appears low because most interviewees already use little water, and 2) perceived norms regarding water conservation appear low as the majority of interviewees believe few others in the area are specifically taking steps to conserve. According to the literature, the lack of perceived control and perceived conservation norms could out-weigh positive attitudes towards conservation and therefore limit intentions to conserve (Ajzen, 1991; Clark & Finley, 2007; Fishbein & Ajzen, 2010; Trumbo & O'Keefe, 2001). Thus, this research is aligned with that of others.

### Follow up Research on Contemporary Values

Regarding traditional Anishinaabe culture, the majority of interviewees appear familiar with traditions, stories, and values related to water and consider sacred as described by many authors (Benton-Banai, 1988; Danziger, 1979; Densmore, 1979; Johnston, 1976; Kimmerer, 2013; Reynolds, 2013). Interviewees tended to share the most wide-ranging and personal insights in response to questions about traditional water-related values, citing many traditional stories and ceremonies that are part of Anishinaabe cultural identity. Combined with the frequency and variety of water-related activities, water certainly does appear to greatly influence day-to-day lifeways among interviewees.

The extent to which interviewees perceive traditional water-related values to exist today is less clear. The majority of interviewees indicated limited confidence that traditional ways are being followed as strongly as in previous generations. Clarity on this question is advised for potential follow-up research, possibly through a survey instrument with a larger sample size and a limited choice of responses. It is noteworthy, however, that a majority of interviewees expressed the "water is life" sentiment (or similar), reflecting wider Indigenous environmental movements such as the response to the Dakota Access Pipeline construction (LaDuke, 2017; Whyte, 2017).

### Links between Values and Behaviors

The final research question involves a potential link between values and behaviors that could be quantifiable in follow-up research. Based on the literature, a likely hypothesis would state that individuals expressing strong water-related values would be the most inclined towards household water conservation (Ajzen, 1991; Babbie, 1995; Fishbein & Ajzen, 2010). Interview findings provide intriguing insight on this question. An initial review of interview transcripts shows that few people intend to conserve water and therefore perhaps there is no link between values and behavior. However, a closer examination shows that the reason for limited conservation intentions appears to be that interviewees are already using little water to begin with. Therefore, no conclusion can confidently be drawn from these findings, which again welcomes follow-up efforts to clarify using a longer and more in-depth interview process. Follow-up research might also benefit from an increased emphasis on the topic of pollution as an example of a water-impacting behavior, since 14 of 17 interviewees discussed pollution topics without specifically being prompted.

## Limitations of Research

Findings from this research are limited by several considerations, including the relatively small sample size (n=17) and the inability to infer that responses are representative of the broader community. The average interview length of 26 minutes may be considered short by some researchers, although we found interviewees to elaborate as hoped on questions related to traditional values, contemporary lifeways, and conservation, which were the focus of the research. Nonetheless, findings serve as an intriguing foundation for follow-up studies and also provide valuable additions to the literature on water resource perspectives from community voices not often included in the scientific literature. Repeating this work across numerous Great Lakes Anishinaabe communities could yield more powerful findings that policy-makers and water resource managers would be advised to review.

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## References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50,* 179-211.

Babbie, E. (1995). *The practice of social research* (7th ed.). Belmont, CA: Wadsworth Press.

Becker, H. S. (1998). *Tricks of the trade*. Chicago, IL: University of Chicago Press.

Benton-Banai, E. (1988). *The mishomis book: The voice of the Ojibway*. Minneapolis, MN: University of Minnesota Press.

Clark, W. A. & Finley, J. C. (2007). Determinants of water conservation intention in Blagoevgrad, Bulgaria. *Society and Natural Resources, 20*(7), 613-627.

Council of Great Lakes Governors. (2015). Resolution #30 – Affirmation of basin-wide conservation and efficiency objectives. Retrieved from http://www.glslcompactcouncil.org/.

Danziger, E. J. (1979). *The Chippewas of Lake Superior.* Norman, OK: University of Oklahoma Press.

Densmore, F. (1979). *Chippewa customs*. St. Paul, MN: Minnesota Historical Press.

Domene, E. & Sauri, D. (2006). Urbanisation and water consumption: Influencing factors in the metropolitan region of Barcelona. *Urban Studies*, *43*(9), 1605–1623.

Ettawageshik, F. (2008). Boundary waters treaty and protecting fresh water resources in North America. *Wayne Law Review* 54: 1477-1847.

Farrelly, M. & Brown, R. (2011). Rethinking urban water management: Experimentation as a way forward? *Global Environmental Change, 21*(2), 721-732.

Fishbein, M. & Ajzen, I. (2010). *Predicting and changing behavior*. New York, NY: Psychology Press.

Floress, K., Aakamani, K., Halvorsen, K. E., Kozich, A. T., & Davenport, M. (2015). The role of social science in successfully implementing watershed management strategies. *Journal of Contemporary Water Research & Education, 154,* 85-105.

Gagnon, V. S. (2016). *Ojibwe Gichigami* ("Ojibwa's Great Sea"): An intersecting history of treaty rights, tribal fish harvesting, and toxic risk in Keweenaw Bay, United States. *Water History, 8*(4), 365-384.

Great Lakes Indian Fish and Wildlife Commission [GLIFWC]. (2007). Manoomin – Wild Rice: The Good Berry. Retrieved from http://www.glifwc.org/WildRice/wildrice.html.

Great Lakes Indian Fish and Wildlife Commission [GLIFWC]. (2008). Wild Rice Ecology-Harvest-Management. Retrieved from http://www.glifwc.org/WildRice/wildrice.html.

Great Lakes Indian Fish and Wildlife Commission [GLIFWC]. (2018). Tribal Harvest Management. Retrieved from http://www.glifwc.org/Fisheries/Inland/.

Great Lakes Information Network [GLIN]. (2018). Great Lakes facts and figures. Retrieved from http://www.great-lakes.net/lakes/ref/lakefact.html.

Great Lakes-St. Lawrence River Basin Water Resources Compact. (2008). Public Law no. 110-342, 122 Stat. 3739.

Heberlein, T. A. (2012). *Navigating environmental attitudes.* New York, NY: Oxford University Press.

Hurlimann, A., Dolnicar, S., & Meyer, P. (2009). Understanding behaviour to inform water supply management in developed nations – A review of literature, conceptual model, and research agenda. *Journal of Environmental Management, 91,* 47-56.

International Joint Commission [IJC]. (2016). Binational Great Lakes basin poll. Prepared by the Great Lakes Water Quality Board Public Engagement Work Group. Retrieved from http://ijc.org/files/tinymce/uploaded/WQB/WQB_GreatLakesPollReport_2016.pdf.

Johnston, B. (1976). *Ojibway Heritage.* Lincoln, NE: University of Nebraska Press.

Jorgensen, B., Graymore, M., & O'Toole, K. (2009). Household water use behavior: An integrated model. *Journal of Environmental Management, 91,* 227-236.

Kimmerer, R. W. (2013). *Braiding Sweetgrass.* Minneapolis, MN: Milkweed Editions.

Kozich, A. T. (2016). Climate change and the sacredness of water in Native America: A case study in the Keweenaw Bay Indian Community, Michigan, USA. *Tribal College and University Research Journal, 1,* 20-37.

LaDuke, W. (1999). *All Our Relations: Native Struggles for Land and Life.* Cambridge MA: South End Press.

LaDuke, W. (2017). The water protectors are everywhere. *Indian Country Today.* Retrieved from https://indiancountrymedianetwork.com/news/opinions/water-protectors-everywhere/.

Lam, S. (1999). Predicting intentions to conserve water from the theory of planned behavior, perceived moral obligation, and perceived water right. *Journal of Applied Social Psychology, 29*(5), 1058-1071.

Lam, S. (2006). Predicting intention to save water: Theory of planned behavior, response efficacy, vulnerability, and perceived efficiency of alternative solutions. *Journal of Applied Social Psychology, 36*(11), 2803-2824.

LeCompte, M. D., & Schensul, J. J. (1999). *Analyzing and interpreting ethnographic data.* Walnut Creek, CA: Altamira Press.

Lyman, R. A. (1992). Peak and off-peak residential water demand. *Water Resources Research, 28*(9), 2159-2167.

McGregor, D. (2005). Traditional ecological knowledge: An Anishinaabe woman's perspective. *Atlantis: Critical Studies in Gender, Culture, & Social Justice 29*(2), 103-109.

McGregor, D. (2012). Traditional knowledge: Considerations for protecting water in Ontario. *Water and Indigenous Peoples 3,* 1-21.

McGregor, D. 2013. Indigenous women, water justice, and zaagidowin (love). *Canadian Woman Studies 30(2),* 71-78.

Millock, K. & Nauges, N. (2010). Household adoption of water-efficient equipment: The role of socio-economic factors, environmental attitudes and policy. *Environmental Resource Economics*. doi:10.1007/s10640-010-9360-y.

Randolph, B. & Troy, P. (2008). Attitudes to conservation and water consumption. *Environmental Science & Policy, 11,* 441-455.

Reynolds, G. C. (2003). A Native American water ethic. *Transactions of the Wisconsin Academy of Sciences, Arts and Letters, 90,* 143-61.

Russell, S., & Fielding, K. (2010). Water demand management research: A psychological perspective. *Water Resources Research.* doi:10.1029/2009WR008408.

Szach, N. J. (2013). *Keepers of the water: Exploring Anishinaabe and Metis women's knowledge of water and participation in water governance in Kenora, Ontario* (unpublished Masters thesis). University of Manitoba, Winnipeg.

Trumbo, C. W. & O'Keefe, G. J. (2001). Intention to conserve water: Environmental values, planned behavior and information effects. A comparison of three communities sharing a watershed. *Society and Natural Resources, 14,* 889-899.

United State Environmental Protection Agency [USEPA]. (2014). Great Lakes. Retrieved from http://epa.gov/greatlakes/.

Whyte, K. P. (2014). Indigenous women, climate change impacts, and collective action. *Hypatia*, *29*(3)*,* 599-615.

Whyte, K. P. (2017). The Dakota Access Pipeline, Environmental Injustice, and U.S. Colonialism. *Red Ink: An International Journal of Indigenous Literature, Arts, & Humanities, 19*(1). Retrieved from https://ssrn.com/abstract=2925513.

Willis, R. M., Stewart, R. A., Panuwatwanich, K., Williams, P. R., & Hollingsworth, A. L. (2011). Quantifying the influence of environmental and water conservation attitudes on household end use water consumption. *Journal of Environmental Management, 92,* 1996-2009.

Woboditsch, P. H. (1994). *Ojibwa worldview and environmental ethic: An investigative study* (Masters thesis). Retrieved from Electronic Theses and Dissertations, paper 2907.

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