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## Transforming research and relationships through collaborative tribal-university partnerships on Manoomin (wild rice)

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## ABSTRACT

Manoomin, the Ojibwe word for wild rice, grows in shallow lakes and streams and provides physical, spiritual, and cultural sustenance as a sacred food and relative for Indigenous peoples across the Great Lakes region of North America. Unfortunately, Manoomin has been declining due to multiple environmental stressors. In 2018, an interdisciplinary group from the University of Minnesota came together with natural resource managers from tribes and inter-tribal organizations to understand Manoomin within its socio-environmental context. This partnership grew despite a history fraught with settler colonial structures of knowledge production and commodification. Based on lessons learned from building this transformational partnership, this paper describes ten tenets for responsible research: 1) Honor Indigenous sovereignty and rights; 2) Address past and present harms; 3) Be on the path together with researchers and Indigenous partners; 4) Recognize, respect, and value Indigenous participation and intellectual labor; 5) Encourage the robust exchange of ideas; 6) Recognize that documents formalizing a relationship are not the whole relationship; 7) Make a plan for identifying and protecting sensitive Indigenous data; 8) Be prepared to navigate institutional obstacles; 9) Seek, support, and collaborate with diverse students; and 10) Actively listen and be open to different ways of engaging with the

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world. These lessons can serve as tools to form accountable partnerships that enable robust, nuanced, and effective environmental science, policy, and stewardship.

## 1. Introduction

Manoomin, meaning "the good fruit" or "spirit delicacy" in Ojibwe (David et al., 2019) and "wild rice" in English, is a protein-rich grain that grows naturally in shallow lakes and streams in North America. Manoomin, as a sacred food and relative, provides not only physical but also spiritual and cultural sustenance for Ojibwe, other Anishinaabe, and Dakota peoples across the Great Lakes region and is integral to Indigenous food sovereignty in the region (David et al., 2019; Hyman, 2012; Minnesota Tribal Wild Rice Task Force, 2018; PIIC Land & Environment Department. (n.d.), 2020; Schuldt et al., 2018; Vizenor, 2008; Prairie Island Indian Community, 2017). Guided by the prophecy of a homeland "where food grows on water," Anishinaabe people—including Ojibwe, Odawa, and Potawatomi groups—migrated from northeastern North America until they found Manoomin in the western Great Lakes region in the 16th century (David et al., 2019; Panci et al., 2018; Schuldt et al., 2018; Whyte, 2018). Seasonal cycles of Manoomin became important to Anishinaabe lifeways: traditionally, entire communities would relocate in late summer to ricing camps (David et al., 2019; LaDuke & Carlson, 2003; Schuldt et al., 2018; Yerxa, 2014; Child, 2014), and a resurgence of these and other cultural practices continues today (L. Simpson, 2017; Yerxa, 2014). Unfortunately, these practices have come under threat, as Manoomin has been declining due to multiple environmental stressors, including sulfate contamination from mining, water level alterations from dams and wetland drainage, invasive and competitive plant species, climate change, and landscape changes related to agriculture and urban development (Drewes & Silbernagel, 2012; MNDNR, 2008; Panci et al., 2018). As such, Manoomin has become a flashpoint in debates about the environment, economy, and regulatory policies throughout the Great Lakes region (Governor's Task Force on Wild Rice, 2019; Minnesota Tribal Wild Rice Task Force, 2018; LaDuke, 2005).

In 2018, an interdisciplinary group of researchers from the University of Minnesota (UMN) came together with resource managers from American Indian tribes and inter-tribal organizations in the upper Great Lakes region with the intention of studying declines in Manoomin. Early tribal collaborators came from Ojibwe communities located in present-day Minnesota (they are referred to as "Chippewa" in treaties signed by the U.S. federal government). The project also received early guidance from Dakota tribal representatives, upon whose land the UMN Twin Cities campus sits, and for whom restoration of historical stands of Psij—the Dakota word for Manoomin—is a reemerging priority (Minnesota Tribal Wild Rice Task Force, 2018; PIIC Land & Environment Department. (n.d.), 2020). The UMN researchers spanned four colleges and worked across American Indian studies, ecology, geochemistry, geography, hydrology, law, limnology, natural resource management, and sociology. We came together with a common goal: to understand the multiple facets of Manoomin through research predicated upon respect for tribal communities and for Manoomin itself.

Today, our original team of biophysical and social science researchers has grown to include a close group of students—graduate and undergraduate, Native and non-Native, and from multiple institutions—eager to learn through a multi-disciplinary approach. Our project now includes eight formal tribal partnerships—Minnesota Chippewa Tribe, Fond du Lac Band of Lake Superior Chippewa, Lac du Flambeau Band of Lake Superior Chippewa, Mille Lacs Band of Ojibwe, St. Croix Chippewa Indians of Wisconsin, 1854 Treaty Authority, Great Lakes Indian Fish and Wildlife Commission, and Great Lakes Inter-Tribal Council—which involve tribal natural resource managers, elders, rice chiefs (tribally appointed elders or knowledge holders who guide Manoomin stewardship and harvesting), leaders, youth, and ricers. Reflected in part through co-author affiliations on this collaborative paper,

numerous other tribal representatives from present-day Minnesota, Wisconsin, Michigan, and Ontario—mostly Anishinaabe and also Dakota—attend our biannual collaboration conferences, which are held at tribal venues and are open to any tribal affiliates interested in discussing Manoomin and how our project should approach it. All participants have provided invaluable perspectives, including their concerns about working with university researchers on Manoomin.

With substantial dedication and commitment to rebuilding trust, we have become a network of diverse tribal and university participants contributing in various ways to *Kawe Gidaa-Naanaagadawendaamin Manoomin* (First We Must Consider Manoomin)—the Anishinaabe name given to the project by one of its Ojibwe partners. After two years of funding from UMN sources that appreciate relationship-building above research publications, one of the most significant outcomes of our efforts is a research partnership rooted in trust, respect for tribal political and resource sovereignty, and a commitment to integrating Anishinaabe worldviews and knowledge with Western science and analysis. While collaborative community-based research is increasingly valued in environmental science and management, little has been written about how collaborative partnerships between tribal and non-tribal entities develop or evolve. From our collective experience, we found that the *process* of collaborative community-based research in environmental science and policy is just as important as the products. In this paper, we show that this process is not easy, in part because of the ways in which universities and researchers are embedded in settler colonial structures of knowledge production and commodification. Based on our collective experience, we are confronting the injustices that continue to afflict Indigenous peoples worldwide, and we are developing ways to translate complex ideas between worldviews. By doing so, we are finding ways to work together toward a more complete understanding of Manoomin and its relationship to the broader environment. With this article, UMN researchers and students endeavor to present the lessons learned from and with our tribal co-authors to help guide others at non-Indigenous universities and institutions who are trying to build respectful and reciprocal research partnerships with Indigenous communities.

## 2. Institutional and Intellectual Context for Collaboration around Manoomin

In the 1960's, agronomists at the UMN—unaffiliated with this project—launched a wild rice breeding program that expanded to include genetic research and continues today (Kimball, 2020; Oelke et al., 1982). The program was developed despite vehement protests by tribes, who argued in several letters to UMN that research leading to the possible genetic engineering of Manoomin degraded something sacred for the economic gain of mostly non-Native people (Deschampe, 1998; Manoomin Ogitchidaag Coalition, 2003; as detailed in LaDuke, 2004, 2007). In response to the breeding and genetics program, other UMN researchers and students began working with tribal communities in 2009 to hold a series of biennial symposia called "Nibi [Water] and Manoomin: Bridging Worldviews" with the goals of educating UMN on the cultural harms of its wild rice genetics work and calling for ethical research practices around Manoomin (Andow et al., 2011). Nevertheless, the breeding and genetics program continued with new funds appropriated in 2018 by the Minnesota Legislature under the umbrella of agricultural advancement (Minnesota State Legislature, 2017). At the same time that tensions flared around the revitalization of the breeding and genetics program, the *Kawe Gidaa-Naanaagadawendaamin Manoomin* partnership began to coalesce, with participation from some of the Nibi and Manoomin symposium organizers and others who similarly

sought to rebuild relationships between tribes and UMN. Even in the presence of deep wounds, our collaboration was able to take root. Thanks to the seeds of trust planted by earlier efforts such as the Nibi and Manoomin symposia and other examples of respectful partnerships between UMN researchers and tribes (e.g. Moore et al., 2015; Pastor et al., 2017), our collaboration has grown through a commitment to addressing ongoing harms, respecting Manoomin and other tribal interests, and understanding each others' perspectives.

The challenges described above are not isolated from the complicated relationships between settler colonial institutions and tribes that have shaped the landscape of North America since European contact. Between 1785 and 1871, Anishinaabe people signed more than 40 treaties with the U.S. government (Arnold et al., 2006; Matson, 2018). According to scholar Heidi Kiiwetinewinpegiak Stark, Anishinaabe treaty negotiators interpreted the treaties as memorializing an ongoing relationship of respect between nations that included reciprocal obligations; these obligations were not limited to the words in the formal treaty documents (Stark, 2010). In practice, the treaty documents often memorialized only portions of what had been discussed during the negotiations (Williams, 1997). U.S. government officials used the treaties as a legal means of appropriating massive amounts of invaluable land and resources for extractive activities and European settlement, dispossessing Indigenous communities from their traditional territories (Wilkins & Lomawaima, 2001). Meanwhile, the U.S. government's treaty obligations to tribes often went unfulfilled, resulting in famine and devastation for communities whose sources of sustenance and cultural practice had been fundamentally disrupted by new colonial boundaries and settlement patterns (Deloria & Wilkins, 1999). And yet, these treaties also recognized tribes as sovereign nations and guaranteed tribal rights to continue to use the ceded territories to maintain vital lifeways, including hunting, fishing, and harvesting plants; the 1837 Treaty with the Chippewa specifically protects tribal rights to Manoomin (United States Federal Government, 1837).

The structures of settler colonialism in the U.S. consolidated dispersed tribes onto constrained reservations, limited access to traditional foods and practices (Whyte, 2015; Hilchey & Christian, 2019), and wove European colonialism into the normative languages of law and policy (Wilkins & Lomawaima, 2001) and social mobility (Borrows, 2016; Wolfe, 2006), and science (Deloria, 1979). The structures and logics of settler colonization have also permeated academic discourses and institutions of knowledge production (Hunt, 2014), a legacy that researchers and communities must face in order to counteract. It is also important to recognize that these structures have always been contested, particularly by Indigenous and tribal communities who have asserted their sovereignty as a means of resisting colonial authority and reclaiming Indigenous lifeways (A. Simpson, 2014; Wilkins & Stark, 2011). The modern tribal sovereignty movement coalesced around the intertwined patterns of Indigenous repression and environmental degradation, with tribes re-asserting their treaty rights and authority as stewards of the landscape (Wilkinson, 2005). Anishinaabe people were and continue to be leaders in activism to expand tribal legal jurisdiction as well as hunting, fishing, and gathering rights in their treaty-ceded territories (Matson, 2018; Thompson, 2017). This movement comes at a critical time for preserving Manoomin, as environmental degradation over the last century has caused stands to decrease by nearly one third in Wisconsin and Minnesota, vastly diminish across Michigan, and face declines in Canada (David et al., 2019; Drewes & Silbernagel, 2012; LaDuke, 2005; Smart, 2013; Bunch, 2018).

From generations of experience and out of cultural obligation, tribes have taken care of Manoomin with an understanding that it is dependent on relationships with an order of other beings, including earth elements, plants, animals, and humans (David et al., 2019; Panci et al., 2018; Whyte, 2017). Changes in water levels, contaminants, invasive species, and infrastructural development have all been connected with impacts to Manoomin ecosystems (MNDNR, 2008; Drewes & Silbernagel, 2012; David et al., 2019). This complexity has presented substantial challenges

for determining specific drivers of Manoomin decline in any one lake or stream, in part because data dispersed among different agencies make it difficult to study interacting factors (Drewes & Silbernagel, 2012). Indeed, tribes have expressed their dismay as state agencies focus too narrowly on single, isolated stressors rather than adopt holistic stewardship of Manoomin (as captured in a letter written by the Minnesota Indian Affairs Council to the Minnesota Pollution Control Agency, Larsen, 2017). Today, understanding the connections between Manoomin and all of its relations, elders and rice chiefs guide tribal natural resource agencies and inter-tribal treaty organizations as they continue to care for Manoomin waters (David et al., 2019).

These histories and ways of understanding Manoomin ecosystems are essential foundations on which our research partnership was built. Despite the difference in worldviews and the ongoing harms of settler colonialism, many Indigenous scholars believe Western science collaboration can be beneficial if done in a good way (Kimmerer, 2013b; Whyte et al., 2017): "Although scientific methodologies and technical work may not have been created for the purpose of Indigenous cultures or self-determination, there is no reason why they cannot be redeployed to such ends" (Whyte et al., 2017). To do this work, we must directly address the legacies of colonialism that manifest in the structure of academia, the boundaries of jurisdictional authority, environmental harms, and the ways in which we relate to Manoomin and other non-human elements of our research (Smith, 2012; Whyte, 2017, 2018; Whyte et al., 2017). New paradigms are needed to disrupt the current hierarchy in which researchers and funding institutions preside above local communities, especially Indigenous communities (Smith, 2012). Participatory Action Research (PAR), Community-Based Participatory Research (CBPR), and community-driven models present frameworks for shifting power to local communities, prioritizing relationships over outcomes, and holding researchers accountable to communities (Kemis & McTaggart, 2006; NCAI Policy Research Center & MSU Center for Native Health Partnerships, 2012; Pandya, 2014; Smith, 2012).

If done poorly, participatory action research with Indigenous communities can reinforce colonial research structures and power imbalances (De Leeuw et al., 2012). However, when they are implemented with respect and attention to tribal partners' self-expressed interests and benefits, participatory methodologies have begun to yield fruitful collaborations with Indigenous communities in public health (e.g. Baydala et al., 2013; Morton Ninomiya & Pollock, 2017; Tobias et al., 2013), social sciences (e.g. Datta et al., 2015; Koster et al., 2012; Liebenberg et al., 2017), and education (e.g. Dalbotten et al., 2014). Beneficial examples of participatory research are also appearing in environmental, natural resource, and biophysical sciences (e.g. Amberson et al., 2016; Hilchey & Christian, 2019; TallBear, 2016; UAF & IARC, 2020; Watson, 2013), but they are far from widespread (e.g. David-Chavez & Gavin, 2018), in part due to challenges in bridging disparate cultural perceptions about the natural world and the position of humans within it (Ban et al., 2018; Dockry et al., 2017; Kimmerer, 2013a; Whyte et al., 2017). As part of ongoing resistance and resurgence, Indigenous scholars are calling for their communities to lead in the research that impacts them (e.g. Foster & Janke, 2015; LaFrance & Nichols, 2008; NCAI Policy Research Center, 2009; Sahota, 2007) and to forge their own research projects based on Indigenous knowledge and experiences independent of Western institutions (e.g. Dockry et al., 2016; Lake et al., 2010; Rossier & Lake, 2014; Whyte et al., 2017). These scholars are urging all researchers—Native and non-Native—to decolonize research methodologies (e.g. Carroll & Martinez, 2019; David-Chavez, 2019; Kimmerer, 2013b; NCAI Policy Research Center & MSU Center for Native Health Partnerships, 2012; Smith, 2012; Wilson, 2008).

### 3. Considerations for Responsible Research

Taking the time to first establish respectful and genuine relationships is absolutely critical when conducting environmental science and policy work aimed at supporting Indigenous communities. The legal and



ethical imperatives of Indigenous sovereignty and rights demand equitable and fully formed partnerships when Indigenous interests are at stake. Here we summarize our key insights and share our project's general protocol for responsible research (see Supplementary Information) for researchers seeking to conduct work with Indigenous communities, lands, or cultural resources and for Indigenous groups that wish to direct Western research institutions in carrying out mutually beneficial partnerships. Our insights are informed by other guidelines published by Indigenous institutions and researchers, and we encourage the reader to seek out these foundational works in our citations. Importantly, though, our reflections are not meant to be a checklist for conducting research with Indigenous people. Each collaborative process is unique, and partners must work through their own historical and political contexts and particular forms of cross-cultural learning. We also caution that collaboration takes hard work, and weaving worldviews and ways of knowing across disciplines and backgrounds is not easy. However, such work is immensely beneficial to knowledge creation and is necessary to ensure positive impacts for Indigenous communities. Our reflections can serve as a springboard for different ways of thinking about accountability and community partnerships in research to enable more robust, nuanced, and effective environmental science, policy, and stewardship. The following subsections present ten insights on transforming relationships and research through collaborative tribal-university partnerships.

### 3.1. Honor Indigenous sovereignty and rights

If a project at all affects Indigenous interests, then sovereignty and rights (UN General Assembly, 2007) must be recognized, honored, and protected (Whyte et al., 2017; NCAI Policy Research Center & MSU Center for Native Health Partnerships, 2012). In the United States, tribes are sovereign nations with their own governments, policies, and treaties. Before starting any research, seek official approval for the work from the community's decision-making bodies, such as through proposals to tribal councils, tribal institutional review boards (IRBs), the tribal historic preservation offices (THPOs), and/or tribal cultural committees. Approval may be required by multiple units within a tribe, each of which focuses on a different aspect of the proposed research, such as environmental impacts, cultural sensitivities, or data protocols. As we have experienced, applications may be rejected, in which case no work should proceed on that community's lands and waters. When approval is granted, we sign memoranda-of-understanding (MOUs) (based on our general protocol, see Supplementary Information) with each partnering tribe to establish the research practices allowed and disallowed by the tribe on their reservation. Also, be aware of off-reservation treaty rights in ceded territories, including tribal communities' legal rights to natural resources there (see e.g. Erlinder 2015; GLIFWC 2018), and coordinate work in such regions with the appropriate tribal-led natural resource organizations that protect off-reservation resources guaranteed to tribes. Indigenous peoples today continue to have to fight for their sovereignty and resource rights; any environmental science and policy work conducted on tribal lands or in ceded territories where tribes retain treaty rights should support this fight.

### 3.2. Address past and present harms as an essential part of building accountable relationships

Be aware of and actively address past and ongoing injustices faced by Indigenous peoples, especially those related to the work in which you hope to engage (NCAI Policy Research Center & MSU Center for Native Health Partnerships, 2012; Smith, 2012). On this project, university team members had to reckon with our institution's wild rice breeding and genetics program, as well as our own early missteps. The decision of whether and how to move forward must be led by Indigenous partners and respected by all participants. If Indigenous partners feel that sufficient trust has been developed, they should determine how injustices

should or should not be recognized or confronted in the work. Developing these relationships does not require that Indigenous partners forgive institutions for past harms, but neither must these harms define the limits of what is possible in your collaboration. University researchers on this project openly acknowledge wounds caused by our institution, and we now continue to learn and work collectively to speak out against research practices that marginalize tribal perspectives and to educate other non-Native researchers about the need for culturally responsible approaches that honor tribal sovereignty.

### 3.3. Be on the path together with researchers and Indigenous partners

Researchers and partners should journey together on a path that extends through every phase of the research process—hypothesis generation, research planning, field work, analysis, and dissemination (IPSG-AAG, 2010; Castleden et al., 2012). If any step is missed, go back and iterate until a collaborative plan is achieved. Researchers should offer to visit Indigenous partners' spaces and communities throughout the project, and particularly in early stages. But do not push to enter spaces to which you are not invited; follow Indigenous partners' leads on where, when, and how to enter. In the early stages of our project, tribal partners emphasized the need to iterate on the core tenets and goals of our work together, prompting researchers to put aside original research plans and instead spend the first six months to travel to tribal spaces for in-person meetings. Similarly, researchers should welcome tribal partners into their institutions. After collecting field samples together (Fig. 1), tribal partners visited UMN laboratories, and we discussed sample analysis processes as a team. Now that the project is three years in, we continue to hold regular monthly meetings and biannual conferences to share updates, discuss research findings, grow relationships, plan future research cycles, and agree on ways to disseminate the work. These shared experiences have helped to build trust and facilitate a more complete understanding of the ecosystem and relational importance of Manoomin.

### 3.4. Recognize, respect, and value Indigenous participation and intellectual labor

Acknowledging past harms and walking the path together includes recognizing how Indigenous intellectual and physical labor, knowledge, and data have often been stolen or misused by researchers and other institutions over the years (Smith, 2012; Todd, 2016). This recognition should include a commitment to approach Indigenous knowledge only under the direction of Indigenous partners, and to compensate contributors (IPSG-AAG, 2010) (in our case: conference participants, youth drummers, prayer-givers, elders, tribal leaders, and key consultants) by



Fig. 1. Tribal partner and student intern collect water and sediment samples at a Manoomin site.

following appropriate customs and with payments, travel reimbursements, gifts, and/or professional credit for their time and skills. When developing funding proposals together, include budget preferences and priorities of Indigenous partners to ensure shared benefits of the research grant. Invite co-authorship on presentations and publications that come out of the research collaboration so that partners receive the professional benefits and recognition that come with scholarly products. Failing to provide due credit and resources to Indigenous partners reinforces the exploitation and erasure of Indigenous peoples.

### 3.5. Encourage the robust exchange of ideas for stronger collaborative research

Indigenous communities have unique and distinct ways of looking at and engaging with the world around them, and in many cases are drawing on decades, if not centuries, of observational analysis, cultural teachings, and intergenerational instruction. As much as scientific methods can be useful to Indigenous partners, researchers must be open to adapting their own perspectives and practices as a result of their interactions with Indigenous partners (Whyte et al., 2017; NCAI Policy Research Center and MSU Center for Native Health Partnerships, 2012). This does not mean a corrosion of scientific integrity. On the contrary, it means that the scientific method is informed by deep site-specific knowledge, hypotheses are generated with a broader array of indicators, and analysis of data is subjected to manifold critiques and considerations. Our project's collaboration conferences and knowledge-exchange workshops have given us the opportunity to share skills — for instance, at our events, UMN team members have demonstrated how they collect and process water samples while tribal partners have taught participants how to carve rice knocking sticks and finish Manoomin over a fire. More importantly, through these interactions, tribal partners have pushed UMN team members to look at Manoomin more holistically (Fig. 2) and consider aspects of the ecosystem that extend far beyond each team member's areas of expertise. This creates opportunities for researchers to inspect their blind spots and develop a more thorough, nuanced, and thoughtful interpretation of findings. Importantly, some of the most beneficial insights come in the form of critiques, so willingness to listen without defensiveness is crucial.

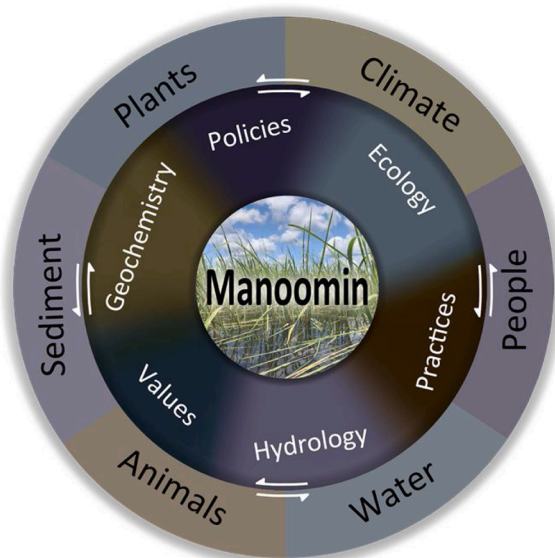


Fig. 2. A holistic view of Manoomin and its relationship to human and non-human beings.

### 3.6. Recognize that documents formalizing a relationship are not the whole relationship

Formal documents, such as protocols and MOUs, are critical for holding researchers and others accountable to a set of standards and agreed-upon conduct (see Supplementary Information for our project's protocol for responsible research). However, these documents do not supersede the actual relationship, which requires regular communication, accountability, and trust; sharing and respect of each other's ideas; and a willingness to overcome differences (IPSG-AAG, 2010; Tobias et al., 2013; Dockry et al., 2017). Meeting the obligations of a protocol, Free Prior and Informed Consent (FPIC) principles, or an IRB review—even a tribally established process—is a floor and not a ceiling for respectful partnerships. Some mechanisms for relationship-building in our project include monthly calls open to all tribal representatives concerned about Manoomin, biannual conferences hosted by one of the tribal partners and paid for by project funding, and in-field interactions when collecting data. Regular evaluations should be conducted such that tribal partners can hold the project accountable and provide feedback on necessary adjustments to strengthen and maintain the relationship.

### 3.7. Make a plan for identifying and protecting sensitive Indigenous data

Indigenous data sovereignty is a critical issue to which tribes, scholars, Indigenous leaders, policy-makers, and regulatory agencies are increasingly attuned (Kukutai and Taylor 2016). In our project protocol (see Supplementary Information), we define “data” to include directly gathered information, such as field measurements and interview transcripts, which are obtained only with approval from tribal partners. Indigenous knowledge can more broadly encompass culturally based understandings and practices that extend beyond directly gathered data (NCAI Policy Research Center & MSU Center for Native Health Partnerships, 2012), but we do not attempt to use or regulate knowledge that is not intentionally provided to the project for research purposes. Learn about best practices to protect sensitive data (e.g., those developed by the World Intellectual Property Organization's Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge, and Folklore; US Indigenous Data Sovereignty Network; Indigenous People's Council on Biocolonialism; and Native Nations Institute at the University of Arizona (Carroll & Martinez 2019)) and work with Indigenous partners to formalize agreements on data ownership and sharing. Further, be mindful of the ways in which some institutional values—e.g., academic freedom and open-data principles—may be at odds with the interests of Indigenous partners (Whyte et al., 2017). As researchers develop projects with Indigenous communities, it is incumbent upon them to understand and communicate funders' data requirements—and potential concerns stemming from them—to Indigenous partners, and to proactively seek solutions. In our project, we were able to reach a satisfactory arrangement for both tribal partners and funders by identifying a public data repository that will not require exact geographical coordinates for on-reservation study sites. Keep in mind that researchers at state-level institutions may be subject to state data laws that are even less protective of sensitive tribal data than the U.S. Freedom of Information Act (FOIA). Be ready to stop and alter the work plan if protection of sensitive tribal data cannot be guaranteed, and be prepared to defend and argue for this decision with your funding agency.

### 3.8. Be prepared to navigate institutional obstacles

Many Western research institutions have fraught histories with Indigenous communities. These institutions also tend to value particular forms of knowledge production and metrics of productivity and impact (Hunt, 2014). Embarking on a collaborative research program with Indigenous partners entails risks for researchers at these

institutions—especially early career researchers and graduate students, who are expected to produce conventional publications under tight time and funding constraints (Hangel & Schmidt-Pfister, 2017). To address colleagues' concerns about longer timelines and unconventional methodologies, emphasize the potential benefits of the partnership for the institution at large. At the same time, reduce later complications by clarifying with Indigenous partners how project data can be used and agreeing upon time frames for reviewing drafts of presentations or publications. The multiple pre-tenure faculty on this project resisted the pressure to publish expediently within their disciplines and instead gave presentations, reviewed in advance by tribal partners, on new community-engaged research methods for their disciplines. There is no easy answer for dealing with institutional obstacles to address aspects of data ownership, tribal requirements for conduct of research, and non-standard workflows and timelines. However, with shared commitments and formal protocols for conduct, a research collaboration can develop a common set of values and a system for regular communication that makes it possible to confront issues together.

### 3.9. Seek, support, and collaborate with diverse students

A key component of Indigenous research is intergenerational involvement extending from elders to youth (Whyte et al., 2017). For collaborative research, students can serve as a common rallying point for university and Indigenous partners who share the goal of fostering subsequent generations' understanding and stewardship of the world around them. Invite Native students who already walk with a foot in each world to join, and celebrate their ability to integrate worldviews that might sometimes seem at odds. Create cohorts across multiple institutions to help build a sense of community—something many Native students lack at their mainstream institutions. Our diverse students have served as teachers to all of us on how to work together across wide ranging academic and cultural experiences, and they will take these skills with them as they become leaders of the next generation of collaborative researchers, resource managers, and policy-makers. Be sure to provide full support from start to end as many students push through socio-economic barriers and challenge conventional research methods.

### 3.10. Actively listen and be open to different ways of engaging with the world

Especially at the start of a project, but also throughout, researchers must talk less in order to truly listen to Indigenous perspectives (NCAI Policy Research Center & MSU Center for Native Health Partnerships, 2012). To do this, approach the collaboration with an openness, curiosity, and desire to reach across cultural and philosophical differences. Researchers should be prepared to change the way they think about and interact with the world around them—their engagements with the social and natural subjects that they study, and the relationships they build with Indigenous neighbors and within their own communities. Many Indigenous peoples use storytelling to pass on intergenerational knowledge, teach values, provide instructions for navigating complex problems, and establish expectations for how to be in the world: “stories not only are things but *do things*, like provoke action, embody sovereignty, or structure social and political institutions” (Doeffler et al., 2013). Listen carefully, because stories are a way for Indigenous collaborators to subtly but meaningfully inform researchers about cultural codes, expectations, and priorities. Researchers and students on our project learned to step off frenetic fieldwork schedules and took the time to paddle the full stretch of a Manoomin river with a life-long ricer as he shared his stories. As researchers learn about Indigenous partners' worldviews, values, and philosophical orientations, they can become aware that there are more ways to see, hear, learn, and engage than just the methods in which they were formally trained.

## 4. Conclusion

With a commitment to honoring tribal sovereignty and rebuilding trust, our partnership was able to confront a difficult history—in which Indigenous perspectives have been persistently undermined by Western researchers—and chart a path forward together. Insights from our experience can provide tools to universities and tribes to build collaborative interdisciplinary partnerships in support of more robust environmental research, policy, and stewardship, and may ultimately play a role in redressing long-standing tribal dispossession and marginalization. In our own journey, following these tenets have led to a start for healing; new connections among tribal communities, university members, and Manoomin waters; and a path forward for working together to protect Manoomin and its relatives. We believe that continued commitments to this path will allow us to build something transformative together in a time of immense environmental and societal change.

### CRedit authorship contribution statement

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### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## Appendix A. Supplementary data

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