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# Building trust through the Two-Eyed Seeing approach to joint fisheries research ☆

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ABSTRACT

The Saugeen Ojibway Nation (SON) and the Ontario Ministry of Natural Resources and Forestry (MNRF) collaboratively govern the commercial fishery within the SON's traditional territory situated in Lake Huron's main basin and Georgian Bay of the North American Great Lakes. Prior to the application of a Two-Eyed Seeing approach (*Etuaptmumk*), the two groups often operated in separate silos and relied on external experts to aid communication, which contributed to a sense of mistrust regarding the legitimacy of science that was being used to inform management. A breakthrough occurred when MNRF and SON began using the Two-Eyed Seeing approach to collaborate and jointly conduct research on fish populations in Lake Huron. In this article, we share how we used Two-Eyed Seeing to jointly develop a research proposal that is guided by both SON's ecological knowledge and Western science. Our research involves addressing the role that lake trout (namegos; *Salvelinus namaycush*) have played in declines in lake whitefish (dikameg; *Coregonus clupeaformis*) abundance in Lake Huron, a priority identified by SON members. We share the challenges and lessons learned while reflecting on the ethical knowledge co-production framework we developed. Our goal is to provide a useful example of how Two-Eyed Seeing can be applied to foster relationship-building between government agencies and First Nations in the pivotal early stages of co-developing a research project. The Two-Eyed Seeing approach is foundational to building more equitable partnerships between Indigenous and non-Indigenous communities and for supporting healthy Great Lakes ecosystems and fisheries.



## Introduction

Research priorities aimed at addressing fisheries issues in the North American Great Lakes have traditionally been driven by government agency management needs or established by Western science-oriented funding institutions. Research based on these priorities is typically carried out by Western science researchers at institutions and government agencies, often excluding Indigenous knowledge and perspectives. Furthermore, when attempts are made to engage or inform Indigenous communities about research priorities or projects in their territories, it is usually well beyond the research development stage and sometimes even after the research has been conducted. To address the complex ecological issues occurring within the North American Great Lakes, there is a critical need for research proposals and initiatives emerging from Indigenous communities and based on Indigenous knowledge (Rathwell et al., 2015; Wong et al., 2020). Indigenous communities have in-depth knowledge of local ecosystems, gained through thousands of years of relying on the land and water for survival, economy, and culture.

In this article, we provide an example of how the Two-Eyed Seeing approach was used as a guiding framework to enable equitable collaboration and knowledge co-production in ecological research between government researchers and two First Nations in the

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Great Lakes. The research we describe is a joint project between the Saugeen Ojibway Nation (SON) and Ontario Ministry of Natural Resources and Forestry (MNRF). We outline how the research was guided by the priorities of two First Nations from the project's earliest stages and how the Two-Eyed Seeing approach permitted a new working relationship to emerge based on a shared commitment to address declines of an important fish species in Lake Huron.

Our article centers around the key early stages of our research project and the writing of a collaborative research proposal. These early stages were critical to our project's success because they included developing research questions centered around SON member concerns, establishing a study design (including adopting a Two-Eyed Seeing approach), and co-producing a research proposal. Co-developing this research study and coming together to write a research proposal was a huge step forward for SON and MNRF and we felt it was important to share our experiences in this journey. To our knowledge, this is the first research proposal jointly developed by a government agency and an Indigenous community that was funded by the fisheries research program of the Great Lakes Fishery Commission. These initial stages of our project set the foundation upon which we could conduct our work in an ethical way, allowing us to fully embrace the concept of Two-Eyed Seeing including learning from SON about their research priorities and formulating the specific research questions our project addresses.

*Project partners*

SON are among the Anishinaabe people of the Great Lakes region and are comprised of two First Nations, the Chippewas of Nawash Unceded First Nation and the Chippewas of Saugeen First Nation. The people of the SON have been living throughout their traditional territory on the Saugeen (Bruce) Peninsula of Lake Huron (Fig. 1) since time immemorial and are ever mindful of their duty to be stewards of the land. Fishing is of special significance to SON, with the 1993 Ontario Supreme Court reaffirmation that the SON had an Aboriginal and Treaty right to fish for commercial and sustenance purposes within their traditional territory (R. v. Jones, 1993; Lowitt et al., 2019). Shortly after this decision, a fisheries assessment program was started by SON to monitor harvest and collect biological information from the fishery. SON's close relationship to the land and water, and in particular their experience as fish harvesters, means that SON members hold a wealth of information on the status and trends of fish populations in Lake Huron. SON has a 930-hectare hunting reserve on the northern Saugeen Peninsula, an Aboriginal Title claim to the waters and lakebed of a large extent of Lake Huron and Georgian Bay, as well as exclusive commercial fishing rights negotiated with the Crown that cover most of their traditional waters around the Saugeen Peninsula in Lake Huron and Georgian Bay. The decline in abundance of fish populations, in particular lake whitefish (dikameg; *Coregonus clupeaformis*), has negatively impacted the SON's commercial fishing economy and is a serious concern to SON members that rely on fishery resources for food, income, and ceremony. The effects of declining fish populations have a cultural impact because, as is true for many Indigenous communities around the Great Lakes, the connection to fish represent an important cultural and reciprocal relationship which bears a significant responsibility to honour and respect these beings (Johnston, 1990).

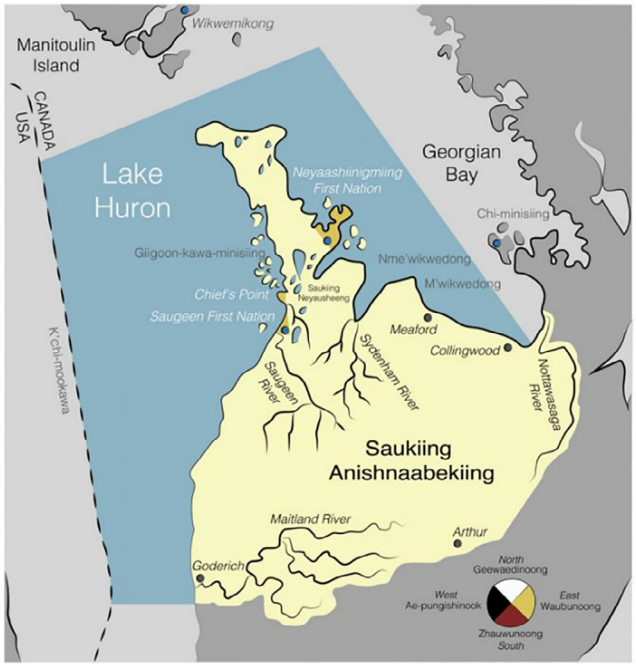


**Fig. 1.** Saukiing Anishnaabeking Traditional Territory. This map depicts the traditional territory of Saugeen Ojibway Nation (SON) on the Saugeen (Bruce) Peninsula of Lake Huron's main basin and Georgian Bay. Reserve lands for the SON's two sister First Nations (Saugeen and Neyaashiinigmiing) are labelled and shown in yellow on the map.

The MNRF is the provincial government agency deemed by the Crown to be responsible for fisheries management in Ontario, a Canadian province, which includes managing recreational, commercial, and Aboriginal fisheries under the Fisheries Act (Ontario Ministry of Natural Resources and Forestry, 2015). Fisheries management decisions in Ontario are informed by Western science, including science conducted internally (by MNRF staff) and externally (by universities, NGOs, etc). MNRF conducts annual monitoring and applied research programs on fish populations within Lake Huron and the Great Lakes, inland lakes, and rivers across the province. The province of Ontario is a signatory to the Joint Strategic Plan for Management of Great Lakes Fisheries (GLFC, 2007). As part of the Joint Strategic Plan, the Great Lakes Fishery Commission (GLFC) coordinates and facilitates cooperation among Great Lakes fisheries management agencies within Canada and the United States. MNRF is an active participant in GLFC committees, initiatives, and programs in support of sustainable management of Great Lakes fisheries (https://www.glfc.org).

SON and MNRF have a long history that was characterized by conflict and disagreement on issues related to fisheries in Lake Huron (Blair, 1997; Koenig, 2005; Lowitt et al., 2019). In the past, SON was excluded from most decisions about fisheries management, including fish stocking, and did not participate in research priority setting conducted by binational management agencies in the Great Lakes basin. The relationship between MNRF and SON can be generally categorized into three time periods: (1) fishery-related conflict, pre-2000; (2) transition to joint fishery governance, 2000–2018; and (3) collaborative fisheries research using the Two-Eyed Seeing approach, 2018-present. Historically, Indigenous fishing activities were subject to government management measures such as licensing requirements and seasonal closures, and Indigenous communities were restricted to fishing for subsistence (Lowitt et al., 2019). For SON specifically, government policy inhibited SON's fishing and management activities following treaties signed in the 19th century and the development of the Canadian Fisheries Act (Koenig, 2005; Lowitt et al., 2019). This resulted in the "*postage stamp fishery*" with SON being excluded from participating in the fishery except for a small portion within waters outside of their reserve land of Neyaashiinigaming. The 1993 affirmation of fishing rights (R. v. Jones, 1993) was followed by conflict and confrontation between SON and non-Indigenous

harvesters as the fishery was reallocated, resulting in increasing tensions between the SON and MNRF. In the subsequent transition era, there was a shift to joint governance with the establishment of the SON and MNRF Fishery Governance Committee which included a data sharing agreement.

Despite the data sharing agreement, MNRF and SON operated in separate silos, with each collecting information independently which led to disagreements about the legitimacy of the respective data provided. Although a SON/MNRF commercial fishing agreement was in place (Substantive Commercial Fishing Agreement, 2012), lack of consensus on issues or decisions impeded collaborative resource stewardship. For example, a particularly contentious issue is that of fish stocking within SON's traditional territory (Gobin et al., this issue). The current era was made possible by using the Two-Eyed Seeing approach as a means of working together, which allowed for a more respectful relationship to emerge. Below, we share the process and lessons learned as we embarked on the co-development of our joint research proposal which led to the new era of SON-MNRF collaboration. We begin with an overview of Two-Eyed Seeing, followed by a description of our research project that was recently funded by the GLFC. We share lessons learned and the challenges encountered while building our research proposal and we conclude by describing the next steps in our Two-Eyed Seeing research project.

## Two-Eyed Seeing – the gift of multiple perspectives

Mi'kmaw Elder Albert Marshall describes Two-Eyed Seeing (or *Etuaptmumk)* as "learning to see from one eye with the strengths of Indigenous knowledges and ways of knowing, and from the other eye with the strengths of mainstream knowledges and ways of knowing, and to use both these eyes together, for the benefit of all" (Bartlett et al., 2012, p. 335). Originally applied to the health field, the concept of Two-Eyed Seeing is gaining prominence as a helpful concept to "provide a conceptual framework for equitably embracing multiple perspectives within a social-ecological system" (Reid et al., 2021, p. 245). This is a concept embodied within other Indigenous knowledge systems such as the two-row wampum belt, symbolizing Indigenous and Western knowledge moving in parallel, enriching but not interfering with one another (Berkes, 2018). Likewise, Macfarelane et al. (2015) promoted the concept of a braided river approach which describes the coming together of different knowledges as streams running independently and upon convergence, learning from one another.

In our Two-Eyed Seeing research study, one eye represents Indigenous ecological knowledge while the other eye represents Western science. A growing body of research shows that bridging Indigenous ecological knowledge, IEK (also known as traditional ecological knowledge, or TEK), with Western scientific knowledge is crucial to informing locally relevant conservation and fisheries management (Ban et al., 2017; Berkes, 2017; Popp et al., 2019; Reid et al., 2021; papers within this issue). For the purposes of this article, we define Indigenous ecological knowledge as the "cumulative body of knowledge, practices, and beliefs, evolving and governed by adaptive processes and handed down and across (through) generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment" (Berkes, 2018, pg 8). While IEK is a general term, each Indigenous community has their own IEK specific to their territory and lived experience. In the case of our research study, we herein refer to SON's Ecological Knowledge (SONEK) because it is not meant to be representative of the knowledge of other Indigenous communities. Although IEK has informed numerous resource management issues (Berkes, 2009; Huntington, 2000; Mantyka-Pringle et al., 2017; McGregor, 2014), relatively few examples exist of the Two-Eyed Seeing approach being applied in a fisheries or aquatic ecosystem context (Reid et al., 2021, Alexander et al., 2019). Notable examples of Two-Eyed Seeing research studies include Abu et al. (2020) which focuses on changes in the Saskatchewan River Delta, and Duncan et al. (this issue) which is one of the only examples we know of where Two-Eyed Seeing was applied in a Great Lakes fishery context.

Two-Eyed Seeing as a guiding framework moves beyond integrating, combining, or incorporating IEK into mainstream Western approaches and instead builds an ethic of knowledge co-existence and reciprocal knowledge exchange (Reid et al., 2021). In this equitable collaboration, knowledge holders are both Indigenous peoples and scientists (Armitage et al., 2011). The purpose of working with the Two-Eyed Seeing approach is not to "calibrate" or "integrate" these two knowledge systems but engage in a process of co-learning and co-production. In this process, Indigenous and Western science can be best considered together by convening in a collaborative way around a particular topic or problem (Armitage et al., 2011) to build an holistic understanding of the problem at hand. For the purposes of this article, we use the word co-learning as synonymous to co-production and to learning together using IEK and Western science.

The Two-Eyed Seeing approach provided a foundation on which to build a more collaborative relationship between MNRF and SON based on co-learning and ethical knowledge co-production. Over the transition era (2000–2018), it was clear that discussing only Indigenous ecological knowledge or only Western science did not create these bridging effects. Latulippe and Klenk (2020) shared that it is important to go beyond the 'integration' of Indigenous knowledge into mainstream approaches and, instead, actively work together between researchers and Indigenous peoples in a process of knowledge co-production. The process of working together expands the evidence-base, increases legitimacy, and builds trust among all participants. In our experience, the Two-Eyed Seeing approach is a "boundary spanning concept" (Safford et al., 2017) which describes a way to translate knowledge into action.

In our research partnership, we view the interface between IEK and Western science as a *source of inventiveness* and an opportunity to use insights from one to enhance the other through learning and dialogue (Durie, 2004). By advancing a Two-Eyed Seeing approach we can provide a more inclusive, comprehensive, and pluralistic foundation that can help inform fisheries management in the Great Lakes. Tengö et al. (2014) and Norström et al. (2020) both shared that there is a need to identify new tools and approaches for knowledge co-production while Johnson et al. (2016) and Whyte (2013) indicated a need to identify and develop methodology for knowledge co-production and mutually respectful learning specifically related to bridging initiatives between Indigenous knowledge systems and Western science. The Council of Canadian Academies (2019) asked for an "elevation in our collective capacity and mainstream methods for incorporating Indigenous local knowledge into resource decision making" (p. 52). Our Two-Eyed Seeing research project serves as a case study that goes beyond the incorporation of Indigenous local knowledge in resource decision making (von der Porten et al., 2016), by contributing to the body of knowledge and wise practices on ethical knowledge co-production between Western science and Indigenous knowledge systems (Mussett et al., this issue). As in every Two-Eyed Seeing project, our approach is unique and designed based on the specific context, research questions, and partnership. Although context specific, our case study is highly relevant and crucial for local fishery management issues, and offers an example of an ethical, mutually beneficial collaboration between government and Indigenous communities.

## Building a Two-Eyed Seeing research proposal

Over the course of two years (2018–2020), SON and MNRF co-created a research study and co-wrote a research proposal *"Engaging SON's Indigenous ecological knowledge and quantitative analysis to study the interaction between lake trout and lake whitefish*" that was submitted for funding to the GLFC, a bi-national organization that coordinates fisheries management among agencies, controls invasive sea lamprey (*Petromyzon marinus*), and funds fisheries research in the Great Lakes. The development of the proposal was a deliberate process that began by defining our research interests together based on SON's input and through extensive dialogue among project team members. While the project team recognized the need for obtaining external funding to conduct the research, we also saw that the process of writing the proposal together was a critical step forward and would provide benefit even if the request for funding was unsuccessful.

Our proposal focused on lake whitefish (*Coregonus clupeaformis*; dikameg in Anishinaabemowin), an essential component of SON's diet, economy, and culture for thousands of years. The species also plays an important role in the ecosystem, undergoing large-scale movements, transferring energy from the benthic to pelagic food web, and supporting valuable commercial and subsistence fisheries throughout the North American Great Lakes. Over the past two decades, lake whitefish populations most notably in lakes Huron and Michigan have undergone substantial declines in abundance, leading to the lowest commercial yields on record over the past 2–3 decades (Ebener et al., 2021). Understanding the reason(s) for the decline is a priority for SON, as well as for management agencies including MNRF (Claramunt et al., 2020; Ebener et al., 2021; Gobin et al., this issue).

### *Community-guided research questions*

A crucial component of Two-Eyed Seeing is that research questions should be led by Indigenous community perspectives and priorities. SON members, including fish harvesters, Elders, and leadership, have expressed concern with the declining abundance of lake whitefish in SON's traditional waters in the main basin of Lake Huron and Georgian Bay. Through community meetings and outreach activities at both First Nations, SON members identified that increasing numbers of lake trout (*Salvelinus namaycush*; namegos) in the area could be contributing to the declines of lake whitefish. Lake trout, a native top predator in the Great Lakes, collapsed or severely declined in abundance throughout many regions of the basin in the mid-1950s. Various strains of lake trout have been stocked into the Great Lakes, including Lake Huron, in an effort to rehabilitate collapsed or extirpated populations of the species (Burnham-Curtis et al., 1995; Eshenroder et al., 1995; Scribner et al., 2018). SON members noted that at the same time lake trout population abundances seemed to increase, lake whitefish populations declined, prompting questions about interactions between the species. SON harvesters reported seeing a change in behaviour and appearance of stocked lake trout in contrast to lake trout that existed in Lake Huron historically. In addition, harvesters noted increases in the number of lake whitefish appearing in the stomachs of lake trout they were catching. There are concerns among SON members about the ecological impacts of reintroducing a top predator into a lake with decreased productivity and the manipulation of nature through stocking large numbers of fish (Almack and Lauzon, 2019; Gobin et al., this issue). Based on these observations, SON brought forward two main hypotheses for how lake trout could be negatively impacting lake whitefish: (1) that lake trout were competing with lake whitefish for resources (e.g., habitat), and (2) that lake trout were predating upon lake whitefish. These two hypotheses originating from SON members formed the basis of the Two-Eyed Seeing research proposal that was subsequently developed.

### *Developing the proposal*

In the fall of 2018, SON and MNRF saw the call for research proposals from the GLFC and embarked on a journey to prepare and submit a joint research proposal focused on the concerns of SON membership that lake trout were causing the declines of lake whitefish. The first steps in our journey included a face-to-face meeting between SON representatives and MNRF staff (including a scientist, assessment and management staff, and an Indigenous relations advisor). SON representatives shared some of the SON member's concerns about lake whitefish (see Gobin et al., this issue) and described the concept of Two-Eyed Seeing. Two-Eyed Seeing was a new concept to MNRF researchers but had been used successfully by SON for a previous project (Duncan et al., this issue). The meeting purposefully focused on sharing research ideas. After this meeting we continued to move forward with refining our research questions, designing a research study, and preparing a proposal to seek funding for the research. The original proposal (called a pre-proposal) was submitted in January 2019, and after going through revisions and resubmissions based on input from the GLFC's Board of Technical Experts and peer reviewers, the full proposal was successfully approved for funding in 2021. At the time the proposal preparation began, SON and MNRF had separate monitoring and research programs and did not collaborate on any projects. Since developing a research proposal together was new, the team opted for a deliberate collaborative approach where decisions about the proposal and research were driven by consensus, respect, and collective understanding. True collaboration and bridging knowledge systems required a different approach than the typical Western science approach of a single principal investigator leading the proposal writing and making executive decisions about the research. While this required extra time, for example needing frequent, longer meetings and more time for each team member to provide thoughtful input, this collaborative approach allowed for the proposal to be a true reflection of the team's joint values and perspectives.

The collaborative process of developing the research project and writing the proposal included input from many people along the way. We received feedback and input from SON members, Elders, the SON Joint Fishery Committee, Chief and Council from both First Nations, grassroots organizations (Bagida'waad Alliance), as well as MNRF staff and managers. The research project was successfully funded by the GLFC and at the time of writing of this article, the research project is underway. As the work has progressed, the team of people carrying out the research has been somewhat fluid including additional SON members, MNRF researchers and biologists, graduate students, and academics (see the acknowledgement section for some of the people that have provided invaluable input to this project).

## Two-Eyed Seeing research methodology

The overall research objective of our Two-Eyed Seeing project is to determine the role of lake trout in the declines in abundance of lake whitefish by examining whether lake trout are a significant source of mortality on lake whitefish and if there is significant niche overlap between these species. By niche, we are referring to the volume the species occupies in ecological dimensions, represented in our study by the species' diet and where in the environment they are feeding (Hutchinson, 1957; Leibold, 1995; Newsome et al., 2007). If too much overlap in niche exists between the spe-

cies, there is the potential for competition to be occurring and for it to have a negative consequence on either species. Our Two-Eyed Seeing project has three components: (1) SONEK component, (2) quantitative Western scientific analyses, and (3) knowledge co-production to achieve a holistic and comprehensive understanding of the interactions between lake trout and lake whitefish. We briefly describe each component below.

*SON ecological knowledge component*

SONEK is central to our project, guiding and informing all aspects of our research. This guidance occurs in a fluid and natural way by routinely seeking feedback and input from SON members throughout the project's timeline. In addition, SONEK is being more explicitly and directly used to answer the research objectives using established methodology for documenting, collecting, and interpreting such knowledge. Semi-structured interviews with SON members, including knowledge holders and harvesters, are being used to gather aspects of SONEK related to lake whitefish, lake trout, and ecosystem changes observed in SON's traditional waters within Lake Huron. Prior to conducting interviews, a SON Indigenous knowledge interview guide was developed as part of our project (requests for copies of the interview guide will be considered by the SON: https://www.nawash.ca/fisheries-assessment-program/). The interview team includes SON members that have relationships with fishers and with fishing families to ensure interviewees are comfortable with sharing their insights. Detailed maps are being created for each interview participant based on their living memory and will be used to provide a comprehensive spatial record of knowledge of lake trout and lake whitefish. The methodology being used to create these maps is a modified version of Tobias's (2009) map biography approach, first applied with the SON by Duncan (2020) and Duncan et al. (this issue). An inherent part of our project is ensuring that data collection follows principles of OCAP (Ownership, Control, Access, and Possession) (First Nations Information Governance Centre, 2020), which includes, for example, not sharing or publishing individual interview transcripts, but instead reporting on higher-level analysis and consolidated results.

*Western science component*

The Western science component of our project includes two parts. For the first part, the diet of lake trout and lake whitefish are being characterized in detail by analyzing stomach contents of fish collected by both MNRF and SON. Stomach content analysis is providing a means of characterizing the direct predation of lake trout on lake whitefish and the degree of similarity of prey items between lake trout and lake whitefish of different sizes and in different regions. An existing MNRF database of over 7000 lake trout stomachs and 5000 lake whitefish stomachs collected in Lake Huron across all seasons dating back to 2004 is being analyzed. Importantly, additional fish are being collected by SON harvesters and included in our analysis, which increases participation of SON in the Western science component of our study and increases the relevance of the diet study findings to the community.

For the second part of the Western Science research, scale samples from collected fish are being used to examine the stable isotope ratios of carbon (δ13C) and nitrogen (δ15N) for both lake trout and lake whitefish, in order to quantify the degree of niche overlap between species and the potential for predation by lake trout on lake whitefish (e.g., Trumpickas et al., 2022). Stable isotopes are a biological tracer that have been used extensively to study food web structure and energy flow in aquatic ecosystems (Fera et al., 2017; Turschak and Bootsma, 2015; Vander Zanden et al., 1999). δ13C provides information on the source of energy in the diet of a fish (e.g., nearshore vs offshore) and δ15N is an indicator of trophic position and environment of the fish (Cabana and Rasmussen, 1994; Vander Zanden and Rasmussen, 1999). The stable isotopes are being used in our study to examine the trophic niche of lake trout and lake whitefish, representing what each species is eating (i.e., the source of energy in the diet) as well as where in the environment they are feeding (Bearhop et al., 2004; Newsome et al., 2007; Schmidt et al., 2009). By examining patterns in the isotopic signatures of collected fish scale samples we can determine if there is overlap in prey and habitat between species, indicating a potential for competition, or whether lake trout have the potential to be predating on lake whitefish because they have a higher trophic level and overlap in habitat.

*Co-learning*

While each knowledge system holds valuable information on its own, our project is ultimately intended to enable co-learning and knowledge co-production between SONEK and Western science. Truly adopting a Two-Eyed Seeing approach requires us to work together throughout the research process from collaboratively framing and designing research, to conducting the research, and jointly using and disseminating the knowledge generated. The goal is not to work separately in our areas of expertise, but to instead invite all team members to participate in all aspects of the work and to continuously share and learn together. We designed our knowledge co-production activities to meet the specific needs of our project. These co-production activities, described in more detail below, include establishing a learning community, embedding culture protocols throughout our project, conducting workshops, and participating in a final structured workshop aimed at developing recommendations together. We emphasize that co-learning is achieved not only through dialogue and communication, but importantly also through specific activities focused on learning through self-reflection, sharing in the responsibilities for completing the research, and participating in community meetings with SON membership.

As part of our co-production process, we established a learning community early in the development of our research proposal. Similar to a community of practice, place-based learning communities refer to a group of people with a shared interest that are committed to learning together through partnership and interactions (Johnson et al., 2016; Davidson-Hunt and O'Flaherty, 2007). We designed our learning community to be a small but diverse group of people that are focused on problem solving and learning together. The purpose of the learning community is to facilitate co-learning opportunities between MNRF staff and SON members and avoid each group working in silos. This learning community includes key investigators, the resource manager from MNRF, and select SON harvesters, Elders, and members of the SON Joint Fishery Committee. This initiative emphasizes building trust and relationships between everyone involved and is a precondition for learning together.

From the earliest stages of our project, we followed cultural protocols from SON's knowledge systems that are central to establishing respectful research relationships. These cultural protocols include ceremonies such as smudging, offerings of tobacco before meetings or interviews, water ceremonies, pipe ceremonies, and talking circles with an eagle feather. We take guidance from Latulippe and Klenk (2020) by recognizing that the scope of Indigenous knowledge extends beyond environment and research to include "protocols and ceremony, building and renewing relationships between people and with other (more-than-human) beings of creation, intergenerational transmission of knowledge, land-based learning, public education, and fostering of mutual responsi-

bility" (p. 8). Cultural protocols are being followed throughout our project, including when engaging in research activities within each First Nation and at the start of the field season.

As an example of our co-learning process, pipe ceremonies were held before the beginning of our project (fall 2020; at Chippewas of Nawash) and once our work was underway (fall 2021; at Saugeen First Nation). For the Anishinaabe of the Great Lakes, the pipe ceremony is a cultural cornerstone that recognizes and gives thanks for all of creation, often preceding other specific ceremonies and protocols or standing on its own (Johnston, 1990, 2003). By engaging in pipe ceremony, we recognize and represent "all relationships, including man to Kitche Manitou, man to the cosmos, man to the plant world, man to the animal world, man to man, man to his state, and quality of life and being and existence" (Johnston, 1990, p. 134). MNRF staff found it was very meaningful to participate in pipe ceremonies with respected SON Elders on the shores of Lake Huron where the research was focused. As our project team learned from Chippewas of Nawash Unceded First Nation Elder Sidney Nadjiwon, the pipe ceremony was an essential tool in Treaty making and continues to be important for building consensus and facilitating discussion between non-Indigenous and Indigenous peoples. Ceremony helps to ground the research to the place in which it occurs and recognizes the relationship between people and nonhuman beings. Engaging in ceremony is an ethical practice (Fig. 2) as it brings every-one together in a good way and recognizes the importance of SON's cultural knowledge. Pipe ceremony is also planned for the learning community towards the end of the project.

Another key component of our co-learning includes a structured workshop towards the end of the research project. The structured workshop will enable us to share and synthesize information from each knowledge system, to co-produce new knowledge through considering research findings from both knowledge systems (i.e., obtaining a more comprehensive understanding by looking with both eyes), and to generate recommendations for future research and management. Participants in the structured workshop will include members of the learning community, additional SON members, resource managers and biologists, and GLFC representatives.

As part of our research project, we are also producing a short film that highlights the co-learning process and the Two-Eyed Seeing approach. The primary purpose of the film is to communicate to SON members about our research project. Using a film to describe the research was viewed by SON as an effective means of community outreach and communication. Additionally, the film will be a resource for the GLFC, government agencies, Western scientists, and other Indigenous communities interested in Two-Eyed Seeing. To support co-learning, we are also sharing information about the project on a regular basis with SON membership through presentations, hand-outs summarizing the research, and community meetings held within each First Nation.

## Lessons learned in developing a Two-Eyed Seeing research proposal

Here, we reflect on the key elements of our approach that enabled us to successfully co-develop our research study. We hope this serves as guidance for others that may wish to embark on equitable collaborations between government agencies and Indigenous communities.

### *Developing an ethical space framework*

A crucial early step in our research process was the development of the SON-MNRF ethical knowledge co-production framework (Fig. 2). The development of this framework was particularly important to SON members given the prior era of conflict with MNRF and the mistrust of SON towards the provincial government. We developed this framework based on literature in knowledge co-production (e.g., Norström et al., 2020), the principles within the SON-MNRF Commercial Fishing Agreement (Substantive Commercial Fishing Agreement, 2012), and by reflecting on our own knowledge and experience with working equitably during the very earliest stages of our project. The framework

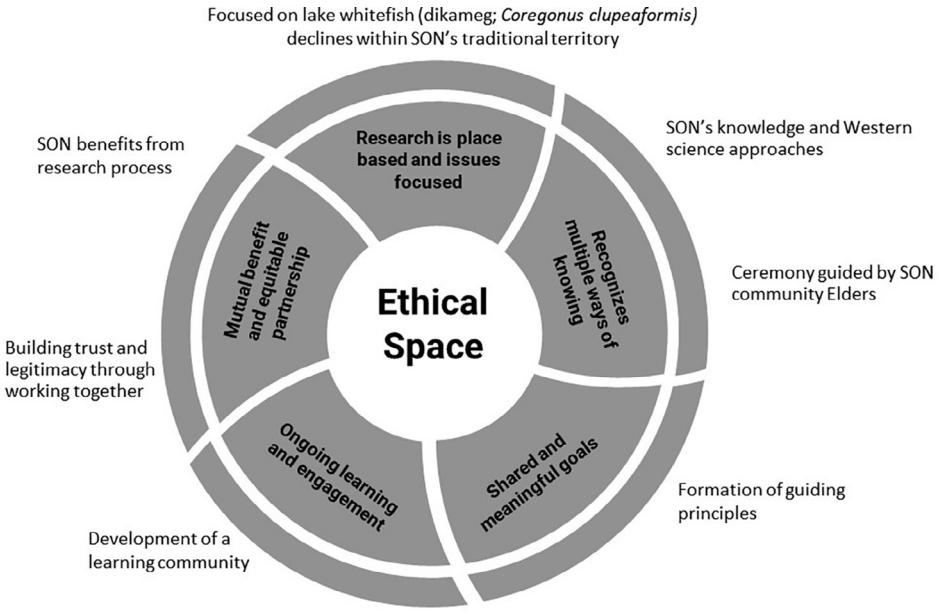


**Fig. 2.** Saugeen Ojibway Nation and Ontario Ministry of Natural Resources and Forestry's ethical knowledge co-production framework. This framework was co-developed during the writing of a Two-Eyed Seeing research proposal submitted to the Great Lakes Fishery Commission on the role of lake trout in the declines of lake whitefish in Lake Huron and is meant to guide the project team and learning community in all aspects of the research study. The text around the framework provides general examples of how the different objectives that make up the framework have been put into practice for this research study.

includes guiding principles for how we work together in a good way (using the Annishinaabe principle of *Mino-bimaadiziwin*), including mutual respect and understanding, equity in decision making, and the shared goal of working together to address the challenge at hand. Collaborating within an ethical space, as described by Nikolakis and Hotte (2022), provides a pathway to balance power and to respectfully acknowledge diverse worldviews between Indigenous and non-Indigenous peoples. The framework we developed with ethical space at its core, guides us during all aspects of our research study and collaboration and is now being used for fishery projects throughout SON's traditional territory. The framework continues to be an important document when new people join the research team or become engaged with our project because the expectations for how we work together are made clear and transparent. We encourage other groups embarking on Two-Eyed Seeing research or undertaking collaborative projects between Indigenous communities and government or academic institutions to develop frameworks for working together in an ethical way.

### *Place-based research*

We focused on issues that were "place based" (Davidson-Hunt and O'Flaherty, 2007) which in our case meant focusing on the lake whitefish declines within SON's traditional waters (Fig. 1). Place-based research means engaging in context-specific knowledge exchanges between Western science researchers and Indigenous community members (Davidson-Hunt and O'Flaherty, 2007). In addressing reconciliation and the Truth and Reconciliation Commission of Canada's Calls to Action (2015), Wong et al. (2020) recommended that researchers understand how proposed research initiatives might impact Indigenous peoples to determine which Indigenous community has interests in the research proposal. Implementing early engagement with Indigenous communities can determine shared questions with scientists and explore where the two different knowledge systems (Indigenous and Western) may complement each other or can be bridged.

Actively listening (Nikolakis and Hotte, 2022) to the concerns and questions posed by the two First Nations about the lake whitefish declines in their territory allowed us to begin the process of developing a successful research proposal and to do so using the principle of *Mino-bimaadiziwin*. Before embarking on this Two-Eyed Seeing research together, we were focused on similar issues (i.e., declining lake whitefish) but were positioned to debate findings rather than generate new insights through listening deeply. The process of generative listening (Scharmer, 2017) includes the willingness to change and connect with the "emerging field of future possibility" which for us was connecting with the best possible future for lake whitefish in SON's territory. Most importantly, in focusing on sharing our perspectives in dialogue about the lake whitefish declines in SON's territory, we were able to move forward with engaging in collaborative research that was based on hypotheses brought forward by SON members.

### *Investing time through walking together "Wesindamay"*

We learned that time and commitment are required for co-developing research in an ethical way (Fig. 2). When working with Indigenous communities, scientists must "demonstrate respect and to create the time and space to listen to the Indigenous community and their information needs" (Wong et al., 2020, pg. 6). Our Two-Eyed Seeing research project took many months to develop and the proposal was carefully and thoughtfully written over a long period of time, requiring a major investment of time from every-one involved.

Commitment by both SON and MNRF to the time required for ethical participation in the design of our research study was critical for several reasons. First, we took a consensus-based decision-making approach, rather than having a lead investigator make final decisions. Second, Two-Eyed Seeing involves frequently communicating with Indigenous community members to ensure their continued input to the project, that they can make informed decisions about their participation in the study, and that they continue to benefit from the work. Indigenous decision-making processes and following community protocols take time. Western scientists may have difficulty with this approach because they are accustomed to a culture where there are pressures for producing results and numerous publications. Government agency staff engaged in research may experience pressure to produce rapid results to satisfy urgent management needs. Third, the concept of Two-Eyed Seeing is new to many people, including most Western-trained scientists, government agency staff, and fisheries managers. Thus, more time is required to communicate about the methods being used and the value of the approach. As an example, our project team conducted a webinar presentation to the GLFC research boards where we described the Two-Eyed Seeing approach (Lauzon et al., 2020). Preparing the presentation alone took frequent meetings because we opted for a collaborative approach with multiple team members delivering the presentation together with SON Elders.

Recognizing the time and commitment required to conduct Two-Eyed Seeing research in a good way, our team has followed the Anishinaabe concept of Wesindamay, or "walking together". Wesinidamay was introduced to our team by Chippewas of Nawash Unceded First Nation Elder and councilor Miptoon (Anthony Chegahno). Truly embracing Wesinidamay means that we cannot let the urgency of the management issue associated with the declines in lake whitefish abundance or the pressures to produce rapid results interfere with the important process of building a respectful relationship and co-producing knowledge in an ethical way. Walking together slowly and deliberately applying a Two-Eyed Seeing approach allows us to work in a way that facilitates learning, develops deliberate and appreciative approaches to our research, and ensures that all parties are benefiting from the research. Building trust together is a work in progress that takes many years. Central to Anishinaabe teachings is the consideration of Seven Generations into the future and connectedness to the Seven Generations before us. As explained by Chippewas of Nawash Unceded First Nation Elder Sidney Nadjiwon, "it has taken 150 years to get into this, and it will take another 150 to move forward".

### *Gaining support across multiple levels*

Co-development of our research proposal was successful because we involved a diversity of perspectives and people throughout all stages of the proposal's development. From the initial stages of identifying our research questions through to responding to reviewer comments, we deliberately involved many key players (scientists, managers, technicians) throughout MNRF and SON (Chief and Council, community members, Elders, grassroots organizations). Involvement from the grassroots level up to the senior leadership level across organizations and within the two First Nations allowed us to gain early support for our research. Being inclusive also secured a commitment across multiple levels to addressing the issue of the lake whitefish declines. For example, MNRF supported SON's request for a moratorium on lake trout stocking in SON's traditional territory while our research was being conducted which showed the government's commitment at the highest level to developing a relationship with SON. We also involved leadership to support the initiative through SON-MNRF

Governance Committee meetings and action items. An example of grassroots engagement was involving Bagida-waad Alliance (https://bagidawaad.ca/) as a research partner. Bagida-waad Alliance is a non-profit organization led by Chippewas of Nawash Unceded First Nation fishing families focusing on climate change research, youth engagement, and active stewardship of lands and waters. To assist with our project, Bagida-waad Alliance is providing knowledge on how to best approach fishing families to share their knowledge and stories about fish populations in Lake Huron.

*Importance of meeting facilitation and boundary spanners*

A boundary spanner (Goodrich et al., 2020; Safford et al., 2017) within our research team also helped ensure success of our research proposal development. A boundary spanner is someone whose strengths and expertise lie at the intersection of team members, helping them to bridge gaps and work together. In our case, a pivotal boundary spanner (KA) was in the role of Indigenous relations advisor with MNRF. Effective boundary spanners recognize the importance of knowledge diversity and take time to learn about the background, experiences, and perspectives of everyone on the team (Safford et al., 2017). Key tasks of the boundary spanner in our project included prioritizing relationship building, setting clear goals for team meetings, following up with team members one-on-one if tensions arose, managing administrative aspects of the project, and ensuring knowledge transfer. The boundary spanner in our project spent time outside of work hours within the First Nations (such as participating in community events like powwows and maple syrup tapping), which provided opportunities to demonstrate commitment to the relationship and to the project. Although not new to transdisciplinary and environmental research (Hinderer et al., 2021; Goodrich et al, 2020), the concept of a boundary spanner has not been applied (to our knowledge) to co-production, co-learning, and bridging efforts between Indigenous and non-Indigenous communities. In our experience, the bridging of knowledge systems and successfully applying the Two-Eyed Seeing approach was greatly helped by involving people in the project that had strengths in relationship building and not just those with subject-level expertise.

For our proposal development, a key role played by our boundary spanner was in meeting organization and facilitation. In the beginning, facilitated meetings were needed to create an atmosphere of trust, openness, and to overcome barriers for people participating freely (Kusters et al., 2018). This included being clear on the purpose of each meeting, preparing agendas in advance, and communicating timelines. Meeting facilitation was particularly important in the scoping phase of our research proposal when we were determining questions of relevance together between SON members and MNRF staff and when the relationship was in the early stages of development. Through effective facilitation we were able to address some of the underlying dynamics of power relations and conflict, and in turn support teamwork. As time went on, the role of the facilitator was less important largely due to the increased trust in the process and familiarity with each other. Having a boundary spanner within the project team was preferable to having an outside consultant facilitate meetings because this further built trust and fostered relationships within the core research team as well as with each First Nation.

*Willingness to learn*

Western-trained scientists on the research team needed an openness to learn. In Western education systems there is little or no exposure to Indigenous worldviews, the history of Indigenous peoples, Treaties, and Aboriginal rights. MNRF staff, including the scientist and biologists on our team, had no prior exposure to Indigenous ecological knowledge and Two-Eyed Seeing. They were willing to spend time to listen and learn from SON members and to do their own readings and reflections on Indigenous knowledge systems. Learning about the successes of other recent projects helped, including Duncan's (2020) research on cisco. Similarly, MNRF staff gained a better understanding of Anishinaabe teachings and participated in cultural protocols and ceremony, which enhanced the opportunity to learn about Indigenous ways of knowing. MNRF staff were able to go outside of their comfort zones and concede to "not know" about project outcomes and to come to an understanding that Indigenous knowledge systems can offer new perspectives and insights on fish populations that would not have been possible by looking only through a Western science lens.

MNRF staff on the research team also showed a willingness to learn and hear about the history of fish stocking and historical exclusion from the commercial fishery from SON's perspective. SON members share a historical context of exclusion from the fishery and fishery management decisions that is far from the reach of most Western scientists' experience. Colonial government employees represent this history to SON members, and this comes with a level of power and privilege as well as a responsibility to listen. MNRF staff also participated in the KAIROS Blanket Exercise (https://www.kairosblanketexercise.org/) with members of the SON-MNRF Governance Committee which was a deeply personal experience and built a collective understanding of the history between Indigenous and non-Indigenous peoples within SON's traditional territory. Through conversations with SON members, MNRF staff began to understand this shared history and foster empathy. For us, mutual respect is defined as a "willingness and commitment to listen to and hear each other and to act honourably and in good faith towards each other, including through meaningful recognition of perspectives, constraints, values, and culture" and a "willingness and commitment to understand each other's cultures, knowledge systems, laws, responsibilities, and limitations" (Substantive Commercial Fishing Agreement, 2012). Through participating in ceremonies and community meetings with SON members, MNRF staff involved in our research project were given the opportunity to reflect on and learn about the history and inherited legacy of working for a crown government agency.

*Reciprocity and building capacity*

In our experience, Two-Eyed Seeing can help create relationships of reciprocity between fishery management agencies and Indigenous communities. A key component of this reciprocity is building capacity and on-going learning within each group. A central concept of Two-Eyed Seeing is using the gifts that each knowledge systems brings to gain an enhanced understanding that would not have otherwise been possible if looking from a single perspective. Each team member brings their own expertise and unique skills, but we have made an effort to provide opportunities for team members to be involved and provide input to all aspects of the project. For example, MNRF team members participated in meetings when the Indigenous knowledge interview guide was being created and a SON biologist (RL) is serving on the supervisory committee for the graduate student at Trent University working on the Western science component of the research. A key component to developing reciprocal relationships is having effective communication back to the community. It is particularly important that all knowledge, data, and information generated from our study are accessible to SON members through regularly sharing results and conducting outreach activities.

Capacity building extends to the First Nations involved in our research and is an essential component of self-determination. Pro-

ject funding has been placed back into the community to support SON members where possible. For example, SON members have been hired to conduct research activities associated with the project (e.g., processing of stomachs, conducting interviews). SON members are learning from MNRF about Western science approaches for understanding ecosystem change and declining abundance of lake whitefish. SON fish harvesters are participating in data collection (e.g., sampling fish stomachs) and are provided funding for their time. Building capacity is important because it will enable SON to train more of their members including youth, technicians, and harvesters in both Western science and Indigenous knowledge approaches, to develop increased capacity for conducting research on SON concerns, and to make informed decisions about fish populations in their territory using information generated from within each First Nation.

*Willingness to take risks*

During the early stages of building our relationship through this project, there was a willingness by both MNRF and SON to take risks and for individuals to go beyond their comfort zone, which catalyzed our partnership. For example, SON took a risk by welcoming staff from the provincial government (MNRF) into each First Nation to give presentations about fish populations and to discuss fish stocking within SON's traditional territory (Almack and Lauzon, 2019). MNRF staff were invited to participate in a ceremony at Neyaashiinigmiing that marked the beginning of the field season. These visits required special permission from Chief and Council because, due to past conflict, there was a standing Band Council Resolution in place since 1992 that the MNRF were not permitted to enter the community. SON demonstrated trust by agreeing to proceed with developing a research proposal with MNRF despite the prior history of conflict.

MNRF scientists were willing to take risks and invest significant time to the development of a research proposal without guarantee that there would be acceptance from their peers about the validity of conducting Two-Eyed Seeing research. There was a feeling of professional risk taken by scientists working on the proposal because the main hypothesis of the study, that lake trout have contributed to the declines in abundance of lake whitefish, does not have much support from existing Western science literature and from other Great Lakes' (Western-trained) scientists. Finally, MNRF managers were willing to take risks by supporting a type of research (Two-Eyed Seeing) that hasn't seen widespread use in the government, by fully investing in a collaboration between groups that have previously had a difficult working relationship, and by accepting that relationship building and Two-Eyed Seeing research would take time.

## Challenges faced during proposal development

While the research project development process was a successful journey overall, we faced several challenges along the way. We share these challenges below, recognizing that experiencing and overcoming these challenges are part of the learning process.

*Working cross culturally*

Communication between SON and MNRF presents challenges with respect to language. Even though English is now widely used by SON members, the basis of the SON perspective is rooted in Anishinaabemowin, which was described by Mead (2014) "as a living, historical, and spiritual member of the cultural community" (page i). As Meighan (2020) explained, language shapes a worldview that is vastly different between the eco-centric perspective of Anishinaabemowin, and what the author describes as "human exceptionalism" that is embedded in the English language. To further compound these differences are the unique terms and jargon that are used by the fisheries science sector which are even further removed from the SON perspective. In many cases there are no translations between even fundamental English concepts, such as the word "management" (e.g., Holtgren and Auer, this issue). As Saugeen First Nation Elder Vernon Roote explained (personal communication, May 26, 2021), there is a strong spiritual component to the responsibility for the relationship with what are described as the animal beings, which is very different from the English concept of management which is tied into a human centric approach to the relationship humans have with nonhuman beings. Similarly, the phrase "natural resources" in English relates to seeing nature as a commodity that humans can exploit and control, which is different from an Anishinaabe perspective that nature is fundamentally based on relationships which must be honoured and respected through reciprocity (Awāsis, 2021).

The first step to resolving communication challenges is to identify where they exist and find common alternative terms that are agreed upon and understood by all involved. For example, stewardship is often a term that is used in place of management. We have come to learn that it can be more useful and provide a learning opportunity to use an Anishinaabemowin word instead of an English word. This places a special significance on where differences in perspective exist, so that we can be mindful in our use of language. This method of communication does require a language speaker who understands the complexities of the differences in worldviews to provide the teachings and appropriate words for us to use. We rely on SON Elders to guide us through this process, and it is an essential component of our learnings in how to overcome communication barriers. For example, the team described that one possible outcome of the project would be information that could help in the protection of lake whitefish for future generations. Chippewas of Nawash Unceded First Nation Elder Sidney Nadjiwon shared from his teachings that "protection" is not a word in the Anishinaabemowin language or an Anishinaabe concept. Moving forward, we began to frame the purpose of our research project in terms of what can we learn from lake whitefish rather than conducting our work with a desired outcome of protecting lake whitefish. Our team is constantly learning the importance of language and are actively trying to shift our language towards recognizing Indigenous perspectives and values.

*Leading with the relationship first*

Occasionally and in building a new team, interpersonal challenges arose between team members which required active communication, patience, and humility. We found that a direct approach, where individuals could speak openly about their individual perspectives, helped ease tension and allowed the project to proceed. Direct communication included approaching individuals about moments of disagreement, making requests, and learning from different perspectives held by individuals. These interpersonal and non-violent communication skills (Sofer, 2018) were essential in the development of our collaborative research and allowed us to have difficult conversations without escalating into conflict or development of mistrust. Conflict resolution typically occurred through one-on-one-phone conversations or meetings among individual team members. Team members found that focusing on the bigger picture of why the work is valuable was important in overcoming conflicts. Furthermore, keeping the perspective that the relationship was more important than the research itself, helped team members to see beyond their own experience and ego and treat the conflicts that occasionally arose as learning opportunities. When tensions or misunderstandings

arose, we also found it helpful to refer back to our ethical knowledge co-production framework (Fig. 2) to provide a set of guiding principles for how we should work together.

*Communicating the relevance of Indigenous knowledge and Two-Eyed Seeing*

We experienced challenges with communicating to Western-trained scientists and others in the mainstream fisheries management realm why it was worthwhile to examine the role of lake trout in the lake whitefish declines using a Two-Eyed Seeing approach. Many scientists have questioned the very premise of our study, including reviewers of our proposal. Available scientific research to date indicates that lake trout predation on lake whitefish is not likely a significant source of mortality for lake whitefish and that lake trout are not the major cause of declining lake whitefish populations (Ebener et al., 2021). Thus, our perception was one of facing an uphill battle in terms of communicating the relevance of our research questions. We had to communicate that the prior research was not focused within SON's traditional territory, that it did not include SON's input, and that it did not include any information based on Indigenous knowledge. Importantly, the questions about the role of lake trout in the lake whitefish declines were identified as being a very high priority to SON members. By addressing the concerns of SON, this research allows for their voices to be heard and recognized as legitimate and it provides an avenue for the consideration of their perspectives in future decision making.

The concept of Two-Eyed Seeing is new to most researchers and managers working in the Great Lakes. We had the challenge of describing the Two-Eyed Seeing approach to a new audience and explaining why it is relevant for addressing our research questions about lake whitefish. The tendency is for managers, reviewers, and funding agencies to want to see established methods used to investigate priority issues. Common questions or comments we were faced with included "how will you compare or calibrate the results of the two knowledge systems?", or "there is no scientific evidence that lake trout are causing the decline in the abundance of lake whitefish, so there is no need to do this research". These examples highlight some of the misconceptions that exist. For example, the purpose of Two-Eyed Seeing is to gain a deeper understanding and broader perspective of an issue and does not include debating the validity of results arising from either knowledge system. Two-Eyed Seeing allows for Indigenous knowledge to be on equal footing with Western science and is a way of ensuring that Indigenous perspectives are heard and included. In the case of this project, SON identified that lake trout and lake whitefish interactions are a priority issue.

To help overcome the challenge of a lack of understanding of Two-Eyed Seeing, we accepted an offer to lead a webinar for the GLFC research boards titled "Indigenous ecological knowledge and fishery science: An introduction to the Two-Eyed Seeing approach and its application" (Lauzon et al., 2020). We have also taken the time to present about our research wherever possible at conferences and agency meetings, and we are making a film documentary as part of our project that is focused on Two-Eyed Seeing and how it has brought us together to address the lake whitefish declines.

*Knowledge co-production during a pandemic*

We faced several challenges because of the COVID-19 pandemic. Research planning, proposal writing, and the beginning of our research activities took place during the pandemic, requiring new approaches and patience. Building a relationship without regular, face-to-face interactions required an added commitment by all team members to ensure the project's success. While we lost out on being able to meet in person and engage in team building activities such as sharing meals, conducting frequent meetings using video platforms helped advance the project.

Community engagement is an important component of our Two-Eyed Seeing research. While some activities during the early stages of project development occurred in person prior to the pandemic, most subsequent meetings took place on-line. Prior to the pandemic, SON engagement revolved around in person gatherings where a feast was a central component. Elder participation and ceremony were also essential parts of these pre-pandemic meetings, and included prayer and smudging along with other ceremony, as guided by Elders. When the pandemic began, virtual engagement with SON membership became a necessity and we adopted the approach of recording meetings and making them available on-line for those not in attendance to view later. Attendance at these meetings was not as high as we had hoped. The absence of ceremony and food, along with limited access to, or knowledge of, virtual platforms created a barrier for SON member participation. We developed incentives like door prizes and presenting in clear language for the virtual sessions to attract participants with some limited success.

During warmer months, we took advantage of the weather and could hold meetings and ceremonies outside. The outdoor ceremonies we held were very meaningful to team members because they took place on the shores of the lake where the research is focused, and they helped nurture our relationship after many months of being apart and only seeing each other through a computer screen. We also found that smaller, more focused meetings with SON members helped increase participation and engagement and allowed us to communicate more effectively about our research. Overall, our experience has been that virtual meetings helped facilitate progress on our project between team members because it increased the frequency of team meetings but presented a significant challenge to communicating with SON members.

## Conclusions

Working together to design a collaborative research study and write a research proposal for the Great Lakes Fishery Commission facilitated a fundamental shift in the relationship between a government agency and two First Nations. Writing this article has furthermore allowed us to reflect on lessons learned and has provided the opportunity to share our ethical knowledge co-production framework (Fig. 2) with a wider audience. The approach we have taken of co-developing research questions based on both scientific priorities and SON's interests have benefits far beyond our project as it not only contributes to our collective knowledge about the declines of an important fish species in the Great Lakes, but it also creates a relationship built on reciprocity, mutual benefit, and trust. As we conduct our research project, the emphasis we have placed on building a relationship has provided the capacity for us to problem solve together as new challenges arise.

As future research is developed between scientists and Indigenous communities, there will be a continual need to refine methods and approaches for applying Two-Eyed Seeing. We strongly encourage other researchers embarking on fisheries research studies in the Great Lakes to apply the concept of Two-Eyed Seeing as there are far-reaching benefits of this approach for scientists, management agencies, and Indigenous communities. Partnering together and co-producing knowledge enables us to move closer

to a shared goal of healthy Great Lakes ecosystems and fisheries for future generations to come.

## 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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