

Potential health impacts due to cultural changes from manoomin (*Zizania palustris*) loss for the Fond du Lac Band of Lake Superior Chippewa



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Literature Review

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Abstract

Many tribes have concepts of health that acknowledge how their culture is a factor of and affects overall health of an individual and community [1, 2]. Impacts to American Indian culture, most notably disruptions in traditional practices, have affected a variety of health aspects related to physical, mental, emotional, behavioral, and spiritual well-being [3, 4, 5]. For the Ojibwe people, manoomin (*Z. palustris*) is a cornerstone of traditional and modern culture including but not limited to spirituality, history, traditional knowledge, economics, and Ojibwemowin [6].

The Fond du Lac Band of Lake Superior Chippewa recognizes the importance that manoomin has for its community members. Given the integral role that manoomin has in Anishinaabe culture, it can be presumed that loss of this resource would in turn impact the Fond du Lac culture in some manner, posing concerns for the health of tribal members and the community. The Fond du Lac Band of Lake Superior Chippewa conducted a health impact assessment utilizing multiple pathways to determine how the loss of manoomin could affect community and individual health of its tribal members. This literature review found evidence of a positive association between American Indians' perception of enculturation and improved health outcomes, while damages to culture, such as loss of indigenous language fluency, were associated with decreased health outcomes. This suggests that manoomin loss and ensuing changes to cultural aspects highly connected to manoomin would most likely have negative health impacts for the Fond du Lac Band.

Key Terms

Acculturation: the modification of one culture by assimilating or borrowing traits from a different culture.

Anishinaabe: the word for person, human, and/or Indian in Ojibwemowin. The Fond du Lac Band is one of many tribes who refer to themselves as Anishinaabe in their indigenous language.

Enculturation: the process of learning and transmitting cultural norms and mores.

Ojibwe/Chippewa: the larger tribe that the Fond du Lac Band belongs to and refers to those who speak Ojibwemowin. Chippewa is the term used by the United States government in legal documents to refer to this tribe.

Ojibwemowin: the Ojibwe language.

Manoomin: the word for wild rice (*Z. palustris*) in Ojibwemowin.

Background

In the Treaties of 1837, 1842, and 1854, the Fond du Lac Band of Lake Superior Chippewa ceded lands to the United States government while retaining their inherent, sovereign rights to hunt, fish, and gather in their traditional territory. These rights were reserved with the intention to preserve the resources necessary for traditional lifeways at the core of Anishinaabe culture for the next seven generations. According to traditional teachings, the Anishinaabe migrated from the eastern seaboard to find the “food that grows on water”, or wild rice, in the Great Lakes region [6]. Manoomin, or wild rice, was a resource explicitly stated in the Treaty of 1837 that the Ojibwe reserved the right to harvest, and today

remains an important cultural and subsistence resource [7].

The Fond du Lac Band of Lake Superior Chippewa decided to conduct a health impact assessment (HIA) in response to a proposed rule change to amend Minnesota's sulfate water quality standard. Manoomin is an aquatic plant and its growth can be inhibited by high levels of sulfate in water [8]. Although the rule change was ultimately withdrawn, there was still interest in describing the potential health impacts of the original proposal [9].

This literature review was conducted under the "cultural pathway" of the HIA in an effort to focus on health impacts related to changes in culture. The intention of this literature review was to assess the current research on the relationship between culture and health and to evaluate how changes in cultural aspects can impact health outcomes for American Indians. Fond du Lac Resource Management staff used pertinent information to describe potential health impacts specific to manoomin and Fond du Lac culture for the HIA.

Search Methods & Selection Criteria

The literature search began on March 8th, 2018 with a search for articles that discussed American Indian health and culture in Ovid Medline. This search yielded articles on the views of American Indians relevant to culture as an aspect of health or wellness for an individual or community; however, very few articles discussed the manner in which culture can affect health. Articles that did not discuss an association between cultural aspects and health were excluded from this literature review. Three articles provided discussion on how culture can affect health and focused on how culturally-based interventions can improve substance abuse recovery. This is different than determining how changes to culture can change health [10]. However, this article discussed the concept of enculturation in designing such interventions which led to improved outcomes for programs that incorporated more traditional aspects of culture. This led to the inclusion of "enculturation" in this literature search and thus inclusion of articles that provided frameworks in which to qualitatively describe cultural aspects linked to health [11-18].

Another search using the keywords, "American Indian, health, culture, and enculturation" in Scopus and Web of

Science on April 26th, 2018 resulted in articles that focused on how environmental risk assessments can and should be used to describe the disproportionate environmental health impacts that negatively affect American Indian health and culture [3, 4, 19-23]. This search also yielded relevant articles that discussed how cultural activities, especially those related to losses of traditional knowledge concerning ceremonies and food resources, impacted health [24-28].

Finally, a search that also included the terms "Anishinaabe" or "Ojibwe" in Ovid and Scopus led to articles mainly focused on studies on Canadian First Nation Anishinaabe communities and how disruptions to culture impacted health [6, 9, 20, 29-33]. Inclusion of those terms did not yield any additional articles in Web of Science. As of May 3rd, 2018, 44 articles met the criteria discussed during the initial planning of the HIA.

Final inclusion of 33 articles used in this review and shared with staff working on the HIA on June 19th, 2018 was based on their relevance to the discussion of the impact of different aspects of culture, especially those related to food or natural resources, on health. An effort was made to use articles published less than 10 years ago; however, information related to the ideas of American Indian spirituality was very limited. Inclusion of the older articles which contained information still applicable for the Fond du Lac Band was deemed directly relevant to describing a holistic and ideal view of health linked to culture.

Literature Review Results

For many American Indian people, the definition of health is multidimensional. It is more qualitative than quantitative and encompasses many aspects beyond typical biomedicine wellness. Health is related to one's physical, mental, and emotional state, such as spirituality and balance with nature [16, 35]. Additional cultural factors such as indigenous language fluency rates, connection to land, and participation in ceremonies and cultural activities, were associated with the overall perception of health for both the community and individuals [14, 27].

The Ojibwe consider health to be directly correlated with and dependent upon spiritual aspects of culture [5]. These are largely understood to include connection to land and food and are "key components of being alive well" beyond physical health status [3]. Health and spirituality

have “important links between Anishinaabe language, identity, customs, and the land” [9]. A number of articles identified that this connection between American Indian health and one’s connection to the land was a driving factor for the health disparities resulting from disproportionate environmental health impacts [9, 20, 22].

Due to the qualitative and often highly subjective nature of culture, “mortality and morbidity risks cannot capture the importance of key health components, such as feeding the spirit” [21]. However, another common theme in many of the articles was that a myriad of cultural activities, when considered as risk factors, were positively associated with better health outcomes, while loss of culture was associated with negative health outcomes.

Cultural activities, such as religious practices and spending time in nature, both of which are an inherent part of manoomin-related practices, were found to be positively related to mental and behavioral health [16]. “Language maintenance and revitalization efforts have positive effects on physical and communal health among indigenous populations” [27], and language fluency was one of the most predictive factors of wellness scores of self-health assessments [14]. Practicing traditional health activities was also found to be significantly associated with behaviors that prevent disease [25].

Historical trauma and environmental losses negatively impacted emotional health and were also associated with depression, grief, and anger, which also tend to negatively impact mental health [34, 35]. Acculturation, partly due to loss of traditional foods, has been linked to increases in diabetes and obesity rates for American Indians, especially for urban populations [12].

Cultural changes were also impacted by environmental health. Decreased accessibility due to contamination and loss of harvesting and other traditional ecological knowledge were noted as contributing factors for the decline in traditional food consumption [19, 20, 21]. However, there was limited research comparing outright loss of a food source with the presence of a highly contaminated food unfit for human consumption. With contaminated food, some consumption still occurs and has negative but most likely distinct health impacts. Therefore, it is unclear how the loss of a food resource versus the need to greatly reduce consumption of a food impacts cultural practices and individual or community health. Similarly, healthy environmental connections result in increased indigenous well-being [24].

A number of frameworks related to culture and health assessments were also presented in the reviewed research. These frameworks were created mostly due to shortcomings of risk assessments that accounted for cultural differences in definitions of health and inadequately addressed the increased environmental impacts on American Indian culture and health. Cultural differences were also identified in resource management techniques; of note was the view that degradation of cultural events occurs when ecosystems are disrupted [36, 37]. These frameworks can also be used to assess enculturation and efficacy of health promotion programs based on culture [6, 13, 18, 33]. However, as noted with descriptions of health in general, many of the measures found within the frameworks tended to be more qualitative in nature.

Discussion

Research found in this literature review provides evidence that changes in culture, most notably those related to spirituality, would likely impact health outcomes. Therefore, changes in bioavailability of a food so closely related to Ojibwe spirituality and other cultural aspects could potentially have a negative impact on the health of the Fond du Lac Band of Lake Superior Chippewa. With the increased reliance on manoomin as a traditional cultural food for the Anishinaabe, it may be fair to consider that manoomin loss could exacerbate current health disparities or serve as an additional barrier that must be addressed. When considering the health disparities seen in this community, the loss of wild rice poses a disproportionate risk of negative health outcomes and ultimately undermines current or future attempts of health promotion based on culture revitalization.

Another important distinction to consider is the difference in acculturation and sociocultural factors between tribal members that live on the reservation compared to those who live in urban communities. Manoomin loss may be an additional burden for urban populations, who may face other barriers to cultural preservation beyond traditional food accessibility. Social and economic conditions were also identified as causes of health disparities between American Indians and the general population and “not only adversely affect health behaviors but, perhaps more fundamentally, create stressors that impose physiological harm on the body” [28]. This loss may be an additional barrier to culture revitalization for tribal members who live off the reservation, impacting the implementation of culturally appropriate health promotion efforts.

Manoomin loss, as driven by potential water contamination, further highlights the increased health burden and environmental injustice to which American Indians are exposed. For current tribal public health efforts, health inequities are unlikely to be addressed without consideration of the extent to which culture affects all aspects of health for American Indians and how negative impacts to culture will likely negatively impact health. However, there may be increased efficacy and improved health outcomes in public health interventions that revitalize or promote traditional practices. Additionally, greater awareness of this inextricable link between health and culture can be another avenue to explore when discussing environmental health impacts beyond toxicological harms for American Indians.

Given the lack of research and general characterization of how manoomin or any other subsistence species impacts culture, there are many future research opportunities to explore. One such opportunity is an examination of the frameworks found in the literature for adaptation to Ojibwe culture and baseline enculturation of aspects related to manoomin for the Fond du Lac Band and its community members. This would help define and assess health concerns related to cultural changes and areas most vulnerable to manoomin loss, such as potential loss of Ojibwe vocabulary related to wild rice harvesting practices. Additionally, the importance of manoomin to both the community and individual band member health and the various methodologies of utilizing wild rice to increase health can be more fully documented, if deemed appropriate by the community.

With a baseline assessment of the cultural status and current influences wild rice access has on community and individual health, the Fond du Lac Band can then identify methods to minimize and/or mitigate any negative impacts that the loss of this resource would have on cultural practices. However, based on the previous research and frameworks described above, descriptions of negative impacts as well as possible mitigation methods, if any, may be more likely to be complex, interconnected to health outcomes, and qualitative in nature when compared to current measures.

The Fond du Lac Band could explore and describe how manoomin relates to and is used in various healing practices by the community through documenting traditional knowledge from appropriate and willing tribal members. Such knowledge holds insight on how culture specific to manoomin, tribal members, and these geographic loca-

tions are linked to health. Knowledge holders can offer invaluable insight on how to categorize health outcomes related to physical, mental, emotional, behavioral, social, and spiritual effects. Methods to mitigate or minimize negative health outcomes could also be explored at this time. While specific findings may not be deemed appropriate to share with those outside of the community, approved generalizations would most likely strengthen and better characterize the unique cultural health role of manoomin for the Fond du Lac Band.

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References

- [1] King, M., Smith, A., & Gracey, M. (2009). Indigenous health part 2: The underlying causes of the health gap. *The Lancet*, 374(9683). [https://doi.org/10.1016/S0140-6736\(09\)60827-8](https://doi.org/10.1016/S0140-6736(09)60827-8)
- [2] Lynn, K., Daigle, J., Hoffman, J., Lake, F., Michelle, N., Ranco, D., ... Williams, P. (2013). The impacts of climate change on tribal traditional foods. *Climatic Change* 120, 545–556. <https://doi.org/10.1007/s10584-013-0736-1>
- [3] Reynolds Turton, C. L. (1997). Ways of knowing about health: An aboriginal perspective. *Advances in Nursing Science* 19(3), 28–36.
- [4] Sasakamoose, J., Bellegarde, T., Sutherland, W., Pete, S., & Mckay-Mcnabb, K. (2017). Miyo-pimātsiwin developing Indigenous Cultural Responsiveness Theory (ICRT): Improving indigenous health and well-being. *The International Indigenous Policy Journal* 8(4). <https://doi.org/10.18584/iipj.2017.8.4.1>
- [5] Tobias, J. K., & Richmond, C. A. M. (2014). “That land means everything to us as Anishinaabe”: Environmental dispossession and resilience on the north shore of Lake Superior. *Health & Place* 29, 26–33. <https://doi.org/10.1016/j.healthplace.2014.05.008>
- [6] Benton-Banai, E. (2010). *The Mishomis book: The voice of the Ojibway*. Minneapolis, MN: University of Minnesota Press.
- [7] *Treaty with the Chippewa, 1837*. (1837, July 29). Retrieved from Great Lakes Indian Fish & Wildlife Commission: <https://www.glifwc.org/TreatyRights/TreatyChippewa07291837Web.pdf>
- [8] Pastor, J., Dewey, B., Johnson, N. W., Swain, E. B., Monson, P., Peters, E. B., & Myrbo, A. (2017). Effects of sulfate and sulfide on the life cycle of *Zizania palustris* in hydroponic and mesocosm experiments. *Ecological Applications* 27(1), 321-336. Doi:10.1002/eap.1452

- [9] "Proposed rules amending the sulfate water quality standard applicable to wild rice and identification of wild rice waters; Notice of Withdrawn Rules", 42 SR 1423 (May 7, 2018). (Notice of Withdrawn Rules), 1423.
- [10] Stone, R. A. T., Whitbeck, L. B., Chen, X., Johnson, K., & Olson, D. M. (2006). Traditional practices, traditional spirituality, and alcohol cessation among American Indians. *Journal of Studies on Alcohol*, 67(2), 236-44.
- [11] Adams, A. (2010). Understanding community and family barriers and supports to physical activity in American Indian children. *Journal of Public Health Management and Practice*, 401-403.
- [12] Companion, M. (2013). Obesogenic cultural drift and nutritional transition: Identifying barriers to healthier food consumption in urban Native American populations. *Journal of Applied Social Science*, 7(1), 80-94. <https://doi.org/10.1177/1936724412467022>
- [13] Greenfield, B. L., Venner, K. L., Tonigan, J. S., Honeyestewa, M., Hubbell, H., & Bluehorse, D. (2018). Low rates of alcohol and tobacco use, strong cultural ties for Native American college students in the Southwest. *Addictive Behaviors*, 82, 122-128. <https://doi.org/10.1016/j.addbeh.2018.02.032>
- [14] Hodge, F. S., & Nandy, K. (2011). Predictors of wellness and American Indians. *Journal of Health Care for the Poor and Underserved*, 22(3) 791-803. <https://doi.org/10.1353/hpu.2011.0093>
- [15] Kiemele, E., Dell, C. A., Hopkins, C., Beckstead, J., & Fromson, J. A. (2017). Reconciling America's research response to binge drinking among American Indians and Alaskan Natives. *Journal of Health Care for the Poor and Underserved* 28(3), 860-868. <https://doi.org/10.1353/hpu.2017.0083>
- [16] Lardon, C., Wolsko, C., Trickett, E., Henry, D., & Hopkins, S. (2016). Assessing health in an Alaska Native cultural context: The Yup'ik wellness survey. *Cultural Diversity and Ethnic Minority Psychology*, 22(1) 126-136. <https://doi.org/10.1037/cdp0000044>
- [17] Teufel-Shone, N. I., Tippens, J. A., McCrary, H. C., Ehiri, J. E., & Sanderson, P. R. (2018). Specific Population: Underserved populations resilience in American Indian and Alaska Native public health: An underexplored framework. *American Journal of Health Promotion* 32(2), 274-281. <https://doi.org/10.1177/0890117116664708>
- [18] Willows, N., Dyck Fehderau, D., & Raine, K. D. (2016). Analysis grid for environments linked to obesity (ANGELO) framework to develop community-driven health programmes in an indigenous community in Canada. *Health & Social Care in the Community*, 24(5) 567-575. <https://doi.org/10.1111/hsc.12229>
- [19] Arquette, M., Cole, M., Cook, K., Lafrance, B., Peters, M., Ransom, J., ... Stairs, A. (2002). Holistic risk-based environmental decision making: A Native perspective. *Environmental Health Perspectives Community, Research, and Environmental Justice*, 110(2) 259-264.
- [20] Bruner, B. G., & Chad, K. E. (2014). Dietary practices and influences on diet intake among women in a woodland Cree community. *Journal of Human Nutrition and Dietetics* 27, 220-229. <https://doi.org/10.1111/jhn.12121>
- [21] Donatuto, J. L., Satterfield, T. A., & Gregory, R. (2011). Poisoning the body to nourish the soul: Prioritising health risks and impacts in a Native American community. *Health, Risk & Society* 13(2), 103-127. <https://doi.org/10.1080/13698575.2011.556186>
- [22] Holifield, R. (2012). Environmental justice as recognition and participation in risk assessment: Negotiating and translating health risk at a superfund site in Indian country. *Annals of the Association of American Geographers*, 102(3), 591-613. <https://doi.org/10.1080/00045608.2011.641892>
- [23] McOliver, C., Camper, A., Doyle, J., Eggers, M., Ford, T., Lila, M., ... Donatuto, J. (2015). Community-based research as a mechanism to reduce environmental health disparities in American Indian and Alaska Native communities. *International Journal of Environmental Research and Public Health*, 12(4), 4076-4100. <https://doi.org/10.3390/ijerph120404076>
- [24] Castleden, H., Bennett, E., Lewis, D., & Martin, D. (2017). "Put it near the Indians": Indigenous perspectives on pulp mill contaminants in their traditional territories (Pictou Landing First Nation, Canada), Pictou Landing Native Women's Group. *Community Health Partnerships: Research, Education, and Action*, 11(23), 25-3315. <https://doi.org/10.1353/cpr.2017.0004>
- [25] Coe, K., Attakai, A., Papenfuss, M., Giulano, A., Martin, L., & Nuvayestewa, L. (2004). Traditionalis and its relationship to disease risk and protective behaviors of women living on the Hope Reservation. *Health Care for Women International*, 25(5), 391-410.
- [26] Hill, D. L. (2009). Relationship between sense of belonging as connectedness and suicide in American Indians. *Archives of Psychiatric Nursing*, 23(1), 65-74. <https://doi.org/10.1016/J.APNU.2008.03.003>
- [27] Oster Canada, R. T., Whalen, D. H., Moss, M., & Baldwin, D. (2016). Healing through language: Positive physical health effects of indigenous language use [version 1; referees: 2 approved with reservations]. *F1000 Research*, 5. <https://doi.org/10.12688/f1000research.8656.1>
- [28] Ramraj, C., Shahidi, F. V., Darity, W., Kawachi, I., Zuberi, D., & Siddiqi, A. (2016). Equally inequitable? A cross-national comparative study of racial health inequalities in the United States and Canada. *Social Science & Medicine*, 161, 19-26. <https://doi.org/10.1016/J.SOCSCIMED.2016.05.028>
- [29] Big-Canoe, K., & Richmond, C. A. M. (2014). Anishinabe youth perceptions about community health: Toward environmental repossession. *Health & Place*, 26, 127-135. <https://doi.org/10.1016/j.healthplace.2013.12.013>

- [30] Gaudin, V. L., Receveur, O., Walz, L., Girard, F., & Potvin, L. (2014). A mixed methods inquiry into the determinants of traditional food consumption among three Cree communities of Eeyou Istchee from an ecological perspective. *International Journal of Circumpolar Health*, 73(1), 24918. <https://doi.org/10.3402/ijch.v73.24918>
- [31] George, J., Macleod, M., Graham, K., Plain, S., Bernards, S., & Wells, S. (2018). *Use of traditional healing practices in two Ontario First Nations*. *Journal of Community Health*, (43), 227–237. <https://doi.org/10.1007/s10900-017-0409-5>
- [32] Snowshoe, A., Crooks, C. V., Tremblay, P. F., Craig, W. M., & Hinson, R. E. (2015). Development of a cultural connectedness scale for First Nations youth. *Psychological Assessment*, 27(1), 249–259. <https://doi.org/10.1037/a0037867>
- [33] Young, N. L., Wabano, M. J., Usuba, K., Pangowish, B., Trottier, M., Jacko, D., ... Corbiere, R. G. (2015). Validity of the aboriginal children's health and well-being measure: Aaniish Naa Gegii? <https://doi.org/10.1186/s12955-015-0351-0>
- [34] Hill, D. L. (2006). Sense of belonging as connectedness, American Indian worldview, and mental health. *Archives of Psychiatric Nursing*, 20(5), 210–216. <https://doi.org/10.1016/J.APNU.2006.04.003>
- [35] Yurkovich, E. E., Hopkins (Lattergrass), I., & Rieke, S. (2012). Health-seeking behaviors of Native American Indians with persistent mental illness: Completing the circle. *Archives of Psychiatric Nursing*, 26(2), e1–e11. <https://doi.org/10.1016/J.APNU.2011.11.002>
- [36] Burger, J., & Gochfeld, M. (2010). Conceptual environmental justice model for evaluating chemical pathways of exposure in low-income, minority, Native American, and other unique exposure populations. *American Journal of Public Health*, 2(101). <https://doi.org/10.2105/AJPH>
- [37] Raster, A., & Hill, C. G. (2017). The Dispute over Wild Rice: An investigation of treaty agreements and Ojibwe food sovereignty. *Agriculture and Human Values*, 34, 267–281. <https://doi.org/10.1007/s10460-016-9703-6>