Tribal Health Impact Assessment for wild rice rule revisions

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A systematic process that uses an array of data sources and analytic methods and considers input from stakeholders to determine the potential effects of a proposed policy, plan, program, or project on the health of a population and the distribution of those effects within the population. HIA provides recommendations on monitoring and managing those effects.

The purpose of an HIA: to provide health information to decision-makers before important decisions are made, so they can make a more informed decision.
Types of Decisions Influenced by HIA

**POLICY DECISIONS**
(bills passed by state legislature, city council decisions, school board district policies)

**POLICY IMPLEMENTATION**
(weigh various implementation options for a policy once it is passed)

**PROJECT SPECIFIC**
(siting, permitting, construction, design)

**COMMUNITY PLANNING**
(neighborhood plans, regional growth plans, master planning documents)
HIA Issues Assessed

1. Safety and Security - 68
2. Public Participation - 59
3. Livability - 59
• HIAs are voluntary—they are not required by law (generally speaking)
• HIAs can be used in environmental review (NEPA)
• HIAs can put human health into environmental health
**Tribal HIAs**

**IN-PROGRESS:**
- Wild Rice Water Quality Standards and Tribal Health HIA

**INCOMPLETE:**
- Alaska Pipeline Project HIA
- Chuitna Coal Mine HIA
- Donlin Gold Mine HIA
- Foothills West Transportation Access Project HIA
- Livengood Gold HIA
- Santo Domingo Pueblo Community Master Plan
- Shale Oil Task Force
- Susitna-Watana Hydroelectric Dam HIA

**COMPLETE:**
- Arctic Outer Continental Shelf Oil and Gas Multiple Lease Sale Environmental Impact Statement
- Central Oregon Regional Transit HIA
- Industrial Sand Mining in Western Wisconsin
- Mojave Desert Utility-Scale Solar Project
- Northeast National Petroleum Reserve Supplemental Environmental Impact Statement
- Red Dog Mine Extension Aqqaluk Project Final Supplemental Environment
- Coal Mine at Wishbone Hill
What creates health?

SOCIAL DETERMINANTS OF HEALTH

- Social, Economic & Political Factors
- Natural & Built Environment Conditions
- Living & Working Conditions
- Individual Behaviors
- Individual Factors
- Gender
- Diet
- Mode Choice
- Safety from Crime
- Jobs
- Air & Water Quality
- Noise
- Gentrification
- Social Cohesion
- Inequality

Risky Behaviors
- Traffic Safety
- Schools
- Food Access
- Climate
- Racism
- Political Participation
Why conduct a Health Impact Assessment?

- Identify harms and benefits *before decisions are made*
- Identify *evidence-based strategies* and recommendations to promote health and prevent disease
- Support *increased transparency* in the decision-making process
- Support *community engagement* in the decision-making process and foster community empowerment
- Advance *equity and justice*

*Note: There are many ways to insert health into decision-making. HIA is one way.*
Decisions:
- MPCA wild rice water quality rule revisions
- Fond du Lac Water Quality Standards Triennial Review

Decision makers: tribal council, MPCA, EPA
Collaborative Process with Minnesota Department of Health

• Core Team: Fond du Lac Resource Management, Min No Aya Win Clinic, MDH staff
• Steering Committee: Fond du Lac Community (elders, youth, ricers, men & women); other tribes, intertribal agencies; UMD (Med School, Social Science); EPA Midcontinent Ecology Lab; Minnesota Pollution Control Agency, Minnesota Department of Natural Resources
• Community input (Reservation Health Fair, first Community Meeting)
• Goal is to capture/communicate Anishinaabe peoples’ unique relationship with manoomin (sustenance, sacredness, central to migration story, cultural identity) as it relates to holistic tribal health, to inform upcoming decisions about Clean Water Act regulatory revisions
Began with simple survey questions:

• How important is wild rice to you and your family’s health?
• How important is wild rice to your community’s health?
• How does the health of wild rice affect your health?
• “It feeds our community, our families and important to our health.”

• “Manoomin is medicine, a way of life, tradition and very important food source.”

• “Because it’s sacred and important to our survival.”

• “It is one of our family’s staples – and important for our culture and keeping us connected.”
HIA Pathway 1: Proposed Rule Revisions, Negative Health Outcomes

Decision Event

Direct Impacts & Co-occurring Stressors

Manoomin
- Potential adverse impacts on productivity, nutritional value, and sustainability
- Climate changes (warming temperatures, changing rainfall patterns, pathogens)
- Other environmental contaminants
- Gene transfer from GMO crops
- Changing land use patterns
- Invasive species

Manoomin • Potential adverse impacts on productivity, nutritional value, and sustainability • Climate changes (warming temperatures, changing rainfall patterns, pathogens) • Other environmental contaminants • Gene transfer from GMO crops • Changing land use patterns • Invasive species

Immediate Impacts

Decrease in cross-generational harvesting, transfer of traditional gathering ways

Intermediate Impacts

Weakening of family and community ties, connection to cultural identity, and cultural respect (reduced access to traditional spiritual resources)

Health Outcomes

Threats to mental health, spiritual health, individual and community empowerment

Potential for reduced access to health care and essential services

Decrease in resilience

Loss of connection with the land, community, and traditional way of life

Endangered ability to live by the 7th generation principle

EPA decision of acceptance for proposed statewide wild rice (manoomin) water quality rule revisions

Anishinaabe Community
- Systemic oppression & racism
- Historical trauma impacts (genocide, forced relocation, destruction of cultural practices, cumulative psychological wounds carried across generations, racism)
- Historical loss impacts (land, language, spiritual ways, family ties, culture, respect)
- Forced socio-economic dynamic changes (traditional way of life in a modern world)

Decreased food security; continued or worsened diabetes, obesity

Less individual/ household income and economic security

Less manoomin for sale

Manoomin • Potential adverse impacts on productivity, nutritional value, and sustainability • Climate changes (warming temperatures, changing rainfall patterns, pathogens) • Other environmental contaminants • Gene transfer from GMO crops • Changing land use patterns • Invasive species

Potential impacts to ecosystem services

Less manoomin for tribal members (individual, community storage & sharing)

Anishinaabe Community • Systemic oppression & racism • Historical trauma impacts (genocide, forced relocation, destruction of cultural practices, cumulative psychological wounds carried across generations, racism) • Historical loss impacts (land, language, spiritual ways, family ties, culture, respect) • Forced socio-economic dynamic changes (traditional way of life in a modern world)
HIA Pathway 2: Most Protective Rule Revisions, Positive Health Outcomes

**Direct & Co-Occurring Impacts**

**Healthy & Abundant Manoomin**
- Improved species quantity and quality
- Increased protection against co-occurring stressors (climate changes, other environmental contaminants, gene transfer from GMO crops, invasive species, and changing land use patterns)

**Intermediate Impacts**

- Increased opportunity for wild rice restoration
- Protection of ecosystem services
- Increased revenue generation (sale of manoomin)
- Maintaining nutritional value of manoomin
- Sustained cultural practice of gifting manoomin
- Increase in cross-generational harvesting, transfer of traditional gathering ways
- Increase in physical activity

**Health Outcomes**

- Improved food sovereignty
- Increased community cohesion, strengthened social ties
- Greater sense of wellbeing, belonging, spiritual connectedness and happiness: The Good Life
- Decreased rates of obesity, diabetes, and chronic health conditions
- Increased economic prosperity and financial security; decrease in stress
- Increased voice in public policy and government-to-government trust
- Increased resilience
- Empowered individuals and community
- Improved ability to live by and teach the 7th generation principle

**Anishinaabe Community**
- Increased respect, support, and preservation of cultural ways and for cultural knowledge
- Acknowledgement of the connection between historical trauma and historical loss of natural resources/environmental decisions (treaty rights)
- Improved government-to-government relationship

**EPA decision of acceptance for most protective wild rice (manoomin) water quality rule revisions**

*Last Updated: 12/13/17*
Where are we now?

- Baseline Health Assessment (sources of community health data, demographics, studies and literature)
- Social/Community health metrics
- Nutritional information

Recruited 6 grad students to assist with data analysis, literature search, policy & recommendations
MN Rural Food Deserts and State-identified Wild Rice Waters

USDA defines a rural food desert as a low-income area where a significant number of residents live more than 10 miles from a big grocery store in rural areas or one mile in urban ones.

The map here just shows rural food deserts identified by census tract. I had trouble accessing the shapefile for urban ones, but I’m sure I can eventually get it or recreate it. The data you see here was created in 2015.

The purple dots identify the 1289 lakes and rivers identified by the state (i.e. DNR) as supporting wild rice.

I see a couple issues here. One, there are a number of rural food deserts that contain wild rice waters and thus the potential to provide a native, nutritious source of food to residents. Two, there are numerous food deserts without any identified wild rice waters, begging the question, are there waters in these areas that could sustain wild rice cultivation?
Baseline Assessment: Population Statistics

Prepared by: Kellen Schalter & Kari Carlson, MPH
Top 10 Leading Causes of Mortality

- Heart disease
- Cancer
- Injuries
- Diabetes
- Chronic Liver Disease
- Chronic Respiratory Disease
- Stroke
- Suicide
- Nephritis
- Influenza/Pneumonia

Population: American Indians in the U.S. Source: Ucare
Access to Care & Health Insurance

- The overall uninsurance rate among the American Indian population in Minnesota is 23%.

Healthy Food Sources
Walking (0.5), Biking (3.0), Driving (10.0)
### Table 6 Summary of published studies on potential health benefits of wild rice (Zizania spp.)

<table>
<thead>
<tr>
<th>Reference</th>
<th>Study design</th>
<th>Study conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wu et al. (1994)</td>
<td>In vitro studies of antioxidant potential of wild rice</td>
<td>Wild rice has high antioxidant activity and has high potential for commercial application in food production. Phytic acid is one of wild rice’s potent antioxidant compounds.</td>
</tr>
<tr>
<td>Asmarai et al. (1996)</td>
<td>In vitro studies of antioxidant potential of wild rice</td>
<td>Wild rice hull has higher antioxidant activity than the kernel. The potential antioxidant compound in the methanolic extract includes anisole, vanillin, and syringaldehyde.</td>
</tr>
<tr>
<td>Qui et al. (2009)</td>
<td>In vitro studies of antioxidant potential of wild rice</td>
<td>The antioxidant activity of wild rice was 30 times higher than that of white rice. The potential antioxidant compounds were identified as flavonoid glycosides.</td>
</tr>
<tr>
<td>Qui et al. (2010)</td>
<td>In vitro studies of antioxidant potential of wild rice</td>
<td>The antioxidant potential of wild rice was approximately 10 times higher than that of white rice. Ferulic acid and sinapic acid were reported as the most abundant phenolic acids in wild rice.</td>
</tr>
<tr>
<td>Quian et al. (2012)</td>
<td>In vitro studies of antioxidant and ACE-inhibitor activity of wild rice</td>
<td>The stem and leaf sheet extracts had effective antioxidant properties and the stem extract possessed ACE-inhibitor activity.</td>
</tr>
<tr>
<td>Britani et al. (2009)</td>
<td>In vitro studies of wild rice’s stimulating effect on the innate immune system</td>
<td>The gall extract of Z. latifolia significantly stimulated the promoter activity of hBD-2 in colon carcinoma (Caco) cells.</td>
</tr>
<tr>
<td>Kawagishi et al. (2006)</td>
<td>In vivo studies of prevention of osteoporosis in rice</td>
<td>Ethanol fraction of the gall of Z. latifolia reduced the osteoclast formation up to 49% without any cytotoxicity.</td>
</tr>
<tr>
<td>Kim et al. (2012)</td>
<td>In vivo studies of anti-fatigue activity of wild rice (Z. caudiflora) in rats</td>
<td>Raw rice and malted barley hydrolyzed rice reduced the immobility times of FST and TST, and further improved the serum albumin, glucose, and total protein levels.</td>
</tr>
<tr>
<td>Zhang et al. (2009)</td>
<td>In vivo studies of cardioprotective effects of wild rice (Z. latifolia) in rats</td>
<td>Wild rice as part of an atherogenic diet suppressed the increase in serum triglycerides and total cholesterol in mice.</td>
</tr>
<tr>
<td>Han et al. (2012)</td>
<td>In vivo studies of protective potential of wild rice (Z. latifolia) on obesity and lipotoxicity in rats</td>
<td>Wild rice has potential antioxidant activity in vivo. Wild rice suppressed the increase of lipid droplets accumulation, free fatty acids, and leptin; it also inhibited the decrease of lipoprotein lipase and adipose triglyceride lipase activities.</td>
</tr>
<tr>
<td>Han et al. (2013)</td>
<td>In vivo studies of wild rice (Z. latifolia) on insulin resistance in rats</td>
<td>Wild rice has ameliorating effects on insulin resistance in rats.</td>
</tr>
<tr>
<td>Surendiran et al. (2013)</td>
<td>In vivo studies of wild rice (Z. palustris L) on cholesterol-lowering and anti-atherogenic activity in LDLr-KO mice</td>
<td>Wild rice prevents atherogenesis in LDLr-KO mice.</td>
</tr>
</tbody>
</table>

**Figure 1.** Summary of published studies on health benefits from a 2014 Literature Review by Surendiran et al.
For many American Indian people, the definition of health is more qualitative than quantitative and encompasses many aspects beyond typical biomedicine wellness related to one’s physical, mental, and emotional state, such as spirituality and balance with nature (Hill, 2006; Lardon et al., 2016). Additional cultural factors such as indigenous language fluency rates, participation in ceremonies and cultural activities, and connection to land were also found to be associated with the overall perception of health for both the community and individuals (Hodge & Nandy, 2011; Oster Canada et al., 2016).
Survey Instrument Questions

Health Fair Survey
• How important is wild rice to you and your family’s health? (rank 1-5)
• How important is wild rice to your community’s health? (rank 1-5)
• If wild rice is important to you, please describe why.

Community Interviews
• How important is wild rice to you and your family’s health needs?
• How important is wild rice to your community’s health needs?
• How does the health of wild rice affect your health?
Methodology

- Compile
- Explore
- Interpret
- Reflect
- Code

The process is cyclical, moving from Compile to Explore, then to Interpret, Reflect, Code, and back to Compile.
Emergent Themes

Health Fair Survey
• Identity (13)
• Social Relations (9)
• Health (7)
• Environment (6)
• Enjoyment (5)
• Activity (4)

Community Interviews
• Identity (22)
• Social Relations (17)
• Health (22)
• Environment (16)
• Enjoyment (1)
• Activity (7)
• Management (6)
• Supply (5)
Identity

Definition:
• Cultural, spiritual, or sacred practices, including ceremonies and gifting

Supporting Literature:
• For indigenous cultures, “traditional food retains significant symbolic and spiritual value, and is central to personal identity and the maintenance of culture,” (Power, 2008, p. 96).
“I can give you at least eight generations of family oral history of us harvesting wild rice. This is the first food we give to our babies, we have lifelong connections to our sacred food.”
“For the same reasons—the season brings families together. To gather—to finish—to feast—to dance. That way the togetherness will create a healthy community.”

Social Relations, Environment, Activity
“Wild rice is a good and healthy food source. No chemicals or additives. No GMOs. Reduces the risk of cancers and other health problems.”

Health
“Wild rice needs clean, fresh water to grow and thrive. So do we. Water is life and wild rice is a part of a healthy life and environment. What is good for wild rice is good for all of us. We need to be the voice of the Manoomin! We need to be the voice of the water! We need to be the voice of the earth! We need to be a voice for each other!”

Environment, Social Relations
Economic Analysis

Contracted with Earth Economics:

• Provide more detailed analysis of manoomin’s contribution to the Minnesota and tribal economies
• Data on tribal, state rice harvesters, processors; annual harvest data
• Developed IMPLAN model
• Evaluated scenario with reduced manoomin; economic impacts to tribes and the state
Next steps...

- Using Baseline Health Assessment, evaluate outcomes for both pathways
- Continue to review, refine with steering committee input
- Establish communications committee and develop robust communications plan
- Develop Recommendations
- Draft Report back to the community in late summer
- Ready for public ~ end of September 2018
Chi Miigwech!