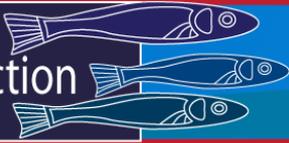


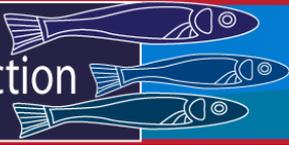
# Risk Communication with Tribal Communities

Matthew Dellinger, MS, PhD  
Institute for Health and Society  
Medical College of Wisconsin



# NIEHS R21: "A Fish Consumption Advisory to Promote Anishinaabe Environmental Health Literacy"

- Partners: Sault Ste. Marie Tribe of Chippewa Indians, Sault Ste. Marie, MI
  - Inter-Tribal Council of Michigan (ITCM)
  - Chippewa Ottawa Resource Authority (CORA)/Inter-Tribal Fisheries and Assessment Program



# Culture, Subsistence, and Recreation



Ojibwe Fisherman,  
Roland W. Reed,  
1908

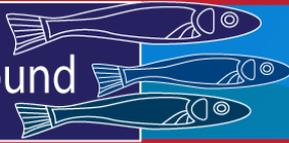
Me and my little  
brother circa 1989





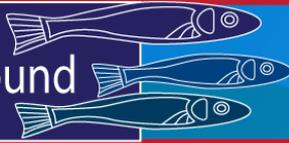
# Anishinaabe (Chippewa, Ottawa, and Potawatomi)





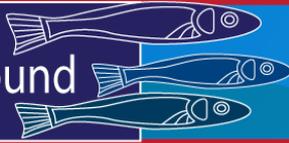
# Benefits Associated with Fish

1. Fish contain beneficial Omega-3 Polyunsaturated Fatty Acids
2. Lean protein, other nutrients
3. Culture, traditions, physical activity, & recreation
4. Environmental stakeholders



# Harms Associated with Fish

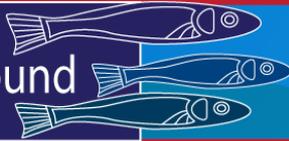
1. Chemical exposures (MeHg, PCBs, Dioxins)
2. Poor nutrition
3. Loss of: culture, tradition, physical activity & recreation
4. Sociopolitical tension: considered protected treaty right



- EPA/FDA Recommend: 240g/week of fish<sup>1,2</sup>
- Reported Anishinaabe consumption: 420g/week of fish<sup>3</sup>
- Measured Anishinaabe consumption: 78.4g/week<sup>3</sup>

1. U.S.EPA. What You Need to Know about Mercury in Fish and Shellfish. U.S. Environmental Protection Agency 2004 [cited 2013 September 25]; Available from: [http://water.epa.gov/scitech/swguidance/fishshellfish/outreach/advice\\_index.cfm](http://water.epa.gov/scitech/swguidance/fishshellfish/outreach/advice_index.cfm).
2. USDA, Dietary Guidelines for Americans, 2010, in U.S. Department of Agriculture and U.S. Department of Health and Human Services. 2010, U.S. Government Printing Office: Washington, D.C.
3. Dellinger, J.A., Exposure assessment and initial intervention regarding fish consumption of tribal members of the Upper Great Lakes Region in the United States. Environ Res, 2004. 95(3): p. 325-40.





1. Advisories were effective at communicating risks. But, not likely to increase fish consumption.
2. New opportunities using mobile technology
3. Need for PUFA-3 assessments in tribal fish

Nindamwaa Giigoon:  
An Anishnaabe  
Guide to Eating Fish

Choosing which fish are safe to eat is no simple task. This video was produced in collaboration with the Anishnaabe People and the National Institute of Environmental Health Sciences UWM Marine and Freshwater Biomedical Sciences center to help clarify and explain the issues involved with fish consumption today.

Logos: UWM, NIEHS, ATSDR, EPA, and others.

Copyright: David H. Paterling (paterling@uwm.edu), John Dellinger, Allison Rutenkowski, Rick Haverkate, 2007, all rights reserved.

*Eating fish is more than healthy — it's essential*

Mercury Levels In Upper Great Lakes Fish\*

Choosing your fish is easy if you remember — SOURCE SPECIES SIZE

Lower

Higher

Favorite Great Lakes Fish Species	Chances of Eating Aflatoxin / 1 oz serving
Lake Herring	3.4
Chub	3.5
Lake Whitefish	3.4
Lean Lake Trout	3.0
Coho Salmon	1.5
Chinook Salmon	1.3
Rainbow Smelt	1.2
Walleye	0.4
Yellow Perch and Loche	0.3

Lower

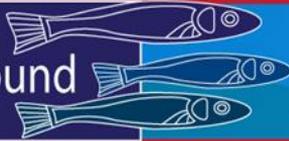
- Rainbow Smelt (Annissee Species)
- Lake Whitefish (Annissee)
- Lake Herring (Ojibwa)
- Perch (Annissee)
- Lake Trout (Nanabegon)
- Salmon (International Species)
- Northern Pike (Gnawche)
- Walleye (Ojibwa)
- Loche (Annissee)

Higher

\*SOURCE — Find out where your fish is from. Some species and areas have low contaminants. Use others. Lake Superior, Michigan and these have lower levels of mercury than inland lakes and streams. If there's no label, ask.

\*\*NEEDS — Fish that eat other fish need to build up more contaminants in their fish. Some species grow more slowly, allowing more time for contaminants to build up.

\*\*SIZE — Choose smaller fish. Larger fish eat other large fish, building up even more contaminants.



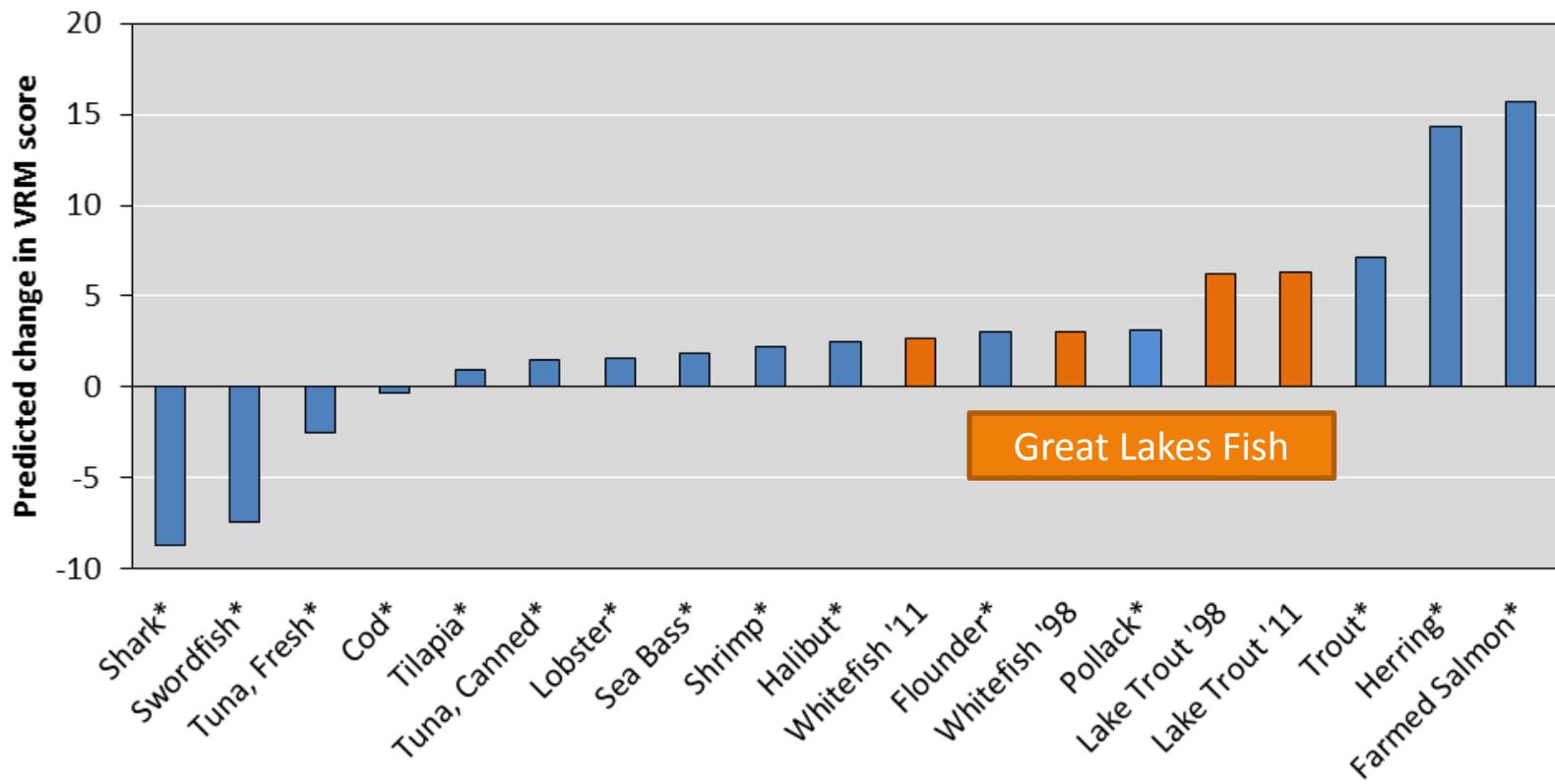
## Risk Assessment Advances Since ITCM Advisory (Ginsberg et al 2009, 2015)

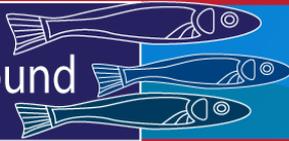
### Adult Heart Disease Estimate

- Benefit = 14.6% lowered risk per 100mg PUFA-3
- Risk = 23% higher risk per 0.51ppm Hg change in hair

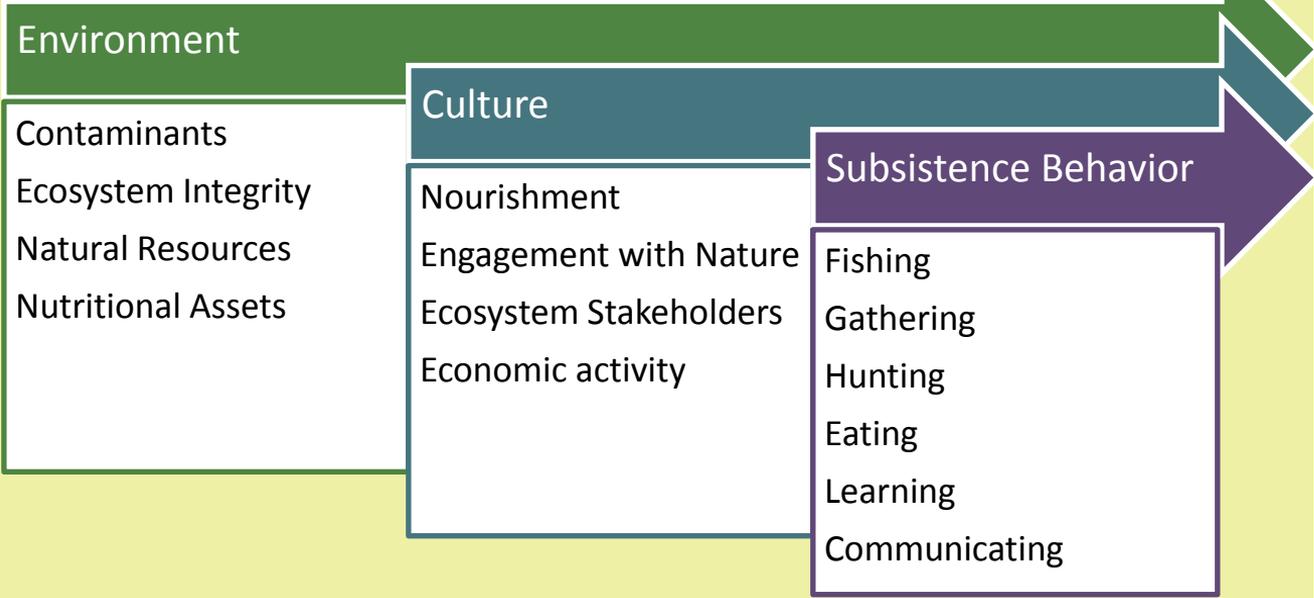
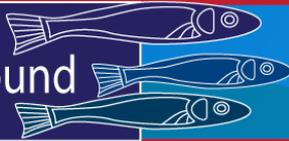
### Infant Neural Development

- Benefit = 3.04 VRM points per 100 mg PUFA-3
- Risk = 3.05 VRM points 1ppm change in hair Hg



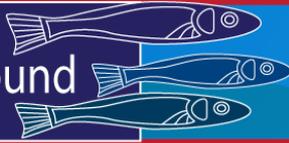


1: Environmental conditions interact with culture to influence exposure, nutrition, and health.

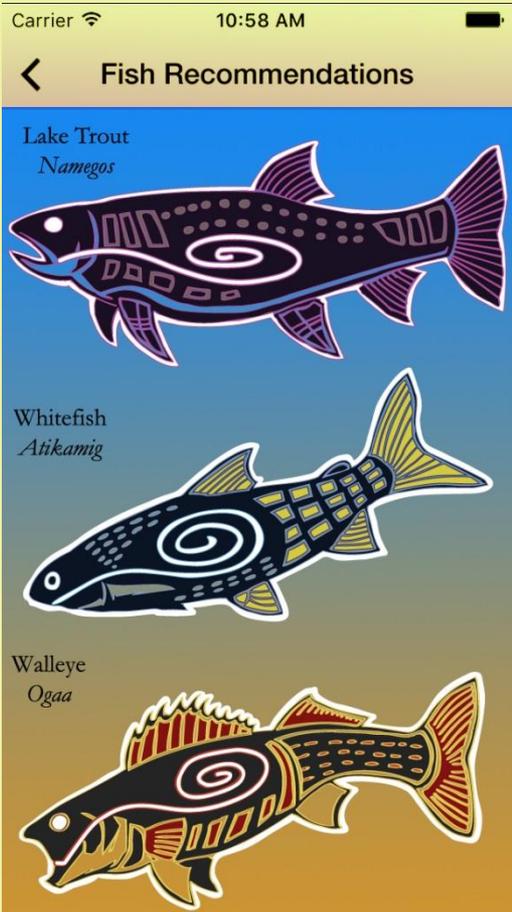


Health Outcomes (Holistic):

1. Varying Risks of Disease
  - Exposure
  - Nutrition
1. Wellbeing
  - Stress
  - Tradition
  - Happiness
2. Agency
  - Health Literacy
  - Self-determination



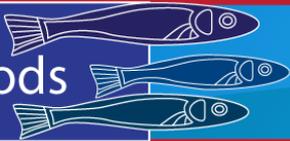
2: Improved access to knowledge, via culturally-tailored computationally powerful outreach, will help to optimize benefits/harms of fish consumption.



# R21: Mobile App

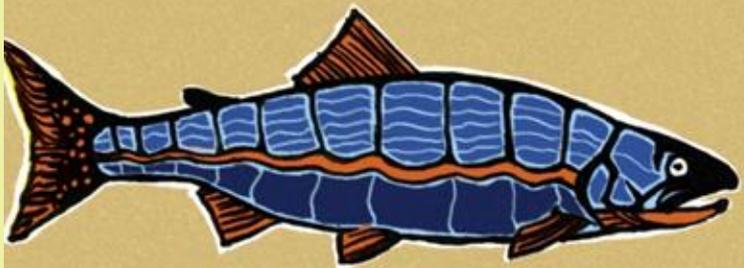
## AIMS:

1. Quantify risk and benefits/support tribal fish monitoring
2. Construct culturally-tailored advisory
3. Test behavior changes that are directly linked to exposure (harms) and nutrition (benefits)



# Anishinaabe Art (Woodland Style)

**Original request from ITCM Partners**



Choosing which fish are safe to eat is no simple task. This video was produced in collaboration with the Anishnaabe People and the National Institute of Environmental Health Sciences UWM Marine and Freshwater Biomedical Sciences center to help clarify and explain the issues involved with fish consumption today.

Nindamwaa Giigoon: An Anishnaabe Gu

Nindamwaa Giigoon:  
An Anishnaabe  
Guide to Eating Fish





# Anishinaabe Art (Woodland Style)

**Norval Morrisseau: revitalized Anishinaabe iconography, traditionally incised on rocks and Midewiwin birchbark scrolls**



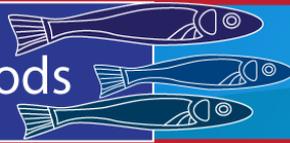


## “Woodland” Style



## Representational (Details Page)





Carrier 10:38 AM

**Smart Fish**

Your Weight (lbs)

Your Age

Your Sex

Male  Female

Select a Portion Size

4 oz  6 oz  8 oz



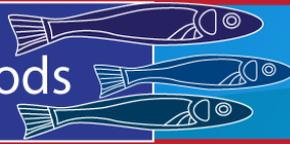
Lake Superior Trout:

1. High PUFA-3 Benefits
2. If female, 2 meals/week
3. If male or >50, no restriction



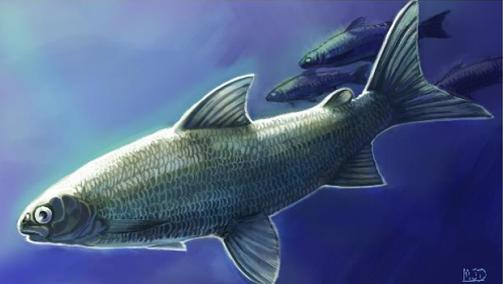
Lake Superior Trout:

1. High PUFA-3 Benefits
2. If female, 2 meals/week
3. If male or >50, no restriction



Carrier 4:11 PM

< Whitefish



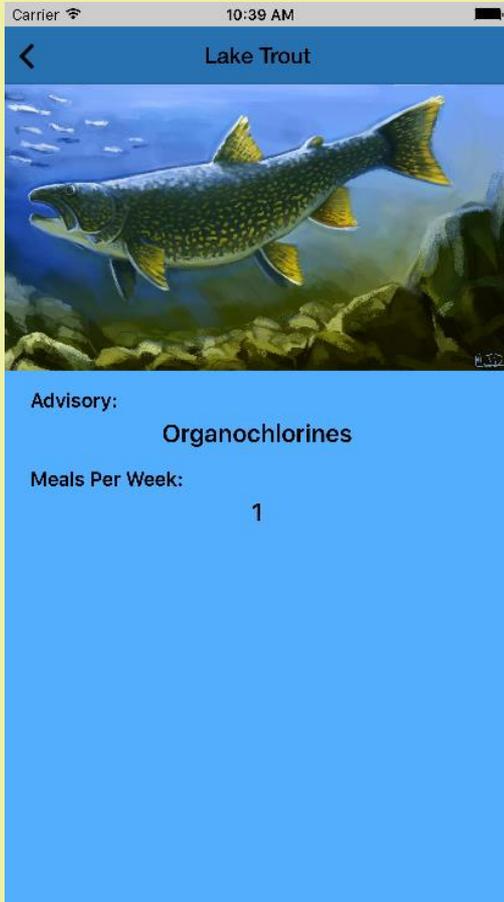
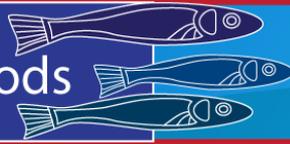
Advisory:  
**Organochlorines**

Meals Per Week:  
**4**



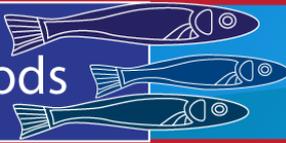
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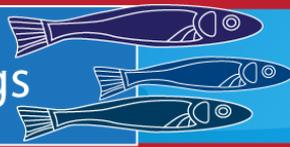
### Lake Superior Trout:

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## Focus Groups at ITCM

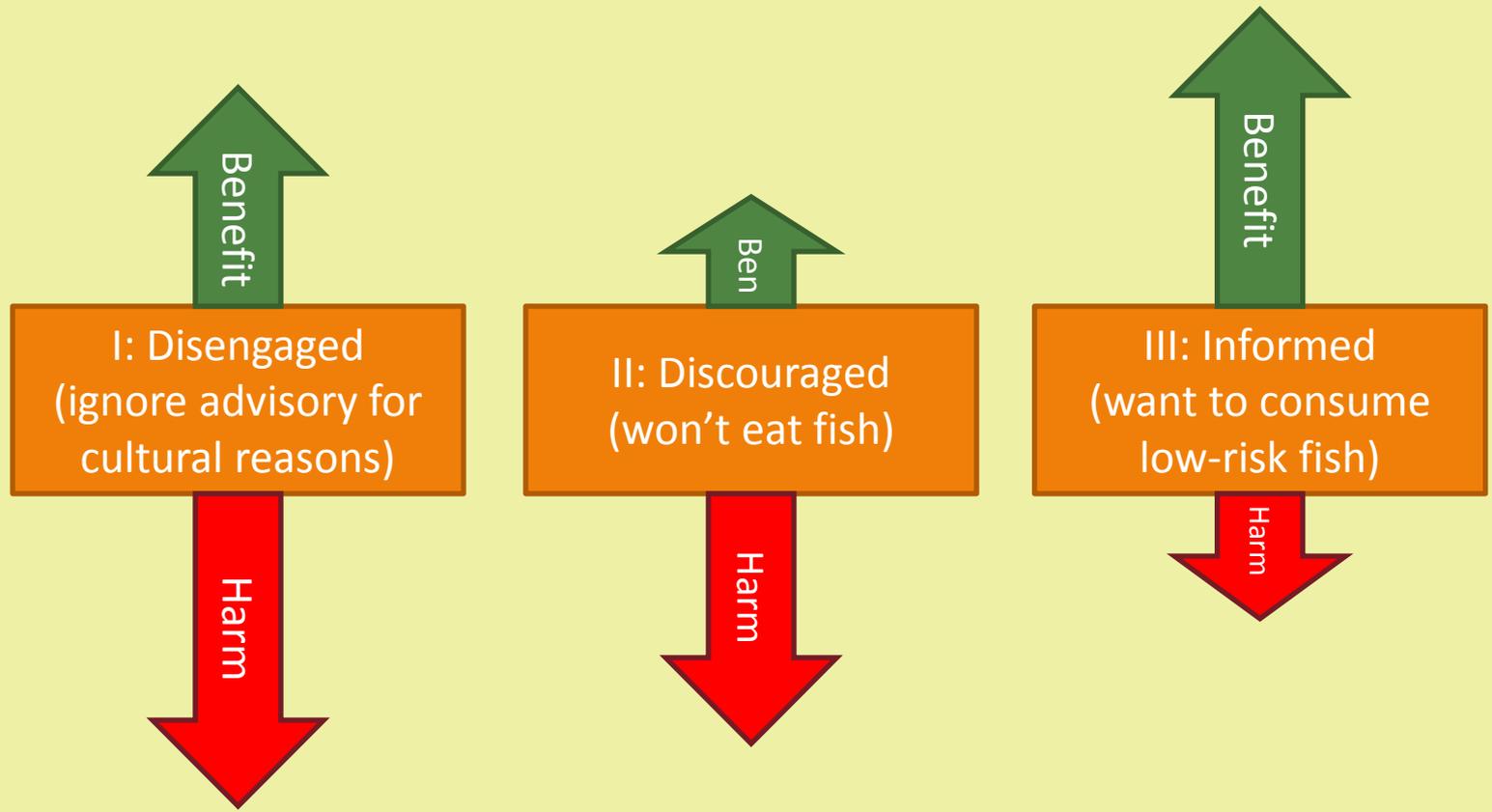
- Held on-site at ITCM (Sault Tribe)
- Three groups of 8 people (N =24)
- Age  $\geq 18$  years, Tribal Member in 1836 Treaty Ceded Territories, Makes dietary decisions
- Facilitated by Sault Tribe Environmental Specialist at ITCM
- Data collection: Facilitator notes and Auditory Response System (Clicker)



- “It’s good info if you’re looking for it, but it wouldn’t make a difference for me. I grew up eating wild caught fish and will keep on eating it.”
- “We eat a lot of fish – my family probably eats it at least four times a week and the recommendation might be around one, but that would be really hard. I go by the saying ‘ignorance is bliss’ and we just don’t know enough information to make an informed decision.”



# Three Types of Environmental Health Literacy for Fish Consumers





- “It’s not the fish – they make it seem like the fish are bad, but it’s not the fish, it’s the environment”
- “I’m less concerned about me – to enter age and weight is more important to me so that I can look out for the kids. It’s also a motivator to use the app.”

# Thank you

## Acknowledgments

- Sault Ste. Marie Tribe of Chippewa Indians
- Great Lakes Inter-Tribal Council
- Chippewa Ottawa Resource Authority
- UW-Milwaukee, Mobile App Innovation Lab
- Inter-Tribal Council of Michigan
- Agency for Toxic Substances and Disease Registry
- National Institutes for Health and National Institute for Environmental Health Sciences
- Indian Health Service

Collaborators: Laura Cassidy, Jared Olson, Michael Ripley, Noel Pingatore, Robin Clark, Renee Hill, John Dellinger, Rick Haverkate, David H. Petering, Beth Tornes, and Michael Moths