

GREAT LAKES INDIAN FISH & WILDLIFE COMMISSION

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• MEMBER TRIBES •

MICHIGAN

Bay Mills Community
Keweenaw Bay Community
Lac Vieux Desert Band

WISCONSIN

Bad River Band
Lac Courte Oreilles Band
Lac du Flambeau Band

MINNESOTA

Fond du Lac Band
Mille Lacs Band

Red Cliff Band
St. Croix Chippewa
Sokaogon Chippewa

To: Neil Kmiecik, Biological Services Director

From: Sara Moses, Environmental Biologist

A handwritten signature in dark blue ink that reads "Sara K. Moses". The signature is written in a cursive style.

Date: April 28, 2015

Re: Mercury-Based Consumption Advice for Northern Pike from Mille Lacs

Under a recent Great Lakes Restoration Initiative (GLRI) grant (GL-00E00613-0, *Mercury Testing and Updating Tribal Walleye Consumption Advice*), GLIFWC collected and tested for mercury 28 northern pike from Mille Lacs in 2013 and 2014. Skin-off fillets were tested for total mercury by the Lake Superior Research Institute (LSRI) at the University of Wisconsin – Superior. In addition, GLIFWC’s mercury database contains mercury data from the Minnesota Department of Health for 44 northern pike skin-on fillets from Mille Lacs collected between 1985 and 2008. This memo describes the utilization of this data for developing mercury-based consumption advice for northern pike from Mille Lacs.

Available information on the length, weight, age, sex, and mercury concentration of all 72 northern pike in the database from Mille Lacs are shown in Appendix A. Mercury concentrations ranged from 0.011 to 0.607 $\mu\text{g/g}$ (ppm), with an average of 0.159 $\mu\text{g/g}$. A plot of mercury concentration versus walleye length is shown in Figure 1, below. The mean length of northern pike harvested by GLIFWC tribes from Mille Lacs during spring spearing and netting is typically ~26 inches.

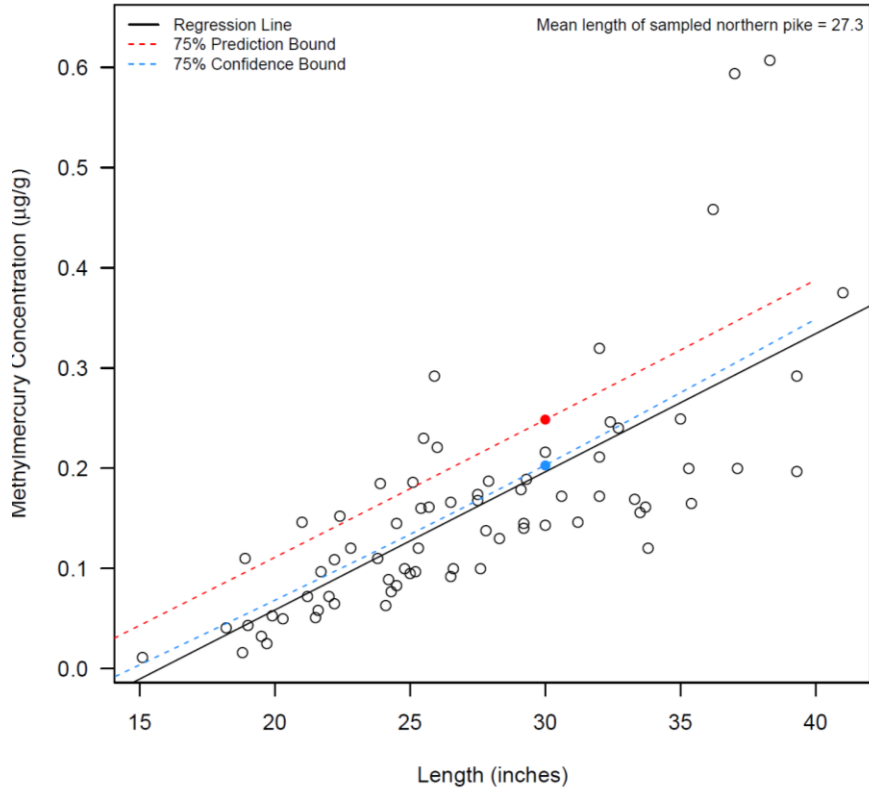


Figure 1: Mercury concentration versus northern pike length for Mille Lacs. [Note: The 75% confidence and prediction upper bounds shown are used in the determination of northern pike consumption advice.]

An analysis similar to that used to assign color codes to inland lakes for the walleye Mercury Maps was performed for the Mille Lacs northern pike. The major modification was that fish mercury was normalized to a 30- or 36-inch northern pike, rather than the 20-inch length applied to walleye. Two methods were used for determining the appropriate length for normalization and subsequent consumption advice. Both methods, which resulted in identical consumption advice recommendations, are detailed below.

Method 1

GLIFWC's walleye consumption advice, as communicated by our Mercury Maps, is standardized to a 20-inch walleye. 77.6-85.8% of walleye harvested by GLIFWC member tribes from Mille Lacs from the 2008-2009 through 2010-2011 quota years were less than 20-inches, and thus covered by our walleye consumption advice. For Method 1, a length of 30 inches was chosen for developing consumption for northern pike from Mille Lacs because it covers approximately the same percentage of northern pike in Mille Lacs. In other words, approximately the same percentage of northern pike (79.8-84.8%) harvested from Mille Lacs in

recent years are <30 inches as walleye <20 inches, as shown in Table 1 below. A length of 30 inches allows the consumption advice developed to be applicable to the majority of the northern pike harvested and is consistent with the length used by the Minnesota Department of Health for issuing statewide northern pike consumption advice.

Table 1: Percent of walleye <20 inches and northern pike <30 inches and average walleye and northern pike length (all gear types) harvested by GLIFWC tribes from Mille Lacs by quota year

Quota Year	% Walleye <20 inches	Average Walleye Length (inches)	# of Walleye Measured	% Northern Pike <30 inches	Average Northern Pike Length (inches)	# of Walleye Measured
2008-2009	84.1%	17.9	7,930	79.8%	27.0	1,599
2009-2010	85.8%	17.5	10,832	80.1%	26.4	1,953
2010-2011	77.6%	18.1	8,050	84.8%	25.7	1,951

The result based on the available information is that 30-inch northern pike from Mille Lacs fall into the “blue” consumption advice category for the general population and the “yellow” category for the sensitive population. This corresponds to the following consumption advice for northern pike (up to 30 inches) from Mille Lacs:

MILLE LACS NORTHERN PIKE (up to 30”) CONSUMPTION ADVICE			
Sensitive Population (women of childbearing age and children under 15)		General Population (women beyond childbearing age and men 15 and older)	
	Eat up to 2 meals or 16 oz. per month		Eat up to 8 meals or 64 oz. per month

These are the same consumption advice categories as GLIFWC recommends for walleye (up to 20 inches) from Mille Lacs.

Method 2

The second method for choosing the length northern pike for which advice should be generated was based on the method originally used to choose the 20-inch walleye length. 20 inches was chosen for walleye because it is protective of the vast majority of walleye harvested by GLIFWC member tribes in Wisconsin, where the majority of the walleye harvest lakes are located. Between 1985 and 2013, 94.1% of the 618,668 walleye harvested in Wisconsin were under 20 inches. In order to develop consumption advice protective of approximately the same percentage

(93.9%) of the 926 tribally harvested northern pike from 1985 to 2013, a length of 36 inches was used to develop consumption advice.

The result based on the available information is that 36-inch northern pike from Mille Lacs fall into the “blue” consumption advice category for the general population and the “yellow” category for the sensitive population. This corresponds to the following consumption advice for northern pike (up to 36 inches) from Mille Lacs:

MILLE LACS NORTHERN PIKE (up to 36”) CONSUMPTION ADVICE			
Sensitive Population (women of childbearing age and children under 15)		General Population (women beyond childbearing age and men 15 and older)	
	Eat up to 2 meals or 16 oz. per month		Eat up to 8 meals or 64 oz. per month

These are the same consumption advice categories as GLIFWC recommends for walleye (up to 20 inches) from Mille Lacs and is identical to the advice generated for a 30-inch pike. Mercury is fairly low in Mille Lacs fish relative to other inland lakes across the ceded territories.

Cc: John Coleman, Environmental Section Leader

APPENDIX A

Length, weight, age, sex, and mercury concentration of northern pike collected from the Mille Lacs used for generating consumption advice

Fish ID	Collection Date	Agency	Length (inches)	Weight (Pounds)	Age (Years)	Sex	Form	Mercury (µg/g, ppm)
12909	5/15/2013	GLIFWC	19.9	1.99	-----	F	Skin off fillet	0.053
11744	5/15/2013	GLIFWC	21.0	1.97	3	F	Skin off fillet	0.146
12789	5/15/2013	GLIFWC	22.2	2.36	2	F	Skin off fillet	0.109
12910	5/15/2013	GLIFWC	24.5	3.10	3	M	Skin off fillet	0.145
11976	5/15/2013	GLIFWC	26.5	4.43	3	F	Skin off fillet	0.166
12911	5/15/2013	GLIFWC	27.9	4.84	4	F	Skin off fillet	0.187
11996	5/15/2013	GLIFWC	32.0	5.46	5	F	Skin off fillet	0.211
11281	5/15/2013	GLIFWC	33.3	11.2	7	F	Skin off fillet	0.169
12908	5/15/2013	GLIFWC	33.5	8.78	5	F	Skin off fillet	0.156
11743	5/15/2013	GLIFWC	39.3	13.9	9	F	Skin off fillet	0.197
11977	5/30/2015	GLIFWC	39.3	13.8	8	U	Skin off fillet	0.292
12645	6/3/2013	GLIFWC	35.4	3.62	5	U	Skin off fillet	0.165
11913	6/3/2013	GLIFWC	37.1	11.9	6	U	Skin off fillet	0.200
11282	6/6/2013	GLIFWC	24.2	2.94	3	M	Skin off fillet	0.089
11978	6/6/2013	GLIFWC	24.3	3.27	4	M	Skin off fillet	0.077
11280	6/6/2013	GLIFWC	25.2	3.24	4	M	Skin off fillet	0.097
6854	4/29/2014	GLIFWC	22.4	2.90	4	F	Skin off fillet	0.152
12820	4/29/2014	GLIFWC	23.9	3.30	4	M	Skin off fillet	0.185
6849	4/29/2014	GLIFWC	25.1	4.60	5	F	Skin off fillet	0.186
12898	4/29/2014	GLIFWC	26.0	4.25	4	F	Skin off fillet	0.221
12884	4/29/2014	GLIFWC	27.5	6.07	5	F	Skin off fillet	0.168
6846	4/29/2014	GLIFWC	30.0	7.99	7	F	Skin off fillet	0.216
12883	4/29/2014	GLIFWC	32.4	10.2	8	F	Skin off fillet	0.246
12897	4/29/2014	GLIFWC	35.0	11.5	9	F	Skin off fillet	0.249
12891	4/29/2014	GLIFWC	37.0	10.1	13	F	Skin off fillet	0.594
12910	4/29/2014	GLIFWC	41.0	17.7	13	F	Skin off fillet	0.375
12986	4/30/2014	GLIFWC	30.0	5.87	4	F	Skin off fillet	0.143
13000	4/30/2014	GLIFWC	30.6	5.95	5	M	Skin off fillet	0.172
-----	9/26/1985	MDNR	18.9	1.5	-----	----	Skin on fillet	0.11
-----	9/26/1985	MDNR	22.8	2.8	-----	----	Skin on fillet	0.12
-----	9/26/1985	MDNR	25.3	3.8	-----	----	Skin on fillet	0.12
-----	9/26/1985	MDNR	25.4	3.5	-----	----	Skin on fillet	0.16
90438	10/3/1990	MDNR	19.7	1.9	-----	----	Skin on fillet	0.025
90439	10/3/1990	MDNR	24.1	3.3	-----	----	Skin on fillet	0.063
90440	10/3/1990	MDNR	26.6	3.5	-----	----	Skin on fillet	0.100
-----	10/1/1997	MDNR	21.7	2.34	-----	----	Skin on fillet	0.097
-----	10/1/1997	MDNR	24.8	3.22	-----	----	Skin on fillet	0.10

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Fish ID	Collection Date	Agency	Length (inches)	Weight (Pounds)	Age (Years)	Sex	Form	Mercury ($\mu\text{g/g}$, ppm)
----	10/1/1997	MDNR	25.5	3.51	----	----	Skin on fillet	0.23
----	10/1/1997	MDNR	27.6	5.42	----	----	Skin on fillet	0.10
----	10/1/1997	MDNR	28.3	5.18	----	----	Skin on fillet	0.13
----	10/1/1997	MDNR	29.2	6.66	----	----	Skin on fillet	0.14
----	10/1/1997	MDNR	32.0	9.10	----	----	Skin on fillet	0.32
----	10/1/1997	MDNR	32.7	9.55	----	----	Skin on fillet	0.24
----	10/1/1997	MDNR	33.8	10.7	----	----	Skin on fillet	0.12
----	10/1/1997	MDNR	35.3	10.1	----	----	Skin on fillet	0.20
30845	9/24/2003	MDNR	20.3	2.26	----	----	Skin on fillet	0.050
30846	9/24/2003	MDNR	26.5	4.70	----	----	Skin on fillet	0.092
30847	9/24/2003	MDNR	31.2	7.54	----	----	Skin on fillet	0.146
30848	9/24/2003	MDNR	32.0	8.82	----	----	Skin on fillet	0.172
30849	9/24/2003	MDNR	33.7	9.35	----	----	Skin on fillet	0.161
081220	9/23/2008	MDNR	15.1	0.84	----	----	Skin on fillet	0.011
081221	9/23/2008	MDNR	18.2	1.55	----	----	Skin on fillet	0.041
081223	9/23/2008	MDNR	18.8	1.59	----	----	Skin on fillet	0.016
081224	9/23/2008	MDNR	19.0	1.74	----	----	Skin on fillet	0.043
081222	9/23/2008	MDNR	19.5	1.65	----	----	Skin on fillet	0.032
081225	9/23/2008	MDNR	21.1	1.90	----	----	Skin on fillet	0.072
081226	9/23/2008	MDNR	21.5	2.20	----	----	Skin on fillet	0.051
081228	9/23/2008	MDNR	21.6	2.62	----	----	Skin on fillet	0.058
081229	9/23/2008	MDNR	22.0	2.67	----	----	Skin on fillet	0.072
081227	9/23/2008	MDNR	22.2	2.62	----	----	Skin on fillet	0.065
081230	9/23/2008	MDNR	23.8	3.24	----	----	Skin on fillet	0.110
081231	9/23/2008	MDNR	24.5	3.48	----	----	Skin on fillet	0.083
081233	9/23/2008	MDNR	25.0	3.59	----	----	Skin on fillet	0.095
081232	9/23/2008	MDNR	25.7	4.08	----	----	Skin on fillet	0.161
081235	9/23/2008	MDNR	25.9	3.92	----	----	Skin on fillet	0.292
081236	9/23/2008	MDNR	27.5	3.88	----	----	Skin on fillet	0.174
081234	9/23/2008	MDNR	27.8	3.99	----	----	Skin on fillet	0.138
081237	9/23/2008	MDNR	29.1	4.01	----	----	Skin on fillet	0.179
081238	9/23/2008	MDNR	29.2	4.37	----	----	Skin on fillet	0.145
081239	9/23/2008	MDNR	29.3	5.20	----	----	Skin on fillet	0.189
081240	9/23/2008	MDNR	36.2	8.47	----	----	Skin on fillet	0.458
081241	9/23/2008	MDNR	38.3	11.8	----	----	Skin on fillet	0.607