



2020 Update of GLIFWC's Mercury Maps for Walleye Consumption Advice

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This report describes the methods used to update GLIFWC’s GIS-based Mercury Maps, which are used to provide walleye consumption advice to GLIFWC member tribes. These methods are based on those detailed in Madsen *et al.* (2007). The maps were last updated in 2018. The updated 2020 maps include GLIFWC mercury data through the 2019 spring spearing/netting season, Wisconsin Department of Natural Resources data through 2018, Michigan Department of Environmental Quality data through 2018, and Minnesota Department of Health data through 2018.

Lake Selection

There are a total of eight GIS-based Mercury Maps: one for each of GLIFWC’s six Wisconsin tribes (Bad River, Lac Courte Oreilles, Lac du Flambeau, Red Cliff, St. Croix, and Mole Lake) as well as maps for select walleye lakes in the 1842 ceded territory of Michigan and the 1837 ceded territory of Minnesota. Appendix 1 shows the lakes included on each of the eight maps as well as the lake color assignments in 2018 and 2020. Appendix 2 shows the lakes added (Appendix 2a) to and removed from (Appendix 2b) the maps in 2020 versus the 2018 maps.

Bad River, Lac Courte Oreilles, Red Cliff, and St. Croix

Lakes included on the maps for Bad River, Lac Courte Oreilles, Red Cliff, and St. Croix were selected based on the same criteria as was used for the 2018 Mercury Maps. Lakes were included on these maps if that tribe had harvested a walleye from them since 1985, or if the lakes had been declared in the last 5 years (2015-2019), even if a walleye had not been harvested. In addition, Mille Lacs (Minnesota) was depicted on each map for the Wisconsin tribes because each tribe has harvested walleye there. A summary of the number of lakes added to or removed from each of these four maps is shown below (Table 1) and detailed in Appendix 2.

Table 1: Summary of number of lakes on the Mercury Maps for Bad River, Lac Courte Oreilles, Red Cliff, and St. Croix Tribes

| Mercury Map | Number of Lakes on 2018 Version | Number of New Lakes Added in 2020 | Number of Lakes Removed from 2018 Maps for 2020 | Number of Lakes on 2020 Version |
|---------------------|--|--|--|--|
| Bad River | 60 | 0 | 0 | 60 |
| Lac Courte Oreilles | 42 | 0 | 0 | 42 |
| Red Cliff | 28 | 0 | 0 | 28 |
| St. Croix | 73 | 2 | 0 | 75 |

Lac du Flambeau and Mole Lake

Due to the large number of lakes declared in the last 5 years (2015-2019) by Lac du Flambeau and Mole Lake, stricter criteria for choosing lakes to appear on the maps was necessary in order to keep the lakes to a number that would fit onto the Mercury Maps and allow for a scale that is reasonable and legible. These stricter criteria were also applied to the 2012, 2014, 2016, and 2018 maps. Lakes were selected for these maps only if a walleye had been harvested from that lake by the tribe since 1985. Unlike the other Wisconsin tribes, lakes that had been declared in the last five years but had never had a walleye harvested by the tribe were not included on the maps. There were 129 and 110 lakes declared in the last 5 years by Lac du Flambeau and Mole Lake, respectively, that have never had a walleye harvested and thus were not included on these tribe’s Mercury Maps. These lakes are listed in Appendix 3 (Lac du Flambeau) and Appendix 4

(Mole Lake). Advice for these lakes, and all Ceded Territory lakes for which there is sufficient data to develop consumption advice regardless of whether they appear on the maps, can be displayed at maps.glifwc.org. A summary of the number of lakes added to or removed from each of these two maps is shown below (Table 2) and detailed in Appendix 2.

Table 2: Summary of number of lakes on the Mercury Maps for the Lac du Flambeau and Mole Lake Tribes

| Mercury Map | Number of Lakes on 2018 Version | Number of New Lakes Added in 2020 | Number of Lakes Removed from 2018 Maps for 2020 | Number of Lakes on 2020 Version |
|-----------------|---------------------------------|-----------------------------------|---|---------------------------------|
| Lac du Flambeau | 146 | 2 | 0 | 148 |
| Mole Lake | 88 | 1 | 0 | 89 |

Michigan 1842 Ceded Territory

The Michigan 1842 ceded territory map includes all lakes for which walleye harvest guidelines were calculated for the Lac Vieux Desert tribe for 2020. As on the 2016 maps, lakes of interest to KBIC were determined by the tribe and displayed on the maps according to their request. The lists of both LVD and KBIC lakes are unchanged from the 2018 maps. A summary of the number of lakes added to or removed from this map is shown below (Table 3) and detailed in Appendix 2.

Table 3: Summary of number of lakes on the Mercury Map for the Michigan 1842 ceded territory

| Mercury Map | Number of Lakes on 2018 Version | Number of New Lakes Added in 2020 | Number of Lakes Removed from 2018 Maps for 2020 | Number of Lakes on 2020 Version |
|---------------|---------------------------------|-----------------------------------|---|---------------------------------|
| Michigan 1842 | 87 | 0 | 0 | 87 |

Minnesota 1837 Ceded Territory

The Minnesota 1837 ceded territory map includes all lakes for which walleye harvestable surplus were calculated for 2020. There were three lakes (Big Comfort L and Spider L in Chisago County and Peavy Lake in Morrison County) removed from the list since the 2018 maps were published. A summary of the number of lakes added to or removed from this map is shown below (Table 4) and detailed in Appendix 2.

Table 4: Summary of number of lakes on the Mercury Maps for the Minnesota 1837 ceded territory

| Mercury Map | Number of Lakes on 2018 Version | Number of New Lakes Added in 2020 | Number of Lakes Removed from 2018 Maps for 2020 | Number of Lakes on 2014 Version |
|----------------|---------------------------------|-----------------------------------|---|---------------------------------|
| Minnesota 1837 | 74 | 0 | 3 | 71 |

Assignment of Color Codes

Detailed methods for the assignment of color codes to lakes are available in Madsen *et al.* (2007). In short, each lake included on the Mercury Maps was assigned two color codes corresponding to the meal frequency advice for the Sensitive Population (women of childbearing age and children under 15 years of age) and the General Population (women beyond childbearing

age and men 15 years of age or older). Individual lake color codes were based on predicted mercury concentrations for a 20-inch walleye, with the exception of the light blue color which indicates insufficient data to provide consumption advice. Mercury data used in the analysis included both skin-on and skin-off fillet concentrations. A summary of lake color assignments for each map appears in Appendix 5.

Light Blue Lakes

A minimum of four walleye samples were required to have been tested for mercury from a lake for consumption advice to be generated for that lake. Lakes with less than four samples were depicted with a light blue color on the maps, indicating that not enough information was available to provide consumption advice. Of the 493 lakes depicted on the maps, 137 (28%) had a light blue color and the remaining 356 lakes (72%) had a consumption advice color code (Appendix 5). In 2018, the maps had 492 lakes depicted with 29% of the lakes assigned a light blue color and 71% assigned a consumption advice color code.

Other Color Assignments

For lakes with mercury concentration data for at least four walleye, linear regressions were developed with walleye length as the predictor variable and walleye fillet mercury concentration as the response variable. This regression was used for making lake color assignments if the range of lengths was at least five inches and the slope of the regression was positive. Otherwise, mean mercury concentration values without regard to walleye length were used as the basis for advice. Of the 356 lakes with at least four walleye tested for mercury, linear regressions were used for 334 (94%) of the lakes. Mean mercury concentration values without regard to walleye length were used for the remaining 22 (6%) lakes, with one lake having a slope of the regression less than zero, 20 lakes having a range of walleye lengths less than or equal to five inches, and one lake with both a negative slope and a length range less than or equal to five inches.

In both cases, whether a regression equation or the mean mercury concentration values without regard to walleye length were used, upper 75% confidence and prediction intervals were generated. The intervals were generated using R statistical software (version 3.4.2). The R code (with explanatory notation), written by former GLIFWC Data Analyst, Brian Brost, is shown in Appendix 6. These were then used to determine the lake color code depending on the population that the map is intended to serve (i.e., confidence intervals for the general population and prediction intervals for the sensitive population). Individual lake color codes were based on predicted mercury concentrations for a 20-inch walleye. Confidence intervals provide intervals within which the *mean* of the response values (walleye tissue mercury concentrations) will lie with a specified probability. Prediction intervals provide intervals within which the value of a new individual observation will lie with a specified probability. For the sake of assigning color codes and consumption advice, prediction intervals are the more conservative method (produce a higher interval value for a 20-inch walleye).

Walleye fillet mercury concentrations that correspond to each lake color code and the associated maximum recommended number of meals per month for both the general and sensitive populations are shown below (Table 5).

Table 5: Meal frequency advice based on walleye mercury fillet concentration

| Lake Color Code | Number of Meals per Month | Walleye Mercury Concentration (ppm) Sensitive Population | Walleye Mercury Concentration (ppm) General Population |
|-----------------|-----------------------------------|--|--|
| Blue | 8 | 0-0.12 | 0-0.35 |
| Green | 4 | >0.12-0.23 | >0.35-0.70 |
| Yellow | 2 | >0.23-0.47 | >0.70-1.41 |
| Orange | 1 | >0.47-0.94 | >1.41-2.81 |
| Red | 0 | >0.94 | >2.81 |
| Light Blue | Consumption advice not developed* | | |

* The light blue lake color is assigned to all lakes with less than four walleye tested for mercury and indicates that there is not enough information available to provide consumption frequency advice for that lake.

Generation of the GIS-Based Maps

The Mercury Maps themselves were generated by Esteban Chiriboga, GLIFWC Environmental Specialist. In general, the procedure for generating GIS mercury maps is the same as has been used in past versions. Basic layout of the maps for sensitive and general populations, legends, and metadata are unchanged.

For the 2020 set of maps, the most recent GIS layers for hydrography developed by the WDNR, MNDNR, and MIDEQ were used. The refinements of these new GIS layers may lead to slight changes in the shape of some of the lakes in the maps however these changes are unlikely to be noticed by tribal users. Some maps have also changed based on the lake selection methods previously described. The changes in the number of lakes for some maps may lead to small changes in scale when compared to previous versions. As with previous versions, placement of labels is done manually to help maximize the font size for readability.

The table with the color codes for each lake was joined to the GIS hydrography layer using the Water Body ID Codes as a common field. A check of the joined tables is done to ensure that all data in the original table are accounted for in the GIS. A legend is generated in the GIS using the standard color scheme.

References

Madsen, ER, AD DeWeese, NE Kmiecik, JA Foran, and ED Chiriboga. 2007. Methods to develop consumption advice for methylmercury-contaminated walleye harvested by Ojibwe tribes in 1837 and 1842 ceded territories of Michigan, Minnesota and Wisconsin, USA. *Integrated Environmental Assessment and Management* 4(1):118-124.

APPENDIX 1: Lakes on Maps and Color Codes

Appendix 1: Summary of lakes included on 2018 Mercury Maps and Color Assignments for Walleye Consumption Advice

[Blue highlighted lakes are those with color codes for the first time (previously not enough information for color assignment). Red and green highlighted lakes are those whose color has become more or less restrictive, respectively, since the 2016 version of the Mercury Maps. Yellow highlighted lakes show the color assignments for lakes not previously displayed on the mercury maps.]

| MWBC | STATE | COUNTY | LAKE | BRV | LCO | LDF | MLK | RC | STC | MI 1842 | MN 1837 | 2018 COLOR GEN POP | 2018 COLOR SENS POP | 75% CONF BOUND | 75% PRED BOUND | 2020 COLOR GEN POP | 2020 COLOR SENS POP |
|---------|-------|-----------|-------------------|-----|-----|-----|-----|----|-----|---------|---------|--------------------|---------------------|----------------|----------------|--------------------|---------------------|
| 27-111 | MI | GOGEBIC | ALLEN L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 27-622 | MI | GOGEBIC | BEATONS L | | | | | | | X | | GREEN | ORANGE | 0.548012 | 0.610140 | GREEN | ORANGE |
| 7-194 | MI | BARAGA | BEAUFORT L | | | | | | | X | | GREEN | ORANGE | 0.816139 | 0.925085 | YELLOW | ORANGE |
| 27-731 | MI | GOGEBIC | BIG AFRICAN L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 7-540 | MI | BARAGA | BIG L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 27-13 | MI | GOGEBIC | BIRCH L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 31-585 | MI | HOUGHTON | BOB L | | | | | | | X | | YELLOW | RED | 0.889062 | 1.029807 | YELLOW | RED |
| 66-31 | MI | ONTONAGON | BOND FALLS FL | | | | | | | X | | YELLOW | ORANGE | 0.782966 | 0.915745 | YELLOW | ORANGE |
| 36-1360 | MI | IRON | BONE L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 36-192 | MI | IRON | BRULE L | | | | | | | X | | YELLOW | RED | 1.172928 | 1.228533 | YELLOW | RED |
| 36-1480 | MI | IRON | CABLE L | | | | | | | X | | GREEN | ORANGE | 0.566114 | 0.654411 | GREEN | ORANGE |
| 36-174 | MI | IRON | CAMP L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 27-933 | MI | GOGEBIC | CHANEY L | | | | | | | X | | GREEN | ORANGE | 0.445409 | 0.478206 | GREEN | ORANGE |
| 36-137 | MI | IRON | CHICAGON L | | | | | | | X | | YELLOW | ORANGE | 0.762623 | 0.843644 | YELLOW | ORANGE |
| 27-275 | MI | GOGEBIC | CISCO L | | | | | | | X | | GREEN | ORANGE | 0.360264 | 0.422728 | GREEN | YELLOW |
| 27-713 | MI | GOGEBIC | CLEARWATER L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 27-727 | MI | GOGEBIC | CLOVERLEAF L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 36-278 | MI | IRON | CRYSTAL FALLS IMP | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 36-894 | MI | IRON | DEER L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 52-1311 | MI | MARQUETTE | DEER L | | | | | | | X | | YELLOW | RED | 1.154920 | 1.321091 | YELLOW | RED |
| 27-117 | MI | GOGEBIC | DINNER L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 27-108 | MI | GOGEBIC | DUCK L | | | | | | | X | | GREEN | ORANGE | 0.607253 | 0.713550 | GREEN | ORANGE |
| 27-318 | MI | GOGEBIC | E BAY L | | | | | | | X | | GREEN | ORANGE | 0.517134 | 0.583931 | GREEN | ORANGE |
| 36-363 | MI | IRON | EMILY L | | | | | | | X | | YELLOW | ORANGE | 0.721549 | 0.827567 | YELLOW | ORANGE |
| 27-309 | MI | GOGEBIC | FISHHAWK L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 36-690 | MI | IRON | GIBSON L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 52-1807 | MI | MARQUETTE | GREENWOOD RES | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 36-190 | MI | IRON | HAGERMAN L | | | | | | | X | | BLUE | YELLOW | 0.290416 | 0.327972 | BLUE | YELLOW |
| 36-371 | MI | IRON | ICE L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 27-316 | MI | GOGEBIC | INDIAN L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 36-138 | MI | IRON | INDIAN L | | | | | | | X | | GREEN | ORANGE | 0.542693 | 0.698570 | GREEN | ORANGE |
| 36-384 | MI | IRON | IRON L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 36-771 | MI | IRON | JAMES L | | | | | | | X | | YELLOW | RED | 1.231241 | 1.438236 | YELLOW | RED |
| 7-297 | MI | BARAGA | KING L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 42-146 | MI | KEWEENAW | L FANNY HOE | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 27-966 | MI | GOGEBIC | L GOGEBIC | | | | | | | X | | GREEN | ORANGE | 0.492543 | 0.570362 | GREEN | ORANGE |
| 42-36 | MI | KEWEENAW | L GRATIOT | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | 0.736419 | 0.803010 | YELLOW | ORANGE |
| 52-1703 | MI | MARQUETTE | L INDEPENDENCE | | | | | | | X | | GREEN | ORANGE | 0.683925 | 0.749214 | GREEN | ORANGE |
| 36-34 | MI | IRON | L MARY | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 42-86 | MI | KEWEENAW | L MEDORA | | | | | | | X | | GREEN | ORANGE | 0.335900 | 0.446967 | BLUE | YELLOW |
| 52-1185 | MI | MARQUETTE | L MICHIGAMME | | | | | | | X | | ORANGE | RED | 1.558912 | 1.687994 | ORANGE | RED |
| 42-33 | MI | KEWEENAW | LAC LA BELLE | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 27-696 | MI | GOGEBIC | LANGFORD L | | | | | | | X | | YELLOW | RED | 1.083393 | 1.247106 | YELLOW | RED |
| 27-305 | MI | GOGEBIC | LINDSLEY L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 27-858 | MI | GOGEBIC | LITTLE OXBOW L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 36-311 | MI | IRON | LONG L | | | | | | | X | | GREEN | ORANGE | 0.573597 | 0.648467 | GREEN | ORANGE |
| 27-495 | MI | GOGEBIC | MARION L | | | | | | | X | | YELLOW | RED | 0.934536 | 1.047364 | YELLOW | RED |
| 36-2 | MI | IRON | MICHIGAMME L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | 1.291159 | 1.389528 | YELLOW | RED |
| 36-204 | MI | IRON | MICHIGAMME RES | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | 1.094783 | 1.259909 | YELLOW | RED |

APPENDIX 1: Lakes on Maps and Color Codes

| MWBC | STATE | COUNTY | LAKE | BRV | LCO | LDF | MLK | RC | STC | MI 1842 | MN 1837 | 2018 COLOR GEN POP | 2018 COLOR SENS POP | 75% CONF BOUND | 75% PRED BOUND | 2020 COLOR GEN POP | 2020 COLOR SENS POP |
|----------|-------|------------|----------------------|-----|-----|-----|-----|----|-----|---------|---------|--------------------|---------------------|----------------|----------------|--------------------|---------------------|
| 36-1488 | MI | IRON | NORWAY L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 36-417 | MI | IRON | OTTAWA L | | | | | | | X | | BLUE | YELLOW | 0.309444 | 0.362352 | BLUE | YELLOW |
| 31-825 | MI | HOUGHTON | OTTER L | | | | | | | X | | GREEN | ORANGE | 1.072220 | 1.421549 | YELLOW | RED |
| 36-2067 | MI | IRON | PAINT L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 36-4 | MI | IRON | PAINT POND | | | | | | | X | | YELLOW | RED | 0.983582 | 1.053169 | YELLOW | RED |
| 7-272 | MI | BARAGA | PARENT L | | | | | | | X | | YELLOW | RED | 1.034616 | 1.072491 | YELLOW | RED |
| 36-32 | MI | IRON | PEAVY POND | | | | | | | X | | YELLOW | RED | 0.913028 | 1.001885 | YELLOW | RED |
| 36-1529 | MI | IRON | PERCH L | | | | | | | X | | YELLOW | RED | 0.837939 | 0.992337 | YELLOW | RED |
| 27-761 | MI | GOGEBIC | POMEROY L | | | | | | | X | | GREEN | ORANGE | 0.522030 | 0.572880 | GREEN | ORANGE |
| 27-319 | MI | GOGEBIC | POOR L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 31-933 | MI | HOUGHTON | PORTAGE L | | | | | | | X | | GREEN | ORANGE | 0.389681 | 0.521271 | GREEN | ORANGE |
| 36-952 | MI | IRON | PORTER L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 7-843 | MI | HOUGHTON | PRICKETT L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 27-730 | MI | GOGEBIC | RECORD L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 36-289 | MI | IRON | RUNKLE L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 7-160 | MI | BARAGA | RUTH L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 31-818 | MI | ONTONAGON | SIX MILE L | | | | | | | X | | GREEN | ORANGE | 0.666871 | 0.723213 | GREEN | ORANGE |
| 36-175 | MI | IRON | SNIFE L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 36-17 | MI | IRON | STAGER L | | | | | | | X | | GREEN | YELLOW | 0.352033 | 0.405392 | GREEN | YELLOW |
| 36-173 | MI | IRON | STANLEY L | | | | | | | X | | BLUE | YELLOW | 0.330501 | 0.389965 | BLUE | YELLOW |
| 36-1501 | MI | IRON | STE KATHRYN L | | | | | | | X | | GREEN | YELLOW | 0.381536 | 0.445239 | GREEN | YELLOW |
| 66-450 | MI | ONTONAGON | SUDDEN L | | | | | | | X | | GREEN | ORANGE | 0.623450 | 0.736791 | GREEN | ORANGE |
| 27-1063 | MI | GOGEBIC | SUNDAY L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 36-355 | MI | IRON | SUNSET L | | | | | | | X | | GREEN | ORANGE | 0.533484 | 0.565566 | GREEN | ORANGE |
| 36-307 | MI | IRON | SWAN L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 36-768 | MI | GOGEBIC | TAMARACK L | | | | | | | X | | GREEN | ORANGE | 0.617252 | 0.732504 | GREEN | ORANGE |
| 52-1288 | MI | MARQUETTE | TEAL L | | | | | | | X | | GREEN | ORANGE | 0.480695 | 0.538259 | GREEN | ORANGE |
| 36-1936 | MI | IRON | TEPEE L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 27-265 | MI | GOGEBIC | THOUSAND ISLAND L | | | | | | | X | | GREEN | ORANGE | 0.572969 | 0.648562 | GREEN | ORANGE |
| 31-1178 | MI | HOUGHTON | TORCH L | | | | | | | X | | GREEN | ORANGE | 0.640818 | 0.811817 | GREEN | ORANGE |
| 66-406 | MI | ONTONAGON | VICTORIA RESERVOIR | | | | | | | X | | YELLOW | ORANGE | 0.739412 | 0.788995 | YELLOW | ORANGE |
| 27-221 | MI | GOGEBIC | WHITEFISH L | | | | | | | X | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 36-1760 | MI | IRON | WINSLOW L | | | | | | | X | | GREEN | ORANGE | 0.665356 | 0.728357 | GREEN | ORANGE |
| 7-285 | MI | BARAGA | WORM L (I VERMILLAC) | | | | | | | X | | YELLOW | RED | 0.876174 | 1.038731 | YELLOW | RED |
| 330040 | MN | KANABEC | ANN L | | | | | | | | X | BLUE | YELLOW | 0.293737 | 0.342157 | BLUE | YELLOW |
| 580137 | MN | PINE | BASS L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 300107 | MN | ISANTI | BLUE L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 820054 | MN | WASHINGTON | BONE L | | | | | | | | X | BLUE | YELLOW | 0.294922 | 0.319026 | BLUE | YELLOW |
| 180020 | MN | CROW WING | BORDEN L | | | | | | | | X | YELLOW | RED | 0.902852 | 1.073388 | YELLOW | RED |
| 180018 | MN | CROW WING | CAMP L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 10065 | MN | AITKIN | CEDAR L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 130012 | MN | CHISAGO | CHISAGO L | | | | | | | | X | BLUE | YELLOW | 0.349518 | 0.410744 | BLUE | YELLOW |
| 580119 | MN | PINE | CROSS L | | | | | | | | X | GREEN | ORANGE | 0.563311 | 0.599033 | GREEN | ORANGE |
| 180155 | MN | CROW WING | CROW WING L | | | | | | | | X | BLUE | YELLOW | 0.266872 | 0.318720 | BLUE | YELLOW |
| 33003300 | MN | KANABEC | DEVILS L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 330001 | MN | KANABEC | ELEVEN L | | | | | | | | X | BLUE | BLUE | 0.096761 | 0.100207 | BLUE | BLUE |
| 300043 | MN | ISANTI | FANNIE L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 130068 | MN | CHISAGO | FISH L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 330036 | MN | KANABEC | FISH L | | | | | | | | X | BLUE | YELLOW | 0.312171 | 0.363795 | BLUE | YELLOW |
| 300035 | MN | ISANTI | FLORENCE L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 300008 | MN | ISANTI | FRANCIS L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 130083 | MN | CHISAGO | GOOSE L | | | | | | | | X | GREEN | ORANGE | 0.411362 | 0.503305 | GREEN | ORANGE |
| 130041 | MN | CHISAGO | GREEN L | | | | | | | | X | BLUE | YELLOW | 0.186370 | 0.236613 | BLUE | YELLOW |
| 300136 | MN | ISANTI | GREEN L | | | | | | | | X | GREEN | YELLOW | 0.377973 | 0.439024 | GREEN | YELLOW |
| 580123 | MN | PINE | GRINDSTONE L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 180029 | MN | CROW WING | HOLT L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |

APPENDIX 1: Lakes on Maps and Color Codes

| MWBC | STATE | COUNTY | LAKE | BRV | LCO | LDF | MLK | RC | STC | MI 1842 | MN 1837 | 2016 COLOR GEN POP | 2016 COLOR SENS POP | 75% CONF BOUND | 75% PRED BOUND | 2018 COLOR GEN POP | 2020 COLOR SENS POP |
|----------|-------|------------|----------------------|-----|-----|-----|-----|----|-----|---------|---------|--------------------|---------------------|----------------|----------------|--------------------|---------------------|
| 20022 | MN | ANOKA | ISLAND L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 330028 | MN | KANABEC | KNIFE L | | | | | | | | X | BLUE | YELLOW | 0.236543 | 0.272067 | BLUE | YELLOW |
| 130013 | MN | CHISAGO | KROON L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 330032 | MN | KANABEC | LEWIS L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 130054 | MN | CHISAGO | LITTLE COMFORT L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 710055 | MN | SHERBURNE | LITTLE ELK L | | | | | | | | X | BLUE | GREEN | 0.159019 | 0.190858 | BLUE | GREEN |
| 130033 | MN | CHISAGO | LITTLE L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | 0.099765 | 0.102544 | BLUE | BLUE |
| 50013 | MN | BENTON | LITTLE ROCK L | | | | | | | | X | BLUE | GREEN | 0.142408 | 0.158059 | BLUE | GREEN |
| 300044 | MN | ISANTI | LITTLE STANCHFIELD L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 300072 | MN | ISANTI | LONG L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 490015 | MN | MORRISON | LONG L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 580107 | MN | PINE | LONG L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 300096 | MN | ISANTI | LORY L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 130074 | MN | CHISAGO | MANDALL L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 20034 | MN | ANOKA | MARTIN L | | | | | | | | X | BLUE | YELLOW | 0.237271 | 0.268357 | BLUE | YELLOW |
| 50007 | MN | BENTON | MAYHEW L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 480002 | MN | MILLE LACS | MILLE LACS L | X | X | X | X | X | X | | X | BLUE | YELLOW | 0.206471 | 0.269616 | BLUE | YELLOW |
| 330015 | MN | KANABEC | MUD (QUAMBA) L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 580138 | MN | PINE | NORTH BIG PINE L | | | | | | | | X | YELLOW | RED | 0.792676 | 0.951681 | YELLOW | RED |
| 130032 | MN | CHISAGO | NORTH CENTER L | | | | | | | | X | BLUE | GREEN | 0.194724 | 0.222131 | BLUE | GREEN |
| 130035 | MN | CHISAGO | NORTH LINDSTROM L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 300143 | MN | ISANTI | NORTH STANCHFIELD L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 480014 | MN | MILLE LACS | OGECHIE L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 490030 | MN | MORRISON | PELKEY L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 490024 | MN | MORRISON | PIERZ FISH L | | | | | | | | X | BLUE | GREEN | 0.207266 | 0.223517 | BLUE | GREEN |
| 180088 | MN | CROW WING | PLATTE L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 580142 | MN | PINE | POKEGAMA L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 330009 | MN | KANABEC | POMROY L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 130079 | MN | CHISAGO | RABOUR L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 580010 | MN | PINE | RAZOR L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 580007 | MN | PINE | ROCK L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 180147 | MN | CROW WING | ROUND L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 490019 | MN | MORRISON | ROUND L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 13006901 | MN | CHISAGO | RUSH L (EAST) | | | | | | | | X | BLUE | YELLOW | 0.210556 | 0.248625 | BLUE | YELLOW |
| 13006902 | MN | CHISAGO | RUSH L (WEST) | | | | | | | | X | BLUE | YELLOW | 0.295451 | 0.338296 | BLUE | YELLOW |
| 480012 | MN | MILLE LACS | SHAKOPEE L | | | | | | | | X | BLUE | YELLOW | 0.242630 | 0.250070 | BLUE | YELLOW |
| 300022 | MN | ISANTI | SKOGMAN L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 180028 | MN | CROW WING | SMITH L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 10001 | MN | AITKIN | SOUTH BIG PINE L | | | | | | | | X | YELLOW | RED | 0.987575 | 1.041481 | YELLOW | RED |
| 130027 | MN | CHISAGO | SOUTH CENTER L | | | | | | | | X | BLUE | YELLOW | 0.294488 | 0.347051 | BLUE | YELLOW |
| 130028 | MN | CHISAGO | SOUTH LINDSTROM L | | | | | | | | X | BLUE | YELLOW | 0.333632 | 0.359998 | BLUE | YELLOW |
| 180136 | MN | CROW WING | SOUTH LONG L | | | | | | | | X | BLUE | YELLOW | 0.298261 | 0.352550 | BLUE | YELLOW |
| 300138 | MN | ISANTI | SOUTH STANCHFIELD L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 300135 | MN | ISANTI | SPECTACLE L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 580111 | MN | PINE | STANTON L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 490016 | MN | MORRISON | SULLIVAN L | | | | | | | | X | GREEN | YELLOW | 0.355617 | 0.398902 | GREEN | YELLOW |
| 300009 | MN | ISANTI | TYPO L | | | | | | | | X | BLUE | GREEN | 0.188063 | 0.218190 | BLUE | GREEN |
| 580130 | MN | PINE | UPPER PINE L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 180001 | MN | CROW WING | WHITEFISH L | | | | | | | | X | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2329600 | WI | VILAS | ALDER L | | | X | | | | | | GREEN | ORANGE | 0.611849 | 0.708325 | GREEN | ORANGE |
| 1494600 | WI | LINCOLN | ALEXANDER L | | | | X | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2323400 | WI | VILAS | ALLEQUASH L | | | X | | | | | | GREEN | ORANGE | 0.548098 | 0.606591 | GREEN | ORANGE |
| 2359700 | WI | RUSK | AMACOY L | | X | | | | | | | GREEN | ORANGE | 0.444850 | 0.527041 | GREEN | ORANGE |
| 2858100 | WI | DOUGLAS | AMNICON L | | | | | X | | | | GREEN | ORANGE | 0.656562 | 0.734061 | GREEN | ORANGE |
| 2953800 | WI | VILAS | ANNABELLE L | X | | | | | | | X | YELLOW | RED | 1.027910 | 1.163275 | YELLOW | RED |
| 968800 | WI | VILAS | ANVIL L | | | X | | | | | | GREEN | ORANGE | 0.456588 | 0.521708 | GREEN | ORANGE |

APPENDIX 1: Lakes on Maps and Color Codes

| MWBC | STATE | COUNTY | LAKE | BRV | LCO | LDF | MLK | RC | STC | MI 1842 | MN 1837 | 2018 COLOR GEN POP | 2018 COLOR SENS POP | 75% CONF BOUND | 75% PRED BOUND | 2020 COLOR GEN POP | 2020 COLOR SENS POP |
|---------|-------|----------|--------------------------|-----|-----|-----|-----|----|-----|---------|---------|--------------------|---------------------|----------------|----------------|--------------------|---------------------|
| 181400 | WI | FOREST | ARBUTUS L | | | | X | | | | | NA | NA | 0.755024 | 0.875944 | YELLOW | ORANGE |
| 417400 | WI | OCONTO | ARCHIBALD L | | | | X | | | | | GREEN | ORANGE | 0.535225 | 0.607805 | GREEN | ORANGE |
| 1541500 | WI | VILAS | ARROWHEAD L | | | X | | | | | | GREEN | YELLOW | 0.389719 | 0.402960 | GREEN | YELLOW |
| 2734000 | WI | BAYFIELD | ATKINS L | | | | | X | | | | GREEN | ORANGE | 0.616525 | 0.641931 | GREEN | ORANGE |
| 2340700 | WI | VILAS | BALLARD L | | | X | | | | | | YELLOW | RED | 0.958436 | 1.066841 | YELLOW | RED |
| 2112800 | WI | WASHBURN | BALSAM L | | | | | | X | | | GREEN | ORANGE | 0.578114 | 0.630208 | GREEN | ORANGE |
| 2620600 | WI | POLK | BALSAM L | | | | | | X | | | BLUE | YELLOW | 0.255636 | 0.298681 | BLUE | YELLOW |
| 2382300 | WI | SAWYER | BARBER L | | X | | | | | | | GREEN | ORANGE | 0.569370 | 0.658810 | GREEN | ORANGE |
| 2451900 | WI | WASHBURN | BASS-PATTERSON L | | | | | | X | | | GREEN | ORANGE | 0.458175 | 0.532222 | GREEN | ORANGE |
| 1833300 | WI | WASHBURN | BASS L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2451300 | WI | WASHBURN | BASS L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2451700 | WI | DOUGLAS | BASS L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 417900 | WI | OCONTO | BASS L | | | | X | | | | | BLUE | YELLOW | 0.245451 | 0.278854 | BLUE | YELLOW |
| 2105100 | WI | BARRON | BEAR L | | | | | | X | | | GREEN | ORANGE | 0.425946 | 0.519256 | GREEN | ORANGE |
| 2403200 | WI | ASHLAND | BEAR L | X | | | | | | | | YELLOW | ORANGE | 0.831650 | 0.910280 | YELLOW | ORANGE |
| 2452200 | WI | POLK | BEAR L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2857700 | WI | DOUGLAS | BEAR L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1523600 | WI | ONEIDA | BEARSKIN L | | | X | | | | | | BLUE | YELLOW | 0.222589 | 0.267378 | BLUE | YELLOW |
| 2452400 | WI | DOUGLAS | BEAUREGARD L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2081200 | WI | BARRON | BEAVER DAM L | | | | | | X | | | GREEN | ORANGE | 0.433016 | 0.505369 | GREEN | ORANGE |
| 1545600 | WI | VILAS | BIG ARBOR VITAE L | | | X | X | | | | | BLUE | YELLOW | 0.283358 | 0.334518 | BLUE | YELLOW |
| 2453300 | WI | WASHBURN | BIG BASS L | | | | | | X | | | GREEN | YELLOW | 0.370881 | 0.413316 | GREEN | YELLOW |
| 2641000 | WI | POLK | BIG BUTTERNUT L | | | | | | X | | | BLUE | YELLOW | 0.251128 | 0.325017 | BLUE | YELLOW |
| 971600 | WI | ONEIDA | BIG CARR L | | | X | | | | | | YELLOW | ORANGE | 0.736861 | 0.828652 | YELLOW | ORANGE |
| 1835100 | WI | BARRON | BIG DUMMY L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1427400 | WI | MARATHON | BIG EAU PLEINE RESERVOIR | | | X | | | | | | YELLOW | ORANGE | 0.713108 | 0.778360 | YELLOW | ORANGE |
| 1610700 | WI | ONEIDA | BIG FORK L | | | | X | X | | | | YELLOW | ORANGE | 0.649554 | 0.778434 | GREEN | ORANGE |
| 1835200 | WI | VILAS | BIG GIBSON L | | | X | | | | | | GREEN | ORANGE | 0.546274 | 0.576438 | GREEN | ORANGE |
| 1613000 | WI | ONEIDA | BIG L | | | | X | | | | | YELLOW | ORANGE | 0.824605 | 0.945614 | YELLOW | RED |
| 2334700 | WI | VILAS | BIG L (BOULDER JCT) | | | X | X | | | | | GREEN | ORANGE | 0.590203 | 0.694765 | GREEN | ORANGE |
| 2963800 | WI | VILAS | BIG L (MI BORDER) | | | X | X | | | X | | BLUE | YELLOW | 0.317936 | 0.359967 | BLUE | YELLOW |
| 2706800 | WI | BURNETT | BIG MCKENZIE L | | | | | | X | | | GREEN | YELLOW | 0.307595 | 0.370187 | BLUE | YELLOW |
| 2079000 | WI | BARRON | BIG MOON L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1835300 | WI | VILAS | BIG MUSKELLUNGE L | | | X | X | | | | | GREEN | ORANGE | 0.464197 | 0.517207 | GREEN | ORANGE |
| 1629500 | WI | VILAS | BIG PORTAGE L | | | X | | | | | | GREEN | ORANGE | 0.504754 | 0.566679 | GREEN | ORANGE |
| 2627400 | WI | POLK | BIG ROUND L | | | | | | X | | | GREEN | YELLOW | 0.364997 | 0.467597 | GREEN | YELLOW |
| 1602600 | WI | VILAS | BIG SAND L | | | X | X | | | | | GREEN | ORANGE | 0.628640 | 0.726702 | GREEN | ORANGE |
| 2676800 | WI | BURNETT | BIG SAND L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1591100 | WI | VILAS | BIG ST GERMAIN L | | | X | | | | | | GREEN | YELLOW | 0.385207 | 0.450587 | GREEN | YELLOW |
| 1612200 | WI | ONEIDA | BIG STONE L | | | | X | | | | | YELLOW | RED | 0.865128 | 1.026919 | YELLOW | RED |
| 2113000 | WI | WASHBURN | BIRCH L | | X | | | | | | | GREEN | YELLOW | 0.365202 | 0.430017 | GREEN | YELLOW |
| 2311100 | WI | VILAS | BIRCH L | X | | X | | | | | | YELLOW | ORANGE | 0.818633 | 0.900898 | YELLOW | ORANGE |
| 1630100 | WI | VILAS | BLACK OAK L | X | | X | | | | | | GREEN | ORANGE | 0.539345 | 0.607220 | GREEN | ORANGE |
| 2756200 | WI | BAYFIELD | BLADDER L | | | | | X | | | | GREEN | ORANGE | 0.627840 | 0.656072 | GREEN | ORANGE |
| 1538600 | WI | ONEIDA | BLUE L | | | X | | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 973000 | WI | ONEIDA | BOLGER L | | | X | | | | | | NA | NA | 0.524140 | 0.626187 | GREEN | ORANGE |
| 2693700 | WI | DOUGLAS | BOND L | X | | | | | | | | GREEN | ORANGE | 0.644013 | 0.707043 | GREEN | ORANGE |
| 2742500 | WI | BAYFIELD | BONY L | | | | | X | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 418700 | WI | OCONTO | BOOT L | | | | X | | | | | BLUE | YELLOW | 0.327914 | 0.376981 | BLUE | YELLOW |
| 1537800 | WI | ONEIDA | BOOTH L | | | X | | | | | | GREEN | ORANGE | 0.638733 | 0.759219 | GREEN | ORANGE |
| 2338300 | WI | VILAS | BOULDER L | | | X | | | | | | GREEN | ORANGE | 0.647618 | 0.711679 | GREEN | ORANGE |
| 1541300 | WI | VILAS | BRANDY L | | | X | | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2272600 | WI | ONEIDA | BUCKSKIN L | | | X | | | | | | GREEN | ORANGE | 0.635047 | 0.731621 | GREEN | ORANGE |
| 2283300 | WI | PRICE | BUTTERNUT L | X | | X | X | | | | | YELLOW | RED | 0.951188 | 1.062017 | YELLOW | RED |
| 692400 | WI | FOREST | BUTTERNUT L | | | X | X | | | | | BLUE | YELLOW | 0.250629 | 0.310170 | BLUE | YELLOW |
| 1544800 | WI | ONEIDA | CARROL L | | | X | | | | | | GREEN | YELLOW | 0.352795 | 0.382844 | GREEN | YELLOW |
| 1603700 | WI | VILAS | CATFISH L | | | X | X | | | | | GREEN | ORANGE | 0.469809 | 0.528414 | GREEN | ORANGE |

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| MWBC | STATE | COUNTY | LAKE | BRV | LCO | LDF | MLK | RC | STC | MI 1842 | MN 1837 | 2018 COLOR GEN POP | 2018 COLOR SENS POP | 75% CONF BOUND | 75% PRED BOUND | 2020 COLOR GEN POP | 2020 COLOR SENS POP |
|---------|-------|-----------|----------------------|-----|-----|-----|-----|----|-----|---------|---------|--------------------|---------------------|----------------|----------------|--------------------|---------------------|
| 2615100 | WI | ST CROIX | CEDAR L | | | | | | X | | | BLUE | YELLOW | 0.268998 | 0.336552 | BLUE | YELLOW |
| 1598000 | WI | ONEIDA | CHAIN L | | | X | | | | | | YELLOW | RED | 0.823353 | 0.957742 | YELLOW | RED |
| 2350500 | WI | RUSK | CHAIN L | X | | | | | | | | GREEN | ORANGE | 0.646717 | 0.685531 | GREEN | ORANGE |
| 2326700 | WI | VILAS | CIRCLE LILY L | | | X | | | | | | ORANGE | RED | 2.376081 | 2.629011 | ORANGE | RED |
| 2654500 | WI | BURNETT | CLAM R FL | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2329000 | WI | VILAS | CLEAR L | | | X | | | | | | GREEN | YELLOW | 0.382093 | 0.435550 | GREEN | YELLOW |
| 977500 | WI | ONEIDA | CLEAR L | | | X | | | | | | GREEN | ORANGE | 0.669180 | 0.747045 | GREEN | ORANGE |
| 2275100 | WI | SAWYER | CONNORS L | X | | | | | | | | GREEN | YELLOW | 0.392260 | 0.438918 | GREEN | YELLOW |
| 2953500 | WI | VILAS | CRAB L | X | | X | | | | | | YELLOW | ORANGE | 0.748520 | 0.815134 | YELLOW | ORANGE |
| 1603800 | WI | VILAS | CRANBERRY L | | | X | X | | | | | GREEN | ORANGE | 0.447578 | 0.525529 | GREEN | ORANGE |
| 2693100 | WI | DOUGLAS | CRANBERRY L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 388500 | WI | FOREST | CRANE L | | | | X | | | | | GREEN | ORANGE | 0.528822 | 0.623161 | GREEN | ORANGE |
| 1564200 | WI | ONEIDA | CRESCENT L | | | X | X | | | | | BLUE | YELLOW | 0.210181 | 0.244268 | BLUE | YELLOW |
| 2229200 | WI | RUSK | DAIRYLAND RESERVOIR | | | X | | | | | | YELLOW | RED | 1.206558 | 1.341889 | YELLOW | RED |
| 1596900 | WI | ONEIDA | DAM L | | | X | | | | | | GREEN | ORANGE | 0.633114 | 0.696046 | GREEN | ORANGE |
| 2316600 | WI | VILAS | DEAD PIKE L | | | X | | | | | | YELLOW | RED | 0.948627 | 1.032508 | YELLOW | RED |
| 2461100 | WI | BURNETT | DEVILS L | | | | | | X | | | BLUE | YELLOW | 0.238040 | 0.258826 | BLUE | YELLOW |
| 2897100 | WI | BAYFIELD | DIAMOND L | X | | | | X | | | | YELLOW | ORANGE | 0.747323 | 0.824428 | YELLOW | ORANGE |
| 2858300 | WI | DOUGLAS | DOWLING L | X | | | | | | | | YELLOW | RED | 0.890597 | 0.970084 | YELLOW | RED |
| 2100300 | WI | BARRON | DUCK L | | | | | | X | | | BLUE | YELLOW | 0.262871 | 0.284321 | BLUE | YELLOW |
| 2651800 | WI | BURNETT | DUNHAM L | | | | | | X | | | GREEN | ORANGE | 0.666169 | 0.745215 | GREEN | ORANGE |
| 2709800 | WI | WASHBURN | DUNN L | | | | | | X | | | BLUE | YELLOW | 0.333283 | 0.442451 | BLUE | YELLOW |
| 2240100 | WI | PRICE | DUROY L | | | X | | | | | | GREEN | ORANGE | 0.503238 | 0.536745 | GREEN | ORANGE |
| 2396800 | WI | SAWYER | DURPHEE L | | X | | | | | | | BLUE | YELLOW | 0.293526 | 0.333025 | BLUE | YELLOW |
| 1600200 | WI | VILAS | EAGLE L | | | X | | | | | | GREEN | ORANGE | 0.529729 | 0.617206 | GREEN | ORANGE |
| 2301800 | WI | IRON | ECHO L | X | | | | | | | | GREEN | ORANGE | 0.611926 | 0.647639 | GREEN | ORANGE |
| 2914800 | WI | ASHLAND | ENGLISH L | X | | | | | | | | YELLOW | RED | 1.132244 | 1.237457 | YELLOW | RED |
| 1579700 | WI | LANGLADE | ENTERPRISE L | | | | X | | | | | GREEN | ORANGE | 0.421915 | 0.487266 | GREEN | ORANGE |
| 2277600 | WI | SAWYER | EVERGREEN L | X | X | | | | | | | BLUE | YELLOW | 0.281742 | 0.309801 | BLUE | YELLOW |
| 677100 | WI | FLORENCE | FAY L | | | | X | | | | | GREEN | ORANGE | 0.668502 | 0.735573 | GREEN | ORANGE |
| 1571100 | WI | ONEIDA | FIFTH L | | | | X | | | | | YELLOW | RED | 0.806266 | 0.909324 | YELLOW | ORANGE |
| 2349500 | WI | RUSK | FIRESIDE LAKES | | X | | | | | | | BLUE | YELLOW | 0.273126 | 0.305559 | BLUE | YELLOW |
| 2307300 | WI | IRON | FISHER L | X | | | | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2343200 | WI | VILAS | FISHTRAP L | | | X | | | | | | GREEN | ORANGE | 0.427838 | 0.513018 | GREEN | ORANGE |
| 2762200 | WI | VILAS | FOREST L | X | | X | | | | | | YELLOW | ORANGE | 0.723030 | 0.814421 | YELLOW | ORANGE |
| 1593800 | WI | VILAS | FOUND L | | | X | | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1610800 | WI | ONEIDA | FOURMILE L | | | | X | | | | | YELLOW | RED | 1.051921 | 1.171382 | YELLOW | RED |
| 692900 | WI | FOREST | FRANKLIN L | | | X | X | | | | | BLUE | YELLOW | 0.232434 | 0.261867 | BLUE | YELLOW |
| 1569600 | WI | ONEIDA | GEORGE L | | | X | X | | | | | GREEN | ORANGE | 0.483436 | 0.536978 | GREEN | ORANGE |
| 2942300 | WI | IRON | GILE FL | | | X | | | | | | YELLOW | RED | 1.026981 | 1.119752 | YELLOW | RED |
| 1589300 | WI | ONEIDA | GILMORE L | | | X | | | | | | GREEN | ORANGE | 0.648462 | 0.671414 | GREEN | ORANGE |
| 2695800 | WI | WASHBURN | GILMORE L | | | | | | X | | | GREEN | ORANGE | 0.624215 | 0.746852 | GREEN | ORANGE |
| 2406500 | WI | ASHLAND | GORDON L | X | | | | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2100800 | WI | BARRON | GRANITE L | | | | | | X | | | BLUE | YELLOW | 0.311394 | 0.349166 | BLUE | YELLOW |
| 2391200 | WI | SAWYER | GRINDSTONE L | | X | | | | | | | GREEN | ORANGE | 0.424407 | 0.483991 | GREEN | ORANGE |
| 2621100 | WI | POLK | HALF MOON L | | | | | | X | | | GREEN | YELLOW | 0.357148 | 0.416366 | GREEN | YELLOW |
| 679300 | WI | FLORENCE | HALSEY L | | | | X | | | | | GREEN | YELLOW | 0.383655 | 0.430650 | GREEN | YELLOW |
| 2958500 | WI | VILAS | HARRIS L | X | | X | | | | | | GREEN | ORANGE | 0.688689 | 0.788231 | GREEN | ORANGE |
| 1589100 | WI | ONEIDA | HASBROOK L | | | X | | | | | | GREEN | ORANGE | 0.534716 | 0.587855 | GREEN | ORANGE |
| 2725500 | WI | SAWYER | HAYWARD L | | X | | | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2109800 | WI | BARRON | HEMLOCK L | X | | | | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 540600 | WI | MARINETTE | HIGH FALLS RESERVOIR | | | | X | | | | | YELLOW | RED | 1.02719 | 1.179921 | YELLOW | RED |
| 2344000 | WI | VILAS | HIGH L | X | | X | | | | | | GREEN | ORANGE | 0.455595 | 0.522384 | GREEN | ORANGE |
| 501200 | WI | MARINETTE | HILBERT L | | | | X | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2184900 | WI | CHIPPEWA | HOLCOMBE FL | X | X | | | | X | | | GREEN | ORANGE | 0.632979 | 0.730029 | GREEN | ORANGE |
| 2953100 | WI | VILAS | HORSEHEAD L | | | X | | | | | | GREEN | ORANGE | 0.455289 | 0.506175 | GREEN | ORANGE |
| 2469800 | WI | BARRON | HORSESHOE L | | | | | | X | | | YELLOW | RED | 1.189122 | 1.388864 | YELLOW | RED |

APPENDIX 1: Lakes on Maps and Color Codes

| MWBC | STATE | COUNTY | LAKE | BRV | LCO | LDF | MLK | RC | STC | MI 1842 | MN 1837 | 2018 COLOR GEN POP | 2018 COLOR SENS POP | 75% CONF BOUND | 75% PRED BOUND | 2020 COLOR GEN POP | 2020 COLOR SENS POP |
|---------|-------|------------|-----------------------|-----|-----|-----|-----|----|-----|---------|---------|--------------------|---------------------|----------------|----------------|--------------------|---------------------|
| 2630100 | WI | BARRON | HORSESHOE L | | | | | | X | | | NA | NA | 0.484105 | 0.556732 | GREEN | ORANGE |
| 691800 | WI | FOREST | HOWELL L | | | | X | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1598900 | WI | ONEIDA | INDIAN L | | | X | | | | | | GREEN | YELLOW | 0.375902 | 0.417838 | GREEN | YELLOW |
| 2634400 | WI | POLK | INDIANHEAD FL | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2340900 | WI | VILAS | IRVING L | | | X | | | | | | YELLOW | ORANGE | 0.798063 | 0.865738 | YELLOW | ORANGE |
| 1610500 | WI | ONEIDA | ISLAND L | | | X | X | | | | | YELLOW | ORANGE | 0.763302 | 0.870280 | YELLOW | ORANGE |
| 2334400 | WI | VILAS | ISLAND L | | | X | | | | | | GREEN | ORANGE | 0.437436 | 0.517016 | GREEN | ORANGE |
| 2350200 | WI | RUSK | ISLAND L | X | | | | | | | | BLUE | YELLOW | 0.271718 | 0.324317 | BLUE | YELLOW |
| 2734200 | WI | BAYFIELD | JACKSON L | | | | | X | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1855900 | WI | VILAS | JAG L | | | X | | | | | | ORANGE | RED | 1.461499 | 1.675231 | ORANGE | RED |
| 1516000 | WI | LINCOLN | JERSEY CITY FL | | | X | X | | | | | GREEN | ORANGE | 0.495936 | 0.546663 | GREEN | ORANGE |
| 1541100 | WI | VILAS | JOHNSON L | | | X | | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1614300 | WI | ONEIDA | JULIA L (THREE LAKES) | | | X | X | | | | | YELLOW | RED | 1.150411 | 1.270043 | YELLOW | RED |
| 377900 | WI | FOREST | JUNGLE L | | | | X | | | | | YELLOW | ORANGE | 0.815374 | 0.896625 | YELLOW | ORANGE |
| 1543300 | WI | ONEIDA | KATHERINE L | | | X | X | | | | | GREEN | ORANGE | 0.568577 | 0.646076 | GREEN | ORANGE |
| 1542300 | WI | ONEIDA | KAWAGUESAGA L | | | X | X | | | | | BLUE | YELLOW | 0.345613 | 0.424495 | BLUE | YELLOW |
| 716800 | WI | VILAS | KENTUCK L | | | X | X | | | | | GREEN | ORANGE | 0.571537 | 0.694747 | GREEN | ORANGE |
| 672900 | WI | FLORENCE | KEYES L | | | | X | | | | | GREEN | ORANGE | 0.455808 | 0.533575 | GREEN | ORANGE |
| 1555900 | WI | LINCOLN | L ALICE | | | X | X | | | | | YELLOW | ORANGE | 0.787142 | 0.888699 | YELLOW | ORANGE |
| 2113300 | WI | SAWYER | L CHETAC | | X | | | | | | | BLUE | YELLOW | 0.241768 | 0.303639 | BLUE | YELLOW |
| 2094000 | WI | BARRON | L CHETEK | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2399700 | WI | SAWYER | L CHIPPEWA | | X | X | | | | | | GREEN | ORANGE | 0.545171 | 0.657748 | GREEN | ORANGE |
| 1592000 | WI | VILAS | L CONTENT | | | X | | | | | | NA | NA | | | LIGHT BLUE | LIGHT BLUE |
| 2133200 | WI | EAU CLAIRE | L EAU CLAIRE | | X | | | | | | | GREEN | ORANGE | 0.498129 | 0.555777 | GREEN | ORANGE |
| 2935500 | WI | ASHLAND | L GALILEE | X | X | X | X | X | X | | | GREEN | ORANGE | 0.580151 | 0.634082 | GREEN | ORANGE |
| 995000 | WI | ONEIDA | L JULIA (RHINELANDER) | | | | X | | | | | YELLOW | ORANGE | 0.701267 | 0.715490 | YELLOW | ORANGE |
| 995200 | WI | VILAS | L LAURA | | | X | X | | | | | GREEN | ORANGE | 0.431232 | 0.481346 | GREEN | ORANGE |
| 396500 | WI | FOREST | L LUCERNE | | | | X | | | | | GREEN | ORANGE | 0.541544 | 0.629653 | GREEN | ORANGE |
| 394400 | WI | FOREST | L METONGA | | | | X | | | | | GREEN | ORANGE | 0.443542 | 0.520968 | GREEN | ORANGE |
| 2866200 | WI | DOUGLAS | L MINNESUING | X | | | | X | | | | YELLOW | RED | 1.106292 | 1.327328 | YELLOW | RED |
| 1515400 | WI | LINCOLN | L MOHAWKSIN | | | X | X | | | | | YELLOW | RED | 0.840922 | 0.948377 | YELLOW | RED |
| 2691500 | WI | WASHBURN | L NANCY | | | | | | X | | | GREEN | ORANGE | 0.596192 | 0.706312 | GREEN | ORANGE |
| 2865000 | WI | DOUGLAS | L NEBAGAMON | | | | | X | | | | YELLOW | RED | 0.866076 | 0.977950 | YELLOW | RED |
| 2298300 | WI | IRON | L OF THE FALLS | X | | X | | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2275300 | WI | SAWYER | L OF THE PINES | | X | | | | | | | GREEN | ORANGE | 0.487084 | 0.531239 | GREEN | ORANGE |
| 2900200 | WI | BAYFIELD | L OWEN | X | | | | X | | | | GREEN | ORANGE | 0.530939 | 0.623012 | GREEN | ORANGE |
| 1569900 | WI | ONEIDA | L THOMPSON | | | X | | | | | | YELLOW | ORANGE | 0.721292 | 0.788207 | YELLOW | ORANGE |
| 2152800 | WI | CHIPPEWA | L WISSOTA | X | | X | | | X | | | GREEN | ORANGE | 0.634213 | 0.728746 | GREEN | ORANGE |
| 2390800 | WI | SAWYER | LAC COURTE ORIELLES | | X | | | | | | | GREEN | YELLOW | 0.365812 | 0.431876 | GREEN | YELLOW |
| 2236800 | WI | PRICE | LAC SAULT DORE | X | | X | | | | | | GREEN | YELLOW | 0.420311 | 0.460331 | GREEN | YELLOW |
| 1631900 | WI | VILAS | LAC VIEUX DESERT | | | X | X | | | X | | BLUE | YELLOW | 0.264048 | 0.305179 | BLUE | YELLOW |
| 1611800 | WI | ONEIDA | LAUREL L | | | | X | | | | | GREEN | ORANGE | 0.676587 | 0.737240 | GREEN | ORANGE |
| 2693800 | WI | DOUGLAS | LEADER L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 376900 | WI | FOREST | LILY L | | | | X | | | | | GREEN | ORANGE | 0.622205 | 0.719969 | GREEN | ORANGE |
| 2678100 | WI | BURNETT | LIPSETT L | | | | | | X | | | GREEN | YELLOW | 0.386481 | 0.422929 | GREEN | YELLOW |
| 1545300 | WI | VILAS | LITTLE ARBOR VITAE L | | | X | | | | | | BLUE | YELLOW | 0.202210 | 0.232289 | BLUE | YELLOW |
| 2335500 | WI | VILAS | LITTLE CROOKED L | | | X | | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1610600 | WI | ONEIDA | LITTLE FORK L | | | X | X | | | | | YELLOW | RED | 0.942092 | 0.981021 | YELLOW | RED |
| 2332300 | WI | VILAS | LITTLE JOHN L | | | X | | | | | | BLUE | YELLOW | 0.198460 | 0.225573 | BLUE | GREEN |
| 2395500 | WI | SAWYER | LITTLE ROUND L | | X | | | | | | | GREEN | ORANGE | 0.448711 | 0.528819 | GREEN | ORANGE |
| 1596300 | WI | VILAS | LITTLE ST GERMAIN L | | | X | | | | | | BLUE | YELLOW | 0.317051 | 0.391469 | BLUE | YELLOW |
| 2334300 | WI | VILAS | LITTLE STAR L | | | X | | | | | | GREEN | ORANGE | 0.569815 | 0.630052 | GREEN | ORANGE |
| 2321600 | WI | VILAS | LITTLE TROUT L | | | X | | | | | | GREEN | ORANGE | 0.500157 | 0.574064 | GREEN | ORANGE |
| 2674800 | WI | BURNETT | LITTLE YELLOW L | | | | | | X | | | BLUE | YELLOW | 0.249156 | 0.277819 | BLUE | YELLOW |
| 1605600 | WI | ONEIDA | LONE STONE L | | | | X | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1602300 | WI | VILAS | LONG L | | | X | X | | | | | GREEN | ORANGE | 0.531788 | 0.641645 | GREEN | ORANGE |
| 1609000 | WI | ONEIDA | LONG L | | | | X | | | | | GREEN | ORANGE | 0.560249 | 0.631137 | GREEN | ORANGE |

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| MWBC | STATE | COUNTY | LAKE | BRV | LCO | LDF | MLK | RC | STC | MI 1842 | MN 1837 | 2018 COLOR GEN POP | 2018 COLOR SENS POP | 75% CONF BOUND | 75% PRED BOUND | 2020 COLOR GEN POP | 2020 COLOR SENS POP |
|---------|-------|----------|---------------------|-----|-----|-----|-----|----|-----|---------|---------|--------------------|---------------------|----------------|----------------|--------------------|---------------------|
| 2106800 | WI | WASHBURN | LONG L | | X | | | | X | | | BLUE | YELLOW | 0.286566 | 0.332529 | BLUE | YELLOW |
| 2239300 | WI | PRICE | LONG L | X | | X | | | | | | GREEN | ORANGE | 0.546836 | 0.630318 | GREEN | ORANGE |
| 2303500 | WI | IRON | LONG L | X | | | | | | | | YELLOW | RED | 0.930874 | 1.009069 | YELLOW | RED |
| 2351400 | WI | CHIPPEWA | LONG L | X | | | | | | | | BLUE | YELLOW | 0.347840 | 0.388511 | BLUE | YELLOW |
| 2767100 | WI | BAYFIELD | LONG L | | | | | X | | | | YELLOW | ORANGE | 0.771368 | 0.852231 | YELLOW | ORANGE |
| 1593400 | WI | VILAS | LOST L | | | X | | | | | | BLUE | YELLOW | 0.208936 | 0.234283 | BLUE | YELLOW |
| 2418600 | WI | SAWYER | LOST LAND L | X | X | | | | | | | GREEN | ORANGE | 0.416616 | 0.502296 | GREEN | ORANGE |
| 1621000 | WI | VILAS | LOWER BUCKATABON L | | | X | | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2429300 | WI | SAWYER | LOWER CLAM L | | X | | | | | | | GREEN | YELLOW | 0.408941 | 0.447803 | GREEN | YELLOW |
| 1864000 | WI | BARRON | LOWER DEVILS L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2741600 | WI | DOUGLAS | LOWER EAU CLAIRE L | | | | | X | | | | GREEN | YELLOW | 0.393583 | 0.452002 | GREEN | YELLOW |
| 1605200 | WI | ONEIDA | LOWER NINEMILE L | | | | X | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2079700 | WI | BARRON | LOWER TURTLE L | | | | | | X | | | BLUE | YELLOW | 0.320405 | 0.369414 | BLUE | YELLOW |
| 2098200 | WI | BARRON | LOWER VERMILLION L | | | | | | X | | | BLUE | YELLOW | 0.222537 | 0.268935 | BLUE | YELLOW |
| 2856400 | WI | DOUGLAS | LYMAN L | | | | | X | | | | YELLOW | RED | 1.306172 | 1.407881 | YELLOW | RED |
| 2954500 | WI | VILAS | LYNX L | X | | X | | | | | | YELLOW | RED | 1.207484 | 1.341285 | YELLOW | RED |
| 1544700 | WI | ONEIDA | MADELINE L | | | X | | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2624600 | WI | POLK | MAGNOR L | | | | | | X | | | GREEN | ORANGE | 0.443475 | 0.535182 | GREEN | ORANGE |
| 487500 | WI | OCONTO | MAIDEN L | | | | X | | | | | GREEN | ORANGE | 0.599615 | 0.664114 | GREEN | ORANGE |
| 2964100 | WI | VILAS | MAMIE L | X | | X | | | | | | GREEN | ORANGE | 0.499434 | 0.555365 | GREEN | ORANGE |
| 2329400 | WI | VILAS | MANITOWISH L | | | X | | | | | | GREEN | ORANGE | 0.617743 | 0.728736 | GREEN | ORANGE |
| 1517200 | WI | ONEIDA | MANSON L | | | X | | | | | | GREEN | ORANGE | 0.519609 | 0.564931 | GREEN | ORANGE |
| 2277200 | WI | SAWYER | MASON L | X | X | | | | | | | BLUE | YELLOW | 0.248996 | 0.269208 | BLUE | YELLOW |
| 2710800 | WI | WASHBURN | MATTHEWS L | | | | | | X | | | GREEN | ORANGE | 0.656100 | 0.727521 | GREEN | ORANGE |
| 1611700 | WI | ONEIDA | MEDICINE L | | | X | | | | | | GREEN | ORANGE | 0.668130 | 0.764672 | GREEN | ORANGE |
| 2742100 | WI | BAYFIELD | MIDDLE EAU CLAIRE L | X | | | | X | | | | GREEN | ORANGE | 0.577414 | 0.664608 | GREEN | ORANGE |
| 2706500 | WI | WASHBURN | MIDDLE MCKENZIE L | | | | | | X | | | BLUE | YELLOW | 0.246333 | 0.274304 | BLUE | YELLOW |
| 2916900 | WI | ASHLAND | MINERAL L | X | | | | | | | | YELLOW | ORANGE | 0.898292 | 0.934649 | YELLOW | ORANGE |
| 1542400 | WI | ONEIDA | MINOCQUA L | | | X | | | | | | GREEN | YELLOW | 0.368404 | 0.439222 | GREEN | YELLOW |
| 2692900 | WI | WASHBURN | MINONG FL | | | | | X | X | | | GREEN | ORANGE | 0.596713 | 0.647802 | GREEN | ORANGE |
| 1573800 | WI | ONEIDA | MOEN L | | | X | X | | | | | ORANGE | RED | 1.520309 | 1.642839 | ORANGE | RED |
| 390600 | WI | FOREST | MOLE L | | | | X | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2420600 | WI | SAWYER | MOOSE L | | X | | | X | | | | YELLOW | RED | 1.136642 | 1.260299 | YELLOW | RED |
| 2094600 | WI | BARRON | MUD L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1595600 | WI | ONEIDA | MUSKELLUNGE L | | | X | | | | | | GREEN | ORANGE | 0.467855 | 0.555673 | GREEN | ORANGE |
| 2245100 | WI | PRICE | MUSSER L | | | X | | | | | | YELLOW | RED | 0.860106 | 1.002314 | YELLOW | RED |
| 1595800 | WI | ONEIDA | N NOKOMIS L | | | X | | | | | | YELLOW | ORANGE | 0.773676 | 0.859532 | YELLOW | ORANGE |
| 2485700 | WI | POLK | N PIPE L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2310400 | WI | VILAS | N TURTLE L | X | | X | | | | | | YELLOW | ORANGE | 0.733175 | 0.787167 | YELLOW | ORANGE |
| 2732600 | WI | BAYFIELD | NAMEKAGON L | X | | | | X | | | | GREEN | ORANGE | 0.517975 | 0.627325 | GREEN | ORANGE |
| 2704200 | WI | SAWYER | NELSON L | X | X | | | X | | | | GREEN | ORANGE | 0.532944 | 0.626530 | GREEN | ORANGE |
| 1600100 | WI | VILAS | OTTER L | | | X | | | | | | LIGHT BLUE | LIGHT BLUE | 0.524020 | 0.561593 | GREEN | ORANGE |
| 2157000 | WI | CHIPPEWA | OTTER L | | X | | | | | | | GREEN | ORANGE | 0.494275 | 0.544679 | GREEN | ORANGE |
| 387200 | WI | LANGLADE | OTTER L | | | | X | | | | | BLUE | YELLOW | 0.217606 | 0.242103 | BLUE | YELLOW |
| 2954800 | WI | VILAS | OXBOW L | X | | X | | | | | | YELLOW | RED | 0.883081 | 1.006154 | YELLOW | RED |
| 2962900 | WI | VILAS | PALMER L | | | X | | | | | | GREEN | ORANGE | 0.643694 | 0.729317 | GREEN | ORANGE |
| 2328700 | WI | VILAS | PAPOOSE L | | | X | | | | | | GREEN | ORANGE | 0.672552 | 0.770415 | GREEN | ORANGE |
| 653700 | WI | FLORENCE | PATTEN L | | | | X | | | | | GREEN | ORANGE | 0.509756 | 0.567094 | GREEN | ORANGE |
| 1579900 | WI | ONEIDA | PELICAN L | | | X | X | | | | | BLUE | YELLOW | 0.351133 | 0.397849 | GREEN | YELLOW |
| 1590400 | WI | ONEIDA | PICKEREL L | | | X | | | | | | GREEN | ORANGE | 0.466067 | 0.511587 | GREEN | ORANGE |
| 1619700 | WI | VILAS | PICKEREL L | | | X | | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2268300 | WI | PRICE | PIKE L | X | | X | | | | | | GREEN | ORANGE | 0.649464 | 0.748144 | GREEN | ORANGE |
| 2902700 | WI | BAYFIELD | PIKE L CHAIN | | | | | X | | | | GREEN | ORANGE | 0.436192 | 0.510992 | GREEN | ORANGE |
| 2949200 | WI | IRON | PINE L | X | | | | X | | | | YELLOW | RED | 0.928413 | 0.992325 | YELLOW | RED |
| 406900 | WI | FOREST | PINE L | | | | X | | | | | GREEN | ORANGE | 0.595315 | 0.699507 | GREEN | ORANGE |
| 2490500 | WI | POLK | PIPE L | | | | | | X | | | YELLOW | RED | 1.070660 | 1.163986 | YELLOW | RED |
| 1609100 | WI | ONEIDA | PLANTING GROUND L | | | | X | | | | | YELLOW | ORANGE | 0.747439 | 0.872923 | YELLOW | ORANGE |

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| MWBC | STATE | COUNTY | LAKE | BRV | LCO | LDF | MLK | RC | STC | MI 1842 | MN 1837 | 2018 COLOR GEN POP | 2018 COLOR SENS POP | 75% CONF BOUND | 75% PRED BOUND | 2020 COLOR GEN POP | 2020 COLOR SENS POP |
|---------|-------|----------|----------------------|-----|-----|-----|-----|----|-----|---------|---------|--------------------|---------------------|----------------|----------------|--------------------|---------------------|
| 1592400 | WI | VILAS | PLUM L | | | X | X | | | | | GREEN | ORANGE | 0.415367 | 0.471910 | GREEN | ORANGE |
| 2094300 | WI | BARRON | POKEGAMA L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2098000 | WI | BARRON | POSKIN L | | | | | | X | | | YELLOW | ORANGE | 0.712599 | 0.751683 | YELLOW | ORANGE |
| 2355300 | WI | RUSK | POTATO L | | X | | | | | | | GREEN | ORANGE | 0.506340 | 0.556763 | GREEN | ORANGE |
| 2094100 | WI | BARRON | PRAIRIE L | | | | | | X | | | BLUE | YELLOW | 0.259358 | 0.318274 | BLUE | YELLOW |
| 2956501 | WI | VILAS | PRESQUE ISLE L CHAIN | X | | X | | | | | | GREEN | YELLOW | 0.384414 | 0.463614 | GREEN | YELLOW |
| 1875900 | WI | RUSK | PULASKI L | | X | | | | | | | YELLOW | RED | 0.879117 | 0.961634 | YELLOW | RED |
| 1595300 | WI | ONEIDA | RAINBOW FL | X | | X | X | | | | | YELLOW | ORANGE | 0.766015 | 0.850618 | YELLOW | ORANGE |
| 2318500 | WI | IRON | RANDALL L | | | X | | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1013800 | WI | VILAS | RAZORBACK L | | | X | | | | | | GREEN | ORANGE | 0.522422 | 0.574549 | GREEN | ORANGE |
| 2109600 | WI | BARRON | RED CEDAR L | | | | | | X | | | GREEN | ORANGE | 0.468574 | 0.532175 | GREEN | ORANGE |
| 2492100 | WI | DOUGLAS | RED L | | | | | | X | | | GREEN | ORANGE | 0.513351 | 0.592495 | GREEN | ORANGE |
| 2327500 | WI | VILAS | REST L | | | X | | | | | | GREEN | ORANGE | 0.558695 | 0.628614 | GREEN | ORANGE |
| 1580100 | WI | ONEIDA | RHINELANDER FL | | | X | X | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1469100 | WI | TAYLOR | RIB L | X | | | | | | | | GREEN | ORANGE | 0.438375 | 0.481113 | GREEN | ORANGE |
| 2103900 | WI | BARRON | RICE L | | X | | | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1516401 | WI | LINCOLN | RICE R FL CHAIN | | | X | X | | | | | GREEN | ORANGE | 0.581119 | 0.671071 | GREEN | ORANGE |
| 378400 | WI | FOREST | ROBERTS L | | | | X | | | | | GREEN | ORANGE | 0.610493 | 0.690896 | GREEN | ORANGE |
| 389300 | WI | LANGLADE | ROLLING STONE L | | | | X | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2493100 | WI | BURNETT | ROONEY L | | | | | | X | | | YELLOW | RED | 0.804132 | 1.018830 | YELLOW | RED |
| 494200 | WI | LANGLADE | ROSE L | | | | X | | | | | BLUE | YELLOW | 0.280585 | 0.344025 | BLUE | YELLOW |
| 1610400 | WI | ONEIDA | ROUND L | | | | X | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2267800 | WI | PRICE | ROUND L | X | | X | | | | | | YELLOW | RED | 0.930553 | 1.026861 | YELLOW | RED |
| 2334900 | WI | VILAS | ROUND L | | | X | | | | | | YELLOW | RED | 0.857870 | 0.972663 | YELLOW | RED |
| 2395600 | WI | SAWYER | ROUND L | | X | | | | | | | BLUE | YELLOW | 0.315807 | 0.366553 | BLUE | YELLOW |
| 2640100 | WI | BURNETT | ROUND L | | | | | | X | | | GREEN | ORANGE | 0.676021 | 0.735296 | GREEN | ORANGE |
| 2310200 | WI | VILAS | S TURTLE L | X | | X | | | | | | YELLOW | RED | 0.898438 | 0.989848 | YELLOW | RED |
| 1597000 | WI | ONEIDA | SAND L | | | X | | | | | | YELLOW | RED | 0.861817 | 0.966556 | YELLOW | RED |
| 2353600 | WI | RUSK | SAND L | | X | | | | | | | YELLOW | RED | 0.852604 | 0.973592 | YELLOW | RED |
| 2393200 | WI | SAWYER | SAND L | | X | | | | | | | GREEN | ORANGE | 0.625537 | 0.729464 | GREEN | ORANGE |
| 2495000 | WI | POLK | SAND L | | | | | | X | | | GREEN | YELLOW | 0.424742 | 0.456722 | GREEN | YELLOW |
| 2495100 | WI | BURNETT | SAND L | | | | | | X | | | GREEN | ORANGE | 0.380983 | 0.442035 | GREEN | YELLOW |
| 2661100 | WI | BARRON | SAND L | | | | | | X | | | GREEN | ORANGE | 0.429574 | 0.470925 | GREEN | ORANGE |
| 198100 | WI | LANGLADE | SAWYER L | | | | X | | | | | GREEN | ORANGE | 0.621290 | 0.689138 | GREEN | ORANGE |
| 1600300 | WI | VILAS | SCATTERING RICE L | | | X | | | | | | YELLOW | ORANGE | 0.735255 | 0.855057 | YELLOW | ORANGE |
| 1605800 | WI | ONEIDA | SEVENMILE L | | | | X | | | | | YELLOW | ORANGE | 0.719156 | 0.862915 | YELLOW | ORANGE |
| 2496300 | WI | WASHBURN | SHELL L | | | | | | X | | | GREEN | ORANGE | 0.699456 | 0.769653 | GREEN | ORANGE |
| 1880700 | WI | VILAS | SHERMAN L | | | X | | | | | | GREEN | ORANGE | 0.480556 | 0.556493 | GREEN | ORANGE |
| 1539600 | WI | ONEIDA | SHISHEBOGAMA L | | | X | | | | | | BLUE | YELLOW | 0.269987 | 0.299473 | BLUE | YELLOW |
| 1881100 | WI | BARRON | SILVER L | | | | | | X | | | YELLOW | RED | 0.989484 | 1.091151 | YELLOW | RED |
| 555700 | WI | FOREST | SILVER L | | | | X | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2882300 | WI | BAYFIELD | SISKIWI L | X | | | | X | | | | YELLOW | RED | 1.113187 | 1.220458 | YELLOW | RED |
| 2393500 | WI | SAWYER | SISSABAGAMA L | | X | | | X | X | | | GREEN | YELLOW | 0.374796 | 0.434858 | GREEN | YELLOW |
| 2109300 | WI | WASHBURN | SLIM L | | X | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2726100 | WI | SAWYER | SMITH L | | X | | | | | | | GREEN | ORANGE | 0.650790 | 0.772010 | GREEN | ORANGE |
| 1018500 | WI | VILAS | SNIPE L | | | X | | | | | | YELLOW | RED | 1.217604 | 1.305176 | YELLOW | RED |
| 2242500 | WI | PRICE | SOLBERG L | X | | X | | | | | | YELLOW | ORANGE | 0.833663 | 0.933876 | YELLOW | ORANGE |
| 1881900 | WI | VILAS | SPARKLING L | | | X | | | | | | GREEN | ORANGE | 0.641169 | 0.874408 | GREEN | ORANGE |
| 2306300 | WI | IRON | SPIDER L | X | | | | | | | | YELLOW | RED | 1.265798 | 1.328388 | YELLOW | RED |
| 2329300 | WI | VILAS | SPIDER L | | | X | | | | | | YELLOW | ORANGE | 0.724616 | 0.811475 | YELLOW | ORANGE |
| 2435700 | WI | SAWYER | SPIDER L | | X | | | | | | | GREEN | ORANGE | 0.582682 | 0.679526 | GREEN | ORANGE |
| 1612000 | WI | ONEIDA | SPIRIT L | | | | X | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1882800 | WI | BARRON | SPRING L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2724900 | WI | SAWYER | SPRING L | | X | | | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1019500 | WI | ONEIDA | SQUASH L | | | X | X | | | | | GREEN | ORANGE | 0.478816 | 0.517868 | GREEN | ORANGE |
| 2271600 | WI | VILAS | SQUAW L | X | | X | | | | | | YELLOW | ORANGE | 0.713073 | 0.820402 | YELLOW | ORANGE |
| 1536300 | WI | ONEIDA | SQUIRREL L | | | X | X | | | | | GREEN | ORANGE | 0.451134 | 0.530377 | GREEN | ORANGE |

APPENDIX 1: Lakes on Maps and Color Codes

| MWBC | STATE | COUNTY | LAKE | BRV | LCO | LDF | MLK | RC | STC | MI 1842 | MN 1837 | 2018 COLOR GEN POP | 2018 COLOR SENS POP | 75% CONF BOUND | 75% PRED BOUND | 2020 COLOR GEN POP | 2020 COLOR SENS POP |
|---------|-------|----------|--------------------|-----|-----|-----|-----|----|-----|---------|---------|--------------------|---------------------|----------------|----------------|--------------------|---------------------|
| 2631200 | WI | BARRON | STAPLES L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1593100 | WI | VILAS | STAR L | | | X | X | | | | | GREEN | YELLOW | 0.392992 | 0.457644 | GREEN | YELLOW |
| 683000 | WI | FOREST | STEVENS L | | | | X | | | | | YELLOW | ORANGE | 0.709372 | 0.748034 | YELLOW | ORANGE |
| 1884100 | WI | WASHBURN | STONE L | | X | | | | | | | GREEN | ORANGE | 0.546551 | 0.608360 | GREEN | ORANGE |
| 232880 | WI | VILAS | STONE L | | | X | | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1528700 | WI | ONEIDA | SWAMSAUGER L | | | X | | | | | | LIGHT BLUE | LIGHT BLUE | 0.791973 | 0.817408 | YELLOW | ORANGE |
| 1589600 | WI | ONEIDA | SWEENY L | | | X | | | | | | GREEN | ORANGE | 0.447203 | 0.481847 | GREEN | ORANGE |
| 2068000 | WI | DUNN | TAINTER L | | | | | | X | | | GREEN | ORANGE | 0.596785 | 0.698200 | GREEN | ORANGE |
| 2417000 | WI | SAWYER | TEAL L | X | X | | | | | | | GREEN | YELLOW | 0.393133 | 0.456003 | GREEN | YELLOW |
| 2962400 | WI | VILAS | TENDERFOOT L | X | | X | | | | | | GREEN | ORANGE | 0.520312 | 0.606548 | GREEN | ORANGE |
| 2227500 | WI | RUSK | THORNAPPLE FL | | X | | | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 1618100 | WI | ONEIDA | THUNDER L | | | | X | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2435000 | WI | SAWYER | TIGER CAT FL | | X | | | | | | | GREEN | ORANGE | 0.473825 | 0.525182 | GREEN | ORANGE |
| 1542701 | WI | ONEIDA | TOMAHAWK L CHAIN | | | X | X | | | | | GREEN | ORANGE | 0.411392 | 0.491830 | GREEN | ORANGE |
| 1609600 | WI | ONEIDA | TOWNLIN L | | | | X | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2712000 | WI | WASHBURN | TREGO L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2331600 | WI | VILAS | TROUT L | | | X | X | | | | | GREEN | ORANGE | 0.396004 | 0.486900 | GREEN | ORANGE |
| 2295200 | WI | IRON | TRUDE L | X | | X | | | | | | YELLOW | RED | 0.925503 | 1.020461 | YELLOW | RED |
| 479300 | WI | FOREST | TRUMP L | | | | X | | | | | GREEN | ORANGE | 0.691899 | 0.721460 | GREEN | ORANGE |
| 2268500 | WI | PRICE | TURNER L | X | | X | | | | | | GREEN | ORANGE | 0.628075 | 0.692287 | GREEN | ORANGE |
| 2294900 | WI | IRON | TURTLE-FLAMBEAU FL | X | | X | | X | | | | YELLOW | ORANGE | 0.768405 | 0.916674 | YELLOW | ORANGE |
| 1623801 | WI | VILAS | TWIN L CHAIN | | | X | X | | | | | BLUE | YELLOW | 0.337847 | 0.419454 | BLUE | YELLOW |
| 1588200 | WI | ONEIDA | TWO SISTERS L | | | X | X | | | | | GREEN | ORANGE | 0.503928 | 0.601920 | GREEN | ORANGE |
| 1621800 | WI | VILAS | UPPER BUCKATABON L | | | X | | | | | | YELLOW | ORANGE | 0.758752 | 0.883906 | YELLOW | ORANGE |
| 2656200 | WI | BURNETT | UPPER CLAM L | | | | | | X | | | NA | NA | | | LIGHT BLUE | LIGHT BLUE |
| 2043500 | WI | BARRON | UPPER DEVILS L | | | | | | X | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2742700 | WI | BAYFIELD | UPPER EAU CLAIRE L | X | | | | X | | | | GREEN | ORANGE | 0.581697 | 0.651889 | GREEN | ORANGE |
| 2330800 | WI | VILAS | UPPER GRESHAM L | | | X | | | | | | BLUE | YELLOW | 0.242692 | 0.277608 | BLUE | YELLOW |
| 399200 | WI | LANGLADE | UPPER POST L | | | | X | | | | | LIGHT BLUE | LIGHT BLUE | | | LIGHT BLUE | LIGHT BLUE |
| 2747300 | WI | DOUGLAS | UPPER ST CROIX L | | | | | X | | | | GREEN | ORANGE | 0.569251 | 0.649058 | GREEN | ORANGE |
| 2079800 | WI | BARRON | UPPER TURTLE L | | | | | | X | | | BLUE | YELLOW | 0.263663 | 0.317030 | BLUE | YELLOW |
| 1614100 | WI | ONEIDA | VIRGIN L | | | | X | | | | | YELLOW | RED | 0.930860 | 1.057853 | YELLOW | RED |
| 2964000 | WI | VILAS | W BAY L | | | X | | | | X | | GREEN | ORANGE | 0.427611 | 0.489449 | GREEN | ORANGE |
| 2618000 | WI | POLK | WAPOGASSET L | | | | | | X | | | BLUE | YELLOW | 0.275779 | 0.320852 | BLUE | YELLOW |
| 439800 | WI | OCONTO | WHEELER L | | | | X | | | | | GREEN | ORANGE | 0.466116 | 0.505756 | GREEN | ORANGE |
| 2339100 | WI | VILAS | WHITE SAND L | | | X | | | | | | GREEN | ORANGE | 0.429548 | 0.481528 | GREEN | ORANGE |
| 1613500 | WI | ONEIDA | WHITEFISH L | | | | X | | | | | YELLOW | RED | 0.988042 | 1.116152 | YELLOW | RED |
| 2392000 | WI | SAWYER | WHITEFISH L | | X | | | | | | | GREEN | YELLOW | 0.471290 | 0.556893 | GREEN | ORANGE |
| 2694000 | WI | DOUGLAS | WHITEFISH L | X | | | | X | X | | | GREEN | ORANGE | 0.493044 | 0.534433 | GREEN | ORANGE |
| 2329800 | WI | VILAS | WILD RICE L | | | X | | | | | | GREEN | ORANGE | 0.410988 | 0.476451 | GREEN | ORANGE |
| 2336800 | WI | VILAS | WILDCAT L | | | X | | | | | | BLUE | YELLOW | 0.285905 | 0.325566 | BLUE | YELLOW |
| 1528300 | WI | ONEIDA | WILLOW FL | | | X | X | | | | | YELLOW | RED | 1.037978 | 1.184189 | YELLOW | RED |
| 2239400 | WI | PRICE | WILSON L | | | X | | | | | | GREEN | ORANGE | 0.443576 | 0.476714 | GREEN | ORANGE |
| 2046500 | WI | SAWYER | WINDFALL L | | X | | | | | | | GREEN | YELLOW | 0.395382 | 0.442429 | GREEN | YELLOW |
| 2046600 | WI | SAWYER | WINDIGO L | | X | | | | | | | YELLOW | RED | 1.152453 | 1.254230 | YELLOW | RED |
| 1599600 | WI | VILAS | YELLOW BIRCH L | | | X | | | | | | LIGHT BLUE | LIGHT BLUE | 0.384648 | 0.418442 | GREEN | YELLOW |
| 2675200 | WI | BURNETT | YELLOW L | | | | | | X | | | GREEN | ORANGE | 0.409860 | 0.489255 | GREEN | ORANGE |

APPENDIX 2: Lakes Added or Removed in 2020

Appendix 2a: Lakes Added to the 2020 Mercury Maps versus the 2018 Maps

| MWBC | COUNTY | LAKE | MAP ADDED TO |
|-------------|---------------|--------------|---------------------|
| 2630100 | BARRON | HORSESHOE L | ST CROIX |
| 2656200 | BURNETT | UPPER CLAM L | ST CROIX |
| 973000 | ONEIDA | BOLGER L | LAC DU FLAMBEAU |
| 1592000 | VILAS | L CONTENT | LAC DU FLAMBEAU |
| 181400 | FOREST | ARBUTUS L | MOLE LAKE |

Appendix 2b: Lakes Removed from the 2020 Mercury Maps versus the 2018 Maps

| MWBC | COUNTY | LAKE | MAP REMOVED FROM |
|-------------|---------------|---------------|-------------------------|
| 130053 | CHISAGO | BIG COMFORT L | MINNESOTA 1837 |
| 490005 | MORRISON | PEAVY L | MINNESOTA 1837 |
| 13001900 | CHISAGO | SPIDER L | MINNESOTA 1837 |

APPENDIX 3: Declared Lakes Not Added to LDF Map

Appendix 3: Lakes Declared by Lac du Flambeau 2015-2019 that were not Added to the 2020 Mercury Maps (n=129)

| MWBC | COUNTY | LAKE |
|---------|----------|---------------------|
| 2184900 | CHIPPEWA | HOLCOMBE FL |
| 2068000 | DUNN | TAINTER L |
| 677400 | FLORENCE | LONG L |
| 2270700 | IRON | BIG PINE L |
| 2945500 | IRON | ISLAND L |
| 2267000 | IRON | LOWER SPRINGSTEAD L |
| 2314300 | IRON | MARTHA L |
| 2313600 | IRON | MERCER L |
| 2308000 | IRON | PARDEE L |
| 2299900 | IRON | PIKE L |
| 2949200 | IRON | PINE L |
| 2300600 | IRON | RICE L |
| 2316100 | IRON | SANDY BEACH L |
| 1506800 | LINCOLN | SPIRIT R FL |
| 968100 | ONEIDA | ALVA L |
| 1523800 | ONEIDA | BIRCH L |
| 1580200 | ONEIDA | BOOM L |
| 1616400 | ONEIDA | CLEARWATER L |
| 1616900 | ONEIDA | COLUMBUS L |
| 1523000 | ONEIDA | E HORSEHEAD L |
| 1571100 | ONEIDA | FIFTH L |
| 1572000 | ONEIDA | FOURTH L |
| 1567325 | ONEIDA | HAT RAPIDS FL |
| 1598300 | ONEIDA | KATHAN L |
| 1580500 | ONEIDA | L CREEK |
| 1538900 | ONEIDA | MERCER L |
| 1518200 | ONEIDA | ONEIDA L |
| 1581700 | ONEIDA | PINE L |
| 1618100 | ONEIDA | THUNDER L |
| 1535000 | ONEIDA | UPPER KAUBASHINE L |
| 2282000 | PRICE | LONG L |
| 2288900 | PRICE | PIXLEY FL |
| 967900 | VILAS | ALMA L |
| 2269400 | VILAS | APEEKWA L |
| 2953200 | VILAS | ARMOUR L |
| 1604200 | VILAS | BASS L |
| 2335400 | VILAS | BEAR L |
| 2960600 | VILAS | BEAVER L |
| 2955700 | VILAS | BELLE L |
| 2327100 | VILAS | BENSON L |
| 2338800 | VILAS | BIG CROOKED L |
| 971700 | VILAS | BIG DONAHUE L |
| 2756000 | VILAS | BIG HURST L |
| 2336700 | VILAS | BIG KITTEN L |
| 1619100 | VILAS | BOOT L |
| 2756400 | VILAS | BOOT L |
| 976100 | VILAS | CARPENTER L |
| 2758600 | VILAS | CLEVELAND L |
| 2963500 | VILAS | COCHRAN L |
| 2759000 | VILAS | CRAMPTON L |
| 1842400 | VILAS | CRYSTAL L |

APPENDIX 3: Declared Lakes Not Added to LDF Map

| MWBC | COUNTY | LAKE |
|---------|--------|-----------------------|
| 980600 | VILAS | DEER L |
| 2311500 | VILAS | DEER L |
| 1601300 | VILAS | DEERSKIN L |
| 1844700 | VILAS | DIAMOND L |
| 1845600 | VILAS | DOROTHY DUNN L |
| 1599900 | VILAS | DUCK L |
| 2331300 | VILAS | E ELLERSON L |
| 1631500 | VILAS | ELEANORE L |
| 983600 | VILAS | ERICKSON L |
| 2339900 | VILAS | ESCANABA L |
| 1591000 | VILAS | FAWN L |
| 2328900 | VILAS | FAWN L |
| 984700 | VILAS | FINGER L |
| 985900 | VILAS | FRANK L |
| 988300 | VILAS | HARMONY L |
| 2964400 | VILAS | HELEN L |
| 2328400 | VILAS | HIAWATHA L |
| 991700 | VILAS | HUNTER L |
| 586800 | VILAS | IMOGENE L |
| 1856400 | VILAS | JENNY L |
| 2957000 | VILAS | KATINKA L |
| 1629800 | VILAS | KENU L |
| 1631700 | VILAS | KILDARE L |
| 1630900 | VILAS | LAC DES FLEURS |
| 2953000 | VILAS | LITTLE HORSEHEAD L |
| 2328200 | VILAS | LITTLE PAPOOSE L |
| 1629200 | VILAS | LITTLE PORTAGE L |
| 2959700 | VILAS | LITTLE PRESQUE ISLE L |
| 2338900 | VILAS | LITTLE RICE L |
| 1540400 | VILAS | LITTLE SPIDER L |
| 2961600 | VILAS | LONE PINE L |
| 1001600 | VILAS | LOON L |
| 2339800 | VILAS | LOST CANOE L |
| 2955000 | VILAS | LOWER AIMER L |
| 1600000 | VILAS | LYNX L |
| 2332000 | VILAS | MANN L |
| 1626600 | VILAS | MARSHALL L |
| 2960400 | VILAS | MCCULLOUGH L |
| 2768100 | VILAS | MERMAID L |
| 1004400 | VILAS | META L |
| 2330700 | VILAS | MIDDLE GRESHAM L |
| 1005700 | VILAS | MOCCASIN L |
| 1005800 | VILAS | MOON L |
| 2960300 | VILAS | MORTON L |
| 2769700 | VILAS | MURPHY L |
| 1596600 | VILAS | MUSKELLUNGE L |
| 2953400 | VILAS | N CRAB L |
| 1007600 | VILAS | NELSON L |
| 2341200 | VILAS | NIXON L |
| 2312100 | VILAS | NO MANS L |
| 1008100 | VILAS | NORWOOD L |
| 2341500 | VILAS | PARTRIDGE L |
| 1011900 | VILAS | PINE ISLAND L |
| 1623400 | VILAS | PIONEER L |

APPENDIX 3: Declared Lakes Not Added to LDF Map

| MWBC | COUNTY | LAKE |
|---------|--------|---------------|
| 2963200 | VILAS | PLUM L |
| 2310800 | VILAS | RAINBOW L |
| 1618600 | VILAS | RICE L |
| 1014000 | VILAS | ROACH L |
| 2772500 | VILAS | ROACH L |
| 2311700 | VILAS | ROCK L |
| 2343600 | VILAS | RUSH L |
| 2335300 | VILAS | SANFORD L |
| 717400 | VILAS | SPECTACLE L |
| 2964800 | VILAS | SPRING L |
| 2952100 | VILAS | STATELINE L |
| 1020000 | VILAS | STEWART L |
| 2327200 | VILAS | STURGEON L |
| 1020500 | VILAS | SUMACH L |
| 1022900 | VILAS | TOWANDA L |
| 2959300 | VILAS | TWIN ISLAND L |
| 2955100 | VILAS | UPPER AIMER L |
| 2327300 | VILAS | VANCE L |
| 1603400 | VILAS | VOYAGEUR L |
| 1592500 | VILAS | W PLUM L |
| 1177500 | VILAS | W WITCHES L |
| 1599400 | VILAS | WATERSMEET L |
| 2340500 | VILAS | WHITE BIRCH L |
| 2336100 | VILAS | WOLF L |

APPENDIX 4: Declared Lakes Not Added to MLK Map

Appendix 4: Lakes Declared by Mole Lake 2015-2019 that were not Added to the 2020 Mercury Maps (n=110)

| MWBC | COUNTY | LAKE |
|---------|-----------|--------------------------|
| 651600 | FLORENCE | EMILY L |
| 704200 | FLORENCE | FISHER L |
| 651300 | FLORENCE | PINE R FL |
| 672300 | FLORENCE | SEA LION L |
| 555500 | FOREST | BIRCH L |
| 395900 | FOREST | GROUND HEMLOCK L |
| 501700 | FOREST | KING L |
| 190500 | FOREST | LITTLE LONG L |
| 478200 | FOREST | RANGE LINE L |
| 182200 | LANGLADE | BIG TWIN L |
| 981500 | LANGLADE | DUCK L |
| 188700 | LANGLADE | JESSIE L |
| 997300 | LANGLADE | LAWRENCE L |
| 1005600 | LANGLADE | MOCCASIN L |
| 194000 | LANGLADE | MUELLER L |
| 388100 | LANGLADE | PICKEREL L |
| 1445600 | LANGLADE | SUMMIT L |
| 365500 | LANGLADE | WHITE L |
| 1519600 | LINCOLN | DEER L |
| 1427400 | MARATHON | BIG EAU PLEINE RESERVOIR |
| 49880 | MARINETTE | BIG NEWTON L |
| 545400 | MARINETTE | CALDRON FALLS RESERVOIR |
| 533300 | MARINETTE | JOHNSON FALLS FL |
| 502300 | MARINETTE | LITTLE NEWTON L |
| 503300 | MARINETTE | ONEONTA L |
| 531300 | MARINETTE | SANDSTONE FL |
| 471200 | OCONTO | BEAR L |
| 462000 | OCONTO | CROOKED L |
| 467100 | OCONTO | HORN L |
| 470600 | OCONTO | JOHN L |
| 470900 | OCONTO | MUNGER L |
| 465000 | OCONTO | TOWNSEND FL |
| 439500 | OCONTO | WAUBEE L |
| 967400 | ONEIDA | ALDRIDGE L |
| 1546000 | ONEIDA | BAKER L |
| 1580300 | ONEIDA | BASS L |
| 1527800 | ONEIDA | BEAR L |
| 972000 | ONEIDA | BIRD L |
| 973000 | ONEIDA | BOLGER L |
| 973700 | ONEIDA | BROWN L |
| 974200 | ONEIDA | BUFFALO L |
| 975000 | ONEIDA | BURROWS L |
| 977200 | ONEIDA | CLEAR L |
| 977400 | ONEIDA | CLEAR L |
| 1613300 | ONEIDA | CROOKED L |
| 1590000 | ONEIDA | CUNARD L |
| 979300 | ONEIDA | CURRIE L |
| 1612300 | ONEIDA | DEER L |
| 1537100 | ONEIDA | DIAMOND L |
| 1590200 | ONEIDA | DOG L |
| 1612900 | ONEIDA | DOG L |

APPENDIX 4: Declared Lakes Not Added to MLK Map

| MWBC | COUNTY | LAKE |
|---------|--------|-------------------|
| 1597800 | ONEIDA | ECHO L |
| 1570600 | ONEIDA | FISH L |
| 986000 | ONEIDA | FRANKLIN L |
| 2272000 | ONEIDA | FULLER L |
| 986600 | ONEIDA | GARTH L |
| 1517900 | ONEIDA | HANCOCK L |
| 989200 | ONEIDA | HEMLOCK L |
| 990200 | ONEIDA | HILL L |
| 1568900 | ONEIDA | HIXON L |
| 990700 | ONEIDA | HODSTRADT L |
| 1574300 | ONEIDA | JENNY WEBBER L |
| 1586300 | ONEIDA | KATE PIER L |
| 1520900 | ONEIDA | KILLARNEY L |
| 996100 | ONEIDA | L SEVENTEEN |
| 1523500 | ONEIDA | LITTLE BEARSKIN L |
| 998800 | ONEIDA | LITTLE CARR L |
| 1001300 | ONEIDA | LONG L |
| 1618300 | ONEIDA | LONG L |
| 1575100 | ONEIDA | LOST L |
| 1002800 | ONEIDA | LUMEN L |
| 1609900 | ONEIDA | MAPLE L |
| 1615900 | ONEIDA | MARGARET L |
| 1577100 | ONEIDA | MARS L |
| 1526600 | ONEIDA | MCCORMICK L |
| 1004600 | ONEIDA | MILDRED L |
| 1612100 | ONEIDA | MOCCASIN L |
| 1544000 | ONEIDA | MUD L |
| 1612500 | ONEIDA | MUD L |
| 1524300 | ONEIDA | MUSKIE L |
| 1007500 | ONEIDA | N TWO L |
| 1597300 | ONEIDA | OATMEAL L |
| 1009400 | ONEIDA | PARADISE L |
| 1529700 | ONEIDA | PIER L |
| 1012200 | ONEIDA | PINE L |
| 1013000 | ONEIDA | PRAIRIE L |
| 1610300 | ONEIDA | RANGE LINE L |
| 1525500 | ONEIDA | ROCKY RUN FL |
| 1580700 | ONEIDA | S PINE L |
| 1015500 | ONEIDA | S TWO L |
| 1572300 | ONEIDA | SECOND L |
| 1576100 | ONEIDA | SHEPARD L |
| 1533200 | ONEIDA | SKUNK L |
| 1018900 | ONEIDA | SOO L |
| 1586600 | ONEIDA | SPIDER L |
| 1575700 | ONEIDA | STELLA L |
| 2272700 | ONEIDA | STONE L |
| 1020600 | ONEIDA | SUNDAY L |
| 1572500 | ONEIDA | SUNSET L |
| 1522400 | ONEIDA | SWAMP L |
| 1582200 | ONEIDA | TAMARACK L |
| 1572200 | ONEIDA | THIRD L |
| 1597400 | ONEIDA | TIM LYNN L |
| 1586800 | ONEIDA | TOM DOYLE L |
| 1587400 | ONEIDA | TURTLE L |

APPENDIX 4: Declared Lakes Not Added to MLK Map

| MWBC | COUNTY | LAKE |
|-------------|---------------|-------------|
| 1577000 | ONEIDA | VENUS L |
| 1582800 | ONEIDA | WALTERS L |
| 1178600 | ONEIDA | WILDWOOD L |
| 1529500 | ONEIDA | WILLOW L |

APPENDIX 5: Summary of 2020 Lake Color Code Assignments

Appendix 5: Summary of Color Code Assignments for Lakes Depicted on the 2018 Mercury Maps^a

| | | Bad River - Wisconsin | | | |
|-------------------------|----------------|-----------------------|------------|--------------------|------------|
| | | Sensitive Population | | General Population | |
| Color Code | Meal Frequency | Number of Lakes | % of Lakes | Number of Lakes | % of Lakes |
| Blue | 8 | 0 | 0.0% | 5 | 8.3% |
| Green | 4 | 0 | 0.0% | 26 | 43.3% |
| Yellow | 2 | 9 | 15.0% | 25 | 41.7% |
| Orange | 1 | 33 | 55.0% | 0 | 0.0% |
| Red | 0 | 14 | 23.3% | 0 | 0.0% |
| Light Blue (No Advice) | N/A | 4 | 6.7% | 4 | 6.7% |
| Total Lakes with Advice | | 56 | 93.3% | 56 | 93.3% |
| Total Lakes Depicted | | 60 | | 60 | |

| | | Lac Courte Oreilles - Wisconsin | | | |
|-------------------------|----------------|---------------------------------|------------|--------------------|------------|
| | | Sensitive Population | | General Population | |
| Color Code | Meal Frequency | Number of Lakes | % of Lakes | Number of Lakes | % of Lakes |
| Blue | 8 | 0 | 0.0% | 8 | 19.0% |
| Green | 4 | 0 | 0.0% | 25 | 59.5% |
| Yellow | 2 | 14 | 33.3% | 4 | 9.5% |
| Orange | 1 | 19 | 45.2% | 0 | 0.0% |
| Red | 0 | 4 | 9.5% | 0 | 0.0% |
| Light Blue (No Advice) | N/A | 5 | 11.9% | 5 | 11.9% |
| Total Lakes with Advice | | 37 | 88.1% | 37 | 88.1% |
| Total Lakes Depicted | | 42 | | 42 | |

| | | Lac du Flambeau - Wisconsin | | | |
|-------------------------|----------------|-----------------------------|------------|--------------------|------------|
| | | Sensitive Population | | General Population | |
| Color Code | Meal Frequency | Number of Lakes | % of Lakes | Number of Lakes | % of Lakes |
| Blue | 8 | 0 | 0.0% | 17 | 11.5% |
| Green | 4 | 1 | 0.7% | 77 | 52.0% |
| Yellow | 2 | 27 | 18.2% | 38 | 25.7% |
| Orange | 1 | 85 | 57.4% | 3 | 2.0% |
| Red | 0 | 22 | 14.9% | 0 | 0.0% |
| Light Blue (No Advice) | N/A | 13 | 8.8% | 13 | 8.8% |
| Total Lakes with Advice | | 135 | 91.2% | 135 | 91.2% |
| Total Lakes Depicted | | 148 | | 148 | |

APPENDIX 5: Summary of 2020 Lake Color Code Assignments

| | | Mole Lake - Wisconsin | | | |
|-------------------------|----------------|-----------------------|------------|--------------------|------------|
| | | Sensitive Population | | General Population | |
| Color Code | Meal Frequency | Number of Lakes | % of Lakes | Number of Lakes | % of Lakes |
| Blue | 8 | 0 | 0.0% | 13 | 14.6% |
| Green | 4 | 0 | 0.0% | 40 | 44.9% |
| Yellow | 2 | 16 | 18.0% | 21 | 23.6% |
| Orange | 1 | 47 | 52.8% | 1 | 1.1% |
| Red | 0 | 12 | 13.5% | 0 | 0.0% |
| Light Blue (No Advice) | N/A | 14 | 15.7% | 14 | 15.7% |
| Total Lakes with Advice | | 75 | 84.3% | 75 | 84.3% |
| Total Lakes Depicted | | 89 | | 89 | |

| | | Red Cliff - Wisconsin | | | |
|-------------------------|----------------|-----------------------|------------|--------------------|------------|
| | | Sensitive Population | | General Population | |
| Color Code | Meal Frequency | Number of Lakes | % of Lakes | Number of Lakes | % of Lakes |
| Blue | 8 | 0 | 0.0% | 1 | 3.6% |
| Green | 4 | 0 | 0.0% | 16 | 57.1% |
| Yellow | 2 | 3 | 10.7% | 9 | 32.1% |
| Orange | 1 | 17 | 60.7% | 0 | 0.0% |
| Red | 0 | 6 | 21.4% | 0 | 0.0% |
| Light Blue (No Advice) | N/A | 2 | 7.1% | 2 | 7.1% |
| Total Lakes with Advice | | 26 | 92.9% | 26 | 92.9% |
| Total Lakes Depicted | | 28 | | 28 | |

| | | St. Croix - Wisconsin | | | |
|-------------------------|----------------|-----------------------|------------|--------------------|------------|
| | | Sensitive Population | | General Population | |
| Color Code | Meal Frequency | Number of Lakes | % of Lakes | Number of Lakes | % of Lakes |
| Blue | 8 | 0 | 0.0% | 17 | 22.7% |
| Green | 4 | 0 | 0.0% | 29 | 38.7% |
| Yellow | 2 | 24 | 32.0% | 5 | 6.7% |
| Orange | 1 | 23 | 30.7% | 0 | 0.0% |
| Red | 0 | 4 | 5.3% | 0 | 0.0% |
| Light Blue (No Advice) | N/A | 24 | 32.0% | 24 | 32.0% |
| Total Lakes with Advice | | 51 | 68.0% | 51 | 68.0% |
| Total Lakes Depicted | | 75 | | 75 | |

| | | All Wisconsin Lakes Combined | | | |
|-------------------------|----------------|------------------------------|------------|--------------------|------------|
| | | Sensitive Population | | General Population | |
| Color Code | Meal Frequency | Number of Lakes | % of Lakes | Number of Lakes | % of Lakes |
| Blue | 8 | 0 | 0.0% | 44 | 13.0% |
| Green | 4 | 1 | 0.3% | 159 | 46.9% |
| Yellow | 2 | 69 | 20.4% | 74 | 21.8% |
| Orange | 1 | 164 | 48.4% | 3 | 0.9% |
| Red | 0 | 46 | 13.6% | 0 | 0.0% |
| Light Blue (No Advice) | N/A | 59 | 17.4% | 59 | 17.4% |
| Total Lakes with Advice | | 280 | 82.6% | 280 | 82.6% |
| Total Lakes Depicted | | 339 | | 339 | |

APPENDIX 5: Summary of 2020 Lake Color Code Assignments

| | | Michigan 1842 Ceded Territory | | | |
|-------------------------|----------------|-------------------------------|------------|--------------------|------------|
| | | Sensitive Population | | General Population | |
| Color Code | Meal Frequency | Number of Lakes | % of Lakes | Number of Lakes | % of Lakes |
| Blue | 8 | 0 | 0.0% | 6 | 6.9% |
| Green | 4 | 0 | 0.0% | 24 | 27.6% |
| Yellow | 2 | 9 | 10.3% | 20 | 23.0% |
| Orange | 1 | 27 | 31.0% | 1 | 1.1% |
| Red | 0 | 15 | 17.2% | 0 | 0.0% |
| Light Blue (No Advice) | N/A | 36 | 41.3% | 36 | 41.3% |
| Total Lakes with Advice | | 51 | 58.6% | 51 | 58.6% |
| Total Lakes Depicted | | 87 | | 87 | |

| | | Minnesota 1837 Ceded Territory | | | |
|-------------------------|----------------|--------------------------------|------------|--------------------|------------|
| | | Sensitive Population | | General Population | |
| Color Code | Meal Frequency | Number of Lakes | % of Lakes | Number of Lakes | % of Lakes |
| Blue | 8 | 2 | 2.8% | 22 | 31.0% |
| Green | 4 | 5 | 7.0% | 4 | 5.6% |
| Yellow | 2 | 17 | 23.9% | 3 | 4.2% |
| Orange | 1 | 2 | 2.8% | 0 | 0.0% |
| Red | 0 | 3 | 4.2% | 0 | 0.0% |
| Light Blue (No Advice) | N/A | 42 | 59.2% | 42 | 59.2% |
| Total Lakes with Advice | | 29 | 40.8% | 29 | 40.8% |
| Total Lakes Depicted | | 71 | | 71 | |

| | | All Lakes (Wisconsin, Michigan, Minnesota) Combined | | | |
|-------------------------|----------------|---|------------|--------------------|------------|
| | | Sensitive Population | | General Population | |
| Color Code | Meal Frequency | Number of Lakes | % of Lakes | Number of Lakes | % of Lakes |
| Blue | 8 | 2 | 0.4% | 70 | 14.2% |
| Green | 4 | 6 | 1.2% | 185 | 37.5% |
| Yellow | 2 | 93 | 18.9% | 97 | 19.7% |
| Orange | 1 | 191 | 38.7% | 4 | 0.8% |
| Red | 0 | 64 | 12.9% | 0 | 0.0% |
| Light Blue (No Advice) | N/A | 137 | 27.8% | 137 | 27.8% |
| Total Lakes with Advice | | 356 | 72.2% | 356 | 72.2% |
| Total Lakes Depicted | | 493 | | 493 | |

^a Tables for the Wisconsin tribes indicate lakes appearing on that tribe's map, which includes Mille Lacs, Minnesota.

APPENDIX 6: R Code for Assigning Lake Color Codes

Appendix 6: R Code for Generating Upper 75% Confidence and Prediction Bounds used to Assign Lake Color Codes Indicating Consumption Frequency Advice (Written by Brian Brost, GLIFWC Data Analyst)

```
#READ DATA INTO R IN FROM CSV FILE FORMAT
mehg <- read.csv("C:\\Users\\skmos\\Documents\\Moses GLIFWC\\Mercury Maps
2020\\Mercury_Database_2020_Maps.csv ")

head(mehg);tail(mehg) #INSPECT FIRST AND LAST 6 ROWS OF mehg OBJECT
str(mehg)
table(table(mehg$MWBC)) #TABLE OF SAMPLE SIZES

#SET WORKING DIRECTORY
setwd("C:\\Users\\skmos\\Documents\\Moses GLIFWC\\Mercury Maps 2020\\R Output Files\\")

#EXECUTING FUNCTION MeHg.reg WILL OUTPUT THREE FILES TO THE WORKING
DIRECTORY:
#intervals.csv, model_summary.csv, AND graphs.pdf. IF THESE FILES ALREADY EXIST
#IN THIS LOCATION, THEY WILL BE OVERWRITEN.

#BEFORE EXECUTING MeHg.reg, THE FUNCTION NEEDS TO BE LOADED INTO THE
R WORKSPACE.
#THIS IS ACCOMPLISHED BY RUNNING THE LINES OF CODE DEFINING THE
FUNCTION BELOW.

head(mehg)
models <- MeHg.reg(lake=Lake, county=County, state=State, mwbc=MWBC, length=Inches,
  MeHg=Hg.ppm, data=mehg, sim=FALSE)
models$intervals #CONFIDENCE AND PREDICTION BOUNDS, ETC.
models$model.summary #MODEL SUMMARY INFORMATION
as.data.frame(table(models$intervals$comment)) #TABULATE METHODS FOR SETTING
CONSUMPTION GUIDELINE

#-----
#----- Function MeHg.reg -----
#-----

#AUTHOR: B. BROST
#DATE: 23 NOV 2011
#DESCRIPTION: IMPLIMENTS METHODS OF MADSEN ET AL. 2008
#INPUTS: lake = name of variable in data containing lake names; county = name of
#variable in data containing county names; state = name of variable in data
#containing state names; mwbc = name of variable in data containing master water
#body ID codes; length = name of variable in data containing length measurements
#of walleye; MeHg = name of variable in data containing MeHg measurements; data =
#data frame containing preceding variables
```

APPENDIX 6: R Code for Assigning Lake Color Codes

```
#OUTPUTS: intervals.csv contains upper 75% confidence and prediction intervals
#for each lake; model_summary.csv contains estimated model parameters, etc. from
#regressions; graphs.pdf contains graphs for each lake. All outputs are placed in
#the working directory.
#DEPENDS ON: arm PACKAGE
#-----
#-----

library(arm)

MeHg.reg <- function(lake, county, state, mwbc, length, MeHg, data, sim=FALSE){

  #PULL VARIABLES OUT OF data OBJECT, CONVERT TO PROPER CASE, ETC.
  lake <- eval(substitute(lake), envir=data)
  lake <- gsub("(\\w)(\\w*)", "\\U\\1\\L\\2", lake, perl=TRUE) #CONVERT LAKES TO
  PROPER CASE
  lake <- sub("L$", "Lake", lake) #REPLACE LAST "L" AT END OF STRING WITH
  "LAKE"
  lake <- sub("^L\\s", "Lake ", lake, perl=TRUE) #REPLACE FIRST "L " AT START OF
  STRING WITH "LAKE"
  lake <- sub("\\sL\\s", " Lake ", lake, perl=TRUE) #REPLACE " L " IN MIDDLE OF
  STRING WITH "LAKE"
  lake <- sub("FI$", "Flowage", lake) #REPLACE "FI" AT END OF STRING WITH
  "Flowage"
  lake <- sub("Res$", "Reservoir", lake) #REPLACE "Res" AT END OF STRING WITH
  "Reservoir"
  county <- eval(substitute(county), envir=data)
  county <- paste(gsub("(\\w)(\\w*)", "\\U\\1\\L\\2", county, perl=TRUE), "County", sep="
  ")
  state <- eval(substitute(state), envir=data)
  mwbc <- eval(substitute(mwbc), envir=data)
  length <- eval(substitute(length), envir=data)
  MeHg <- eval(substitute(MeHg), envir=data)

  #CREATE NEW DATA FRAME
  df <- data.frame(lake=lake, county=county, state=state, mwbc=mwbc, length=length,
  MeHg=MeHg)

  #CREATE EMPTY DATA FRAMES TO STORE OUTPUT
  intervals <- data.frame(lake=NA, county=NA, state=NA, mwbc=NA, y_20=NA,
  upper_ci=NA,
    upper_pi=NA, n=NA, length_range=NA, b1=NA, comment=NA)
  model.summary <- data.frame(lake=NA, county=NA, state=NA, mwbc=NA, n=NA,
  length_min=NA,
    length_max=NA, b0=NA, se_b0=NA, p_b0=NA, b1=NA, se_b1=NA, p_b1=NA,
  sigma=NA, R2=NA, R2_adj=NA)
```

APPENDIX 6: R Code for Assigning Lake Color Codes

```

#SET UP PLOTTING DEVICE
pdf("graphs.pdf")

#LOOP THROUGH EACH LAKE
for(i in unique(df$mwbc)){

  nd <- df[df$mwbc==i,]
  n <- nrow(nd)
  x.bar <- mean(nd$length) #MEAN LENGTH

  model <- lm(MeHg ~ length, data=nd) #REGRESSION MODEL

  #REGRESSION FOR LAKES WITH >= 4 SAMPLES SPANNING >= 5
  INCHES AND b1 > 0
  if(n >= 4 & max(nd$length)-min(nd$length) >= 5 & coef(model)[2] > 0){

    y.20 <- as.numeric(coef(model)[1]+20*coef(model)[2]) #PREDICTED Y
    AT X=20
    comment <- "Regression method: range(length) >= 5 inches, and b1 > 0"
    #METHOD USED TO DEVELOP CONSUMPTION
    GUIDELINE

    #CALCULATE UPPER CONFIDENCE INTERVAL BOUND FOR
    X=20
    upper.ci <- predict(model, newdata=data.frame(length=20),
    interval="confidence",
    level=0.5)[3]

    #CALCULATE UPPER PREDICTION INTERVAL BOUND FOR X=20
    upper.pi <- predict(model, newdata=data.frame(length=20),
    interval="prediction",
    level=0.5)[3]

    #PLOT DATA FOR LAKE
    xmax <- ifelse(max(nd$length)>=20, max(nd$length), 20) #UPPER X-
    LIMIT FOR PLOT
    ymax <- max(max(nd$MeHg*1.05), upper.pi*1.05) #UPPER Y-LIMIT
    FOR PLOT

    plot(nd$length, nd$MeHg, yaxt="n", xlim=c(min(nd$length), xmax),
    ylim=c(min(nd$MeHg), ymax), xlab = "Length (inches)",
    ylab=expression(paste("Methylmercury Concentration (" , mu,
    "g/g)", sep="")),
    main=paste(nd$lake[1], nd$county[1], nd$state[1], sep=", ")
    axis(2, las=1)
  }
}

```

APPENDIX 6: R Code for Assigning Lake Color Codes

```

        if(sim==TRUE){ #DISPLAY UNCERTAINTY IN FITTED
REGRESSION MODELS USING SIMULATIONS
        model.sim <- sim(model, n=1000)
        apply(model.sim@coef, 1, function(x) abline(a=x[1], b=x[2],
col="gray"))
        points(nd$length, nd$MeHg)
        }

        abline(model, lty=1) #ADD REGRESSION LINE TO PLOT
        points(20, upper.ci, pch=16, col="dodgerblue") #ADD UPPER CI
BOUND FOR X=20 TO PLOT
        points(20, upper.pi, pch=16, col="red") #ADD UPPER PI BOUND FOR
X=20 TO PLOT

        #CONFIDENCE BANDS PER CRAWLEY 2007
        xv <- seq(0,40, 0.1) #VECTOR OF X-VALUES
        yv <- predict(model, newdata=data.frame(length=xv),
            interval="confidence", level=0.5) #CI BOUND FOR PREDICTED
Y-VALUES
        matlines(xv, yv, lty=c(0,0,2), col="dodgerblue") #ADD CONFIDENCE
INTERVAL BOUND TO PLOT
        yv <- predict(model, newdata=data.frame(length=xv),
            interval="prediction", level=0.5) #PI BOUND FOR PREDICTED
Y-VALUES
        matlines(xv, yv, lty=c(0,0,2), col="red") #ADD PREDICTION
INTERVAL BOUND PLOT
        legend("topleft", c("Regression Line", "75% Prediction Bound", "75%
Confidence Bound"),
            lty=c(1,2,2), col=c(1,"red", "dodgerblue"), bty="n", cex=0.75)
#ADD LEGEND

        #COMPILE MODEL SUMMARY OUTPUT
        model.summary <- rbind(model.summary, data.frame(lake=nd$lake[1],
county=nd$county[1],
            state=nd$state[1], mwbc=nd$mwbc[1], n=n,
length_min=min(nd$length),
            length_max=max(nd$length), b0=coef(model)[1],
se_b0=se.coef(model)[1],
            p_b0=summary(model)$coefficients[1,4], b1=coef(model)[2],
se_b1=se.coef(model)[2],
            p_b1=summary(model)$coefficients[2,4],
sigma=summary(model)$sigma, R2=summary(model)$r.squared,
            R2_adj=summary(model)$adj.r.squared))
        }

```

APPENDIX 6: R Code for Assigning Lake Color Codes

```

#MEAN MeHg METHOD FOR LAKES WITH >= 4 SAMPLES, BUT
SAMPLES SPAN < 5 INCHES, OR b1 <=0
  if(n >= 4 & (max(nd$length)-min(nd$length) < 5 | coef(model)[2] <= 0)){
    y.20 <- NA
    y.bar <- mean(nd$MeHg) #MEAN MeHg

#GENERATE COMMENT TO DESCRIBE METHOD USED TO
DEVELOP CONSUMPTION GUIDELINE
  if(max(nd$length)-min(nd$length) < 5) comment <- "Mean MeHg
method: range(length) < 5 inches"
  if(coef(model)[2] <= 0) comment <- "Mean MeHg method: b1 <=0"
  if(max(nd$length)-min(nd$length) < 5 & coef(model)[2] <= 0) comment
<- "Mean MeHg method: range(length) < 5 inches and b1 <=0"

#CALCULATE UPPER CONFIDENCE BOUND FOR X=20
t <- qt(0.75, (n-1)) #P[X>x]
upper.ci <- y.bar+t*sqrt(var(nd$MeHg)/n) #MADSEN ET AL. 2008 EQ 4

#CALCULATE UPPER PREDICTION BOUND FOR X=20
upper.pi <- y.bar+t*sqrt(var(nd$MeHg)*(1+1/n)) #MADSEN ET AL.
2008 EQ 5

#PLOT DATA FOR LAKE
ymax <- max(max(nd$MeHg*1.05), upper.pi*1.05) #UPPER Y-LIMIT
FOR PLOT
plot(nd$length, nd$MeHg, yaxt="n", ylim=c(min(nd$MeHg), ymax), xlab
= "Length (inches)",
      ylab=expression(paste("Methylmercury Concentration (", mu,
" g/g)", sep="")),
      main=paste(nd$lake[1], nd$county[1], nd$state[1], sep=", "))
axis(2, las=1)
abline(h=y.bar)
abline(h=upper.ci, lty=2, col="dodgerblue") #ADD HORIZONTAL LINE
TO PLOT AT Y=upper.ci
abline(h=upper.pi, lty=2, col="red") #ADD HORIZONTAL LINE TO
PLOT AT Y=upper.pi
legend("topleft", c("Mean MeHg", "75% Prediction Bound", "75%
Confidence Bound"),
      lty=c(1,2,2), col=c(1,"red", "dodgerblue"), bty="n", cex=0.75)
#ADD LEGEND
  }

  if(n < 4) {
    y.20 <- NA
    upper.ci <- NA
    upper.pi <- NA
  }

```

APPENDIX 6: R Code for Assigning Lake Color Codes

```
        comment <- "No analysis performed: n < 4"
      }

      legend("topright", paste("Mean length of sampled walleye = ", round(x.bar,2),
sep=""),
            pch="", cex=0.75, xjust=1, bty="n") #ADD MEAN LENGTH TO
PLOT

      #COMPILE CONFIDENCE/PREDICTION BOUND OUTPUT
      intervals <- rbind(intervals, data.frame(lake=nd$lake[1], county=nd$county[1],
state=nd$state[1],
            mwbc=nd$mwbc[1], y_20=y.20, upper_ci=upper.ci, upper_pi=upper.pi,
n=n,
            length_range=max(nd$length)-min(nd$length), b1=coef(model)[2],
comment=comment))
      }
      dev.off() #WRITE PDF WITH ONE PAGE PER LAKE

      #PRETTY UP NUMERIC OUTPUT
      intervals <- intervals[-1,]
      row.names(intervals) <- 1:nrow(intervals)
      model.summary <- model.summary[-1,]
      row.names(model.summary) <- 1:nrow(model.summary)

      #WRITE NUMERIC OUTPUT
      write.csv(intervals, "intervals.csv", row.names=TRUE)
      write.csv(model.summary, "model_summary.csv", row.names=TRUE)

      #FUNCTION RETURNS NUMERIC OUTPUT
      list(intervals = intervals, model.summary = model.summary)
    }
  }
```