

# Lake Michigan/Green Bay Research Priorities - 2021

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These priority research needs were developed by the WDNR Lake Michigan Fisheries Team to encourage progress towards meeting objectives in the Lake Michigan Integrated Fisheries Management Plan and, in some cases, Lake Michigan Fish Community Objectives (FCOs) set forth by the Great Lakes Fishery Commission's Lake Michigan Committee. Interested researchers should review the LMIFMP, FCOs, as well as the latest version of the State of Lake Michigan documents for additional background information concerning these research priorities. The FCOs are available by searching the GLFC web site ([www.glfc.org](http://www.glfc.org)). The LMIFMP can be found on the WDNR website. The current list of priority research questions identified by the WDNR Lake Michigan Fisheries Team are listed in no particular order of importance, but any innovative research project that clearly advances the achievement of FCOs or objectives within the LMIFMP will be encouraged, even if not included in the specific list of priority research questions. Researchers are requested to discuss potential projects with Lake Michigan Fisheries Team members.

| Species     | Research Item  | WDNR Contact  |
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| Walleye     | Recruitment by location & habitat (year class structure) <u>What are the population characteristics of walleye in Green Bay? Is recruitment and year class strength the same across Green Bay or are there areas of Green Bay that contribute more to the overall abundance of walleye in the bay? What factors lead to successful recruitment? What are the adult population estimates for Menominee, Peshtigo, Oconto, Fox and Sturgeon Bay?</u> | Mike Donofrio<br><a href="mailto:Michael.donofrio@wisconsin.gov">Michael.donofrio@wisconsin.gov</a><br>715-923-1156 |
| Muskellunge | Propagation issues and VHS disinfection techniques <u>What new techniques are available for building new broodstock lake populations to address propagation shortfalls? Is an approved technique available to disinfect eggs? Develop spawning methods for inland broodstock lakes.</u>  | Mike Donofrio<br><a href="mailto:Michael.donofrio@wisconsin.gov">Michael.donofrio@wisconsin.gov</a><br>715-923-1156 |
| Muskellunge | Genetics <u>What is the genetic structure/ strain in Wisconsin waters of Lake Michigan (to lend support to our stocking strategy)?</u>   | Mike Donofrio<br><a href="mailto:Michael.donofrio@wisconsin.gov">Michael.donofrio@wisconsin.gov</a><br>715-923-1156 |
| Muskellunge | Spawning and Recruitment. <u>Can we add to information already collected to help determine where are Great Lakes spotted musky spawning in Green Bay, Fox River, and other tributaries? What sort of habitat is being used for spawning and are there projects that can be completed to enhance the amount of spawning habitat available?</u>  | Mike Donofrio<br><a href="mailto:Michael.donofrio@wisconsin.gov">Michael.donofrio@wisconsin.gov</a><br>715-923-1156 |

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| Northern Pike   | Population characteristics (P.E., growth, age distribution, harvest). <u>Can we gain adequate information on the adult population of northern pike in Green Bay to affect management/regulation changes?</u>   | Tammie Paoli<br><a href="mailto:Tammie.paoli@wisconsin.gov">Tammie.paoli@wisconsin.gov</a><br>715-582-5052   |
| Northern Pike   | Spawning habitat (identifying locations – Lake Michigan tributaries). <u>What streams &amp; wetlands do northern pike utilize for spawning Lake MI?</u><br>Identify and collect data from other Lake Michigan populations for comparison with Green Bay stocks. <u>What is the status of populations for Mink River, North Bay, Rowley Bay plus Sheboygan, Kewaunee, Manitowoc counties need further work?</u> | Tammie Paoli<br><a href="mailto:Tammie.paoli@wisconsin.gov">Tammie.paoli@wisconsin.gov</a><br>715-582-5052<br><br>Scott Hansen<br><a href="mailto:Scott.hansen@wisconsin.gov">Scott.hansen@wisconsin.gov</a><br>920-746-2864       |
| Northern Pike   | Habitat Projects <u>Are there significant contributions to the Green Bay and Lake Michigan populations from restored habitat and wetland projects? Need to evaluate restoration techniques and strategies</u>  | Tammie Paoli<br><a href="mailto:Tammie.paoli@wisconsin.gov">Tammie.paoli@wisconsin.gov</a><br>715-582-5052   |
| Smallmouth Bass | Genetics. <u>What, if any, types of genetic differences exist among the Lake Michigan “recognized populations” (Sheboygan, Milwaukee, Manitowoc and Kewaunee rivers)?</u>  | Scott Hansen<br><a href="mailto:Scott.hansen@wisconsin.gov">Scott.hansen@wisconsin.gov</a><br>920-746-2864<br><br>Aaron Schiller<br><a href="mailto:Aaron.Schiller@wisconsin.gov">Aaron.Schiller@wisconsin.gov</a><br>414-852-5488 |
| Smallmouth Bass | Spawning site fidelity/homing, recruitment and general movement patterns. Potential impact of tournament relocation. <u>What are the movement patterns of smallmouth bass in Green Bay? Are there homing tendencies? Does relocation of fish during tournaments have the potential to impact smallmouth distribution? What are the bottlenecks for enhanced recruitment?</u>                                   | Scott Hansen<br><a href="mailto:Scott.hansen@wisconsin.gov">Scott.hansen@wisconsin.gov</a><br>920-746-2864   |
| Smallmouth Bass | Population characteristics (P.E., growth, age distribution, harvest) <u>Are differences known about stocks in Green Bay and remainder of Lake Michigan?</u>  | Scott Hansen<br><a href="mailto:Scott.hansen@wisconsin.gov">Scott.hansen@wisconsin.gov</a><br>920-746-2864   |
| Smallmouth Bass | Fish Health <u>What is the cause of lesions on smallmouth bass in the general Sturgeon Bay</u>   | Scott Hansen<br><a href="mailto:Scott.hansen@wisconsin.gov">Scott.hansen@wisconsin.gov</a>   |

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|               | <u>area?</u>   | 920-746-2864  |
| Yellow Perch  | Southern Lake Michigan Population. <u>How to develop a fishable population (habitat enhancement)?</u>  | Aaron Schiller<br><a href="mailto:Aaron.Schiller@wisconsin.gov">Aaron.Schiller@wisconsin.gov</a><br>414-852-5488  |
| Lake Sturgeon | Survival & outmigration rates of stocked fish (Milwaukee, Kewaunee Rivers). <u>Utilize fish surveys (nets, seines, nighttime visual) to assess survival and outmigration rates in these two systems. Develop survival rate for newly stocked fish into these systems. Juveniles are being caught in gill nets off Milwaukee river. Analyze backlog of genetic samples.</u>   | Mike Donofrio<br><a href="mailto:Michael.donofrio@wisconsin.gov">Michael.donofrio@wisconsin.gov</a><br>715-923-1156<br><br>Aaron Schiller<br><a href="mailto:Aaron.Schiller@wisconsin.gov">Aaron.Schiller@wisconsin.gov</a><br>414-852-5488 |
| Lake Sturgeon | Green Bay restoration. <u>Are sturgeon passed around Menominee and Park Mill dams successfully recruiting (conduct larval surveys) below Grand Rapids dam? Conduct genetic parentage study.</u>  | Mike Donofrio<br><a href="mailto:Michael.donofrio@wisconsin.gov">Michael.donofrio@wisconsin.gov</a><br>715-923-1156   |
| Lake Sturgeon | Larval and juvenile migration from feral populations. <u>Can movements of juvenile sturgeon be tracked at spawning rivers, Green Bay and Lake Michigan?</u>  | Mike Donofrio<br><a href="mailto:Michael.donofrio@wisconsin.gov">Michael.donofrio@wisconsin.gov</a><br>715-923-1156<br><br>Aaron Schiller<br><a href="mailto:Aaron.Schiller@wisconsin.gov">Aaron.Schiller@wisconsin.gov</a><br>414-852-5488 |
| Rainbow Trout | Habitat evaluation of all Lake Michigan streams. <u>Conduct habitat evaluations of all streams for comparison with other Great Lakes steelhead streams. Identify priority areas for habitat improvement projects (for access, hold over areas for spawning adults, spawning, nursery areas, etc.) with reasonable expectations based on watershed scaled factors limiting wild production. Consider contributions of wild production to lake-wide predator/prey balance, and how this might be impacted by habitat improvements.</u> | Nick Legler<br><a href="mailto:Nicholas.legler@wisconsin.gov">Nicholas.legler@wisconsin.gov</a><br>920-746-5112   |

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| Rainbow Trout  | CWT use to determine survival by location stocked, wild production, and to evaluate strains. <u>Which steelhead stocking locations are most effective (i.e., is survival better at certain locations; which locations contribute the most to the fishery; north vs. south; big vs. small rivers; what factors may be limiting survival)?</u> Also evaluate different genetic strains of stocked steelhead (i.e., when and where are different strains being caught; which strains provide the best fishery, etc.). <u>This work is ongoing with the mass marking program.</u> | Nick Legler<br><a href="mailto:Nicholas.legler@wisconsin.gov">Nicholas.legler@wisconsin.gov</a><br>920-746-5112  |
| Rainbow Trout  | Broodstock analysis. <u>More closely evaluate the difference between strains, specifically for run timing and how this timing differs now compared to traditionally (e.g., Chambers vs. Ganaraska vs. Skamania).</u> Have different genetic strains been maintained and does timing of spawning runs differ per strain? <u>This information is important for hatchery production, management decisions, and fishing/angler opportunities.</u>   | Nick Legler<br><a href="mailto:Nicholas.legler@wisconsin.gov">Nicholas.legler@wisconsin.gov</a><br>920-746-5112  |
| Chinook Salmon | Coded-wire tag study. <u>Complete additional analysis of CWT return data.</u> This work is ongoing with the mass marking program.   | Nick Legler<br><a href="mailto:Nicholas.legler@wisconsin.gov">Nicholas.legler@wisconsin.gov</a><br>920-746-5112  |
| Coho Salmon    | CWT use to determine contribution to fishery by north versus south stocking locations <u>Fingerlings vs. yearlings survival/contribution to harvest</u>   | Aaron Schiller<br><a href="mailto:Aaron.Schiller@wisconsin.gov">Aaron.Schiller@wisconsin.gov</a><br>414-852-5488 |
| Brown Trout    | Post-stocking survival (offshore vs. nearshore). <u>Is offshore stocking brown trout effective in increasing survival? To what extent does post-stocking predation play a role in survival of brown trout? Does prey availability and habitat influence movements from offshore stocking locations to nearshore?</u>  | Tammie Paoli<br><a href="mailto:Tammie.paoli@wisconsin.gov">Tammie.paoli@wisconsin.gov</a><br>715-582-5052       |
| Brown Trout    | Movements after stocking. <u>Where and when do brown trout move after they are stocked offshore, nearshore, or through the ice? What is the relative contribution for each port/county to overall brown trout harvest</u>   | Tammie Paoli<br><a href="mailto:Tammie.paoli@wisconsin.gov">Tammie.paoli@wisconsin.gov</a><br>715-582-5052       |

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|                                 | <u>(CWT study)?</u>  |   |
| Lake Whitefish                  | Recruitment in Green Bay tributaries- Peshtigo, Oconto, Fox and U.P. rivers. <u>Considering the success of the Menominee River whitefish recolonization, explore conditions that promoted recruitment there and in other Green Bay Rivers. (flows, habitat, etc.)?</u>   | Scott Hansen<br><a href="mailto:Scott.hansen@wisconsin.gov">Scott.hansen@wisconsin.gov</a><br>920-746-2864    |
| Lake Whitefish                  | Green Bay spawning potential- <u>Determine presence and abundance of Green Bay (e.g. Sturgeon Bay) spawning population(s)</u>  | Scott Hansen<br><a href="mailto:Scott.hansen@wisconsin.gov">Scott.hansen@wisconsin.gov</a><br>920-746-2864    |
| Lake Trout                      | Recruitment at known spawning locations. <u>Assess known reproduction impediments. Define and develop necessary indices for evaluating when rehabilitation goals have been achieved (LT Rehabilitation Strategy). Increased natural recruitment has been documented on offshore reefs – We should assess the genetics of wild recruits, especially as the recently-stocked Klondike strain reaches maturity.</u> | Laura Schmidt<br><a href="mailto:Laura.Schmidt@wisconsin.gov">Laura.Schmidt@wisconsin.gov</a><br>414-416-0591 |
| Cisco, Chub and Round Whitefish | Population characteristics & forage assessments <u>(P.E., life history, age, recruitment, diet). Can we gain adequate information on the adult population to affect management/regulation changes?</u>   | Brad Eggold<br><a href="mailto:Bradley.eggold@wisconsin.gov">Bradley.eggold@wisconsin.gov</a><br>414-303-0138 |
| Bloater Chub                    | Population modeling. <u>Develop a population model and estimate for bloater chub.</u>  | Brad Eggold<br><a href="mailto:Bradley.eggold@wisconsin.gov">Bradley.eggold@wisconsin.gov</a><br>414-303-0138 |
| Burbot                          | Population characteristics <u>(P.E., life history, age, recruitment, diet). Can we gain adequate information on the adult population to affect management/regulation changes?</u>  | Scott Hansen<br><a href="mailto:Scott.hansen@wisconsin.gov">Scott.hansen@wisconsin.gov</a><br>920-746-2864    |
| Habitat (general)               | Habitat identification and enhancement <u>Define for larger harbors like Kewaunee, Sturgeon Bay, Manitowoc, City of Green Bay, Sheboygan, Milwaukee. Continue development of habitat protection, restoration, and rehabilitation priorities through Environmental Principles.</u>  | Tom Meronek<br><a href="mailto:Thomas.meronek@wisconsin.gov">Thomas.meronek@wisconsin.gov</a><br>920-746-2868 |
| Miscellaneous                   | Economic value of sport & commercial   | Cheryl Masterson  |

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|               | fisheries in Lake Michigan- <u>Assign an economic value for the Lake Michigan fishery.</u>   | <a href="mailto:Cheryl.Masterson@wisconsin.gov">Cheryl.Masterson@wisconsin.gov</a><br>414-550-1831<br><br>Al Blizel<br><a href="mailto:Allen.Blizel@wisconsin.gov">Allen.Blizel@wisconsin.gov</a><br>920-559-0066 |
| Miscellaneous | Bioenergetics/diet study on piscivorous birds. <u>What is the diet composition of the cormorant population in northern Door County compared to cormorant colonies in southern Green Bay? How do cormorant and pelican diets differ in southern Green Bay, where both species are present?</u>  | Tammie Paoli<br><a href="mailto:Tammie.paoli@wisconsin.gov">Tammie.paoli@wisconsin.gov</a><br>715-582-5052  |
| Miscellaneous | Tournament mortality- <u>What are the effects of movement of fish, temperature issues, and baro-trauma on populations of smallmouth bass and walleye?</u>  | Scott Hansen<br><a href="mailto:Scott.hansen@wisconsin.gov">Scott.hansen@wisconsin.gov</a><br>920-746-2864  |
| Miscellaneous | Commercial Fishery. <u>What is the bycatch from each commercial gear and in each area of Lake Michigan?</u>  | Tom Meronek<br><a href="mailto:Thomas.meronek@wisconsin.gov">Thomas.meronek@wisconsin.gov</a><br>920-746-2868   |
| Prey fish     | Nearshore alewife and smelt populations. <u>Assess potential contributions of alewife and smelt from nearshore habitats (&lt;15 m) to lake-wide population.</u>  | Aaron Schiller<br><a href="mailto:Aaron.Schiller@wisconsin.gov">Aaron.Schiller@wisconsin.gov</a><br>414-852-5488  |
| Miscellaneous | Creel survey. -- Winter harbor and stream fishing in Lake Michigan has never been surveyed by creel, but there is strong interest by stakeholders to enhance our knowledge of these fisheries. Alternatives to traditional creel which might include mail surveys or GLAD app from MI Sea Grant or other methods. – Summer explore other methods to collect angler data such as live cameras and drones and related applications to recent northern Wisconsin student research project focused on options for collecting creel data. | Laura Schmidt<br><a href="mailto:Laura.schmidt@wisconsin.gov">Laura.schmidt@wisconsin.gov</a><br>414-416-0591   |