

February 2018

*Compilation of Research Activities Related to Lake Whitefish (*Coregonus clupeaformis*) Research in the Upper Great Lakes Between the Years 2007 - 2018*

SO-JUNG YOUN
MICHIGAN STATE UNIVERSITY

Introduction

Lake whitefish (*Coregonus clupeaformis*) has historically supported an economically and culturally valuable commercial fishery in the Great Lakes region (Fagan et al. 2017). In 2015, the state-licensed commercial harvest of lake whitefish from Lake Michigan was 766,941 round pounds with a total dockside value of \$1,625,915 (MDNR, 2016). However, yields of lake whitefish have fluctuated over the past 50 years, declining to all-time lows in the 1960s and 1970s, increasing in the 1980s and 1990s, then decreasing from the mid-1990s to present (Figure 1; Baldwin et al., 2000). Declines in lake whitefish have been attributed to overfishing, reduction in primary food sources (e.g. Diporeia) due to the invasion of dreissenid mussels, increased mortality from sea lamprey (*Petromyzon marinus*), and degradation of water quality and habitat due to increasing human population density and natural resource use and landscape level changes in the Great Lakes basin (Nalepa et al., 2005).

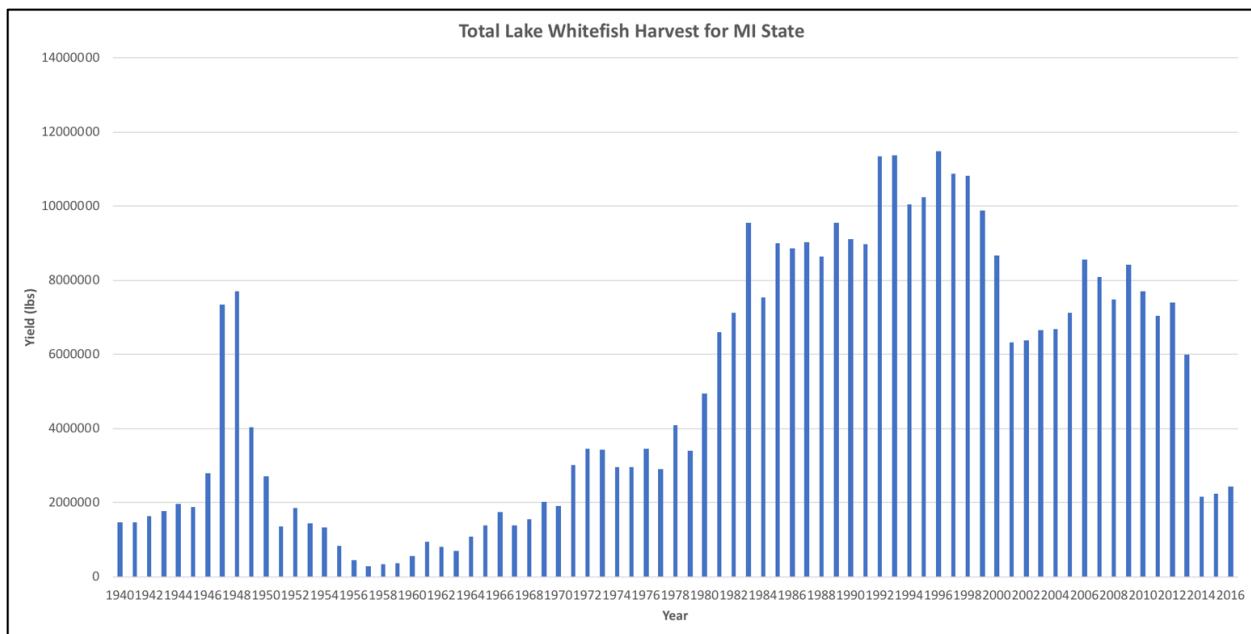


Figure 1. Yields of lake whitefish from the state of Michigan. Data were obtained from Baldwin et al. (2000) and MDNR.

Purpose of this study

The purpose of this study was to catalogue the nature, location, and timing of research on lake whitefish (*Coregonus clupeaformis*) in the upper Great Lakes over the past decade (2007 – 2018) in order to determine what research has been conducted and identify gaps in research and available data. This report identifies key investigators who have conducted lake whitefish research during this time period, the types of data they have been collecting, the data available for these fish and fisheries, and how these data may be accessed. Included in this report is a summary of investigator names, locations of study, and topic of research (e.g. the purpose for which the data were collected). The findings of this report will be shared with participants of

the Lake Whitefish Management Workshop (February 27 – 28, 2018) hosted by the Great Lakes Fishery Commission (GLFC) and Great Lakes Fishery Trust (GLFT).

Methods

Identifying Participants

Emails were sent to researchers who were known to be working on lake whitefish in the upper Great Lakes at universities and state, tribal, and federal agencies (Appendix 1). Initial survey participants were identified via recommendations from members of the Great Lakes Fisheries Trust Science Advisory Committee or because they were identified as a presenter (oral or poster) at the 2017 International Coregonid Symposium (10 – 15 September 2017 in Bayfield, WI) and whose title or abstract contained the keywords “lake whitefish” and “Huron”, “Michigan”, or “Superior”. These initial survey participants were then asked to identify additional investigators (e.g. provide name and contact information) who they knew currently were, or had been, engaged in lake whitefish research in the upper Great Lakes. This snowball sampling method enabled us to identify additional survey participants and ensure a more complete coverage of lake whitefish research programs that have been conducted in the upper Great Lakes since 2007.

Collecting Survey Responses

The survey focused on the nature, extent, and availability of information regarding lake whitefish research that survey participants were conducting in the upper Great Lakes between 2007 – 2018. The survey was developed with input from Dr. Tammy Newcomb (Michigan Department of Natural Resources; MDNR) and Dr. Bill Taylor (Michigan State University; MSU).

Potential participants were initially sent an introduction email and a copy of the survey (Appendix 2), so that participants had an opportunity to review the survey questions before an interview was scheduled. They were informed that they had the option to complete the survey by either email or phone call. If a survey was completed via email, a follow-up phone call was scheduled, if necessary, to obtain more detailed respondent from each survey participant. If no response to the introduction email was received within 1 week of the initial email contact date, a follow-up email was sent. This follow-up email asked the participant for available dates and times in which to schedule a phone interview in order to complete the survey via phone call. A total of 3 contact attempts (including the initial email) were made for each potential participant.

Results

The results presented in this report are a compilation of the individual responses received during the survey process. All information presented are aggregated across individuals.

Survey Participants

A total of 81 people was recommended for participation in the survey (Appendix 1). Of these 81 potential participants, complete survey responses were received from 32 participants (39.5% response rate). Of the remaining 49 people recommended for participation in the survey, we were unable to contact 9 people (no email address or phone number available), 25 people declined to participate (30.9%), and 15 people (18.5%) never responded to either the initial or follow-up emails. Most people who declined to participate in the survey cited lack of subject expertise (e.g. they did not work on lake whitefish), wrong geographical area (e.g. did not work in the upper Great Lakes), or project overlap with another respondent who we already contacted (e.g. we had already obtained a survey response from their project lead) as their reasons for declining to participate.

Lake Studied

Most studies focused on Lakes Michigan (21 studies mentioned conducting research on Lake Michigan; Appendix 3). There were 8 studies conducted on Lakes Huron and Superior, 6 studies on Lake Erie, and 3 studies on Lake Ontario.

Organization Collecting the Data

Organizations collecting data on lake whitefish (Appendix 3) spanned federal government organizations (6 organizations total), tribal organizations (6 total), universities (6 total), state or provincial government organizations (4 total), and others (4 total). Other organizations included nongovernmental organizations (NGOs) and private industries (e.g. Consumers Energy/DTE Energy).

Topic of Research

Based on survey responses, the topic of research (e.g. what data were collected) was divided into 13 categories (Appendix 3). Most projects focused on larval monitoring and recruitment topics (19 studies) or stock characteristics (16 studies; e.g. population abundance, adult lake whitefish indices). The stock characteristics category included data collection efforts done for biological monitoring purposes (e.g. collecting data for catch-at-age models). Some studies included more than one topic of research.

Purpose of Study

In addition to the specific topic of research, survey participants were asked to identify how the data they collected would be used (e.g. purpose of study). Based on survey responses, 12 categories were identified (Appendix 3). Some respondents identified more than one purpose for their data. For example, participants tended to include both development of statistical catch-at-age (SCAA) models and setting management goals as uses of their data. It was rare for

respondents to identify one purpose (e.g. development of SCAA model) and not the other (e.g. setting management goal). Additionally, all respondents who identified “Graduate research” as a purpose of their study also identified other uses for their data.

Accessibility of Data

Most respondents (24 out of 33; 72.7%) indicated that their data could be shared, as long as all partners who helped collect the data gave permission (Appendix 3). Six respondents (18.2%) indicated that their data could be shared, given some limitations. These limitations included publications currently in progress (e.g. data would not be shared until paper was published), QA/QC of data not conducted, or respondent requires co-authorship recognition for sharing data. Three respondents (9.1%) indicated that their data could not be shared. Reasons for indicating that data could not be shared generally tended to be because data collection was not yet complete or data had not yet been analyzed.

Funding Source

Funding sources for lake whitefish research (Appendix 3) spanned federal government sources (13), state/provincial sources (8), other sources of funding (5), tribal (3 sources), and universities (4 sources). Other sources of funding included nongovernmental organizations (NGOs), private industries, GLFT, and GLFC.

References

- Baldwin, N. A., Saalfeld, R. W., Dochoda, M. R., Buettner, H. J., and Eshenroder, R. L. 2000. Commercial fish production in the Great Lakes 1867-2000. <http://www.glfco.org/databases/commercial/commerc.php>
- Fagan, K., Koops, M. A., Arts, M. T., Sutton, T. M., Kinnunen, R. E., Muir, A. M., and Power, M. 2017. Lake whitefish (*Coregonus clupeaformis*) energy and nutrient partitioning in lakes Michigan, Erie, and Superior. *Journal of Great Lakes Research*, 43(1), 144 – 154.
- Michigan DNR. 2016. 2015 state-licensed commercial fishing data for Michigan. Lansing, MI.
- Nalepa, T., Mohr, L., Henderson, B., Madenjian, C., and Shneeburger, P. 2005. Lake whitefish and *Diporeia* spp. in the Great Lakes: an overview. In *Proceedings of a Workshop on the Dynamics of Lake Whitefish Coregonus clupeaformis) and the Amphipod Diporeia spp. in the Great Lakes*, eds. L. Mohr and T. Nalepa, pp. 3-20. Ann Arbor, MI: Great Lakes Fishery Commission Technical Report 66.

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Appendix 1: List of People Contacted for Participation in Survey

81 participants contacted

32 complete responses

25 declined to participate (lack of expertise, did not work in upper Great Lakes, other reason)

9 unable to contact (no email address or phone number found)

15 never responded to initial or follow-up emails

Kevin Donner	Brian Weidel
Matthew Bootsma	Dimitry Gorsky
Hannah Schaefer	Travis Brenden
Ron Kinnunen	Yingming Zhao
Gary Dawson	Yolanda Morbey
Tom Gorenflo	Erin Dunlop
Erik Olsen	Brian Sloss
Julie Hinderer	Dan Isermann
Matt Shackelford	David Caroffino
Mark Holey	Marten Koops
Kyle Kruger	Tim Johnson
Gary Towns	Michael Rennie
Barry Weldon	Jim Hoyle
Bill Mattes	Charles Madenjian
Bryan Matthias	Patrick Forsythe
Gretchen Hansen	Adam Cottrell
Allan Bell	Ryan Lauzon
Courtney Taylor	Wes Larson
Robin DeBruyne	Jory Jonas
Ed Roseman	Ted Treska
Zachary Amidon	Tracy Galarowicz
Scott Hansen	Scott DeBoe
Trent Sutton	Steve Lenart
Timothy O'Brien	Chris Olds
Greg Kennedy	Steve Pothoven
Bruce A. Manny	Ian Harding
James Boase	Paul Ripple
Thomas N. Todd	Nathan Barton
Wendylee Stott	Dale Hanson
Mark P. Ebener	Brad Silet
Lloyd Mohr	Amanda Stoneman
Jim Johnson	Jason Smith
Jeff Schaeffer	Don Uzarski
William J. Harford	Brandon Gerig
Christine Mayer	Vicki Lee
Tomas Höök	Ashley Moerke

Matt Herbert
Marian Shaffer
Chris Vandergoot
Lindsay Chadderton
Andrew Tucker

Dave Clapp
Randy Claramunt
Dave Fielder
Ji He

Appendix 2: Survey Form

Survey Questions

1. Who is collecting the data?
2. What data is being collected?
3. How long has the data been collected?
 - a. What time period(s) does it cover?
4. How is the data structured?
5. Why is the data being collected?
6. How is the data being analyzed?
7. How is the information being used?
8. Can the data be shared?
 - a. What are the limitations to sharing the information?
 - b. Is there a publication or report that can be shared from this work?
 - i. If yes, please attach a copy or provide citations
9. Who is funding this research?
10. Please list the names and contact information for others you know who are also conducting research on lake whitefish in the upper Great Lakes

Appendix 3: Summary of Aggregated Survey Responses

Frequency denotes the number of survey responses that mentioned a given item

Lake Studied

Lake Studied	Frequency
Michigan	21
Huron	8
Superior	7
Erie	6
Ontario	3

Organization Collecting the Data

Organization	Frequency
USGS Great Lakes Science Center	8
Michigan DNR	6
Ontario MNR	5
Central Michigan University	3
University of Toledo	3
NOAA	2
University of Wisconsin – Stevens Point	2
USGS	2
Wisconsin DNR	2
Consumers Energy/DTE Energy	1
CORA	1
DFO	1
GLFC	1
GLIFWC	1
Grand Traverse Band – Natural Resources Department	1
Great Lakes Indian Fish and Wildlife Commission	1
Green Bay Fish and Wildlife Conservation Office	1
Lake Superior Technical Committee	1
LGLFWCO	1
Little River Band of Ottawa Indians	1
Little Traverse Bay Bands of Odawa Indians	1
Michigan State University	1
NYSDEC	1

Purdue University	1
The Nature Conservancy	1
University of Wisconsin – Green Bay	1

Topic of Research

Topic of Research	Frequency
Larval sampling, YOY production, and recruitment	19
Stock characteristics	16
Spawning sites, egg characteristics, and egg retention	12
Commercial catch monitoring	9
Feeding behaviors and diet analyses	8
Genetic analysis	4
Bioenergetics	4
Lake whitefish movement and stock mixing	3
Otolith microchemistry	2
Historical habitat	2
Sport harvest monitoring	1
Bycatch of lake whitefish	1
Development of lake-wide ecosystem model	1
Effectiveness of barrier net	1

Purpose of Study

Purpose of Study	Frequency
Learn more about spawning and early life history	12
Feed into SCAA models	10
Setting management actions/goals or informing managers	10
Monitoring of stock(s)	6
Graduate research	5
Determine impacts of changes in food web or <i>Dreissenid</i> invasions	2
Develop Great Lakes food webs	2
Determine historic habitat locations	2
Develop/modify lake whitefish bioenergetics model	2
Explore relationship between lake whitefish and cisco	1

Monitor barrier net performance	1
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Accessibility of Data

Can the Data be Shared?	Frequency
Yes	18
With Limitations	7
No	9

Funding Source

Funding Source	Frequency
USGS Great Lakes Science Center	6
GLRI	5
Great Lakes Fish and Wildlife Restoration Act	4
Ontario MNR	4
GLFT	3
GLFC	3
MDNR	3
Central Michigan University	2
US Fish and Wildlife Service	2
NOAA	2
EPA	2
Wisconsin DNR	1
The Nature Conservancy	1
Michigan State University	1
Great Lakes Protection Fund (Canada-Ontario Agreement)	1
Office of Great Lakes – State of Wisconsin	1
Grand Traverse Band of Ottawa and Chippewa Indians	1
GLATOS	1
Little River Band of Odawa Indians	1
University of Minnesota – Duluth	1
USGS Ecosystems Mission Area	1
NYSDEC	1
Ohio DNR	1
Green Bay Fish and Wildlife Conservation Office	1
Sportfish and Restoration Act	1
NSERC grant	1

University of Windsor	1
Consumers Energy/DTE Energy	1
Great Lakes Indian Fish and Wildlife Commission	1

Appendix 4: Individual Survey Responses, Grouped by Lake

In cases where respondents described multiple discrete projects as part of their response, each project was listed individually (e.g. some PIs have multiple, separate projects listed).

Additionally, some PIs reported conducting studies in multiple lakes, so these studies appear for each lake category (e.g. a study conducted in Lakes Michigan and Superior appears under both *Lake Michigan Studies* and *Lake Superior Studies*)

Lake Michigan (21)

1. PI: Barry Weldon (Little River Band of Ottawa Indians; LRBOI)

Purpose of Study: Setting management actions/goals or informing managers; Monitoring of stock(s)

Available Data: Length, weight, sex, maturity, scales, otoliths, age, and lamprey wounding classification of lake whitefish; depth, water temperature, management unit, grid, latitude and longitude; commercial harvest. Data have been collected from 1999 – present.

Can Data be Shared? Yes

2. PI: Ted Treska and Dale Hanson (FWS, Green Bay Fish & Wildlife Conservation office, native species subprogram)

Purpose of Study: Feed into SCAA models

Available Data: Standardized gill net surveys (spring LWAP for which FWS surveys 4 locations: Manistique, Washington Island, Sturgeon Bay, and Sheboygan; 1998 – present); Hydroacoustic and mid-water trawl survey of Green Bay pelagic community (2012 - present)

Can Data be Shared? Yes

3. PI: Dan Isermann (University of Wisconsin-Stevens Point)

Purpose of Study: Feed into SCAA models

Available Data: stock characteristics of whitefish from Lake Michigan (estimate growth, mortality, fecundity, condition, and egg size) to compare among management zones and genetic stocks (2012 – 2013)

Can Data be Shared? Yes

4. PI: Dan Isermann (University of Wisconsin-Stevens Point)

Purpose of Study: Feed into SCAA models

Available Data: spawning site contribution and movements (acoustic transmitters implanted into 400 lake whitefish from 4 different spawning aggregates; 2017 – 2012)

Can Data be Shared? Not at this point (no data yet)

5. PI: Dave Caroffino (MDNR)

Purpose of Study: feed into SCAA models; setting management actions/goals or informing managers; learn more about spawning and early life history; graduate research

Available Data: commercial harvest/effort, biological monitoring, and age-0 juvenile catch

rates in nearshore seines (2013 – present); commercial biomonitoring (length, weight, age, lamprey wounds, sex, maturity, visceral fat index; 1986 – present); juvenile seining (count, length, specimens preserved for genetic analysis by UWSP; 2017 – present); maturity schedules of lake whitefish (MS research for Marissa Hammond, MSU)

Can Data be Shared? Yes

6. PI: Kevin Donner (Little Traverse Bay Bands of Odawa Indians)

Purpose of Study: Feed into SCAA models; Learn more about spawning and early life history; Monitoring of stocks

Available Data: YOY LWF between 25 – 60mm abundance, biodata, associated environmental data, some other species data, some otolith microchemistry data (using seines; 2013 – present); larval whitefish abundance, biodata, associated environmental data (neuston; 2012 – present); gillnetting and commercial harvest (LWF all sizes; 1998 – present)

Can Data be Shared? Yes

7. PI: Don Uzarski (Central Michigan University; CMU)

Purpose of Study: Graduate research; Learn more about spawning and early life history

Available Data: Seine-hauls from shore at two sites on Sand Bay of Beaver Island. All fish are identified and enumerated. These data are accompanied by YSI multiprobe - temperature (°C), dissolved oxygen (mg/L and % saturation), chlorophyll a (mg/L), oxidation-reduction potential (mV), total dissolved solids (mg/L), turbidity (Nephelometric Turbidity Units; NTU), pH (Std units), and specific conductance (µS/cm). Raw water samples are also collected for later nutrient analyses – NH₄, NO₂/NO₃, TN, SRP, TP. Data have been collected from 2015 – present.

Can Data be Shared? Yes

8. PI: Erik Olsen (Grand Traverse Band – Natural Resources Department)

Purpose of Study: Feed into SCAA models; Monitoring of stock(s)

Available Data: Biological data from tribal commercial fishery (both gillnet and trap net) in northern Lake Michigan (1985 - present); lake whitefish index (LWI; 2000 – present); bycatch in Lake-wide Assessment Plan survey (LWAP; 1992 – present); bycatch in Lake trout fall spawning survey (LTF; 1999 – present); bycatch in spring larval beach seining (LBS; 2017 – present)

Can Data be Shared? Yes

9. PI: Patrick Forsythe (University of Wisconsin Green Bay)

Purpose of Study: Learn more about spawning and early life history

Available Data: sampling for drifting larval lake whitefish from lower reaches of Menominee River: river, sampling day, time of sampling, flow rates through nets, number of larval fish collected during each net tow (2016)

Can Data be Shared? Not at the present time

- 10. PI:** Patrick Forsythe (University of Wisconsin Green Bay)
Purpose of Study: Learn more about spawning and early life history
Available Data: sampling for drifting larval lake whitefish for 4 major tributaries of Green Bay (Menominee, Peshtego, Okanto, and Fox rivers); river, sampling day, time of sampling, flow rates through nets, number of larval fish collected during each net tow, otolith microchemistry (2017 – 2019)
Can Data be Shared? Not at the present time
- 11. PI:** Scott Hansen (Wisconsin DNR)
Purpose of Study: Monitoring of stock(s); Feed into SCAA models; Setting management actions/goals or informing managers
Available Data: annual adult sampling in Lake Michigan and Green Bay using gill nets and boom shocking gear (late 1990s - present); sampling for juveniles in Green Bay in the spring using small-mesh gill nets; yearling indices in summer for YOY production in Green Bay (and a bit in Lake Michigan) via trawling (1997 – present); length, weight, and age information via otolith aging (1990s – present); commercial fishery harvest (1960s – present); genetic stock identification (joint with UW Stevens Point; 2005 – 2006); larval whitefish ecology production and escapement in west-shore tributaries (2009 – 2015); otolith microchemistry (identifying fish based on natal river or Green Bay area); Northern whitefish stock (Dorr County in Lake Michigan) and stocks in rivers and Green Bay; tagging whitefish in tributaries and several stocks in Green Bay to see how these stocks are mixing
Can Data be Shared? Yes
- 12. PI:** Tracy Galarowicz
Purpose of Study: Learn more about spawning and early life history
Available Data: Coregonid egg deposition (2009 – 2016)
Can Data be Shared? Yes, given permission from MDNR and TNC (The Nature Conservancy)
- 13. PI:** Trent Sutton (University of Alaska Fairbanks)
Purpose of Study: Learn more about spawning and early life history; Determine impacts of changes in food web or dreissenid invasions
Available Data: Female data (catch, age, size, proximate composition, fatty acid composition), egg characteristics, larval and juvenile catches and proximate composition (from subset of locations), and juvenile lake whitefish food habits for multiple stocks (fall 2004 – summer 2006)
Can Data be Shared? Yes, given permission from Co-PIs
- 14. PI:** Wendylee Stott (USGS GLSC)
Purpose of Study: Setting management actions/goals or informing managers
Available Data: population genetic data (1920s, 1999 – 2001, 2005 – 2010)
Can Data be Shared? Yes
- 15. PI:** Wes Larson (University of Wisconsin-Stevens Point)
Purpose of Study: Setting Management Actions/Goals or Informing Managers

Available Data: genomic data from thousands of genetic markers collected from approximately 400 lake whitefish that have acoustic tags (part of project conducted by Dan Isermann; 2017 – present)

Can Data be Shared? Yes, but data have not been collected yet

16. PI: Steven Pothoven (NOAA)

Purpose of Study: Learn more about spawning and early life history

Available Data: larval whitefish abundance, diets, and size and zooplankton data for Saginaw Bay (2009 – 2010) and southwestern Lake Michigan (2013 – 2017; Grand Haven, South Haven, Muskegon, Montague, Pentwater)

Can Data be Shared? Yes

17. PI: Scott DeBoe (Consumers Energy/DTE Energy)

Purpose of Study: Monitor barrier net performance

Available Data: gillnet catch numbers from 4 stations inside barrier net and 4 stations outside barrier net (1989 – 2017)

Can Data be Shared? Yes

18. PI: Randy Claramunt (MDNR)

Purpose of Study: Feed into SCAA models

Available Data: fishery survey data (commercial catch and fishery-independent data (1960s - present)); assessment data (trawls, gillnets, eggs, fry; 1960s - present); recruitment studies (2004 – present)

Can Data be Shared? Yes

19. PI: Charles Madenjian (USGS GLSC)

Purpose of Study: Evaluate existing model for lake whitefish bioenergetics

Available Data: feeding and growth data from lab experiment (2003); Steve Pothoven has some data on stomach contents for lake whitefish from Lake Michigan purchased from commercial fishers (also has energy density of whitefish and PCB determination of some prey species)

Can Data be Shared? Yes

20. PI: Ed Roseman (USGS GLSC)

Purpose of Study: Determine historic habitat; Learn more about spawning and early life history

Available Data: egg deposition; larval density and distribution; historic habitat GIS analysis of spawning and nursery areas. Data were collected for 13 years in Detroit River, 2 years for western Lake Erie and Maumee Bay, in 2017 for central and eastern Lake Erie (larvae only), in 2007 for northern Lake Huron (larvae only), and Saginaw Bay (2014 – 2016 egg deposition work with Tomas Hook and MIDNR)

Can Data be Shared? Yes

21. PI: Jory Jonas (MDNR)

Purpose of Study: Feed into SCAA models; determine relationship between lake whitefish and cisco in Lake Michigan

Available Data: surveys from lakewide assessment protocol (number of species, age structures, otoliths, length, and weight; 1996 or 1997 – present)

Can Data be Shared? Yes

Lake Huron (8)

1. PI: Trent Sutton (University of Alaska Fairbanks)

Purpose of Study: Learn more about spawning and early life history; Determine impacts of changes in food web or dreissenid invasions

Available Data: Female data (catch, age, size, proximate composition, fatty acid composition), egg characteristics, larval and juvenile catches and proximate composition (from subset of locations), and juvenile lake whitefish food habits for multiple stocks (fall 2004 – summer 2006)

Can Data be Shared? Yes, given permission from Co-PIs

2. PI: Wendylee Stott (USGS GLSC)

Purpose of Study: Setting management actions/goals or informing managers

Available Data: population genetic data (1920s, 1999 – 2001, 2005 – 2010)

Can Data be Shared? Yes

3. PI: Steven Pothoven (NOAA)

Purpose of Study: Learn more about spawning and early life history

Available Data: larval whitefish abundance, diets, and size and zooplankton data for Lake Huron (2009 – 2010)

Can Data be Shared? Yes

4. PI: Steven Pothoven (NOAA)

Purpose of Study: Develop Great Lakes food webs

Available Data: diets of adult lake whitefish (2007 – 2011; some earlier data going back to 2002)

Can Data be Shared? Yes

5. PI: Randy Claramunt (MDNR)

Purpose of Study: Feed into SCAA models

Available Data: fishery survey data (commercial catch and fishery-independent data (1960s - present)); assessment data (trawls, gillnets, eggs, fry; 1960s - present); recruitment studies (2004 – present)

Can Data be Shared? Yes

6. PI: Ed Roseman (USGS GLSC)

Purpose of Study: Determine historic habitat; Learn more about spawning and early life history

Available Data: egg deposition; larval density and distribution; historic habitat GIS analysis of spawning and nursery areas. Data were collected for 13 years in Detroit River, 2 years for western Lake Erie and Maumee Bay, in 2017 for central and eastern Lake Erie (larvae only), in 2007 for northern Lake Huron (larvae only), and Saginaw Bay (2014 – 2016 egg deposition work with Tomas Hook and MIDNR)

Can Data be Shared? Yes

7. PI: Michael Rennie (Lakehead University)

Purpose of Study: Determine Impacts of Changes in Food Web or *Dreissenid Invasions*; Graduate research

Available Data: lake whitefish growth and feeding behavior as estimated using stable isotopic analysis of scales (covers whole Great Lakes basin; 1947 - present); bioenergetics modelling across number of fish stocks (PhD work; variations of lake whitefish bioenergetics over concentrations of diapause; 2003 - 2004); nearshore and pelagic coupling spatial variations and impacts on conversion efficiency of organisms (last CSMI year on Lake Superior (2015 - 2017); MS work for Marissa)

Can Data be Shared? Yes

8. PI: Adam Cottrill (OMNRF)

Purpose of Study: Monitoring of stock(s); Setting management actions/goals or informing managers

Available Data: Daily catch reports filed by commercial fishers (1978 - present); fishery-independent catch data (1975 to present); Index netting program for biological characteristics and stomach contents (1984 – present)

Can Data be Shared? Yes

Lake Superior (7)

1. PI: Bryan Matthias (Lake Superior Technical Committee)

Purpose of Study: Develop Great Lakes food webs; Setting management actions/goals or informing managers

Available Data: Coordinated siscowet survey; lakewide harvest and effort data; community-wide fish survey from Ontario (2009 – present); abundance and biomass CPUE for gillnets from Wisconsin (1981 – present)

Can Data be Shared? Yes

2. PI: Tim Johnson (OMNRF)

Purpose of Study: Develop/modify lake whitefish bioenergetics model

Available Data: samples analyzed for diets, stable isotopes (C, N), total mercury, and energy density (2016 - 2017) to inform Great Lakes basin wide analysis of trophic transfer efficiency

Can Data be Shared? Yes, once analyses and publication have occurred

3. PI: Trent Sutton (University of Alaska Fairbanks)

Purpose of Study: Learn more about spawning and early life history; Determine impacts of changes in food web or dreissenid invasions

Available Data: Female data (catch, age, size, proximate composition, fatty acid composition), egg characteristics, larval and juvenile catches and proximate composition (from subset of locations), and juvenile lake whitefish food habits for multiple stocks (fall 2004 – summer 2006)

Can Data be Shared? Yes, given permission from Co-PIs

4. PI: Wendylee Stott (USGS GLSC)

Purpose of Study: Setting management actions/goals or informing managers

Available Data: population genetic data (1920s, 1999 – 2001, 2005 – 2010)

Can Data be Shared? Yes

5. PI: Bill Mattes (Great Lakes Indian Fish and Wildlife Commission)

Purpose of Study: Feed into SCAA models; Setting Management Actions/Goals or Informing Managers; Monitoring of stocks

Available Data: Commercial whitefish harvest (1985 - present); YOY whitefish beach seine in 3 locations around Keweenaw Peninsula (1996 - present); fall spawning survey on 4 major spawning reefs (1987 - present); yearly fish community survey (ciscowets) from nearshore to offshore using variable mesh (1996 - present)

Can Data be Shared? Yes

6. PI: Randy Claramunt (MDNR)

Purpose of Study: Feed into SCAA models

Available Data: fishery survey data (commercial catch and fishery-independent data (1960s - present)); assessment data (trawls, gillnets, eggs, fry; 1960s - present);

recruitment studies (2004 – present)

Can Data be Shared? Yes

7. PI: Michael Rennie (Lakehead University)

Purpose of Study: Determine Impacts of Changes in Food Web or *Dreissenid Invasions*;

Graduate Research

Available Data: lake whitefish growth and feeding behavior as estimated using stable isotopic analysis of scales (covers whole Great Lakes basin; 1947 - present); bioenergetics modelling across number of fish stocks (PhD work; variations of lake whitefish bioenergetics over concentrations of diapause; 2003 - 2004); nearshore and pelagic coupling spatial variations and impacts on conversion efficiency of organisms (last CSMI year on Lake Superior (2015 - 2017); MS work for Marissa)

Can Data be Shared? Yes

Lake Erie (6)

1. PI: Chris Vandergoot (USGS GLSC)

Purpose of Study: Setting management actions/goals or informing managers

Available Data: weekly demographic information (length, weight, sex, age) for western basin reef complex (spawning grounds) via experimental gill nets (2015 – 2017); movement data via acoustic telemetry (2014 – 2017)

Can Data be Shared? Not at this point (study is in progress)

2. PI: Hannah Schaefer (MS student at University of Michigan; USGS)

Purpose of Study: Determine historic habitat locations; Graduate research

Available Data: Historic spawning locations; non-spawning and nursery locations throughout Great Lakes basin and tributaries (1982 – present, depending on data source)

Can Data be Shared? Yes

3. PI: Robin DeBruyne (USGS Great Lakes Science Center; USGS GLSC)

Purpose of Study: Learn more about spawning and early life history

Available Data: Larval abundance by location, larval length, otolith ages (partial), larval diets (partial) for Detroit river and northern western Lake Erie (2006 – present), St. Claire River (2010 – 2015), and Lakes Erie and Ontario (2017)

Can Data be Shared? Yes, will be available on ScienceBase

4. PI: Robin DeBruyne (University of Toledo)

Purpose of Study: Learn more about spawning and early life history; graduate research (Zachary Amidon, MS Student)

Available Data: Egg sampling in SCDRS and western Lake Erie (2017 – 2018)

Can Data be Shared? Yes, will be available on ScienceBase

5. PI: Timothy O'Brien (USGS GLSC)

Purpose of Study: learn more about spawning and early life history

Available Data: intermittent catch data of larval lake whitefish (2007, 2008, 2009, 2012)

Can Data be Shared? Yes; sample size is limited as this is not targeted lake whitefish research

6. PI: Ed Roseman (USGS GLSC)

Purpose of Study: Determine historic habitat; Learn more about spawning and early life history

Available Data: egg deposition; larval density and distribution; historic habitat GIS analysis of spawning and nursery areas. Data were collected for 13 years in Detroit River, 2 years for western Lake Erie and Maumee Bay, in 2017 for central and eastern Lake Erie (larvae only), in 2007 for northern Lake Huron (larvae only), and Saginaw Bay (2014 – 2016 egg deposition work with Tomas Hook and MIDNR)

Can Data be Shared? Yes

Lake Ontario (3)

1. **PI:** Dmitry Gorsky (FWS, Lower Great Lakes Fish and Wildlife Conservation Office; LGLFWCO)
Purpose of Study: Learn more about spawning and early life history
Available Data: Presence/absence of larval coregonines (spring 2017 and 2018); adult cisco abundance in Chaumont Bay (2015 – 2017)
Can Data be Shared? Yes, given co-authorship

2. **PI:** Brian Weidel (USGS)
Purpose of Study: Setting management actions/goals or informing managers
Available Data: lake-wide bottom trawling for pelagic (April) and benthic (October) prey fish and lake whitefish (1978 - present)
Can Data be Shared? Yes

3. **PI:** Michael Rennie (Lakehead University)
Purpose of Study: Determine Impacts of Changes in Food Web or *Dreissenid Invasions*; Graduate research
Available Data: lake whitefish growth and feeding behavior as estimated using stable isotopic analysis of scales (covers whole Great Lakes basin; 1947 - present); bioenergetics modelling across number of fish stocks (PhD work; variations of lake whitefish bioenergetics over concentrations of diapause; 2003 - 2004); nearshore and pelagic coupling spatial variations and impacts on conversion efficiency of organisms (last CSMI year on Lake Superior (2015 - 2017); MS work for Marissa)
Can Data be Shared? Yes

Appendix 5: Individual Survey Responses, Grouped by Purpose of Study

In cases where respondents described multiple discrete projects as part of their response, each project was listed individually (e.g. some PIs have multiple, separate projects listed).

Additionally, some PIs reported conducting studies with multiple purposes, so these studies appear for each “Purpose of Study” category (e.g. a study conducted to feed into SCAA models and learn more about spawning and early life history appears under both *Feed into SCAA models* and *Learn more about spawning and early life history*)

Learn More about Spawning and Early Life History (12)

1. PI: Dave Caroffino (MDNR)

Lake Studied: Lake Michigan

Available Data: commercial harvest/effort, biological monitoring, and age-0 juvenile catch rates in nearshore seines (2013 – present); commercial biomonitoring (length, weight, age, lamprey wounds, sex, maturity, visceral fat index; 1986 – present); juvenile seining (count, length, specimens preserved for genetic analysis by UWSP; 2017 – present); maturity schedules of lake whitefish (MS research for Marissa Hammond, MSU)

Can Data be Shared? Yes

2. PI: Kevin Donner (Little Traverse Bay Bands of Odawa Indians)

Lake Studied: Lake Michigan

Available Data: YOY LWF between 25 – 60mm abundance, biodata, associated environmental data, some other species data, some otolith microchemistry data (using seines; 2013 – present); larval whitefish abundance, biodata, associated environmental data (neuston; 2012 – present); gillnetting and commercial harvest (LWF all sizes; 1998 – present)

Can Data be Shared? Yes

3. PI: Don Uzarski (Central Michigan University; CMU)

Lake Studied: Lake Michigan

Available Data: Seine-hauls from shore at two sites on Sand Bay of Beaver Island. All fish are identified and enumerated. These data are accompanied by YSI multiprobe - temperature (°C), dissolved oxygen (mg/L and % saturation), chlorophyll a (mg/L), oxidation-reduction potential (mV), total dissolved solids (mg/L), turbidity (Nephelometric Turbidity Units; NTU), pH (Std units), and specific conductance (µS/cm). Raw water samples are also collected for later nutrient analyses – NH₄, NO₂/NO₃, TN, SRP, TP. Data have been collected from 2015 – present.

Can Data be Shared? Yes

4. PI: Patrick Forsythe (University of Wisconsin Green Bay)

Lake Studied: Lake Michigan

Available Data: sampling for drifting larval lake whitefish from lower reaches of Menominee River: river, sampling day, time of sampling, flow rates through nets, number

of larval fish collected during each net tow (2016)

Can Data be Shared? Not at the present time

5. PI: Patrick Forsythe (University of Wisconsin Green Bay)

Lake Studied: Lake Michigan

Available Data: sampling for drifting larval lake whitefish for 4 major tributaries of Green Bay (Menominee, Peshtego, Okanto, and Fox rivers): river, sampling day, time of sampling, flow rates through nets, number of larval fish collected during each net tow, otolith microchemistry (2017 – 2019)

Can Data be Shared? Not at the present time

6. PI: Tracy Galarowicz

Lake Studied: Lake Michigan

Available Data: Coregonid egg deposition (2009 – 2016)

Can Data be Shared? Yes, given permission from MDNR and TNC (The Nature Conservancy)

7. PI: Trent Sutton (University of Alaska Fairbanks)

Lake Studied: Lake Michigan, Lake Huron, Lake Superior

Available Data: Female data (catch, age, size, proximate composition, fatty acid composition), egg characteristics, larval and juvenile catches and proximate composition (from subset of locations), and juvenile lake whitefish food habits for multiple stocks (fall 2004 – summer 2006)

Can Data be Shared? Yes, given permission from Co-PIs

8. PI: Steven Pothoven (NOAA)

Lake Studied: Lake Michigan, Lake Huron

Available Data: larval whitefish abundance, diets, and size and zooplankton data for Saginaw Bay (2009 – 2010) and southwestern Lake Michigan (2013 – 2017; Grand Haven, South Haven, Muskegon, Montague, Pentwater)

Can Data be Shared? Yes

9. PI: Robin DeBruyne (USGS Great Lakes Science Center; USGS GLSC)

Lake Studied: Lake Erie

Available Data: Larval abundance by location, larval length, otolith ages (partial), larval diets (partial) for Detroit river and northern western Lake Erie (2006 – present), St. Claire River (2010 – 2015), and Lakes Erie and Ontario (2017)

Can Data be Shared? Yes, will be available on ScienceBase

10. PI: Timothy O'Brien (USGS GLSC)

Lake Studied: Lake Erie

Available Data: intermittent catch data of larval lake whitefish (2007, 2008, 2009, 2012)

Can Data be Shared? Yes; sample size is limited as this is not targeted lake whitefish research

- 11. PI:** Dmitry Gorsky (FWS, Lower Great Lakes Fish and Wildlife Conservation Office; LGLFWCO)
- Lake Studied:** Lake Ontario
- Available Data:** Presence/absence of larval coregonines (spring 2017 and 2018); adult cisco abundance in Chaumont Bay (2015 – 2017)
- Can Data be Shared?** Yes, given co-authorship
- 12. PI:** Ed Roseman (USGS GLSC)
- Lake Studied:** Lake Michigan, Lake Huron, Lake Erie
- Available Data:** egg deposition; larval density and distribution; historic habitat GIS analysis of spawning and nursery areas. Data were collected for 13 years in Detroit River, 2 years for western Lake Erie and Maumee Bay, in 2017 for central and eastern Lake Erie (larvae only), in 2007 for northern Lake Huron (larvae only), and Saginaw Bay (2014 – 2016 egg deposition work with Tomas Hook and MIDNR)
- Can Data be Shared?** Yes

Feed into SCAA Models (10)

1. **PI:** Ted Treska and Dale Hanson (FWS, Green Bay Fish & Wildlife Conservation office, native species subprogram)
Lake Studied: Lake Michigan
Available Data: Standardized gill net surveys (spring LWAP for which FWS surveys 4 locations: Manistique, Washington Island, Sturgeon Bay, and Sheboygan; 1998 – present); Hydroacoustic and mid-water trawl survey of Green Bay pelagic community (2012 - present)
Can Data be Shared? Yes
2. **PI:** Dan Isermann (University of Wisconsin-Stevens Point)
Lake Studied: Lake Michigan
Available Data: stock characteristics of whitefish from Lake Michigan (estimate growth, mortality, fecundity, condition, and egg size) to compare among management zones and genetic stocks (2012 – 2013)
Can Data be Shared? Yes
3. **PI:** Dan Isermann (University of Wisconsin-Stevens Point)
Lake Studied: Lake Michigan
Available Data: spawning site contribution and movements (acoustic transmitters implanted into 400 lake whitefish from 4 different spawning aggregates; 2017 – 2012)
Can Data be Shared? Not at this point (no data yet)
4. **PI:** Dave Caroffino (MDNR)
Lake Studied: Lake Michigan
Available Data: commercial harvest/effort, biological monitoring, and age-0 juvenile catch rates in nearshore seines (2013 – present); commercial biomonitoring (length, weight, age, lamprey wounds, sex, maturity, visceral fat index; 1986 – present); juvenile seining (count, length, specimens preserved for genetic analysis by UWSP; 2017 – present); maturity schedules of lake whitefish (MS research for Marissa Hammond, MSU)
Can Data be Shared? Yes
5. **PI:** Kevin Donner (Little Traverse Bay Bands of Odawa Indians)
Lake Studied: Lake Michigan
Available Data: YOY LWF between 25 – 60mm abundance, biodata, associated environmental data, some other species data, some otolith microchemistry data (using seines; 2013 – present); larval whitefish abundance, biodata, associated environmental data (neuston; 2012 – present); gillnetting and commercial harvest (LWF all sizes; 1998 – present)
Can Data be Shared? Yes
6. **PI:** Erik Olsen (Grand Traverse Band – Natural Resources Department)
Lake Studied: Lake Michigan

Available Data: Biological data from tribal commercial fishery (both gillnet and trap net) in northern Lake Michigan (1985 - present); lake whitefish index (LWI; 2000 – present); bycatch in Lake-wide Assessment Plan survey (LWAP; 1992 – present); bycatch in Lake trout fall spawning survey (LTF; 1999 – present); bycatch in spring larval beach seining (LBS; 2017 – present)

Can Data be Shared? Yes

7. **PI:** Scott Hansen (Wisconsin DNR)

Lake Studied: Lake Michigan

Available Data: annual adult sampling in Lake Michigan and Green Bay using gill nets and boom shocking gear (late 1990s - present); sampling for juveniles in Green Bay in the spring using small-mesh gill nets; yearling indices in summer for YOY production in Green Bay (and a bit in Lake Michigan) via trawling (1997 – present); length, weight, and age information via otolith aging (1990s – present); commercial fishery harvest (1960s – present); genetic stock identification (joint with UW Stevens Point; 2005 – 2006); larval whitefish ecology production and escapement in west-shore tributaries (2009 – 2015); otolith microchemistry (identifying fish based on natal river or Green Bay area); Northern whitefish stock (Dorr County in Lake Michigan) and stocks in rivers and Green Bay; tagging whitefish in tributaries and several stocks in Green Bay to see how these stocks are mixing

Can Data be Shared? Yes

8. **PI:** Randy Claramunt (MDNR)

Lake Studied: Lake Michigan, Lake Huron, Lake Superior

Available Data: fishery survey data (commercial catch and fishery-independent data (1960s - present)); assessment data (trawls, gillnets, eggs, fry; 1960s - present); recruitment studies (2004 – present)

Can Data be Shared? Yes

9. **PI:** Jory Jonas (MDNR)

Lake Studied: Lake Michigan

Available Data: surveys from lakewide assessment protocol (number of species, age structures, otoliths, length, and weight; 1996 or 1997 – present)

Can Data be Shared? Yes

10. **PI:** Bill Mattes (Great Lakes Indian Fish and Wildlife Commission)

Lake Studied: Lake Superior

Available Data: Commercial whitefish harvest (1985 - present); YOY whitefish beach seine in 3 locations around Keweenaw Peninsula (1996 - present); fall spawning survey on 4 major spawning reefs (1987 - present); yearly fish community survey (ciscowets) from nearshore to offshore using variable mesh (1996 - present)

Can Data be Shared? Yes

Setting Management Actions/Goals or Informing Managers (10)

1. PI: Barry Weldon (Little River Band of Ottawa Indians; LRBOI)

Lake Studied: Lake Michigan

Available Data: Length, weight, sex, maturity, scales, otoliths, age, and lamprey wounding classification of lake whitefish; depth, water temperature, management unit, grid, latitude and longitude; commercial harvest. Data have been collected from 1999 – present.

Can Data be Shared? Yes

2. PI: Dave Caroffino (MDNR)

Lake Studied: Lake Michigan

Available Data: commercial harvest/effort, biological monitoring, and age-0 juvenile catch rates in nearshore seines (2013 – present); commercial biomonitoring (length, weight, age, lamprey wounds, sex, maturity, visceral fat index; 1986 – present); juvenile seining (count, length, specimens preserved for genetic analysis by UWSP; 2017 – present); maturity schedules of lake whitefish (MS research for Marissa Hammond, MSU)

Can Data be Shared? Yes

3. PI: Scott Hansen (Wisconsin DNR)

Lake Studied: Lake Michigan

Available Data: annual adult sampling in Lake Michigan and Green Bay using gill nets and boom shocking gear (late 1990s - present); sampling for juveniles in Green Bay in the spring using small-mesh gill nets; yearling indices in summer for YOY production in Green Bay (and a bit in Lake Michigan) via trawling (1997 – present); length, weight, and age information via otolith aging (1990s – present); commercial fishery harvest (1960s – present); genetic stock identification (joint with UW Stevens Point; 2005 – 2006); larval whitefish ecology production and escapement in west-shore tributaries (2009 – 2015); otolith microchemistry (identifying fish based on natal river or Green Bay area); Northern whitefish stock (Dorr County in Lake Michigan) and stocks in rivers and Green Bay; tagging whitefish in tributaries and several stocks in Green Bay to see how these stocks are mixing

Can Data be Shared? Yes

4. PI: Wendylee Stott (USGS GLSC)

Lake Studied: Lake Michigan, Lake Huron, Lake Superior

Available Data: population genetic data (1920s, 1999 – 2001, 2005 – 2010)

Can Data be Shared? Yes

5. PI: Adam Cottrill (OMNRF)

Lake Studied: Lake Huron

Available Data: Daily catch reports filed by commercial fishers (1978 - present); fishery-independent catch data (1975 to present); Index netting program for biological characteristics and stomach contents (1984 – present)

Can Data be Shared? Yes

6. **PI:** Bryan Matthias (Lake Superior Technical Committee)
Lake Studied: Lake Superior
Available Data: Coordinated siscowet survey; lakewide harvest and effort data; community-wide fish survey from Ontario (2009 – present); abundance and biomass CPUE for gillnets from Wisconsin (1981 – present)
Can Data be Shared? Yes
7. **PI:** Chris Vandergoot (USGS GLSC)
Lake Studied: Lake Erie
Available Data: weekly demographic information (length, weight, sex, age) for western basin reef complex (spawning grounds) via experimental gill nets (2015 – 2017); movement data via acoustic telemetry (2014 – 2017)
Can Data be Shared? Not at this point (study is in progress)
8. **PI:** Brian Weidel (USGS)
Lake Studied: Lake Ontario
Available Data: lake-wide bottom trawling for pelagic (April) and benthic (October) prey fish and lake whitefish (1978 - present)
Can Data be Shared? Yes
9. **PI:** Bill Mattes (Great Lakes Indian Fish and Wildlife Commission)
Lake Studied: Lake Superior
Available Data: Commercial whitefish harvest (1985 - present); YOY whitefish beach seine in 3 locations around Keweenaw Peninsula (1996 - present); fall spawning survey on 4 major spawning reefs (1987 - present); yearly fish community survey (ciscowets) from nearshore to offshore using variable mesh (1996 - present)
Can Data be Shared? Yes
10. **PI:** Wes Larson (University of Wisconsin-Stevens Point)
Lake Studied: Lake Michigan
Available Data: genomic data from thousands of genetic markers collected from approximately 400 lake whitefish that have acoustic tags (part of project conducted by Dan Isermann; 2017 – present)
Can Data be Shared? Yes, but data have not been collected yet

Monitoring of Stock(s) (6)

1. PI: Erik Olsen (Grand Traverse Band – Natural Resources Department)

Lake Studied: Lake Michigan

Available Data: Biological data from tribal commercial fishery (both gillnet and trap net) in northern Lake Michigan (1985 - present); lake whitefish index (LWI; 2000 – present); bycatch in Lake-wide Assessment Plan survey (LWAP; 1992 – present); bycatch in Lake trout fall spawning survey (LTF; 1999 – present); bycatch in spring larval beach seining (LBS; 2017 – present)

Can Data be Shared? Yes

2. PI: Scott Hansen (Wisconsin DNR)

Lake Studied: Lake Michigan

Available Data: annual adult sampling in Lake Michigan and Green Bay using gill nets and boom shocking gear (late 1990s - present); sampling for juveniles in Green Bay in the spring using small-mesh gill nets; yearling indices in summer for YOY production in Green Bay (and a bit in Lake Michigan) via trawling (1997 – present); length, weight, and age information via otolith aging (1990s – present); commercial fishery harvest (1960s – present); genetic stock identification (joint with UW Stevens Point; 2005 – 2006); larval whitefish ecology production and escapement in west-shore tributaries (2009 – 2015); otolith microchemistry (identifying fish based on natal river or Green Bay area); Northern whitefish stock (Dorr County in Lake Michigan) and stocks in rivers and Green Bay; tagging whitefish in tributaries and several stocks in Green Bay to see how these stocks are mixing

Can Data be Shared? Yes

3. PI: Adam Cottrill (OMNRF)

Lake Studied: Lake Huron

Available Data: Daily catch reports filed by commercial fishers (1978 - present); fishery-independent catch data (1975 to present); Index netting program for biological characteristics and stomach contents (1984 – present)

Can Data be Shared? Yes

4. PI: Kevin Donner (Little Traverse Bay Bands of Odawa Indians)

Lake Studied: Lake Michigan

Available Data: YOY LWF between 25 – 60mm abundance, biodata, associated environmental data, some other species data, some otolith microchemistry data (using seines; 2013 – present); larval whitefish abundance, biodata, associated environmental data (neuston; 2012 – present); gillnetting and commercial harvest (LWF all sizes; 1998 – present)

Can Data be Shared? Yes

5. PI: Bill Mattes (Great Lakes Indian Fish and Wildlife Commission)

Lake Studied: Lake Superior

Available Data: Commercial whitefish harvest (1985 - present); YOY whitefish beach seine

in 3 locations around Keweenaw Peninsula (1996 - present); fall spawning survey on 4 major spawning reefs (1987 - present); yearly fish community survey (ciscowets) from nearshore to offshore using variable mesh (1996 - present)

Can Data be Shared? Yes

6. **PI:** Barry Weldon (Little River Band of Ottawa Indians; LRBOI)

Lake Studied: Lake Michigan

Available Data: Length, weight, sex, maturity, scales, otoliths, age, and lamprey wounding classification of lake whitefish; depth, water temperature, management unit, grid, latitude and longitude; commercial harvest. Data have been collected from 1999 – present.

Can Data be Shared? Yes

Graduate Research (5)

1. PI: Don Uzarski (Central Michigan University; CMU)

Lake Studied: Lake Michigan

Available Data: Seine-hauls from shore at two sites on Sand Bay of Beaver Island. All fish are identified and enumerated. These data are accompanied by YSI multiprobe - temperature (°C), dissolved oxygen (mg/L and % saturation), chlorophyll a (mg/L), oxidation-reduction potential (mV), total dissolved solids (mg/L), turbidity (Nephelometric Turbidity Units; NTU), pH (Std units), and specific conductance (µS/cm). Raw water samples are also collected for later nutrient analyses – NH₄, NO₂/NO₃, TN, SRP, TP. Data have been collected from 2015 – present.

Can Data be Shared? Yes

2. PI: Hannah Schaefer (MS student at University of Michigan; USGS)

Lake Studied: Lake Erie

Available Data: Historic spawning locations; non-spawning and nursery locations throughout Great Lakes basin and tributaries (1982 – present, depending on data source)

Can Data be Shared? Yes

3. PI: Robin DeBruyne (USGS Great Lakes Science Center; USGS GLSC)

Lake Studied: Lake Erie

Available Data: Egg sampling in SCDRS and western Lake Erie (2017 – 2018)

Can Data be Shared? Yes, will be available on ScienceBase

4. PI: Michael Rennie (Lakehead University)

Lake Studied: Lake Huron, Lake Superior, Lake Ontario

Available Data: lake whitefish growth and feeding behavior as estimated using stable isotopic analysis of scales (covers whole Great Lakes basin; 1947 - present); bioenergetics modelling across number of fish stocks (PhD work; variations of lake whitefish bioenergetics over concentrations of diapause; 2003 - 2004); nearshore and pelagic coupling spatial variations and impacts on conversion efficiency of organisms (last CSMI year on Lake Superior (2015 - 2017); MS work for Marissa)

Can Data be Shared? Yes

5. PI: Dave Caroffino (MDNR)

Lake Studied: Lake Michigan

Available Data: commercial harvest/effort, biological monitoring, and age-0 juvenile catch rates in nearshore seines (2013 – present); commercial biomonitoring (length, weight, age, lamprey wounds, sex, maturity, visceral fat index; 1986 – present); juvenile seining (count, length, specimens preserved for genetic analysis by UWSP; 2017 – present); maturity schedules of lake whitefish (MS research for Marissa Hammond, MSU)

Can Data be Shared? Yes

Determine Impacts of Changes in Food Web or *Dreissenid Invasions* (2)

1. PI: Trent Sutton (University of Alaska Fairbanks)

Lake Studied: Lake Michigan, Lake Huron, Lake Superior

Available Data: Female data (catch, age, size, proximate composition, fatty acid composition), egg characteristics, larval and juvenile catches and proximate composition (from subset of locations), and juvenile lake whitefish food habits for multiple stocks (fall 2004 – summer 2006)

Can Data be Shared? Yes, given permission from Co-PIs

2. PI: Michael Rennie (Lakehead University)

Lake Studied: Lake Huron, Lake Superior, Lake Ontario

Available Data: lake whitefish growth and feeding behavior as estimated using stable isotopic analysis of scales (covers whole Great Lakes basin; 1947 - present); bioenergetics modelling across number of fish stocks (PhD work; variations of lake whitefish bioenergetics over concentrations of diapause; 2003 - 2004); nearshore and pelagic coupling spatial variations and impacts on conversion efficiency of organisms (last CSMI year on Lake Superior (2015 - 2017); MS work for Marissa)

Can Data be Shared? Yes

Develop Great Lakes Food Webs (2)

1. PI: Bryan Matthias (Lake Superior Technical Committee)

Lake Studied: Lake Superior

Available Data: Coordinated siscowet survey; lakewide harvest and effort data; community-wide fish survey from Ontario (2009 – present); abundance and biomass CPUE for gillnets from Wisconsin (1981 – present)

Can Data be Shared? Yes

2. PI: Steven Pothoven (NOAA)

Lake Studied: Lake Huron

Available Data: diets of adult lake whitefish (2007 – 2011; some earlier data going back to 2002)

Can Data be Shared? Yes

Determine Historic Habitat Locations (2)

1. PI: Ed Roseman (USGS GLSC)

Lake Studied: Lake Michigan, Lake Huron, Lake Erie

Available Data: egg deposition; larval density and distribution; historic habitat GIS analysis of spawning and nursery areas. Data were collected for 13 years in Detroit River, 2 years for western Lake Erie and Maumee Bay, in 2017 for central and eastern Lake Erie (larvae only), in 2007 for northern Lake Huron (larvae only), and Saginaw Bay (2014 – 2016 egg deposition work with Tomas Hook and MIDNR)

Can Data be Shared? Yes

2. PI: Hannah Schaefer (MS student at University of Michigan; USGS)

Lake Studied: Lake Erie

Available Data: Historic spawning locations; non-spawning and nursery locations throughout Great Lakes basin and tributaries (1982 – present, depending on data source)

Can Data be Shared? Yes

Develop/Modify Lake Whitefish Bioenergetics Model (2)

1. PI: Charles Madenjian (USGS GLSC)

Lake Studied: Lake Michigan

Available Data: feeding and growth data from lab experiment (2003); Steve Pothoven has some data on stomach contents for lake whitefish from Lake Michigan purchased from commercial fishers (also has energy density of whitefish and PCB determination of some prey species)

Can Data be Shared? Yes

2. PI: Tim Johnson (OMNRF)

Lake Studied: Lake Superior

Available Data: samples analyzed for diets, stable isotopes (C, N), total mercury, and energy density (2016 - 2017) to inform Great Lakes basin wide analysis of trophic transfer efficiency

Can Data be Shared? Yes, once analyses and publication have occurred

Explore Relationship Between Lake Whitefish and Cisco (1)

1. PI: Jory Jonas (MDNR)

Lake Studied: Lake Michigan

Available Data: surveys from lakewide assessment protocol (number of species, age structures, otoliths, length, and weight; 1996 or 1997 – present)

Can Data be Shared? Yes

Monitor Barrier Net Performance (1)

1. **PI:** Scott DeBoe (Consumers Energy/DTE Energy)

Lake Studied: Lake Michigan

Available Data: gillnet catch numbers from 4 stations inside barrier net and 4 stations outside barrier net (1989 – 2017)

Can Data be Shared? Yes