Huron-Michigan Predator Diet Study
2019 Instructions

Scientists working on Lake Michigan and Lake Huron need diet information from trout, salmon, and walleye. The lakes have changed dramatically in recent years, in large part because of invasive species like the quagga mussel and round goby. Anglers, scientists, and fishery managers are trying to figure out what mix of salmon and trout species would be best for our changing lakes and the people who fish here. To do that, we need more information on what predatory fish are eating in different parts of the lake throughout the year.

You can help with this by collecting stomachs from your catches.

Angler caught fish are great sources of information, but it is very important to follow instructions carefully to avoid biasing the study.

Instructions:

To avoid bias, it is important to collect stomachs from **both empty and full stomachs**. Empty stomachs are very important because a high percentage of empty stomachs means that fish are having trouble finding food. If you collect fish stomachs then take the following steps:

1. Decide if you will collect stomachs from this fishing trip.
2. Remove stomachs from ALL fish of each species that you are collecting on this trip. It is okay to collect just one species.
3. Place entire intact stomach into plastic bag with data tag.
4. Freeze or ice stomachs immediately and transfer to drop site freezer.

Detailed instructions for each step are provided below, and in a YouTube video at http://bit.ly/2CIFFr8

Step 1 – Decide if you will collect stomachs from this fishing trip.

You don't need to collect fish from every trip, but stomachs from two or three trips per month would be helpful. It is not necessary for you to collect all species of fish that you catch on a trip, but it is very important that you collect ALL fish of each species that you do collect.

For example, it is perfectly fine to decide to collect only steelhead and brown trout. If your catch is dominated by lake trout and Chinook salmon, this can be a great way to cut down on the time you spend collecting stomachs.

It is also okay to collect different species on different trips. For example, collecting only lake trout on one trip and collecting only Chinook salmon on the next trip is just fine.

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Step 2 – Remove stomachs from ALL fish of each species that you are collecting on this trip. It is okay to collect just one species.

It is very important to take stomachs from ALL fish of the species you are collecting regardless of what they were feeding on or whether they were full or empty.

Cut the esophagus where it enters the stomach and cut the intestine where it exits the stomach. Be careful not to cut the thick-walled bend in the stomach itself, if possible. If you do accidentally cut the stomach, be very careful to collect any food items (including bones and semi-digested slime).

Step 3 – Place entire intact stomach into plastic bag with data tag.

Make sure to include only one stomach per plastic bag. Researchers prefer intact stomachs with no punctures or holes, and will not accept ripped, open, stomachs with large holes, or prey separated from the stomach. These stomachs might be missing small or heavily-digested food items that can bias the study. Printable data tags are available at MichiganSeaGrant.org/diet

Include the following information on each data tag. Use a pencil so the writing will not bleed.

Port Fished This will usually be the port your trip originated from. If you ran a long way and fished closer to a different major port then you should list the port you fished near. If you fishing a well-known area that is not a port (like South Manitou Island or Washington Island) you can list this instead, but do not list local nicknames for fishing spots (like the Barrel or the Bubbler) that may not be familiar to researchers unless you also include the name of the port.

Species

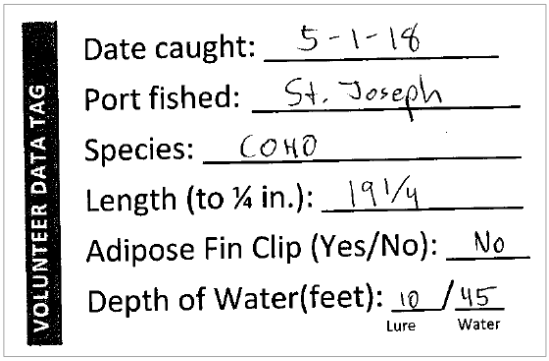
Chinook Salmon – CHS	Lake Trout – LT	Atlantic Salmon – ATS
Pink Salmon – PS	Coho Salmon – COHO	Steelhead - STEEL
Walleye – WAE	Brown Trout – BNT	

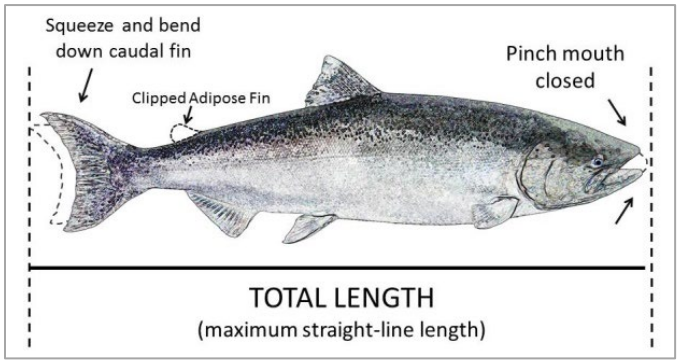
Length Measure total length to nearest **quarter inch** with mouth closed and tail pinched.

In large Chinook salmon, the caudal rays are stiff and the tail fin cannot be squeezed tightly together. Bend the upper lobe down to measure total length for large Chinooks.

Adipose Clip An adipose fin clip indicates a stocked fish. If your fish does have an adipose fin, mark "NO" for the Adipose Fin Clip. If the fish is clipped and **has no adipose fin**, mark "YES" for the Adipose Fin Clip.

Depth OPTIONAL. Record water depth in feet. If you know how deep the fish was caught, you can also record the lure depth. For example, if your lure was running 10 feet below the surface in 45 feet of water you could record this as 10 over 45 (see example).





Be sure to write clearly on data tags and measure fish carefully from the tip of the snout to end of the tail.

Step 4 – Freeze or ice stomachs immediately and transfer to drop site freezer.

It is very important to keep samples cold to slow digestion until it can be stopped by freezing. Carry plenty of ice. Keep captured fish on ice until you can get to a freezer. Otherwise even freshly consumed prey may be well digested by the time they are put into a freezer. This increases the proportion of unidentifiable prey in the study and reduces our ability to determine how predators are responding to changes in the forage base. Think COLD!

Frequently Asked Questions (FAQs):

Why should I do this?

There is consensus among the biologists that predator diet information is important, and needed. It is logistically impossible for us to get the sample sizes we need from all regions of Lake Huron and Lake Michigan without relying on angler-caught fish. Even if we had the ability to put all available boats on the water with gill nets, we could, at best, sample only limited locations at specific times. This is the best way to get predator diet data from the entire lake (north to south) and across the fishing season. It is also a way for anglers to make a difference and participate directly in efforts to better understand the lakes.

What species should I save?

Chinook (king) salmon, coho salmon, Atlantic salmon, pink salmon, lake trout, brown trout, rainbow trout (steelhead) and walleye.

Do you need the whole fish?

No! We only want a bag with the stomach and the tag.

I caught a fish whose stomach was too full for a single one quart bag. What do I do?

Open it up and divide the stomach contents among bags. Duplicate the information on the tag, and make a note on the tag that there are multiple bags per fish. A good way to do this is to write 1 of 2, 2 of 2, etc.

I caught a fish that was obviously empty. Do you really want it?

Empties are important! The fish that are not eating can tell us a lot. So save all stomachs whether they look empty or full.

I caught a fish that looked like it ate a bunch of beetles. Do you still want it?

Yes. Fish with unusual diets are just as important as those with traditional diets.

How will I get the fish to you?

We will pick them up, or you can drop them off with volunteers, or at strategically placed freezers (see list of drop sites at the end of this document). U.S. Fish & Wildlife Service biotechs, Michigan and Wisconsin DNR creel clerks, and USGS biologists are also assisting with sample collections.

I only fish once or twice year. Should I participate?

Absolutely! Every fish we can get adds to the database. The three lake trout and two steelhead you give us may be the only samples we get from that location at that time. As long as you are following the protocol, your data are valid and important.

We decided to take stomachs today, but we caught so many fish that there was not time to collect stomachs from all of them. What should we do?

Either limit your collection to one species or randomly divide the catch. Separate the catch in half randomly, and flip a coin to randomly select the group that will be processed. Any sort of truly random sampling can be used to sub-sample. Just don't pick all the big ones, all the small ones, or the ones that look like they have eaten.

We had a power failure and the stomachs thawed for a couple of hours. Are they ruined?

Probably not. The contents will be harder to work with, and the prey may be more difficult to identify, but they are likely to be useful.

Are agencies collecting fish?

U.S. Fish & Wildlife Service biotechs and DNR creel clerks will help out with collections at some tournaments and access sites. However, a study similar to this was done on Lake Huron in the 1980's and 2009-2011 and most of their fish came from anglers and charter captains!

What if I run out of tags or bags?

Tags are available online for you to print at MichiganSeaGrant.org/diet. Bags may be available at some drop sites. If you regularly use large quantities of tags you may request more from Dan O'Keefe (on Lake Michigan – 616-994-4572, GLanglerdiary@gmail.com) or Ed Roseman (on Lake Huron – 734-214-7237). Be sure to include your full mailing address and zip code with your request.

How will I be informed about results?

Results will be featured in online articles on the MSU Extension website and in presentations, Sea Grant workshops, and various fishing club meetings. YouTube videos will also be posted to let anglers know

what the study finds. You can also connect with the study on Facebook (search Huron-Michigan Predator Diet Study), Instagram (search greatlakespreadatordiet), or Twitter (follow Dr. Brian Roth @ichthyprof).

How You Can Help

- Get instructions, drop sites, and printable data tags: MichiganSeaGrant.org/diet
- Share a video entitled "Huron-Michigan Diet Study Instructions": http://bit.ly/2CIFFr8
- Help us fund student research by donating at MSU's CrowdPower site: http://bit.ly/2ALNSJy
- Make a donation by mailing a check payable to "Michigan State University" to:

  University Advancement
  Spartan Way
  535 Chestnut Road, Room 300
  East Lansing, MI 48824

  NOTE: be sure to write "Appeal 18OOPCF1GLFISH" in the note section.

Contact Us

If you have questions about the study, stomach collection procedures, or drop sites contact:

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Wisconsin Waters

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Lake Huron
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Michigan State University
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rothbri@msu.edu

Freezer Drop Sites for Stomach Collection

Lake Michigan – Wisconsin Waters

AREA	ADDRESS	TELEPHONE
BAILEYS HARBOR	**Town Marina** 8132 Hwy. 57, Baileys Harbor	920-839-9778
GREEN BAY	**Department of Natural Resources** 2984 Shawano Ave., Green Bay (Hours - Monday-Friday 8:30AM – 4PM)	920-662-5100
KENOSHA	**Boat House Pub & Eatery** 4917 7th Ave., Kenosha	262-654-9922
KEWAUNEE	**Accurate Marine and Storage** 203 Dodge St., Kewaunee	920-388-2326
MARINETTE	**A&K Feed, Seed, & Bait** 1616 Shore Dr., Marinette	715-732-6100
MILWAUKEE	**McKinley Marina Fish Cleaning Station** 1750 N. Lincoln Memorial Dr., Milwaukee	414-273-5224
	DNR, UW-Milwaukee School of Freshwater Sciences 600 E. Greenfield Ave., Milwaukee (Hours vary - Monday-Thursday - call ahead)	414-550-1831
PESHTIGO	**Peshtigo Shell Gas Station** 815 French St., Peshtigo	715-582-3681
	Department of Natural Resources 101 N. Ogden Rd., Peshtigo (Hours - Monday-Friday, 11AM – 2PM)	715-582-5000
PORT WASHINGTON	**Port Washington Marina** 106 N. Lake St., Port Washington	262-284-6606
	Fat Boys Bait & Tackle 228 N. Franklin St., Port Washington	262-536-4374
RACINE	**Kortendick Ace Hardware** 3806 Douglas Ave., Racine	262-639-4820
	Department of Natural Resources 9531 Rayne Rd., Suite 4, Sturtevant (Hours - Monday-Friday, 11AM – 2PM)	262-884-2300
SHEBOYGAN	**The Wharf** 733 Riverfront Dr., Sheboygan	920-458-4406
	Department of Natural Resources 1155 Pilgrim Rd., Plymouth (Hours - Monday-Friday, 11AM – 2PM)	920-892-8756
STURGEON BAY	**Howie's Tackle** 1309 Green Bay Rd., Sturgeon Bay	920-746-9916
	Department of Natural Resources 110 S. Neenah Ave., Sturgeon Bay (Hours - Monday-Friday, 11AM – 2PM)	920-746-2860
TWO RIVERS	**Seagull Sports Marina** 1400 Lake St., Two Rivers	920-794-7533

Freezer Drop Sites for Stomach Collection

Lake Michigan – Michigan Waters

St. Joseph - City fish cleaning station at St. Joseph City Boat Launch located on Marina Island.

Benton Harbor – Tackle Haven at 741 Riverview Dr., Benton Harbor (Across street from DNR boat launch).

South Haven - City fish cleaning station at South Haven City boat launch.

Holland - Fish cleaning station at Holland Boat Launch.

Grand Haven - Fish cleaning station at Chinook Pier.

Muskegon - Fish cleaning station at Snug Harbor Boat Launch.

Whitehall/Montague – Fish cleaning station at Montague Municipal Boat Launch.

Pentwater - Fish cleaning station at Pentwater Municipal Marina.

Ludington - Fish cleaning station at Loomis Street Boat Launch.

Manistee - Fish cleaning station at First Street boat launch-the freezer is used for gut disposal and is located near the fish cleaning station. Inside the freezer is a bucket or tote labeled for DNR collection of tagged fish heads and stomachs.

Manistee - Fish cleaning station at Solberg's Marina.

Frankfort - Fish cleaning station at municipal boat launch-the freezer is used for gut disposal and is located near the fish cleaning station. Inside the freezer is a bucket or tote labeled for DNR collection of tagged fish heads and stomachs.

Traverse City – For drop off information and forms call DNR Fisheries Biologist Heather Hettinger at the Traverse City Office 231-922-6056 M-F 8am-5pm.

Elk Rapids – For drop off information and forms call DNR creel clerk Fisheries Biologist Heather Hettinger at the Traverse City Office 231-922-6056 M-F 8am-5pm.

Charlevoix - Fish cleaning station at Ferry Beach Boat Launch.

Charlevoix – Charlevoix Fisheries Station located at 96 Grant St next to the Pine River channel has Coded wire tag forms and bags are available. For more information call DNR (231) 547-2914 M-F 8am-4 pm.

Petoskey – For more information call DNR (231) 547-2914 M-F 8am-4 pm.

Harbor Springs – For more information call DNR (231) 547-2914 M-F 8am-4 pm.

Manistique - Fish cleaning station at Manistique City Boat Launch.

Freezer Drop Sites for Stomach Collection

Lake Huron – Michigan Waters

Sault Ste. Marie – City fish cleaning station at the Aune Osborne municipal boat launch.

Detour – City fish cleaning station – the freezer is for fish gut disposal, however inside the freezer is a 5 gallon DNR bucket for the collection of coded wire tagged fish heads and stomachs.

St. Ignace – City fish cleaning station located at city marina and public boat launch – the freezer is for fish gut disposal, however inside the freezer is a 5-gallon DNR bucket for the collection of coded wire tagged fish heads and stomachs.

St. Ignace – Straits State Park office/garage contains a freezer for the drop-off collection of coded wire tagged fish heads and USGS stomachs.

Cheboygan – Fish cleaning station at marina and boat launch near the mouth of the Cheboygan River.

Rogers City – City fish cleaning station at marina.

Alpena – City fish cleaning station at marina.

Harrisville – Harrisville State Park office/garage contains a freezer.

Oscoda – Wellman's Party and Bait store at 410 State St.

Bay City – DNR Bay City Operations Service Center at 3580 State Park Drive contains a freezer.

Harbor Beach - Fish cleaning station at marina and boat launch.

Harbor Beach – Let's Go Fishing bait shop at 731 N. Huron Ave.

Port Sanilac – Fish cleaning station at municipal boat launch.

Lexington – Fish cleaning station at municipal harbor and boat launch.

Port Huron – Pro Bait bait shop at 2731 Pine Grove Ave.

Contributing Organiztions

The Huron-Michigan Predator Diet Study would not be possible without contributions from all the following collaborators at academic institutions and federal, state, and tribal agencies.

Michigan State University Department of Fisheries and Wildlife (Brian Roth)

Dr. Roth's research group at Michigan State University leads the project. Students and technicians in his lab are primarily responsible for analyzing the stomach contents and the data that derives from the stomachs. In addition, Dr. Roth's research group coordinates stomach collections with project partners on both lakes and will also collect stomachs throughout the project. MSU provides a wealth of eager undergraduate and graduate students that are excited to gain experience in the world of fisheries. They provide project updates on the Facebook page, through Instagram (greatlakespredatordiet), and Twitter (@ichthyprof).

Michigan Department of Natural Resources (Jory Jonas)

Michigan DNR has a strong interest in obtaining information on the dietary and feeding preferences of predatory fish in the Great Lakes. Information from dietary studies is used to inform parameters in fish population (growth, size-at-age) and bioenergetic (prey demands, energy transfer and resource use) models. As such, we have supported field collection efforts angler creel surveys and by volunteer anglers. Collections have occurred by coordinating within existing sample distribution and transport networks. In creel surveys, increased efforts have been made to obtain stomach samples which aren't typically collected.

U.S. Geological Survey (Ed Roseman)

The current diet study was initiated in 2017 by the U.S. Geological Survey Great Lakes Science Center as part of Lake Huron's Cooperative Science and Monitoring Initiative. USGS established a cooperative agreement with the Department of Fisheries and Wildlife at Michigan State University to continue sample processing and collections on Lake Huron in 2018. USGS will continue this collaborative effort in 2019-2021 by assisting with sample collections, data analysis, and reporting project results to stakeholders.

Little Traverse Bay Bands of Odawa Indians (Kevin Donner)

The Little Traverse Bay Bands of Odawa Indians is providing stomach and tissue samples from lake trout, walleye and other species collected in the northeastern areas of Lake Michigan; places that are typically less frequented by recreational fishermen and often harder to sample adequately. We are collecting these samples during our annual fish community monitoring efforts which utilize graded mesh gillnet set by our research and monitoring crews.

Grand Traverse Band of Ottawa and Chippewa Indians (Nathan Barton)

The Grand Traverse Band of Ottawa and Chippewa Indians is providing stomach and tissue samples from lake trout, and other species collected in and around the Grand Traverse Bay area of Lake Michigan. We are collecting these samples during our annual fish community monitoring efforts which utilize graded mesh gillnet set by our research and monitoring crews as well as from the commercial fishery. These samples will provide contrast to samples collected via hook and line.

Wisconsin Department of Natural Resources (Cheryl Masterson)

The Wisconsin Department of Natural Resources helped collect samples while working in conjunction with Fish and Wildlife staff at local fishing tournaments and fish cleaning stations. During the summer months, one full-time DNR employee stationed in Milwaukee recorded biological data and collected samples from angler catches of trout and salmon. The Sturgeon Bay office also provided staff one day per week, and 5 interns working out of Green Bay and Milwaukee each dedicated one day per week to the project.

U.S. Fish & Wildlife Service (Matt Kornis and Chuck Bronte)

The USFWS's Great Lakes Fish Tagging and Recovery Lab operates a large-scale program that coded-wire tags over 9 million salmon and trout annually, and has technicians stationed around lakes Michigan and Huron collecting data on sport-caught tagged fish and their wild counterparts. The program handles 20,000 fish annually and provides an unparalleled source of stomachs and muscle samples for the cooperative diet project. Funding is provided, in part, through the Great Lakes Restoration Initiative administered by the U. S. Environmental Protection Agency.

Wisconsin Sea Grant (Titus Seilheimer)

Titus Seilheimer serves as the contact for Wisconsin anglers with questions on stomach collection and provides updates on the study at meetings including the Lake Michigan Fisheries Forum.

Michigan Sea Grant and MSU Extension (Dan O'Keefe)

Michigan Sea Grant funded an internship for MSU student Jasmine Czajka and Michigan State University Extension funded an internship for Brok Lamorandier to work on the project in summer 2018. Michigan Sea Grant hosts the diet study web page and develops educational resources related to the project.

Michigan Sea Grant helps to foster economic growth and protect Michigan's coastal, Great Lakes resources through education, research and outreach. A collaborative effort of the University of Michigan and Michigan State University and its MSU Extension, Michigan Sea Grant is part of the NOAA-National Sea Grant network of 33 university-based programs.