CAMP

Coordinated Aquatic Monitoring Program

CONNECTIONS

Newsletter | August 2023

Contents

What's New

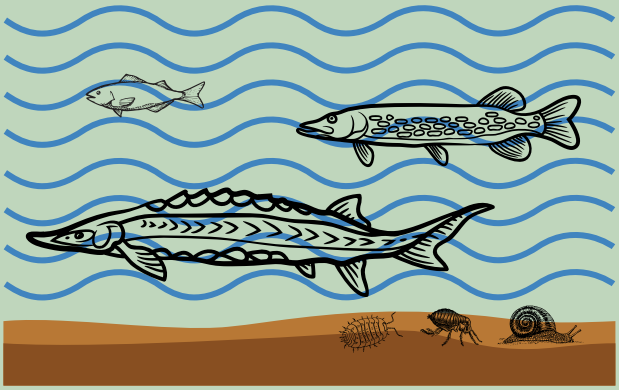
It's summer in Manitoba, which means a new CAMP monitoring season has begun! In this issue of our newsletter, we'll cover some of the highlights of this year's monitoring activities as well as an exciting upcoming expansion of our program. We'll also explore the Upper Nelson River Region, and some of the scientific concepts and methods that are a part of CAMP.

CAMP

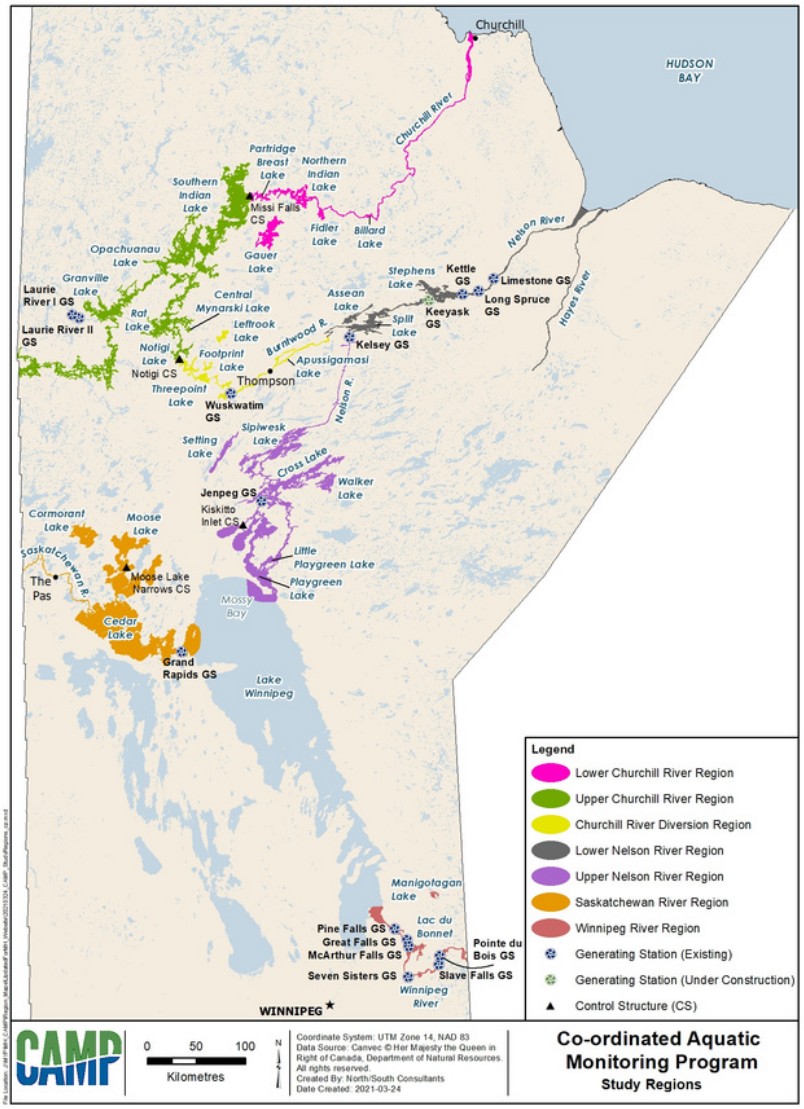
About the Program

The Coordinated Aquatic Monitoring Program (CAMP) was established in 2006 as a partnership between the Province of Manitoba and Manitoba Hydro. CAMP is a long-term aquatic monitoring program to study and monitor the health of rivers and lakes affected by Manitoba Hydro's generating system.

Components currently monitored under CAMP include hydrometrics, water quality, benthic invertebrates, fish community, mercury levels in fish, phytoplankton, sediment quality, and the physical environment.



We monitor water bodies in regions all around the province in relation to Manitoba Hydro's infrastructure.



CAMP Study Region Profile

Upper Nelson River Region

In each issue of CAMP Connections, we highlight one of the seven CAMP Study Regions. This time, we are excited to feature the Upper Nelson River Region, just north of Lake Winnipeg.

The Upper Nelson River Region extends from the outlet of Lake Winnipeg (at 2-Mile Channel and Warren Landing) downstream to the Kelsey Generating Station near Split Lake. The Nelson River is the only outflow from Lake Winnipeg and the watershed drains a total area of approximately 1,050,000 km^2, including the Saskatchewan, Winnipeg, and Red river basins. Upstream, the Jenpeg Generating Station (GS) controls 85% of the flows out of Lake Winnipeg into Cross Lake. The remaining 15% of the Nelson River flows pass unregulated through the East Channel into Cross Lake. At the downstream end of the Upper Nelson River Region, the flow passes through the Kelsey Generating Station and into Split Lake (which is located in the Lower Nelson River Region of CAMP).

Located entirely within the Boreal Shield Ecozone and primarily within the Hayes River Upland Ecoregion, the Nelson River flows through thick deposits of silt and clay. Lakes in the region vary in terms of shoreline composition, as erodible silt and clay is dominant in the southeast, while bedrock is found in the northeast. A mixture of bedrock, soil, and organic shoreline are also present within the downstream Sipiwesk Lake and Kelsey reservoir.

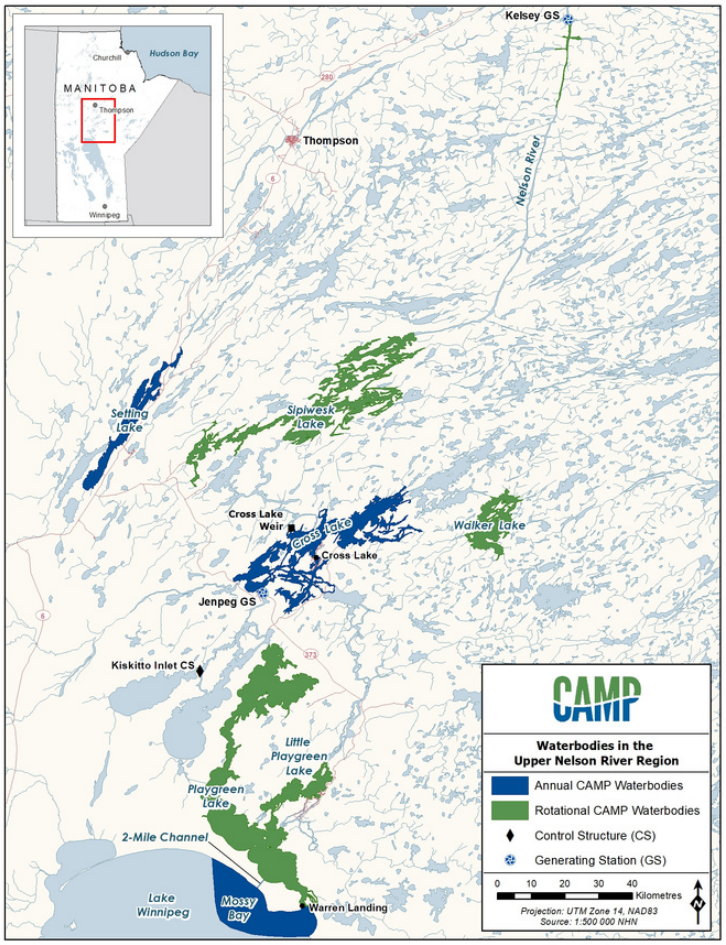
CAMP monitors the following water bodies in this region on an annual basis:

- Cross Lake, west basin
- 2-Mile Channel
- Warren Landing
- Setting Lake

On a rotating schedule, CAMP monitors each of the following water bodies every three years:

- Playgreen Lake
- Little Playgreen Lake
- Sipiwesk Lake
- Nelson River, upstream of the Kelsey Generating Station
- Walker Lake

A continuous monitoring station located at the Jenpeg GS collects physical environment data throughout the year.

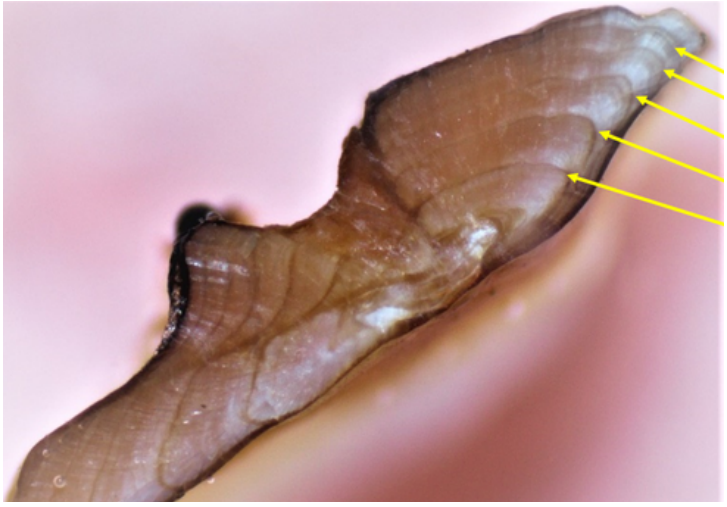


Science Corner

"Crack and Toast" - A Method for Determining Fish Age

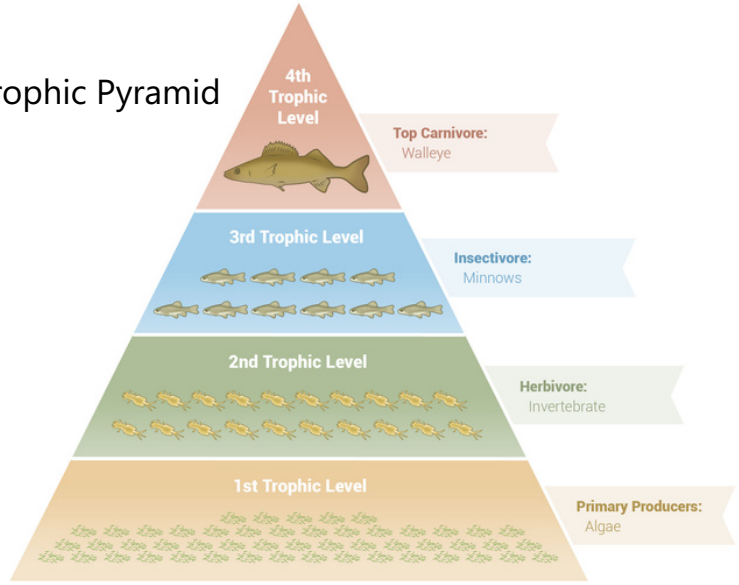
Did you know that you can determine the age of a fish similar to how you can determine the age of a tree? A fish otolith, or ear bone, has layers that accumulate as a fish ages, like the rings on a tree. To count the layers (and determine the age of a fish), scientists use a method called "crack and toast" where they crack an otolith in half, polish it, and then 'toast' it using a Bunsen Burner. This process allows them to clearly see the layers under a microscope, and thereby assess the age of the fish.

Knowing the age of fish can reveal information about the overall health of the population and the waterbody they live in. By sampling a portion of the fish population in a lake, scientists can estimate the number of fish at each age within a population. This can tell us how many spawners are in a population, or how successful spawning has been in the past.



Walleye otolith showing annuli (layers). This walleye is 5 years old.

Trophic Pyramid



Understanding the Aquatic Ecosystem through Trophic Levels

Trophic levels show how energy is transferred through the ecosystem. The relationships between trophic levels are often shown as a pyramid, with layers from bottom to top. The trophic pyramid above shows one example of how food energy enters an aquatic ecosystem (at the bottom of the pyramid) and moves up to the top predators. In this case, the algae at the bottom of the pyramid (the first trophic level) grow by using energy from the sun. The algae are then eaten by the mayflies (second trophic level), which are subsequently eaten by minnows (third trophic level). At the top of the pyramid, we find walleye, which are among the top predators in Manitoba's lakes and rivers.

It is important to understand trophic levels in an ecosystem because of the way they are interconnected. A change to one layer will impact the others. For example, if plants at the first trophic level die, there will be less food available to support the levels above.

The CAMP monitors organisms at many trophic levels - including algae in the water, invertebrates, and fish. By monitoring what is happening at different trophic levels, we will be better able to understand changes to individual organisms and the wider ecosystem over time.

CAMP News

Connecting, Learning, & Sharing - Expanding CAMP in Partnership with Communities

CAMP is expanding! Since it was established in 2006, the program has been focused on conducting aquatic monitoring activities throughout the province. We are excited to soon be expanding to include shoreline monitoring, which will be developed in partnership with Indigenous communities through an approach inclusive of both Indigenous and scientific knowledge.

Expanding CAMP in this collaborative way is a step towards Manitoba and Manitoba Hydro's commitments to environmental stewardship and working with and learning from communities. Expansion will also meet licence conditions in the most recent Water Power Act licences for the Churchill River Diversion, Lake Winnipeg Regulation, and the Jenpeg and Kettle generating stations.

The addition of shoreline monitoring will help us understand current conditions and the effects of hydroelectric operations on things like erosion, traditional plants and medicines, and waterfowl. The results of shoreline and aquatic monitoring will contribute to a more holistic view of the environmental conditions on waterbodies monitored by CAMP through Indigenous Knowledge and western science.

We are looking forward to working with communities in CAMP Study Regions to develop and implement the new shoreline monitoring component while also continuing with the existing aquatic monitoring program.

The expansion will begin in northern Manitoba with a staged roll out to other CAMP regions across the province. We anticipate reaching out to community leadership in the Lower Churchill, Burntwood, Lower Nelson, and Upper Nelson river areas this summer to start working together on this exciting initiative. To support the expansion of CAMP, Manitoba Hydro and Manitoba are currently working to identify and acquire resources. Stay tuned!

CAMP Species Feature

Sauger

A close relative of the Walleye, Sauger can be distinguished by noticeable spots on their dorsal fin and a lack of white spot on the bottom of their tail. Sauger also have scales on their cheek where walleye do not. This species lives in shallow, large, slow-moving rivers and large, turbid lakes with silt, sand, or clay bottoms. They can be found across central and eastern Canada from the St. Lawrence River and the Great Lakes, to Manitoba and Saskatchewan, and even all the way north to Hudson Bay.

Sauger was recently added to the CAMP fish monitoring program because Manitoba Fisheries noticed that their ranges were moving farther north than what had been seen in the past.

In Manitoba, sauger are commonly found in Lac du Bonnet and the Winnipeg River.

While Walleye received their name thanks to their strong eyesight, Sauger can see even better in the same dark and murky conditions!

Sources: Sauger (dfo-mpo.gc.ca); Walleye vs Sauger: Can you tell the difference? | Hunt Fish Manitoba

Sauger

Sauger can be distinguished by their spotted dorsal fins

Did you Know?

CAMP has sampled almost 50 different fish species throughout Manitoba

CAMP Monitoring Calendar

A new CAMP Field Season is here! The CAMP field crews will be out on the lakes and rivers collecting samples and data as part of our monitoring program. Keep reading to learn about the CAMP monitoring planned for this summer.

Fish Monitoring

What: The CAMP fish monitoring program includes both small- and large-bodied fish. Some species of interest include Walleye, Northern Pike, and Sauger. We collect a variety of measurements from the large species including fish size, age, and condition (which describes how fat a fish is). We also look at the fish population in each region by counting the number of different species present, and by determining which of those species are more abundant than others. As we learned on p.4, fish are found at the top of the trophic level pyramid and are an integral part of the aquatic ecosystem. Collecting this data can therefore help us understand both the health of the fish population and the broader environment.

When: Fish sampling occurs once per year in years when a waterbody is sampled. CAMP includes annual waterbodies and 3-year rotational waterbodies. We'll be sampling from June to September.

CAMP Fish Community Program

Collecting benthic invertebrate samples

Benthic Monitoring

What: Despite their small size, benthic invertebrates can tell us a lot about an aquatic ecosystem. Benthic (meaning 'bottom-dwelling') invertebrates are tiny animals without backbones that live at the bottom of lakes and rivers. They include insects and insect larvae, worms, and snails. The presence and abundance of different types of benthic invertebrates is often determined by characteristics such as water depth and nutrient levels, so looking at the benthic community in different locations can be an indicator of overall ecosystem health.

When: Sampling occurs once per year in years when a waterbody is sampled. CAMP includes annual and 3-year rotational waterbodies. We'll be sampling in August and September.

Water Quality Monitoring

What: Water quality is an integral part of ecosystem health. Using the Manitoba Water Quality Standards, Objectives, and Guidelines as a reference, data collected through CAMP can help us understand water quality in lakes and rivers across the province and how it supports aquatic life. We analyze over 50 parameters related to water quality including nutrient levels (chlorophyll, nitrogen, and phosphorous), turbidity (a metric for water clarity), and dissolved oxygen (the amount of oxygen in the water). As the quality of the water can affect all levels of the aquatic food chain, long term monitoring through the CAMP can help us track any changes over time. CAMP collaborates with the Lake Winnipeg Research Consortium (LWRC) to collect water samples using the Namao ship near the inlet to 2-Mile Channel on Lake Winnipeg. For more information on the LWRC, visit www.lakewinnipegresearch.org.

When: Most of our water quality sampling takes place from May to September, though some sites have continuous sensors that are checked monthly throughout the year.

Secchi Disk for measuring water clarity

LWRC's Research Vessel: Namao

LWRC's Research Vessel: Namao

CAMP Team Profile

Russ Schmidt, Environmental Specialist, Manitoba Hydro

What is your role?

My main area of involvement is around aspects of the physical environment, which is a fancy way of saying the water and dirt in which things live. We collect samples, install sensors in the water and look at satellite imagery to help in our monitoring. A part of my time is spent looking at this information and reporting and presenting it to whoever wants to hear about it. I am envious at times of those who get their hands dirty doing the field work and really appreciate the work they do.

What is your educational background?

My formal education is a mix of engineering and environmental science, but I'll add that I've learned more from all the people I've met along the way than in the classroom. After high school I left my hometown in southern Manitoba to attend Red River Community College (now Red River College Polytechnic) to study civil engineering technology. A few years later I moved to the UK to study Water Resource Management at the University of Gloucestershire. After spending nearly four years abroad, our family and friends lured us back home to Manitoba.

Is there a particular body of water or sampling site that you most enjoy going to?

I've had the privilege to see many of the waterbodies where Manitoba Hydro operates, and I wish I could be out of the office more. I don't have a particular favourite site, but remember vividly my first time boating through Birthday Rapids and on another trip being on the Nelson River downstream of the Limestone Generating Station. Both times I was in awe of the speed and power of the water in the Nelson River.

If there is one thing you would like people to know more about the important work that CAMP does, what would that be?

While CAMP has been collecting science data for quite a few years now, plans are forming to include Indigenous participation in planning and implementing new monitoring into the program. My hope is that this will provide opportunities for Indigenous communities to participate and share their observations and knowledge on the health of the waterways with all of Manitoba.

For more information on the program, visit our website www.campmb.com