Coordinated Aquatic Monitoring Program

CAMP is a collaborative partnership between Manitoba Hydro and the Manitoba government.

CONNECTIONS

Newsletter | May 2022

SPRING INTO MONITORING!

WHAT'S NEW?

Since our last newsletter, another cold and snowy Manitoba winter came and went. With the spring season, plants will grow, and so will we. In the next few pages, we'll give you an update on our shoreline monitoring initiative—as well as how you can get involved. You will find out about the places we go, the data we collect, and many fun facts along the way. You will also meet Joy from Manitoba Environment, Climate and Parks. Find out about her role and why she loves her job.

Cormorant Lake, MB

EXPLORING OUR LONG-TERM APPROACH TO DATA COLLECTION – STANDARDIZATION AND CONSISTENCY PAYS DIVIDENDS!

Using standardized methods for sample collection, members of the CAMP team set out for monitoring duties. They jot down information to be consolidated in a large spreadsheet. It contains information about the place and time when samples were collected, and the gear used for getting the data. This answers a variety of questions about the different physical aspects of the rivers and lakes. Answering these questions consistently, and over a long period of time can tell a bigger story.

Even though CAMP has been around since 2008, long-term data collection means our understanding of the ecosystem increases over time. Variations exist from season to season, and from year to year, whether it be in temperature, weather events, ice melt, and more.

Over time, this information will provide a robust narrative of the changes happening in Manitoba's aquatic ecosystems— whether it be changes to water flows and levels, water quality, sediment composition, fish, insect and plant populations, and their habitats. CAMP data is available to scientists and resource managers to help inform decisions.

NEWS YOU CAN USE

SCIENTIFIC MONITORING CALENDAR

Covering six river basins and a land area of 1.3M km^2 is no easy feat! CAMP monitors an area about the land size of the province of Quebec, which is not a small province by any means. The regions are diverse in geography, land use and water management. CAMP was designed so each water body would be compared to itself (rather than each other) over time as more data is collected.

Here's what you can find us doing in the next few months:

SCHEDULE OF ACTIVITIES

Water Quality Monitoring

When: Water quality is measured three to four times per year, although some stations collect data continually.

What: Meters and probes (like thermometers) measure conditions directly in the lakes and rivers. Water samples are also sent to a laboratory for analysis using specialized instruments.

**It is important to note that CAMP was designed to help understand system-wide conditions across the province over the long term. It was not designed to detect specific weather events at local sites, such as nutrient changes from precipitation events.*

Water quality sampling using a Kemmerer sampler

Why: Good water quality contributes to the condition of the ecosystem and aquatic life—for fish, like walleye, and lesser-known organisms alike. Different organisms have different preferences for water quality and habitat conditions. Some organisms are more sensitive to changes than others. For example, fish eggs (and other early life stages of organisms) may require more dissolved oxygen to survive than mature fish. Then, there are a variety of other conditions, such as temperature, acidity (pH), dissolved solids (specific conductance), and particulate matter (turbidity) to consider as well. CAMP refers to the Manitoba Water Quality Standards, Objectives, and Guidelines to help interpret water quality data.

Mayfly (fish fly larva)

Benthic Invertebrate Monitoring Program

When: Sampling is done once per year in years when a waterbody is sampled. There are annual waterbodies and three-year rotational waterbodies.

What: A kicknet sampler is used to collect benthic invertebrates in the nearshore (shallow) habitat. A benthic grab sampler (Ekman or petite Ponar) is used to collect benthic invertebrates in the offshore (deeper) habitat.

Why: Benthic invertebrates are tiny animals without backbones, such as insect larvae and clams, which live in, or on, the bottom sediments of lakes and rivers.

The benthic invertebrate community is an important part of monitoring the aquatic environment. They are often used to determine the health of lakes and rivers and are used in monitoring programs all over the world. Aquatic invertebrates are a valuable food source for fish and an important for describing the quality of habitat for fish.

Fish Program

When: Sampling is done once per year in years when a waterbody is sampled. There are annual waterbodies and 3-year rotational waterbodies.

What: Small-bodied species, and juvenile and adult large-bodied species, including Northern Pike are important to CAMP. Information collected includes the number of species present in the community and relative abundance of these species (proportion of the number of a given species compared to the size of the total catch) fish size (length and weight), age, life stage (juvenile or adult) and condition (fatness). Some of these indicators are measured for communities more broadly, but, in other cases, are targeted to species of importance for fisheries, such as walleye, northern pike and sauger.

Why: It may be obvious that fish are an integral part of an aquatic ecosystem, but the metrics and indicators of the fish community can be used as measures of the general condition of the aquatic ecosystem. Various fish species require different habitats, food, and water flow to thrive.

SHORELINE MONITORING PROGRAM

Where water meets land is known as the shoreline, and it can tell us a lot about the health of an ecosystem. Shorelines are habitat for animals and vegetation, as well as a place where water and ice shape the land through erosion processes influencing the underwater habitat of the organisms that call rivers and lakes their home.

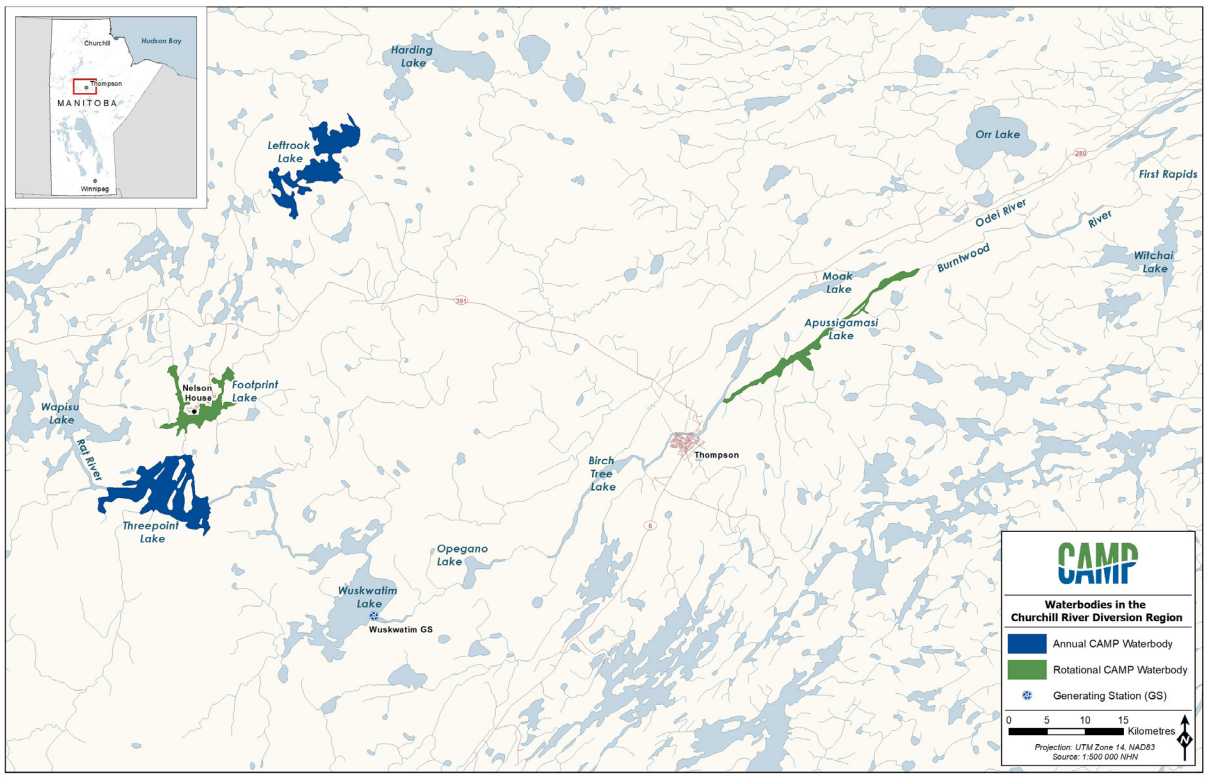
We'll be monitoring shorelines across the Province from the Winnipeg River to Cedar Lake to the Nelson River. The shoreline health program we're developing will help us understand shoreline conditions and the effects from hydroelectric operations. Lake Winnipeg will not be a part of the program, since a variety of other groups are already monitoring the region's shorelines. The information from this program will be provided to decision-makers and will be available for scientists, students, and the public too.

Cross Lake, MB

In addition to western scientific methods, CAMP would like to work with Indigenous peoples to include Indigenous ways of knowing to contribute to our understanding of what's happening.

In terms of next steps, this spring and summer, we will start engaging with Indigenous communities to plan and shape our approach. We'll keep you updated as we work on this long-term, system-wide program—a program that will take time to shape and mature.

CAMP STUDY REGION PROFILE: CHURCHILL RIVER DIVERSION REGION



We explored the Winnipeg River Region in our last summer newsletter. We're now headed northwest, to the Churchill River Diversion region. The Churchill River Diversion region goes from the Notigi Control Structure, to First Rapids, located about 20 km upstream from Split Lake. Most of the Churchill River Diversion region is in the Boreal Shield Ecozone, which means water is generally clearer than it is in prairie rivers, such as the Red River. Some streams and lakes have eroding shorelines and glacial clay deposits at the bottom, which makes the water more turbid.

The diversion project was constructed between 1973 and 1976, designed to increase water flow for hydropower generation on the lower Nelson River. The Missi Falls Control Structure was built to regulate the water passed down the Churchill River from Southern Indian Lake.

The South Bay Diversion channel was created to allow Churchill River water to flow into the Rat and Burntwood rivers through the Notigi Control Structure.

CAMP monitors the following lakes in this region:

- Threepoint Lake (annually)
- Footprint Lake, Apussigamasi Lake (rotationally)
- Leftrook Lake (annually) (an off-system lake, a lake that is not directly impacted by hydroelectric development)

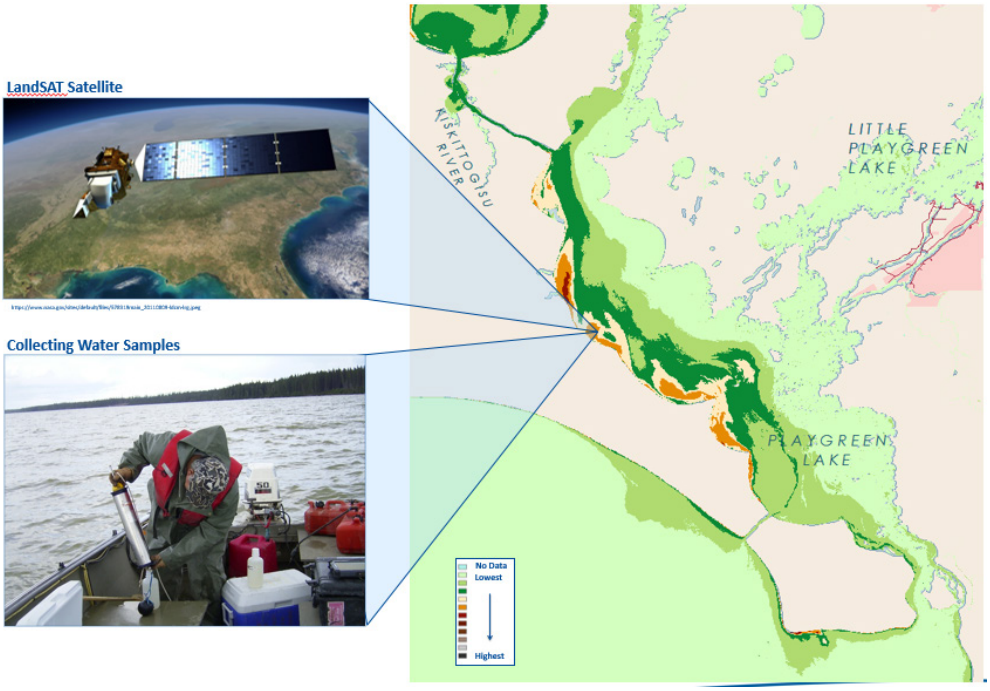
A notable change created by the Churchill River Diversion was the increase in water levels in a previously smaller river system.

Engineering studies hypothesize flooding of highly erodible shorelines increased erosion. Sediments found their way to the bottom of lakes, making the bottom softer, and muddier. In turn, increased bottom sediments impacted the benthos community. Worms and midges that tolerate lower oxygen increased in numbers.

The water became less clear, which lowered the amount of photosynthesis. This reduced the number of primary producers, which impacted the condition of fish. In turn, fish communities that were once more common in rivers may have become more similar to fish communities found in lakes. However, these remain hypotheses of the changes caused by the diversion. CAMP can only confirm these changes by continuing its work of collecting high-quality, consistent data over a long period of time.

COOL CAMP SCIENCE:

SATELLITE IMAGERY



What is visible from the ground, when collecting samples in the water, tells only one story. Combining this information with satellite images offers a bird's eye view of the bigger picture. For example, suspended sediment data from water samples will help CAMP map sediment concentrations, measured as total suspended solids (TSS) in lakes and reservoirs. Understanding TSS conditions highlights patterns in sediment transport— the movement of particles by water, and how different water levels or wind conditions can influence sediment movement.

FUN FACTS ABOUT THE CATFISH

The Channel Catfish is an omnivore that feasts on a variety of other organisms, including a variety of invertebrates and small and medium sized fish. It is one of the most common species of catfish found in North America.

Channel catfish found in the Pine Falls reservoir

Distinctive with its four pairs of barbels, which look like whiskers, the catfish has a highly developed sense of smell and taste. Hence, finding food in dark and muddy waters is no problem thanks to nostrils with a high concentration of odor-sensing organs (known as olfactory receptors) and a body covered with taste buds. The catfish also has a Weberian apparatus, a special structure connecting the swim bladder to the auditory system that amplifies noises a fish with only an inner ear structure could faintly perceive.

Catfish are native to numerous Manitoban fisheries and are a favourite for sport fishers due to their size and abundance.

CAMP TEAM PROFILE: JOY KENNEDY, WATER QUALITY SPECIALIST

What is your role?
I work as a Water Quality Specialist for the Manitoba government. I'm currently Manitoba's lead for CAMP's water quality monitoring component and will support the shoreline monitoring component which seeks to engage with Indigenous Peoples.

What is your educational background?
I graduated from the University of Manitoba with a Bachelor of Science with the Environmental Science Co-Op Program. When not in school, I explored as many waterbodies as I could (from marshes, arroyos, to the Great Lakes), studying the water's trophic levels and ecological organization. The aquatic environments I encountered were not always the most pleasant, but I nonetheless developed a special awe for the high biodiversity I saw in some ecosystems.

Is there a particular body of water or spot you like going to?
I love Glad Lake in Manitoba, especially in the winter, when I can listen to the booming sounds of ice cracking and see the Northern Lights. It's a lake with high clarity, so in the summer, I'd like to see just how clear it is by using a Secchi disk to measure the depth.

(Note: Our last newsletter featured the Secchi disk!)

What is your favourite part about your work?
I love the subject matter: Water. I like learning everything I can about the processes in lakes and rivers. I also like providing the right information about aquatic environments to inform environmental protection efforts.

What is the coolest thing about your work?
Sometimes, I get to be in nature, near the shores of a river.

What activities do you enjoy in your free time?
I enjoy listening to all kinds of music, playing around on my guitar, and going on adventures.

If there's one thing you would like people to know more about the important work that CAMP does, what would that be?
CAMP monitors organisms at many trophic levels ranging from bacteria to algae to invertebrates to fish, all crucial to ecosystem health.

CAMP

Coordinated Aquatic Monitoring Program

WE WANT TO HEAR FROM YOU!

Do you have a question for us? Don't hesitate to ask!

Do you have a concern? We want to hear about it.

Did you snap a cool photo recently? We want to see it!

We will be publishing a Q&A section and reader contributions in future editions, so please send them along to CAMP's coordinator, Jennifer Van de Vooren, by email: CAMP@hydro.mb.ca

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Sauger, a CAMP target fish.