



# CAMP

Coordinated Aquatic Monitoring Program

## Annual Activity Report

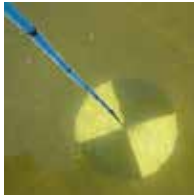
2014/2015

Submitted to:  
Minister of Conservation and Water Stewardship

President/CEO Manitoba Hydro

Submitted by:  
MOU Working Group

July 2015



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## 1.0 Summary

The 2014/15 Coordinated Aquatic Monitoring Program (CAMP) marks the seventh year of monitoring since implementation in 2008/09. The program was initiated to address the need for system-wide monitoring to better understand the potential effects of hydroelectric operations on the aquatic environment. CAMP was designed using an ecosystem-based approach using key biological/chemical parameters and hydrometric data to describe the ecological condition and status of aquatic ecosystem health of the waterways in which MB Hydro operates. The parameters selected are scientifically based and were developed from “best advice” obtained from workshops held each year since November 2007 that include representation from Manitoba Conservation and Water Stewardship, Manitoba Hydro, Fisheries and Oceans Canada, University of Manitoba, Environment Canada, North/South Consultants Inc. and most recently the International Institute for Sustainable Development (IISD).

To date, the program has been assessed annually and adjusted accordingly to ensure it maintains scientific credibility and is on scope for meeting objectives of the Memorandum of Understanding. Recent developments to the program include:

- With the assistance of the IISD, finalized selection of the aquatic ecosystem health indicators
- Implementation of a sediment monitoring program on Southern Indian Lake
- Implementation of an algal monitoring program on Southern Indian Lake
- Acquisition of all CAMP data that was previously warehoused at North South Consultants Inc.

Additional items to be developed over the next few years include:

- Implementation of ecosystem health indicators in the development of the 6-year summary report
- Expansion of the sediment and erosion monitoring program
- Installation of satellite transmitters to view turbidity data in real-time. Standardizing the process for responding to public data requests.
- Expansion of the website to present more reports and data
- Development of a Sharepoint site to organize all CAMP information and to improve information exchange between working group members.



## 2.0 Background

The purpose of this report is to provide the signatories of the "Memorandum of Understanding about the Program of LWR/CRD Monitoring Activities (MOU)" with a summary of the 2014/15 Coordinated Aquatic Monitoring Program. The MOU, signed in 2006 by the Province of Manitoba and Manitoba Hydro (Attachment 1), outlines the need to develop a system-wide aquatic monitoring program to address concerns related to potential effects associated with Manitoba Hydro operations. The Coordinated Aquatic Monitoring Pilot Program (CAMPP) was developed and implemented in 2008/09 and operated for the first three years to test sampling methodologies. This 2014/15 annual activity report represents the fourth year of a fully implemented, post-pilot phase Coordinated Aquatic Monitoring Program (CAMP).

## 3.0 Meetings

Several meetings were held throughout the year between different groups relevant to CAMP, including the main working group, smaller subcommittee, broader workshops, and community meetings.

### 3.1 Working Group

On May 7, 2014, a draft workplan for 2014/15 program was presented to the MOU Working Group, which is the oversight committee identified in the MOU (see Attachment 2). Items that were presented and discussed include:

1. Review of the 2013/14 CAMP
2. Update on CAMP reporting and data management
3. Presentation and discussion of proposed 2014/15 CAMP workplan
4. Update on community dialogue efforts.

No significant concerns or issues were raised by the Working Group members during the meeting or the two week review period and the 2014/15 workplan was subsequently accepted as presented.

### 3.2 Subcommittee

The subcommittee is composed of groups of technical experts from Manitoba Hydro, Manitoba and North South Consultants Inc. for each of the specific parameters sampled in CAMP. There were no specific technical subcommittee meetings during 2014/15. Instead, two workshops were scheduled and those discussions were sufficient to clarify any questions.



### 3.3 Annual Workshop

Usually one annual CAMP workshop is held with approximately 30 people representing federal and provincial agencies, private consultants and Manitoba Hydro staff. The intent of the workshop is to disseminate information related to CAMP activities and receive feedback on future directions. This year, two workshops were held with the specific focus to work through the development process for the aquatic ecosystem health indicators. The workshops were facilitated this year by the IISD and were held on March 4th to 5th, 2014 and November 25th, 2014.

### 3.4 Community Meetings

Manitoba Conservation and Water Stewardship presented and discussed CAMP at a variety of community meetings in 2014/15. Program progress and results were presented and feedback received. A list of these community meetings is provided in Attachment 3.

## 4.0 Summary of Activities

The following summary documents the major activities undertaken by CAMP in 2014/15.

### 4.1 Field Program

A total of 31 sites (22 on-system and 9 off-system) were sampled for water quality, benthic invertebrates, and fish community during the 2014/15 CAMP. A list of sample sites and associated field parameters is included in Attachment 4 and a map showing the waterbodies sampled, is included in Attachment 5.

#### 4.1.1 Program Changes

The lower Churchill site at Redhead Rapids was moved to the forebay of the Churchill River Weir. This is a three year rotational site first sampled this year. Water Quality, benthic and sediment sites were added on Lake Winnipeg in the vicinity of the fish sampling sites.

#### 4.1.2 Aquatic Habitat

An aquatic habitat (bathymetry and substrate) survey was completed at Threepoint Lake in summer 2014. Threepoint was selected as a lower cost option over the middle basin of Cedar Lake.

#### 4.1.3 Water Quality

Water quality sampling was completed at all sites as planned (See Attachment 4).



#### 4.1.4 Benthic Invertebrates

Benthic invertebrate sampling was completed at all sites as planned (See Attachment 4).

#### 4.1.5 Phytoplankton

Samples for phytoplankton analysis (i.e., community composition and biomass) were collected from the four routine annual monitoring sites (Cross, Setting, Split and Assean lakes) in the open water sampling period.

#### 4.1.6 Fish Community

Fish community sampling was completed at all sites as planned.

#### 4.1.7 Mercury in Fish

Fish tissue samples collected during fish community monitoring at three sites (Threepoint, Leftrook and Sipiwesk lakes) were submitted for mercury content analysis.

#### 4.1.8 Sediment Monitoring

A sediment monitoring plan was conducted on Area 4 of Southern Indian Lake. The design was based on a pilot program conducted on Playgreen Lake in 2013/14. Both programs included the following components:

- continuous turbidity data during open water and winter seasons;
- water samples for total suspended solids (TSS) analysis during open water and winter seasons;
- bed material samples (bedload sampler) during open water; and
- sediment deposition samples (sediment traps) during open water and winter seasons.

In addition, on Southern Indian Lake light meters were added to some of the continuous turbidity sites. Data from these loggers will be used to assess their utility in measuring the effect of turbidity on light penetration and algae production.

### 4.3 Reporting Framework

1. A “Six-Year Summary Report on the Winnipeg River Region” was developed as an internal background document for the Aquatic Ecosystem Health Indicator Workshops that were held in May and November 2014.
2. The “Indicator Framework Report: A report for the Coordinated Aquatic Monitoring Program.” was completed by the International Institute for Sustainable Development. The report describes the process used to develop the aquatic ecosystem health indicators as well as the resulting list of indicators (i.e. water quality, benthos, and fish).



## 5.0 Emerging Items

### 5.1 Six-Year Summary Report

North South Consultants Inc. will be preparing a summary report that covers the first six years (2008-2013) of the program (summary reports are completed every three years). This is the first summary report after the Pilot Program Summary Report, and analyses will focus on the new aquatic ecosystem health indicators. The intent is to look for trends in the data to help inform future direction for the program. The six-year summary report is expected to be completed in winter 2015/2016.

Once North South has completed the six-year report, the Working Group has endorsed the suggestion that IISD (including the Experimental Lakes Science program) peer review the report and provide recommendations for improving the program.

### 5.2 Annual Reporting via CAMP Website

The CAMP website will continue to be updated with data as it is collected, and made available to the public.

### 5.3 Data Management Strategy

All CAMP data that was warehoused with North South Consultants Inc. is being migrated into Manitoba Hydro. Internally, the CAMP data will be managed by a web based software called STARLIMS which will improve data collection, storage, retrieval and analysis of sample data, as STARLIMS is built for traceability, compliance and collaboration.

Implementation of the CAMP Data Integration Strategy will start once the CAMP data management has transferred to Manitoba Hydro.

### 5.4 Sediment and Erosion Monitoring

The sedimentation monitoring program has continued to evolve; however, erosion monitoring methodology is still being investigated. Sediment monitoring is proposed again for Southern Indian Lake (Area 4) in 2015/16 and will be used to investigate the relationship between algal production and reduced light attenuation caused by turbidity.

A pilot study using close range photogrammetry is proposed to measure shoreline erosion. It will be conducted by Hydraulic Operations Department on Wuskwatim Lake in summer 2015. The use of satellite imagery to monitor surface water quality, including total suspended solids and turbidity, is being evaluated by MB Hydro staff (Water Resources Engineering).

### 5.5 Data Sharing

Requests for CAMP data continue to be received from the public. One request for data was received in 2014/15 for a scientific research project and the appropriate data was shared with the individual. The process for responding to data requests is being standardized and tracked and is anticipated for implementation in 2015/16.

## 6.0 Conclusion

Since its inception in 2008, CAMP has grown in scope, functionality and popularity. It has become an integral and well-respected program for MB Hydro and Manitoba as evidenced during the recent Clean Environment Commission (CEC) hearings for the Keeyask Generation Project and Lake Winnipeg Regulation. Several positive references were made about the program by the CEC and other groups, including how it is helping inform decision making and enhance the collective scientific understanding of hydroelectric effects on the aquatic environment. It is anticipated that the current Regional Cumulative Effects Assessment (RCEA) will rely on CAMP data and CAMP monitoring might be enhanced depending on the outcome of the RCEA process. CAMP has become a positive, high-profile project for the corporation and province and it is expected to continue to grow in utility and attractiveness in the coming years







## Attachment 1

### Memorandum of Understanding

#### **Memorandum of Understanding about Program of LWR/CRD Monitoring Activities, dated October 16, 2006.**

The Government of Manitoba and Manitoba Hydro are committed to work together on matters relating to monitoring of hydrometric (water level and stream flow) and environmental data in certain areas in the Lake Winnipeg Regulation and Churchill River Diversion system.

Manitoba and Manitoba Hydro have the common objective of developing a program of activities ("the activities"), building on the existing monitoring program of Manitoba Hydro, that would provide objective information about hydrometric and environmental effects of hydro-electric development on agreed rivers and lakes comprising the Lake Winnipeg Regulation and Churchill River Diversion systems ("the system"). The information from the activities could be of benefit to Manitoba, Manitoba Hydro and other interested parties, including communities in the area of the Lake Winnipeg Regulation/Churchill River Diversion project. Objectives of the program of activities would include:

- (a) assisting in evaluating whether and to what extent the water regime in areas of the system is or will be affected by the addition of additional hydro-electric facilities;
- (b) assisting in identifying adverse effects and positive effects resulting from effects on the water regime; and
- (c) assisting in considering measures that may be undertaken to address any identified adverse effects.

Manitoba and Manitoba Hydro may establish additional objectives of the activities.

Manitoba and Manitoba Hydro recognize that Manitoba Hydro has made commitments to monitoring and follow up programs as part of the environmental licensing process for the Wuskwatim Generating Station. These commitments will be considered in developing the activities.

The program of activities will be reviewed each year and annual workplans will be developed by Manitoba and Manitoba Hydro to assist in achieving the program of activities. The agreed workplan for the fiscal year ending March 31, 2007 is attached as Appendix A to this Memorandum.

Manitoba and Manitoba Hydro will consider methods of making information from the activities available to interested parties.

It is intended that the nature and scope of activities will be developed starting in Fiscal Year 2006-07 (starting April 1, 2006) and will continue until Manitoba and Manitoba Hydro agree to no longer proceed with a program of activities.

As part of the development of the annual program of activities, Manitoba and Manitoba Hydro will consider the resources each will provide in order to carry out the activities

It is intended that Manitoba and Manitoba Hydro personnel will prepare an Annual Report to be delivered to the Minister of Water Stewardship and the Minister of Conservation, on behalf of Manitoba and to the President and CEO of Manitoba Hydro. Additional reports may be prepared as Manitoba and Manitoba Hydro determine to be appropriate. The Annual Report may include:

- a description of the activities for that year;
- a description of any information determined as a result of the activities;
- information about any circumstances where water levels or flows were outside of ranges provided for in licences;
- methods of making the information available to interested parties and to the public;
- any other matters that are considered appropriate. It is expected that Manitoba and Manitoba Hydro will make the Annual Reports available to the public.

Manitoba and Manitoba Hydro may amend this Memorandum from time to time by further Memorandum.

  
for Manitoba

Oct. 16, 2006  
Date

  
for Manitoba Hydro

06 09 06  
Date

## Attachment 2

### Summary of 2014/15 CAMP Meetings

#### Indicator Workshop Part 1. – March 4-5, 2014

##### AGENDA

##### Day 1

- Welcome and introductions
- Overview and background of CAMP
- Identifying Indicators of Watershed Health: workshop objectives, scope and process
- Breakout group session for identifying indicators of watershed health
- Breakout group session and presentations
- Plenary session on indicators of watershed health
- Open discussion

##### Day 2

- Summary of Day 1 and indicator selection and discussion
- Presentation and discussion of indicator selection results by IISD
- Open discussion and closing remarks

#### MOU Working Group Meeting – May 7, 2014

##### AGENDA

- Welcome and review of 2013 Working Group meeting summary & action items
- Review of the 2013/14 CAMP
- Reporting Update and New Initiatives
  - CAMP website
  - Pilot program summary and 6-year reports
  - Aquatic Ecosystem Indicators and Data Management
  - Sediment and erosion monitoring
- Discussion of proposed 2014/15 CAMP workplan
- Update on the system-wide community dialogue



## Indicator Workshop Part 2 – November 25, 2014

### AGENDA

- Welcome, introductions
- Summary and update from March 2014 workshop
- Workshop objectives, scope and process
- Part I: Review of Data:
  - Presentation of indicators analysis from Winnipeg River Region:
    - Water Quality
    - Benthic Macro Invertebrates
    - Fish Community
    - Fish Mercury
  - Breakout group discussion regarding data and indicators:
    - Breakout Group Questions
      - Is the indicator credible? (scientifically defensible and comparable to what has been done elsewhere)
      - Is the indicator linkable to guidelines? (a guideline or credible reference level or benchmark [other location or point in time] exists that can be cited and used as basis to assess the status of the indicator status)
      - Is the indicator sensitive? (shows change over time and does not have significant natural variation)
      - Is the indicator understandable?
    - Hydrometrics – plenary discussion
- Part II: From data to reporting on watershed health:
  - Presentation by IISD
  - Breakout group discussion regarding narrative, framework, and format
    - Breakout Group Questions and Instructions:
      - For one indicator in your component, what is the integrated story about watershed health based on this indicator (use the DPSIR analysis framework to tell story and see linkages with other indicators in your component and other components)
      - What other analysis frameworks have you used to report on watershed health or state of the environment?
      - What format should the report be communicated (a. online info system; b. website with jpg graphs; c. webpage only with digital report)
    - Report back from breakout groups
- Plenary discussion

## Attachment 3

### Listing of CAMP Community Discussions/Presentations 2014/15

The following table lists the Community/Resource Management Board (RMB) meetings where CAMP was discussed; attended by Don Macdonald (Regional Fisheries Manager, Manitoba Fisheries Branch):

| Date              | Location/Group                                  |
|-------------------|---|
| April 10, 2014    | Southern Indian Lake Technical Committee        |
| May 13, 2014      | Southern Indian Lake Technical Committee        |
| May 14, 2014      | Norway House Commercial Fisherman's Association |
| May 28, 2014      | Cedar Lake Resource Management Board            |
| June 24, 2014     | Fox Lake Resource Management Board              |
| August 27, 2014   | Moose Lake Resource Management Board            |
| November 13, 2014 | York Factory Resource Management Board          |
| December 16, 2014 | Norway House Resource Management Board          |

Meetings were planned with the Nelson House Resource Management Board, Split Lake Resource Management Board and for Norway House Article 7 (Environmental Monitoring) groups. These meetings were cancelled or postponed for various reasons. The CAMP 3 Year Summary Report will be presented to these groups at the earliest opportunity.

# Attachment 4

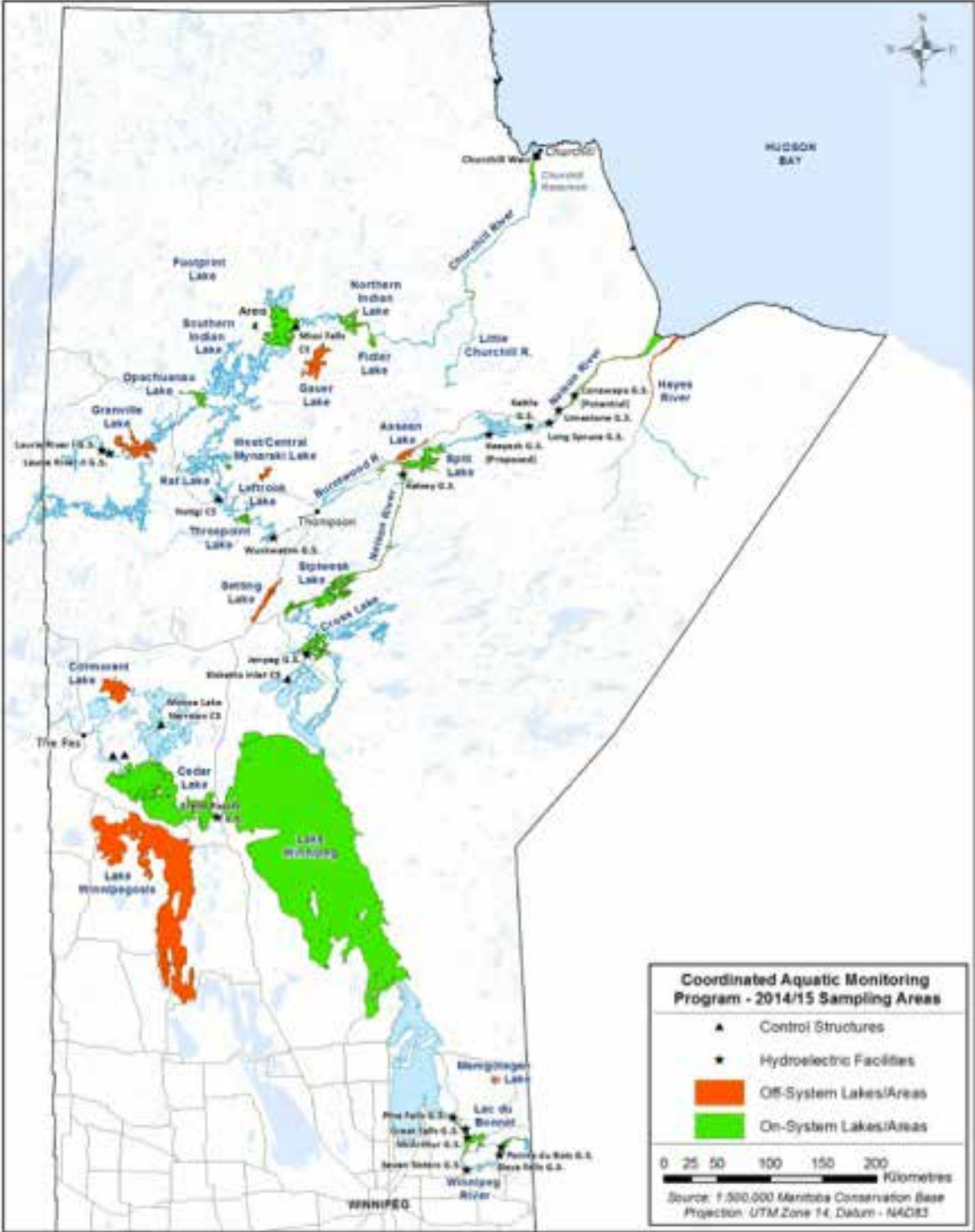
## 2014/15 Sampling Parameters and Waterbodies

| Region                    | Site                                      | Fish Community | Water Quality | Benthic Invertebrate | Hg in Fish | Sediment Quality | Phytoplankton |
|---------------------------|---|----------------|---------------|----------------------|------------|------------------|---------------|
| Upper Churchill River     | Southern Indian Lake (Area 4)             |                |               |                      |            |                  |               |
|                           | Granville Lake                            |                |               |                      |            |                  |               |
|                           | Southern Indian Lake (Area 1)             |                |               |                      |            |                  |               |
|                           | Southern Indian Lake (Area 6)             |                |               |                      |            |                  |               |
|                           | Opachuanau Lake                           |                |               |                      |            |                  |               |
| Churchill River Diversion | Threepoint Lake                           |                |               |                      |            |                  |               |
|                           | Leftrook Lake                             |                |               |                      |            |                  |               |
|                           | Notigi Lake                               |                |               |                      |            |                  |               |
|                           | Rat Lake                                  |                |               |                      |            |                  |               |
|                           | West/Central Mynarski Lake                |                |               |                      |            |                  |               |
|                           | Apussigamasi Lake                         |                |               |                      |            |                  |               |
|                           | Footprint Lake                            |                |               |                      |            |                  |               |
| Lower Churchill River     | Northern Indian Lake                      |                |               |                      |            |                  |               |
|                           | Churchill R. at Little Churchill R.       |                |               |                      |            |                  |               |
|                           | Gauer Lake                                |                |               |                      |            |                  |               |
|                           | Partridge Breast Lake                     |                |               |                      |            |                  |               |
|                           | Billard Lake                              |                |               |                      |            |                  |               |
|                           | Fidler Lake                               |                |               |                      |            |                  |               |
|                           | Churchill R. at Churchill Weir            |                |               |                      |            |                  |               |
| Winnipeg River            | Upstream of Pointe du Bois                |                |               |                      |            |                  |               |
|                           | Lac du Bonnet                             |                |               |                      |            |                  |               |
|                           | Manigotagan Lake                          |                |               |                      |            |                  |               |
|                           | Eaglenest Lake                            |                |               |                      |            |                  |               |
|                           | Pine Falls Reservoir                      |                |               |                      |            |                  |               |
| Saskatchewan River        | Cedar Lake                                |                |               |                      |            |                  |               |
|                           | Cormorant Lake                            |                |               |                      |            |                  |               |
|                           | Moose Lake                                |                |               |                      |            |                  |               |
|                           | Cedar Lake - west basin                   |                |               |                      |            |                  |               |
|                           | Sask.R. - Prov. Border to Summerberry R.  |                |               |                      |            |                  |               |
| Upper Nelson River        | Cross Lake - West basin                   |                |               |                      |            |                  |               |
|                           | Setting Lake                              |                |               |                      |            |                  |               |
|                           | Playgreen Lake                            |                |               |                      |            |                  |               |
|                           | Little Playgreen                          |                |               |                      |            |                  |               |
|                           | Walker Lake                               |                |               |                      |            |                  |               |
|                           | Sipiwesk Lake                             |                |               |                      |            |                  |               |
|                           | Nelson R: d/s Sipiwesk Lake to Kelsey GS  |                |               |                      |            |                  |               |
| Lower Nelson River        | Split Lake                                |                |               |                      |            |                  |               |
|                           | Assean Lake                               |                |               |                      |            |                  |               |
|                           | Nelson R. Mainstem - d/s Limestone GS     |                |               |                      |            |                  |               |
|                           | Hayes River                               |                |               |                      |            |                  |               |
|                           | Stephens Lake - north arm                 |                |               |                      |            |                  |               |
|                           | Stephens Lake - south                     |                |               |                      |            |                  |               |
|                           | Limestone Forebay                         |                |               |                      |            |                  |               |
|                           | Burntwood R. - First Rapids to Split Lake |                |               |                      |            |                  |               |
| Lake Winnipeg             | Lake Winnipeg                             |                |               |                      |            |                  |               |
|                           | Lake Winnipegosis                         |                |               |                      |            |                  |               |

|                              |  |
|------------------------------|--|
| MCWS - Water Quality Section |  |
| MCWS - Fisheries Branch      |  |
| Consultants                  |  |

# Attachment 5

## Map of Waterbodies Sampled in 2014/15







# CAMP

Coordinated Aquatic Monitoring Program

[www.campmb.com](http://www.campmb.com)

