

**REVIEW OF THE REGIONAL CUMULATIVE EFFECTS ASSESSMENT FOR
HYDROELECTRIC DEVELOPMENTS ON THE
CHURCHILL, BURNTWOOD AND NELSON RIVER SYSTEMS (RCEA)**

**Prepared for
The Town of Churchill
by
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September 2017**

1. Introduction

In its 2013 report on the Bipole III Project, the Clean Environment Commission (CEC) recommended that Manitoba Hydro, in cooperation with the Manitoba Government, conduct a regional cumulative effects assessment (RCEA) for all Manitoba Hydro projects and associated infrastructure in the Nelson River sub-watershed. This recommendation was accepted by Manitoba and Terms of Reference were agreed to in May 2014. Subsequently, the scope of the RCEA was expanded to include the Churchill, Burntwood and Nelson River systems.

The Terms of Reference require Manitoba and Manitoba Hydro to:

- “identify, describe and acknowledge the cumulative impacts of past Hydro developments”; and
- “describe the current state of the environment in areas affected by Manitoba Hydro’s system”.

Phase I and Phase II reports were completed by December 2015. Subsequently, an integrated summary report was also prepared. These three reports are collectively referred to as the RCEA report. Due to the considerable public interest in the RCEA, it was decided that a public outreach program should be implemented to supplement the findings of the Phase II report. The CEC made funding available to affected communities for the purpose of reviewing the RCEA report and provide input on the report’s accuracy, in presenting past and current effects and community perspectives and concerns, and to identify any additional information relevant to the assessment.

The Town of Churchill (the Town) applied for and received funding from the CEC for this purpose. The Town retained Boothroyd & Associates to:

- review the methodology used in the RCEA to identify and assess cumulative effects;
- review the Phase I report, Phase II report and integrated summary report to determine the extent to which they address the issues of concern to the Town and its residents;
- determine the accuracy of the information, highlight omissions and provide additional information collected during the work of the Executive Implementation Committee Task Teams; and
- prepare a report on the findings for submission to the CEC.

After these tasks were begun, the CEC held a one-day workshop on June 15, 2017 with the Working Group established for the RCEA review. Although the workshop was not open to the general public, the CEC made available the PowerPoint slides displayed by the various presenters during the workshop and a transcript of the presentations. This material was also reviewed by Boothroyd & Associates.

2. The Phase I and Phase II Reports

2.1 Report Organization

The Phase I report is divided into five parts:

- **Part I: Introduction and Approach**

This part includes the Terms of Reference for the RCEA, scope and general methodology.

- **Part II: History of Hydroelectric Development in the Region of Interest**

- **Part III: People**

This part summarizes the socioeconomic effects of hydroelectric development and various settlement agreements.

- **Part IV: Physical Environment**

This part describes key changes to the physical environment resulting from hydroelectric development including changes to the water regime, ice regime, erosion and sedimentation, and area flooded.

- **Part V: Water and Land**

This part summarizes studies conducted on the effects of hydroelectric development on water and land. It also describes the rationale used to select a preliminary list of the key aquatic (water) and terrestrial (land) Regional Study Components (RSCs) that were assessed during the RCEA. The RSCs selected for “water” were: water quality, fish populations, Lake Sturgeon, fish quality (including mercury and taste, texture and palatability), and marine mammals (whales, seals, and polar bears). For “land”, the RSCs were include: terrestrial habitat, intactness, colonial waterbirds, forest birds, waterfowl, aquatic furbearers, terrestrial furbearers, moose, and caribou.

The Phase II report is divided into six parts:

- **Part I: Introduction and Approach**

This part includes the Terms of Reference for the RCEA, scope and general methodology.

- **Part II: History of Hydroelectric Development in the Region of Interest**

- **Part III: People**

This part summarizes the socioeconomic effects of hydroelectric development and various settlement agreements.

- **Part IV: Physical Environment**

This part describes key changes to the physical environment resulting from hydroelectric development including changes to the water regime, ice regime, erosion and sedimentation, area flooded and the terrestrial landscape.

- **Part V: Water**

This part provides a detailed description of changes to the aquatic environment based on a series of RSCs. The RSCs were: water quality, fish populations, Lake Sturgeon, mercury in fish, fish quality, seals and beluga whales.

- **Part VI: Land**

This part provides a detailed description of changes to the terrestrial environment based on a series of RSCs. The RSCs were: terrestrial habitat, intactness, colonial waterbirds, waterfowl, aquatic furbearers, moose, caribou and polar bear.

2.2 Region of Interest

In the Phase I report, Map 1-1 shows the Region of Interest (ROI) for the RCEA which includes the Town of Churchill. Table 3-1 includes the Town in the list of communities within the ROI. The Town is also included in the list of communities provided in Table 3.2.1-1 of the Phase II report.

The ROI was divided into four areas. The Town is included in Area 4: the Missi Falls Control Structure to the Churchill River estuary.

2.3 Methodology

In addition to the two main objectives of the RCEA, stated in section 1. **Introduction** of this report, the CEC's Terms of Reference include additional guidance for the RCEA. The RCEA is to make use of "attributes of contemporary environmental effects assessment and post-project assessment methodology". Phase II of the RCEA was to include "an assessment of the

environmental effects of hydro development” and “preparation of an Environmental Assessment and State of Knowledge Report”. The desired end product is to include “a consolidated, vast and comprehensive collection of environmental data and community knowledge about the region”.

Page 1.2-1 of the Phase II report states that the Phase I report was “an interim product developed to provide an early indication of the studies and information being gathered to undertake the Phase II RCEA”. Page 1.2-5 states that the Phase II report was jointly prepared by Manitoba and Manitoba Hydro “as a retrospective document that includes a review and synthesis of available data and information from existing and ongoing studies and monitoring programs to:

- identify, describe, and acknowledge the cumulative effects of past Manitoba Hydro developments in the ROI;
- describe the current state of the environment in areas affected by Manitoba Hydro’s developments within the RCEA ROI; and
- identify gaps in knowledge and include a description of current monitoring initiatives that will provide information to the public on the RCEA ROI.” (underline added)

In describing methodology used in the RCEA, the Phase II report makes reference to the “Cumulative Effects Assessment Practitioners Guide” (the Guide) prepared for the Canadian Environmental Assessment Agency in February 1999. The Guide defines cumulative effects as “changes to the environment that are caused by an action in combination with other past, present and future human actions”. The Guide points out that “assessment of cumulative effects is increasingly seen as representing best practice in conducting environmental assessments” and that “assessment of cumulative effects is now required ... when an action is subject to a federal environmental assessment”. This statement was referring to requirements of the *Canadian Environmental Assessment Act, 1992*. Subsection 19(1) of the current *Canadian Environmental Assessment Act, 2012* requires that an environmental assessment of a designated project must take into account “any cumulative environmental effects that are likely to result from the designated project in combination with other physical activities that have been or will be carried out”.

All environmental assessment legislation (federal and provincial) pertains to the assessment of the environmental effects of a proposed project that has not yet proceeded. The environmental assessment is forward-looking and attempts to identify the potential environmental effects that

are likely to occur should a project proceed. Cumulative environmental effects are environmental effects that are likely to result from the project in combination with the environmental effects of other projects or activities that have already taken place or will take place. As the Guide points out, cumulative effects assessment is carried out “to ensure the incremental effects resulting from the combined influences of various actions are assessed. These incremental effects may be significant even though the effects of each action, when independently assessed, are considered insignificant”.

The RCEA does not strictly conform to the structure of a cumulative effects assessment as defined above. It was not conducted in advance of a specific proposed project or collection of proposed projects. Rather, it was carried out after the various projects comprising Lake Winnipeg Regulation (LWR) and the Churchill River Diversion (CRD) were already in place. Its purpose was not to assess the cumulative effects of a proposed project in combination with the environmental effects of other projects or activities that have already taken place or will take place. Rather, the RCEA identifies, describes and acknowledges the cumulative effects of past hydro developments in the ROI.

As indicated above, Manitoba Hydro and Manitoba recognize that the Phase II report is a “retrospective document”, not a forward-looking document. In addition, Shelley Matkowski of Manitoba Hydro admitted, during the June 15, 2017 workshop, that “[w]e haven’t been able to do a classic regional cumulative effects assessment, just because we are looking back and we were limited by the available data and our ability to compare that pre and post data” (page 273 of the transcripts).

Therefore, it would be more accurate to say that the Phase II report addresses accumulated effects of past projects rather than cumulative effects of past, present and future projects. The report looks at the accumulated effects of all the various structures and physical works that comprise the LWR and CRD, and describes the current state of the environment in areas affected by Manitoba Hydro’s facilities. In fairness to Manitoba Hydro and Manitoba, this is what the CEC asked them to do and what they accomplished is impressive. But the RCEA is not a cumulative effects assessment in the strict sense of the term.

2.4 Effects of the CRD on the Interests of the Town and its Residents

Details on the effects of the CRD on the lower Churchill River and areas of interest to the Town and its residents are contained mostly in the Phase II report. The Phase II report describes the

effects of the CRD as well as the effects of the Churchill Weir constructed for the purpose of mitigating some of the effects of the CRD. The following sections refer mostly to information provided in the Phase II report. However, where applicable, relevant sections of the Phase I report and integrated summary report are also referenced.

2.4.1 Physical Effects

Page 19 of the integrated summary report states that “approximately 85% of the Churchill River flow is diverted through the South Bay Diversion Channel down the Rat and Burntwood rivers to Split Lake”. This is confirmed again on page 58 of that report where it states that “approximately 85% of inflowing water typically flows south via the South Bay Diversion Channel” and on page 65 where it states that “the flow into the lower Churchill River was reduced by 85% immediately downstream of the Missi Falls Control Structure”. However, Appendix 4.3B to the Phase II report indicates that “with the Churchill River Diversion in place, approximately 83% of the flow that would have occurred at Missi Falls is diverted into the Rat and Burntwood Rivers for power production purposes on the Lower Nelson River”. Page 4.3-58 states that “on average, 27,700 cfs (780 cms) is diverted from the Churchill River system into the Nelson River system at SIL”.

The Churchill Weir was initiated in the summer of 1998 and completed in 1999. One of the purposes of the weir was to improve boat navigation along the lower Churchill River in the reservoir created by the weir. Page 4.3-61 of the Phase II report includes the following statements concerning the performance of the weir:

“Analyses indicated that the water level has increased by approximately 6.6 ft (2.0 m) near the weir and the water level at the CR30 Pumphouse has risen by about 3.3 ft (1.0 m). The elevated water level effects extend upstream from the weir for a distance of at least 6.2 mi (10 km).”

What is not explicitly stated is that, due to the gradient of the lower Churchill River, the increase in water depth upstream of the weir diminishes as the distance from the weir increases. The CR30 Pumphouse is located about 3.7 miles (6 km) from the weir and the increased depth at that location (3.3 ft or 1.0 m) is already only half of the increased depth experienced at the weir (6.6 ft or 2.0 m). At a distance of 6.2 miles (10 km) from the weir, water levels are no longer affected by the weir and, at that point, there is no increase in water level. Another thing that is not pointed out is that, in the 6.2-mile reach of the river above the weir, water depths along the west side of the river tend to be less than those along the east side of the river where the thalweg, or mainstem, has its course. What this means is that, even though water levels near

the weir have increased by about 6.6 ft (2.0 m), this has not translated into sufficient depths for safe boat navigation throughout the entire 6.2-mile reach of the river that experiences some degree of water level increase.

2.4.2 Effects on Fish Populations

The Phase II report acknowledges that “a large amount of data has been collected on fish abundance, species composition, and movements as part of the environmental impact assessment and post-project monitoring for the Churchill Weir” (page 5.3-168). For the purpose of analysis and comparison, the data was grouped into three time periods: pre-Churchill Weir (1994–1996); immediate post-Churchill Weir (1999–2006); and current (2008–2013).

Page 5.3-170 refers to Figure 5.3.8A-2 in Appendix 5.3 which shows a comparison of total catch per unit effort (CPUE) above the Churchill Weir over the three time periods. It is stated that the Figure shows that mean CPUE for total catch was comparable for the 1994-1996 and 1999-2006 periods but that it was higher for the 2008-2013 period. However, immediately following this observation, a disclaimer is provided:

“While efforts were made to standardize the data sets among the surveys (Appendix 5.3.1B), residual differences in methods among studies may have contributed to the observed differences in CPUE over time.”

The bar graphs in Figure 5.3.8A-2 are very small and hard to read and no tables of data from which the graphs were derived are provided. Without the numerical data, it is difficult to determine whether the comparison is valid. In addition, it would have been more meaningful to separate the CPUE data into spring and fall because there are seasonal differences in the abundance of many fish species.

Referring to Figure 5.3.8A-4, page 5.3-171 states that, “prior to construction of the Churchill Weir, the most abundant species in the Churchill River at this location were Northern Pike (39%), Lake Whitefish (27%) and White Sucker (13%)”. It is assumed that these percentages were derived from combining the results of experimental gillnetting conducted in the spring and fall of 1994, 1995 and 1996. The problem with combining these results is that variations in the abundance of these species between seasons and between years are hidden. For example,

according to Hertam et al. (2014)¹, Northern Pike constituted 63% of the catch in the spring of 1994 while Lake Whitefish comprised only 9.7 % of the catch. However, in the fall of that same year these two species were similar in abundance (34.3% Northern Pike, 36.5% Lake Whitefish). In the spring of 1996, the percentage of Northern Pike in the catch was 85.1% while the percentage of Lake Whitefish in the catch was only 4.3%. In the fall of that year, 48.8% of the catch was Northern Pike and 23.4 % was Lake Whitefish.

Page 5.3-171 also states that, immediately following construction of the Churchill Weir (1999-2006), Lake Whitefish (43%) was the most abundant species followed by Northern Pike (38%) and White Sucker (9%). The data collected by Hertam et al. (2014) shows that Lake Whitefish was the most abundant fish caught in the fall of 1999, 2001 and 2006 (45.7%, 40.7% and 56.9%, respectively). However, the data shows that, in the spring of 2001, 2002, 2003 and 2005, Northern Pike was by far the most abundant species caught (77.9%, 90%, 71.4% and 81.3%, respectively). Northern Pike was also the most abundant species caught in the fall of 2000, 2002 and 2005 (54.2%, 41.1% and 40%, respectively). This is the danger of inappropriately lumping the data.

On the same page (5.3-171), it is stated that, in the 2008-2013 time period, Lake Whitefish made up 73% of the catch. According to Hertam et al. (2014), Lake Whitefish made up 74.9% of the catch in the fall of 2008 compared to Northern Pike which constituted only 16.9% of the catch. However, in the spring of that same year, the situation was reversed with Lake Whitefish making up only 14.4 % of the catch and Northern Pike representing 74.5% of the catch. The same trend occurred in 2013. In the fall, Lake Whitefish constituted 64.2% of the catch while Northern Pike made up 22.8 %. However, in the spring, Lake Whitefish comprised only 18.3% of the catch while Northern Pike made up 65%. In other words, Lake Whitefish was the most abundant species in the fall of 2008 and 2013 whereas Northern Pike was the most abundant species in the spring of those years.

Page 5.3-197 summarizes the current status of the fish community of the lower Churchill River stating that “the fish community is now dominated by only two species, Lake Whitefish and Northern Pike”. While this is an accurate statement, a more meaningful interpretation of the data leads to the conclusion that Lake Whitefish dominate the fish community in the lower Churchill River in the fall while Northern Pike is dominant in the spring.

¹ Hertam, S., J.K. Aiken and R.A. Remnant. 2014. Lower Churchill River Water Level Enhancement Weir Project – Post-Project Monitoring. Fish population responses in the lower Churchill River, 2013. A report prepared for Manitoba Hydro by North/South Consultants Inc. xiii + 165 pp.

Page 5.3-179 makes reference to the observed decline in Longnose Suckers and White Suckers in the Churchill River upstream of the weir and in Herriot Creek. Reference was also made to the decline in the use of Goose Creek by all fish species except Northern Pike. Page 5.3-180 refers to the lack of use of the Goose Creek Enhancement Reach by Arctic Grayling in spite of the efforts to create attractive habitat for this species in this reach.

2.4.3 Effects on Seals

Page 5.7-17 of the Phase II report includes the following information on the effects of the CRD on seals (primarily Harbour Seals) in the lower Churchill River and estuary:

“There is insufficient information available to assess the effects of CRD on the abundance and distribution of harbour seals within the lower Churchill River and estuary. However, local knowledge suggests that seal numbers may have increased in the lower Churchill River, which may have been due to decreased flow/water levels and increased availability of haul-out locations.”

Information on the effects of construction of the Churchill Weir is also provided on that page:

Construction of the Lower Churchill River Water Level Enhancement Weir Project resulted in a minor shift (less than 1 km) in haul-out locations used by seals. Post-weir seal numbers in the river and estuary were comparable to those observed in pre-weir years ...; however, current information indicates that these numbers have increased considerably over the last decade These increases suggest that despite the minor displacement of seals to haul-out areas downstream, the weir did not negatively impact seal abundance in the Churchill River and estuary.”

2.4.4 Effects on Beluga Whales

Page 5.8-32 of the Phase II report indicates that pre-CRD studies estimated the population of beluga whales inhabiting the Churchill River estuary to be 500-900 whales. The most recent post-CRD population estimate was 4,343 whales.

Concerning the effects of the Churchill Weir project on beluga whales, page 5.8-32 states the following:

“Temporary noise disturbances during construction of the Lower Churchill River Water Level

Enhancement Weir Project were expected to temporarily displace beluga from preferred habitat within the Churchill River estuary; however, no negative impacts were expected during operation. Beluga did not appear to have been affected by construction activities ... and subsequent monitoring investigations based on concerns of residents found no noticeable difference in pre-and post-project abundance or distribution However, one tour operator felt that operation of the weir affected the distribution and abundance of beluga in the upper estuary.”

3. Additional Information

Following construction of the Churchill Weir and associated works and over 13 years of monitoring of their performance, it became apparent that the anticipated benefits of the weir had not been realized. Even though the weir had raised water levels upstream of the weir to some extent and had increased the amount of available fish habitat, Town residents reported that boat navigation on the lower Churchill River was still not safe and fish populations were still much reduced from pre-CRD levels.

The Town of Churchill approached Manitoba Hydro with these concerns and, in 2014, an Executive Implementation Committee (EIC) comprised of senior officials of the Town of Churchill, Manitoba Hydro and the Province of Manitoba was established. The purpose of the EIC is to ensure that the Town’s concerns and issues with respect to the implementation of the 1997 Agreement, that gave rise to the weir, and ongoing adverse effects of the CRD are addressed to the extent possible.

Four task teams were established, with members of each team representing each of the three parties, to carry out various tasks directed by the EIC. These task teams have carried out studies and compiled information that supplements the information on pre-CRD and post-CRD conditions in the lower Churchill River provided in the RCEA reports and is, therefore, of value to the CEC. This additional information is presented in the following sections of this report.

3.1 Effects of the CRD

The Navigation and Access Task Team reviewed information collected during interviews with Town residents and provided the following summary of pre- and post-CRD conditions in one of its reports to the EIC:

“According to the interviews and background documentation, local residents had reported using the Churchill River for a variety of recreational and resource harvesting activities prior to the development of the CRD in 1976. These activities varied, but generally included fishing, hunting, trapping, canoeing, boating (via boat with regular outboard motor), visiting a cabin, camping and snowmobiling. Fishing was by far the most frequent use of the river. The reported frequency of river recreational use varied, but most indicated frequent year round use.

For the post-CRD period, almost all surveyed residents reported that using the river for recreational purposes was more difficult than before the CRD. Two reasons were given for this: (1) excessively low water levels made for difficult travel, especially in the summer and fall; and (2) there was little or no reason to travel upriver as recreational fishing was felt to have declined and cabins once located upriver were purchased and subsequently burnt down, leaving little reason for someone to justify traveling upstream.

Comments on winter travel along the river were mixed, with some stating that ice conditions were better for snowmobiling as a result of the lower water levels, and others stating the opposite, raising concerns about air pockets under the ice.

No destination to travel to upriver and poor fishing were also cited as reasons for lower levels of river usage. Many (pre-CRD) traveled upstream to stay at cabins, but once the cabins located along the river were purchased and destroyed, few had any reason to return. Many moved their recreating to other areas such as Warkworth Lake or Button Bay.

For those who lived in the Churchill area prior to CRD development, almost all indicated that their activities were curtailed or completely dropped after the CRD. Frequency of use post-CRD, with the exception of possibly right after spring melt, was lower for all respondents. The main reason for this was the inability to travel upstream in a boat with an outboard motor for fear of damaging the prop. It was felt that a jet boat or airboat was needed in order to travel upstream, and many felt these specialized boats were prohibitively expensive to buy, operate and maintain.”

3.2 Post-Weir Conditions

3.2.1 Navigation and Access Task Team Findings

The Navigation and Access Team reported on the findings of North/South Consultants regarding performance of the Churchill Weir:

“With respect to recreational performance, North/South found that despite limited quantitative information, the recreational benefit of Churchill residents appears to be limited to an improved shore-based fishery at Goose Creek (at least until 2005). They also suggest from their findings that the [weir] project does not appear to have increased boating and boat-based activity within the reservoir.

- *The quality of the shore-based recreational fishery at Goose Creek has increased*
- *Fewer respondents were fishing in the LCR [lower Churchill River], or its tributaries, in 2005 compared to 1994*
- *The number of boats usually observed berthed at the marina is small (approx. 25% of berthing capacity of 18 boats)*
- *Boats are infrequently observed on the reservoir*
- *Most boats observed on the reservoir are used by people traveling to fishing and hunting areas farther upstream*
- *Very few people are observed fishing on the reservoir.”*

The perspectives of Town residents were also reported:

“Ten years after completion of the weir, Churchill residents feel that the Project has not provided the recreational benefits that were anticipated. In particular, many feel that sufficient and safe boating has not been provided within the reservoir, and that access to the Churchill River upstream of the reservoir still remains difficult under most conditions. Most people also feel that recreational fishing remains limited in that fish populations have not increased to the extent expected.”

The Task Force also summarized the results of interviews conducted with Town residents in September 2013:

“Town residents described difficulties in traveling on the river upstream of the weir. Several residents mentioned damages to their boats resulting from collisions with rocks. Some residents indicated that navigation would be possible if there was more water in the river and if water levels were more stable. Knowledge of river channels was noted as being essential. One resident described winter ice conditions making travel by skidoo dangerous.”

During a meeting held in the Town on September 26, 2017 to discuss the draft report on the findings of the RCEA review, one of the councillors pointed out that the poor access to hunting

areas upriver prevented Town residents from accessing wild food to offset the increased cost of store-bought food as a result of the disruption in rail service caused by spring flooding.

3.2.2 Fisheries Management Task Team Findings

In one of its reports to the EIC, the Fisheries Management Task Team provided the following summary of community concerns regarding fish populations and recreational fishing:

“Following the CRD, Town residents observed that fish populations in the lower Churchill River had reduced numbers and the number of species that were available for fishing was also less. Water levels decreased significantly causing difficulties with navigating the river by boat and accessing traditionally-used fishing areas.

One of the purposes of the weir was to increase fish habitat in the weir forebay and consequently increase fish populations in the mainstem and improve recreational fishing opportunities. While fish habitat has increased in the weir forebay, Town residents feel that fish populations have not recovered. The weir has not met their expectations.

Notably, residents report that Arctic Grayling are very difficult, if not impossible, to catch. Brook Trout are also difficult to catch and suckers are noticeably less numerous. Residents complain that the river now supports a monoculture of Northern Pike compared to the diverse fishery that used to exist prior to the CRD. There is a common perception among Town residents that the river freezes to the bottom in some years and that this would explain the apparent reduction in fish populations and diversity.

Residents view that, for the majority of the time, conditions for boating are dangerous. As a result, many of them have sold their boats and gear. Consequently, less fishing is taking place on the river even with the weir in place. However, several residents have consistently fished in the Churchill River prior to and since the CRD commenced operation and have continued to fish in the weir forebay and further upstream during the winter when travel conditions are favorable. Winter travel conditions vary depending on flow levels resulting from fall releases at Missi Falls and input to the Churchill River from adjacent sub-watersheds.

Residents have witnessed a continuous decline in species and their abundance since the construction of the weir. Only Northern Pike and Lake Whitefish are caught. The outstanding question by local residents remains: why were the predictions made during the Environmental Impact Assessment process, so different from today’s reality?”

In July 2016, an angling survey of the lower Churchill River above the Churchill weir was carried out to supplement the results of monitoring studies based on index netting. The following summary of the results is taken from one of the Fisheries Management Task Team reports to the EIC:

“The angling survey was conducted over four days (July 25 – 28) and resulted in approximately 92 hours of total angling time (4 anglers @ ~23 hours each). Most effort (72%) was targeted at the lower Churchill River mainstem within the weir forebay area, with the remaining time directed at Goose Creek between the weir and CR-30 road (28%). A total of 129 Northern Pike were angled during the survey, six (5%) of which were caught in the mainstem and 123 (95%) in the Goose Creek area. ... Some general observations about the survey are provided below:

- *The majority of Northern Pike were caught in Goose Creek area despite substantially more effort directed in the mainstem of the river.*
- *Based on a comparison of length of pike caught during the survey with the 2014 CAMP [Coordinated Aquatic Monitoring Program] age/length data, most pike (~81%) were considered to be immature (508mm and less).*
- *Angling success appeared to be consistent with the fish community sampled by index netting, including the size range of pike caught.*
- *Majority of pike appeared to be in good condition; all but one pike were live released.*
- *Water temperatures ranged from 17°C in the mainstem of the river to 19°C in Goose Creek.*
- *Seals were observed all days at various locations throughout the mainstem of the river, but none in Goose Creek.*
- *Schools of forage fish (small bodied) were observed in the shallow areas throughout Goose Creek but none were seen in the mainstem of the river.*
- *A number of fish were observed surface feeding in the current at the upstream end of the forebay. Although none of these fish were caught, their behavior was indicative of whitefish.”*

Through its efforts to try to understand the factors limiting the fish community in the lower Churchill River, the Fisheries Management Task Team has identified a number of unknowns:

- the availability of overwintering habitat and its use by overwintering fish;

- the availability of sufficient food to sustain fish populations (e.g. benthic invertebrates, forage fish); and
- predation by seals (the number of seals utilizing the Churchill River estuary has increased over the last 10 years).

Because of these unknowns, and because fish populations in the lower Churchill River responded to the weir differently from what was predicted in the Environmental Impact Assessment conducted in relation to the weir, a consultant has been retained by the EIC to conduct an independent review and evaluation of existing environmental information relating to the weir. The findings of this review will be available in December 2017 and could be made available to the CEC on request.

4. Conclusions

For the most part, the RCEA reports have fulfilled the CEC's Terms of Reference: the cumulative impacts, or rather the accumulated impacts, of past hydro developments have been identified, described and acknowledged and the current state of the environment in areas affected by Manitoba Hydro's system has been described.

The RCEA reports thoroughly summarize the results of the many years of monitoring studies carried out on the lower Churchill River and its tributaries following construction of the Churchill Weir. Some of the interpretation of the data collected on the fish community was distorted by inappropriate lumping of data that had the effect of masking seasonal and annual differences in the use of the lower Churchill River by the two dominant species, Lake Whitefish and Northern Pike.

Additional information is provided in this report on community perspectives and on the results of further investigations conducted by the Navigation and Access Task Team and Fisheries Management Task Team established by the three-party Executive Implementation Committee.