

Lake Manitoba and Lake St. Martin Outlet Channel Project Spring Fish Use of Watercourses along the LMBOC Alignment

REPORT

Prepared for Manitoba Infrastructure $\,\cdot\,$ March 2019 By North/South Consultants Inc. $\,\cdot\,$ 83 Scurfield Blvd. $\,\cdot\,$ Winnipeg, MB $\,\cdot\,$ R3Y 1G4

Lake Manitoba and Lake St. Martin Outlet Channel Project

2018

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A Draft Report Prepared for

Manitoba Infrastructure

By:

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March 2019

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EXECUTIVE SUMMARY

Flood events in 2011 and 2014 emphasized the need for better water level regulation on Lake Manitoba and Lake St. Martin. Consequently, the Province of Manitoba has committed to enhancing the outlet capacities to better regulate water levels on both lakes and improve flood protection for the people of Manitoba. The Lake Manitoba and Lake St. Martin Outlet Channel Project (the Project) was initiated subsequent to the 2011 flood event and, to date, has included a feasibility assessment, analysis of alternate routes, and the preliminary engineering to construct a diversion channel between Lake Manitoba and Lake St. Martin as well as a second channel from Lake St. Martin to Lake Winnipeg.

The Project will require an environmental assessment pursuant to *The Environment Act* and *CEAA 2012*, and will also need regulatory approvals pursuant to the *Fisheries Act* and the *Navigation Protection Act*. The environmental assessment process is underway for the Project, and includes the collection of baseline data to describe the existing environment, assess impacts, and provide the basis for future monitoring programs. Numerous watercourses and drainage ditches occur in the vicinity of the Lake Manitoba Outlet Channel (LMBOC) alignment, several of which may be affected by construction of the channel. Information describing current fish use of those watercourses will be of value towards assessing potential effects related to construction of the LMBOC. This report provides a summary of methods and results for a fish use survey conducted along the alignment during the spring of 2018.

Site visits were conducted at 18 road-accessible watercourses within three creek drainage basins in the vicinity of the proposed LMBOC alignment route. 2018 was characterized as having a "dry" spring, and many drains and watercourses in the general area contained little or no water. Fish were observed in all of the creeks but their distribution was restricted to the mainstem of each creek; fish were not observed in ditches or drains feeding into the creeks. This may be due to the "dry" spring.

TABLE OF CONTENTS

Page

1.0	INT	RODUCTION	. 1			
2.0	METHODS2					
3.0	RES	ULTS	. 2			
	3.1	MERCER CREEK WATERSHED	. 2			
	3.2	WATCHORN CREEK WATERSHED	. 2			
	3.3	BIRCH CREEK WATERSHED	. 3			
4.0	REF	ERENCES	.4			

LIST OF TABLES

	<u>Þ</u>	<u>age</u>
Table 1.	Observations from drain sites visited on May 04, 2018.	5

LIST OF FIGURES

Page

Figure 1.	Location of the proposed Lake Manitoba and Lake St. Martin Outlet Channels in central Manitoba.	. 7
Figure 2.	Location of key components of the provincial flood control system in southern Manitoba	. 8
Figure 3.	Existing Drainage Area – Option D (KGS Group 2017).	.9
Figure 4.	Future Drainage Area – Option D (KGS Group 2017)	10
Figure 5.	Location of drain sites inspected on May 04, 2018.	11

LIST OF PLATES

	Page	2
Plate 1.	Upstream and downstream views at Site 1 (Mercer Creek), May 04, 201812	2
Plate 2.	Downstream view of culverts at Site 1 (Mercer Creek), May 04, 2018	3
Plate 3.	Upstream and downstream views at Site 2 (Mercer Creek), May 04, 201814	1
Plate 4.	View looking east at Site 2 (ditch into Mercer Creek), May 04, 2018	5
Plate 5.	View looking upstream at Site 3 (1 st order drain to Mercer Creek), May 04, 2018 16	ô
Plate 6.	Upstream views at Site 4 (Watchorn Creek), May 04, 201817	7
Plate 7.	Downstream views at Site 4 (Watchorn Creek), May 04, 2018	3
Plate 8.	Upstream and downstream views at Site 5 (2 nd order drain to Reed Lake), May 04, 2018.	Э
Plate 9.	Upstream and downstream views at Site 6 (2 nd order drain to Clear Lake), May 04, 2018.	C
Plate 10.	Upstream and downstream views at Site 7 (Birch Creek), May 04, 2018	1
Plate 11.	Upstream and downstream views at Site 8 (2 nd order drain to Birch Creek), May 04, 2018.	2
Plate 12.	Upstream view at Site 9 (Birch Creek), May 04, 2018.	3
Plate 13.	Downstream views at Site 9 (Birch Creek), May 04, 2018	4
Plate 14.	Upstream and downstream views at Site 10 (Woodale Drain), May 04, 2018 25	5
Plate 15.	Upstream and downstream views at Site 11 (Birch Creek), May 04, 2018	ô
Plate 16.	Upstream and downstream views at Site 12 (2 nd order drain to Birch Creek), May 04, 2018.	7
Plate 17.	Upstream view and fish trap at Site 13 (Birch Creek), May 04, 2018	3
Plate 18.	Upstream, downstream , and downstream culvert views at Site 14 (Birch Creek), May 04, 2018	Э
Plate 19.	Upstream and downstream views at Site 15 (3 rd order drain to Birch Creek), May 04, 2018.	C
Plate 20.	Upstream and downstream views at Site 16 (3 rd order drain to Goodison Lake), May 04, 2018	1
Plate 21.	Upstream and downstream views at Site 17 (2 nd order drain to Goodison Lake), May 04, 2018	2
Plate 22.	Upstream and downstream views at Site 18, May 04, 2018	3

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INTRODUCTION

Widespread record flooding throughout southern Manitoba during 2011 led to water levels in Lake Manitoba and Lake St. Martin that were several feet higher than desirable, resulting in significant damage to hundreds of properties, restricted road access to several communities, and long-term evacuation of four First Nations communities in the vicinity of Lake St. Martin. Heavy precipitation during winter 2013/2014 and spring 2014 again elevated water levels in Lake Manitoba and Lake St. Martin. Martin, resulting in a second flood event in areas around Lake Manitoba and Lake St. Martin.

The 2011 and 2014 flood events emphasized the need for better water level regulation on Lake Manitoba and Lake St. Martin. Consequently, the Province of Manitoba has committed to enhancing the outlet capacities to better regulate water levels on both lakes and improve flood protection for the people of Manitoba. The Lake Manitoba and Lake St. Martin Outlet Channel Project (the Project) was initiated subsequent to the 2011 flood event and, to date, has included a feasibility assessment, analysis of alternate routes, and the preliminary engineering to construct a diversion channel between Lake Manitoba and Lake St. Martin to Lake St. Martin to Lake Winnipeg (Figure 1).

The Lake Manitoba Outlet Channel (LMBOC) will work with the existing Fairford River Water Control Structure to help regulate water levels and mitigate flooding on Lake Manitoba. The Lake St. Martin Outlet Channel (LSMOC) will also provide flood protection by mitigating increased inflows from operation of the Fairford River Water Control Structure, as well as additional inflows from the planned outlet from Lake Manitoba. Together, the two proposed channels will provide flood protection around Lake Manitoba and Lake St. Martin, but will also provide greater flexibility in operating the provincial water control system including the Shellmouth Dam and Reservoir, the Red River Floodway and the Portage Diversion (Figure 2).

The Project will require an environmental assessment pursuant to *The Environment Act* and *CEAA 2012*, and will also need regulatory approvals pursuant to the *Fisheries Act* and the *Navigation Protection Act*. The environmental assessment process is underway for the Project, and is being led by Manitoba Infrastructure (MI). North/South Consultants Inc. (NSC) has been contracted by MI to provide technical expertise and collect baseline data to describe the existing environment, assess impacts, and provide the basis for future monitoring programs.

Numerous watercourses and drainage ditches occur in the vicinity of the LMBOC alignment, several of which may be re-routed by construction of the channel. Information describing current fish use of those watercourses will be of value towards assessing potential effects related to construction of the LMBOC. This report provides a summary of methods and results for a brief fish use survey conducted during spring 2018.

2.0 METHODS

As part of a preliminary engineering assessment KGS Group (2017) identified watersheds and watercourses likely to be affected by development of the LMBOC. Watershed mapping provided in KGS Group (2017; Figures 3 and 4 in this report) was used to identify locations where fish could occur. Each location was visited during spring 2018 and a brief assessment of fish habitat was conducted. Water temperature was measured with a hand-held thermometer, water depth and flow conditions were noted, and representative digital photographs were taken. Fish presence was determined by direct observation and species identification (where possible) and counts were recorded (Table 1).

3.0 RESULTS

A total of 18 potential fish-bearing watercourse or drain sites were identified prior to the field program (Figure 7). These included 14 within the Birch Creek watershed, three sites in the Mercer Creek watershed and one within the Watchorn Creek watershed. Site visits occurred on May 04, 2018. The spring of 2018 was a notably dry spring, and water levels within most of the observed ditches and drains were low.

3.1 MERCER CREEK WATERSHED

The Mercer Creek watershed lies to the west of the proposed LMBOC and surface water flow patterns will not be interrupted by construction of the LMBOC. Two of the three sites visited within the watershed were situated on the Mercer Creek mainstem (Sites 1 and 2). A shallow pool (30 cm depth; Table 1) occurred in the vicinity of culverts at Site 1, but little water occurred in the creek immediately upstream or downstream of the culvert crossing (Plates 1 and 2). Two live Northern Pike (*Esox lucius*) were observed in the pool. Based on the lack of water elsewhere in the creek, it is likely that those pike ascended the creek earlier in the spring and were stranded in the pool as water level receded. In the absence of increased flow in the creek, fish occurring in the pool at Site 1 would likely have perished as the pool dried up. Site 2 was located about 1 km downstream of Site 1 and 1.6 km from Lake Manitoba (Figure 5). Water depth at that location was 45 cm (Table 1) and the creek was continuously wetted upstream and downstream of the culvert crossing, although no flow was evident (Table 1; Plate 3). Fish were not observed at this site, but it appeared that fish could access the site from Lake Manitoba. The occurrence of fish farther upstream at Site 1 suggests that fish likely occurred in the vicinity of Site 2. Water temperature at both sites was 9°C.

The third site visited (Site 3) occurred on a first order drain approximately 600 m upstream of Mercer Creek. The drain had little water in it (< 5 cm; Table 1) and it is doubtful whether fish occurred there (Plate 3).

3.2 WATCHORN CREEK WATERSHED

The Watchorn Creek watershed lies to the east of the proposed LMBOC alignment and encompasses 10,345 ha (KGS Group 2017). Construction of the LMBOC will result in an estimated 2% reduction in drainage basin area (KGS Group 2017) and surface water flow patterns will only be slightly affected. Site

4 was the only location visited in the watershed and it occurred on the Watchorn Creek mainstem approximately 4.5 km upstream of Lake Manitoba (Figure 7). Water depth was greater than 45 cm at this location and flow was observed at the culvert crossings (Table 1). Although no fish were observed, it is expected that fish could reach the site from Lake Manitoba. The water temperature in Watchorn Creek was 9°C at the time of the site visit.

3.3 BIRCH CREEK WATERSHED

Birch Creek flows north into Lake St. Martin, fed by a series of drains and lakes encompassing an area of 29,477 ha (KGS Group 2017). The proposed LMBOC alignment bisects the Birch Creek watershed and will result in substantive changes to surface water flow patterns within the watershed (Figures 3 and 4). Areas to the west of the LMBOC (Figures 3 and 4) will be isolated from Birch Creek, resulting in an estimated 32% reduction in surface area drained by the creek (KGS Group 2017).

Sites visited in spring 2018 included several drains occurring to the west (Sites 5, 6, 8, 10 and 12) and to the east (Sites 15, 16, 17, and 18) of the LMBOC alignment, as well as several mainstem sites on Birch Creek, (Sites 7, 9, 11, 13 and 14).

To the west of the LMBOC alignment, Sites 5, 6, and 8 were located on 2^{nd} order drains that flowed into small lakes in the upper Birch Creek watershed (Figure 5). The Site 5 drain (Plate 8) entered into Reed Lake, the Site 6 drain (Plate 9) flowed into Clear Lake, and the Site 8 drain (Plate 11) entered into Goodison Lake. Water depth was less than 30 cm and water flow was not apparent at any of those sites. No fish were observed and it is doubtful whether fish occurred at any of those locations during the spring of 2018. Site 10 was located at the Woodale Drain, a 3^{rd} order drain entering into Birch Creek (Figure 5). Water was shallow in the drain, but was flowing (Table 1; Plate 14). Fish were not observed in the drain, but may be able to access the drain from Birch Creek, especially when water levels are higher than observed in 2018. Site 12 occurred on a 2^{nd} order drain that entered Birch Creek near Lake St. Martin (Figure 5). Water depth at the culvert crossing was shallow (< 15 cm) but water flow was evident (Table 1; Plate 16). Although small-bodied fish likely could access the site from Birch Creek, no fish were observed.

To the east of the LMBOC alignment, Sites 15, 17, and 18 had approximately 30 cm of water flowing in each drain (Table 1; Plates 19, 21 and 22 respectively). The drain at Site 16 was characterized by shallow waters (<30 cm) and had no flow (Table 1; Plate 20). Fish were not observed at any of these sites and it is thought they would be inaccessible to fish occurring in Birch Creek, at least during conditions occurring at the time of the survey.

Sites along Birch Creek extended from 2.1 (Site 13) to 12.8 km (Site 7) upstream of Lake St. Martin (Figure 5). At the downstream end of the creek (Site 13), water was approximately 45 cm deep and flowing (Table 1; Plate 17). Fish were not observed at this site but a commercial fisher had installed a fish trap upstream of the culvert crossing and was capturing Northern Pike (Plate 17). No fish were observed approximately 1 km farther upstream at Site 11 (Plate 15), where water was shallower (30 cm) but flow was maintained (Table 1; Plate 15). Site 14 occurred where Birch Creek crosses PTH 6, approximately 6.6 km upstream of Lake St. Martin (Figure 5). At this location the creek was about 30 cm

deep and flowing (Table 1). A large pool was observed downstream of the culvert crossing that was slightly deeper than the upstream or downstream waters (Plate 18). Numerous fish were observed holding in the pool including Northern Pike, White Sucker (*Catostomus commersonii*), and at least two Walleye (*Sander vitreus*). No fish were observed 1.6 km farther upstream at Site 9 (Figure 5), although water depth and flow (30 cm deep, moderate flow; Table 1; Plate 13) were comparable to those observed at Site 14. At Site 7, the upstream-most site, water depth was approximately 30 cm deep but flow at this site was minimal (Table 1; Plate 10). One live White Sucker, one dead White Sucker and one dead Northern Pike were observed at this site. Site 7 was located upstream of Goodison Lake, indicating fish are able to access Birch Creek from Goodison Lake, but whether the fish observed at Site 7 ascended Birch Creek from Lake St. Martin or from Goodison Lake is not known.

4.0

REFERENCES

KGS Group. 2017. Investigations and preliminary engineering for LMB Outlet Channels Options C and D Summary Report. Final Rev 0. Prepared for Manitoba Infrastructure by KGS Group.

Table 1.	Observations from drain sites visited on May 04, 2018.
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Cite) Managara da s	Location ¹		Time	Water	Water	Water	Dhatas	Commente
Site	waterbody	Easting	Northing	Time	Depth (m)	Flow	(°C)	Photos	Comments
1	Mercer Creek	527297	5683749	8:01:02	30 cm	No	9	Site 1 US Site 1 DS Site 1 DS culverts	2 culverts ~ 40 inch diameter 2 live NRPK (~350 mm) observed
2	Mercer Creek	528336	5683594	8:13:25	45 cm	No	9	Site 2 US Site 2 DS Site 2 East	2 culverts ~ 40 inch diameter no fish observed, likely can reach the site from Lake Manitoba
3	Unnamed 1st Order Drain	528919	5683599	8:22:17	<5 cm	No	-	Site 3 US	likely no fish
4	Watchorn Creek	531627	5683592	8:30:01	<45 cm	Yes	9	Site 4 US (East) Site 4 DS (West) Site 4 DS (South)	3 culverts ~ 48 inch diameter no fish observed; likely can reach the site from Lake Manitoba
5	Unnamed 2nd Order Drain	530529	5689110	8:55:25	<30 cm	No	-	Site 5 US Site 5 DS Site 5 (South)	likely no fish
6	Unnamed 2nd Order Drain	530512	5690156	9:01:47	<30 cm	No	-	Site 6 DS (West) Site 6 US (East)	likely no fish
7	Birch Creek	531318	5693400	9:13:02	30 cm	No	9.5	Site 7 US Site 7 DS	1 culvert ~ 60 inch diameter 1 NRPK and 1 WHSC observed dead 1 live WHSC observed
8	2nd Order Drain	530491	5695002	9:22:37	<30 cm	No	-	Site 8 US (South) Site 8 DS	1 culvert ~ 24 inch diameter no fish observed
9	Birch Creek	531746	5697512	9:31:13	30 cm	Yes	9	Site 9 US Site 9 DS (1) Site 9 DS (2)	box culvert no fish observed fish can likely reach the site from Lake St. Martin

Table 1. (continued).

C : b -	Martin alter	Location ¹		Time	Water	Water	Water	Dhatas	Commonte ²
Site	waterbody	Easting	Northing	Time	Depth (m)	Flow	Temperature (°C)	Photos	Comments
10	Woodale Drain	530890	5699867	9:47:32	<30 cm	Yes	-	Site 10 US (West) Site 10 DS (East)	no fish observed
11	Birch Creek	533166	5701508	9:57:26	30 cm	Yes	-	Site 11 US Site 11 Substrate Site 11 DS	3 culverts ~ 60 inch diameter lots of flow no fish observed
12	Unnamed 2nd Order Drain	532893	5702104	10:09:13	<15 cm	Yes	-	Site 12 US Site 12 DS	2 culverts ~30 inch diameter little water no fish observed
13	Birch Creek	533235	5702310	1:13:04	45 cm	Yes	9	Site 13 US Site 13 Fish Trap	3 culverts ~60 inch diameter fish trap full of NRPK no fish observed other than those in trap
14	Birch Creek	532548	5698371	11:16:54	45 cm	Yes	-	Site 14 US Site 14 DS Site 14 Culvert	1 culvert ~84 inch diameter WHSC, NRPK, WALL observed
15	Unnamed 3rd Order Drain	533733	5697571	11:37:47	30 cm	Yes	-	Site 15 US Site 15 DS (1) Site 15 DS (2)	3 culverts ~60 inch diameter no fish observed
16	Unnamed 3rd Order Drain	534045	5695115	11:48:28	<30 cm	No	-	Site 16 US	2 culverts ~36 inch diameter no fish observed
17	Unnamed 2nd Order Drain	532919	5693410	11:56:18	30 cm	Yes	-	Site 17 US Site 17 DS	1 culvert ~36 inch diameter no fish observed
18	Unnamed 4th Order Drain	533784	5688556	12:05:23	30 cm	Yes	-	Site 18 US Site 18 DS	2 culverts ~36 inch diameter no fish observed

1 - UTM coordinates; Datum NAD83; Locations illustrated on Figure 3

2 - Fish species acronyms: NRPK = Northern Pike (*Esox lucius*); WHSC = White Sucker (*Catostomus commersoni*); WALL = Walleye (*Sander vitreus*)



Figure 1. Location of the proposed Lake Manitoba and Lake St. Martin Outlet Channels in central Manitoba.



Figure 2. Location of key components of the provincial flood control system in southern Manitoba.



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Flow Direction
LMB Channel Option D
Existing Transmission Lin
Municipal Road
Highway
Limited Use Road
Trail
Watercourse
Waterbody
First Nation

NOLES: 1. The image shown was obtained from ESRI base map. 2. All units are metric and in metres unless otherwise specified. Transverse Mercator Projection, NAD 1983, Zone 14. Elevations are in metres above sea level (MSL).





Figure 5. Location of drain sites inspected on May 04, 2018.





Plate 1. Upstream and downstream views at Site 1 (Mercer Creek), May 04, 2018.



Plate 2. Downstream view of culverts at Site 1 (Mercer Creek), May 04, 2018.



Plate 3. Upstream and downstream views at Site 2 (Mercer Creek), May 04, 2018.



Plate 4. View looking east at Site 2 (ditch into Mercer Creek), May 04, 2018.



Plate 5. View looking upstream at Site 3 (1st order drain to Mercer Creek), May 04, 2018.



Plate 6. Upstream views at Site 4 (Watchorn Creek), May 04, 2018.





Plate 7. Downstream views at Site 4 (Watchorn Creek), May 04, 2018.



Plate 8. Upstream and downstream views at Site 5 (2nd order drain to Reed Lake), May 04, 2018.





Plate 9. Upstream and downstream views at Site 6 (2nd order drain to Clear Lake), May 04, 2018.



Plate 10. Upstream and downstream views at Site 7 (Birch Creek), May 04, 2018.



Plate 11. Upstream and downstream views at Site 8 (2nd order drain to Birch Creek), May 04, 2018.



Plate 12. Upstream view at Site 9 (Birch Creek), May 04, 2018.





Plate 13. Downstream views at Site 9 (Birch Creek), May 04, 2018.





Plate 14. Upstream and downstream views at Site 10 (Woodale Drain), May 04, 2018.





Plate 15. Upstream and downstream views at Site 11 (Birch Creek), May 04, 2018.



Plate 16. Upstream and downstream views at Site 12 (2nd order drain to Birch Creek), May 04, 2018.



Plate 17. Upstream view and fish trap at Site 13 (Birch Creek), May 04, 2018.







Plate 18. Upstream, downstream , and downstream culvert views at Site 14 (Birch Creek), May 04, 2018.



Plate 19. Upstream and downstream views at Site 15 (3rd order drain to Birch Creek), May 04, 2018.



Plate 20. Upstream and downstream views at Site 16 (3rd order drain to Goodison Lake), May 04, 2018.





Plate 21. Upstream and downstream views at Site 17 (2nd order drain to Goodison Lake), May 04, 2018.



Plate 22. Upstream and downstream views at Site 18, May 04, 2018.