Manitoba

Memorandum

DATE: August 6, 2015

SUBJECT: Flood Reduction Storage Analysis – Netley-Grassmere Watershed

This memo responds to the flood reduction analysis request for the Netley-Grassmere Watershed.

To achieve the downstream flow reduction goals, watershed storage required for a certain percentage of peak flow reduction was calculated for various frequencies at selected index stations. Correlations were established between annual peak daily flows and the corresponding hydrograph volumes. This relationship was used to calculate the storage volumes to achieve a 5, 10 or 15 % reduction in peak. These figures are approximate to provide a general storage goal on a watershed scale. Actual peak flow reductions would depend on storage location and reservoir characteristics.

Two hydrometric stations were used for the analysis:

1. 05OJ008 – Netley Creek near Petersfield
2. 05OJ017 – Grassmere Creek Drain near Middlechurch

The results from the analysis were transferred downstream to the outlets of the watercourses using drainage area ratios and the regional flood formula coefficient. The attached figures show the watershed areas for the storage volume analysis. The analysis results for the sub-watershed are attached.

Peak Flow Reduction Storage Analysis for Netley Creek (050J008)

Watershed area at the dam= 1,329 sq. km.

Period of Record 1960-2014

		Daily peak flow and corresponding hydrograph volume at the mouth			Peak flow in cfs at the mouth after peak flow reduction by			Storage in ac-ft required upstream to achieve peak flow reduction by		
Percent Exceedance	Return Period (years)	Daily Peak Q (cms)	Daily Peak Q (cfs)	Volume of Hydrograph (acre-ft)	5%	10%	15%	5%	10%	15%
1	100	145	5,120	94,830	4,860	4,610	4,350	4,990	9,990	14,980
2	50	130	4,590	84,000	4,360	4,130	3,900	4,450	8,910	13,360
5	20	107	3,780	68,480	3,590	3,400	3,210	3,680	7,350	11,030
10	10	88	3,110	55,710	2,950	2,800	2,640	3,040	6,080	9,120
20	5	68	2,400	41,870	2,280	2,160	2,040	2,350	4,690	7,040
50	2	38	1,340	21,120	1,270	1,210	1,140	1,310	2,620	3,930

Peak Flow Reduction Storage Analysis for Grassmere Creek Drain (050J017)

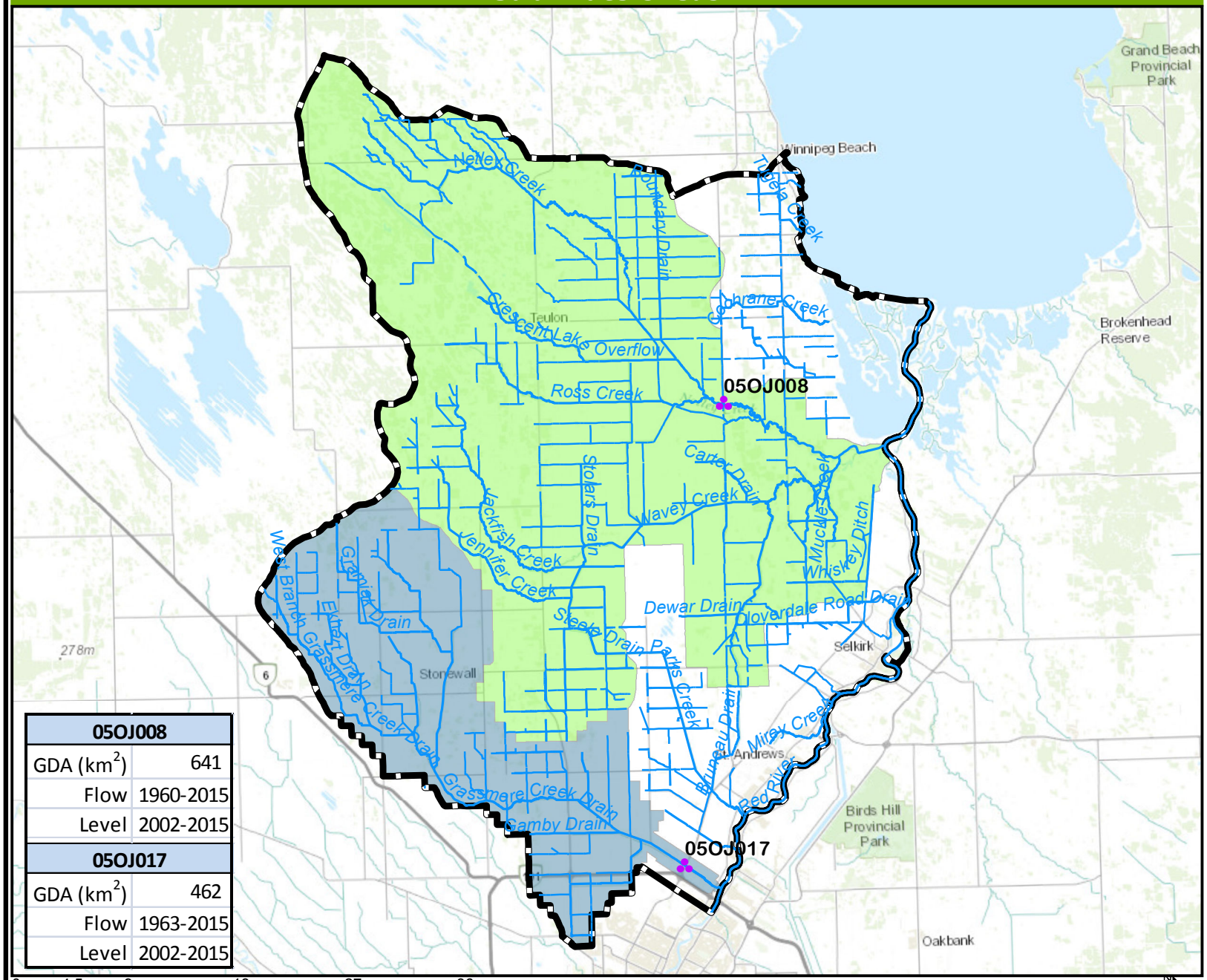
Watershed area at the dam= 471 sq. km.

Period of Record 1963-2014

		Daily peak flow and corresponding hydrograph volume at the outlet			Peak flow in cfs at the outlet after peak flow reduction by			Storage in ac-ft required upstream to achieve peak flow reduction by		
Percent Exceedance	Return Period (years)	Daily Peak Q (cms)	Daily Peak Q (cfs)	Volume of Hydrograph (acre-ft)	5%	10%	15%	5%	10%	15%
1	100	63	2,220	35,450	2,110	2,000	1,890	1,870	3,740	5,610
2	50	57	2,010	31,460	1,910	1,810	1,710	1,670	3,340	5,010
5	20	47	1,660	25,900	1,580	1,490	1,410	1,390	2,780	4,170
10	10	40	1,410	21,410	1,340	1,270	1,200	1,170	2,330	3,500
20	5	31	1,090	16,600	1,040	980	930	930	1,850	2,780
50	2	19	670	9,310	640	600	570	560	1,120	1,680

NETLEY-GRASSMERE WATERSHED

Sub-Watersheds



Legend

- Netley-Grassmere Watershed

Sub-Watersheds

- Grassmere Creek at the outlet
- Netley Creek at the mouth
- Hydrometric Stations
- Watercourses

05OJ008	
GDA (km^2)	641
Flow	1960-2015
Level	2002-2015
05OJ017	
GDA (km^2)	462
Flow	1963-2015
Level	2002-2015

Station 05OJ008		
Gauge	641	km^2
Outlet	688	
	1,329	
Station 05OJ017		
Gauge	462	km^2
Outlet	9	
	471	

0 4.5 9 18 27 36 Kilometers

1:450,000

0 3 6 12 18 24 Miles

Datum: GCS NAD 1983
Projection: UTM Zone 14 N
Base Map: ESRI World Topo Map
Date Printed: May 11, 2015

Manitoba
Water Science and Management Branch
Conservation and Water Stewardship