Report on the Transfer of Adult Lake Whitefish From Lake of Bays into Mary Lake, 2011

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Bracebridge

2011

This report presents the results of the third and final year of transfers of adult lake whitefish to Mary Lake from Lake of Bays. The results of the transfer in 2009 and 2010 were reported by Scholten et al. (2009) and Scholten (2010). For the final year a target of 79 fish was used to meet the arbitrary three year goal of 300 adult whitefish.

Methods used were largely the same as those used in 2010. The gill nets used were panels of Spring Littoral Index Netting (SLIN) gillnet. The 76 mm (2.5 in) mesh size was found to be most effective at catching whitefish without excessive damage to the fish. Gangs of two panels were set for roughly half hour periods to minimize the mortality.

Captured whitefish were measured for their fork length and the adipose fin was clipped to be able to recognize the fish from this project. Fin clips from fish caught were kept for potential future genetic analysis. All fish were sexed by expressing gametes. If gametes could not be produced, the fish was assumed to be a pre-spawning female. No ageing structures were collected in order to minimize stress.

Fish were held on board the boat in a half-size (~ 1 m x 1m x 0.5 m h) insulated commercial fish tote (www.bonarplastic.com) then transferred to a full size tote (~0.75 m h) in a pick-up truck. Oxygen was supplied using compressed oxygen diffused through an air stone. Fish were released at the public dock on Mary Lake in Port Sydney.

Collections began on November 22, 2011 when the surface temperature in Lake of Bays was approximately 6.5 ºC. This was the recommended temperature to begin netting, according to previous years, as spawning was found to begin around 6.5 ºC. The boat was launched from Portage Bay and nets were set in the surrounding area. Efforts were set, as indicated by Figure 1, on the following shoals: Wee Island, Britannia Shoal, Seagull Rock, Point Ideal buoy and shoals;12, 13, 47, 48. These efforts, however, were not productive and only one lake trout was caught off shoal 13.

After waiting for two days netting continued on November 24th. The water temperature was 5.1 ºC in the river as indicated by the water level gauge, which is likely cooler than the lake temperature. Efforts were concentrated around the Elizabeth Point shoal (shoal 27 A) in hope to confirm if spawning had begun, as many fish were caught at this location in 2010. Three efforts, however, produced only one whitefish and two lake trout. After trying various other areas and having no success netting was stopped for the day and it was concluded that whitefish spawning had not yet started. The one whitefish that was caught was released back into Lake of Bays.

Off the Gull Rock shoal, on November 28th, 5 whitefish were caught. Four were deemed to be male and one a large pre-spawning female due to no gametes being expressed. The water temperature had risen back up to 6.5 ºC, while the air temperature was 2 ºC. All five fish were caught after 1:45 pm. The successful netting sites were very specific around the Gull Rock Shoal. Most fish were caught in the same net that was reset multiple times, while nets placed on the opposite side of the shoal were unsuccessful.

On December 2nd whitefish netting was attempted again. The surface water temperature was 6 ºC. At Gull Rock, 14 whitefish were caught. Three were caught at the Bigwin buoy (shoal 20) while 2 were lost. The Bigwin buoy shoal was an unknown spawning ground for whitefish but was tried due to a second hand report of whitefish being seen by the Bigwin ferry operator. Three were also caught at shoal 17. Out of the 20 fish that were caught 7 were female of which 3 were ripe. This was the first time in the 2011 project that ripe females were caught, indicating that spawning had begun.

On December 5th nets were set again around the Gull Rock area and the Bigwin buoy. The Bigwin shoal only produced one whitefish, while the Gull Rocks shoal yielded 14 fish throughout the day. Whitefish were also caught on shoal 17 (5) and shoal 51 (1).

Again, water temperatures recorded at the automated sensors on both lakes are provided in Figure 4, Figure 5 and the Appendix. The temperatures from the Lake of Bays sensor are more variable and slightly lower overall than the temperatures recorded on the main lake. The Mary Lake sensor appears to reflect the open lake temperature quite closely.

In total, 46 whitefish were caught in Lake of Bays. One died in the transfer to Mary Lake, while another fish was questionable on whether it survived. Therefore, 45 whitefish were successfully transferred into Mary Lake as indicated by Table 1. Approximately 72 percent of all the whitefish transferred were caught at the Gull Rock shoal. Overall, 36 males were caught compared to 10 females. The one fish that died was a male. All of the males were ripe, while 4 out of the 10 females were ripe.

The size distribution and descriptive statistics were essentially the same as was observed in 2009 (Table 2, Figure 2), Using the same length-weight regression used in 2009:

$$(\log(RWT)=3.229\log(FL)-5.438)$$

yielded the same mean weight as well. Data for individual fish are provided in the Appendix.

Combining 2009, 2010 and 2011, a total of 266 whitefish have been transferred into Mary Lake with an overall mean fork length of 443 mm and estimated total weight of 340 kg (Table 3, Figure 3). This represents a stocking rate of 0.25 fish/ha and 0.32 kg/ha. Of the 266 whitefish approximately 112 were female and 154 were male (Table 4).

In 2011 whitefish spawning occurred late in the year in comparison to previous years. Large catches of fish and the occurrence of ripe females didn't occur until December 2nd. In 2010, large numbers of fish were caught as early as November 22. This may be attributed to larger fluctuations in lake temperature as compared to previous years. Furthermore, even though the water temperature was as cold, even colder than previous years on the day of netting, in the weeks previous to netting the water temperature was warmer than previous years. This may have resulted in whitefish spawning later than initially expected.

Some evidence of survival of transferred fish was detected in 2011. Lake trout netting conducted by the Muskoka Lakes Fisheries Assessment Unit captured eight adult whitefish with an adipose fin clip, indicating they were stocked fish from Lake of Bays. Five were females, of which three had developing gonads and appeared they would have spawned in the fall of 2011. Two had gonads that appeared dormant; one of which had some residual eggs, suggesting spawning had occurred in 2010. Several had stomach contents that included *Bythotrephes*, small cladocerans, a ninespine stickleback and several small sculpins. These observations are encouraging in that enough fish have been stocked and survived to be detectable, they are successfully finding food and they are reaching spawning condition. One juvenile lake whitefish was also caught. It had a fin clip indicating it was a Lake Simcoe strain fish stocked as a fingerling in the fall of 2009. Therefore, at least some survival of juvenile fish is occurring as well.

This concludes the three year whitefish transfer project into Mary Lake. The project will be considered successful if a self-sustaining population of whitefish is established in Mary Lake. Monitoring should be done through creel surveys, a netting program or spawning observations in the fall in the next five to ten years.

Acknowledgements

Brett Thomas, Christy MacDonald and Al Theiss assisted in the field. The Minden and Parry Sound offices loaned transfer tanks.

References

Scholten, S., A. Ivany and C. Johnson. 2009. Report on the Transfer of Adult Lake Whitefish from Lake of Bays to Mary Lake, 2009. File Report. Ontario Ministry of Natural Resources, Bracebridge.

Scholten S. 2010. Report on the Transfer of Adult Lake Whitefish from Lake of Bays to Mary Lake, 2010. File Report. Ontario Ministry of Natural Resources, Bracebridge.

Table 1 *Stocking details for transfer of adult lake whitefish from Lake of Bays to Mary Lake, November, 2010.*

Lot ID	Date	Capture Location	Temp. (L of Bays)	Temp. (Mary L)	Fish Count	Transit Mortality
1	28-Nov-11	Gull Rock	6.2	6.5	5	0
2	02-Dec-11	Gull Rock	6		14	0
3	02-Dec-11	Shoal 17	6		3	0
4	02-Dec-11	Bigwin Buoy	6		3	0
5	05-Dec-11	Gull Rock	6.1		14	1
6	05-Dec-11	Bigwin Buoy	6.1		1	0
7	05-Dec-11	Shoal 17	6.1		5	0
8	05-Dec-11	Shoal 51	6.1		1	0

Table 2 *Descriptive statistics (fork length) for lake whitefish captured in Lakes of Bays, 2009, 2010 and 2011 (includes mortalities).*

	2009	2010	2011	Total
Mean	438	442	461	443
Standard Error	3	4	6	2
Median	425	432	452	432
Mode	420	425	460	420
Standard Deviation	43	35	37	40
Sample Variance	1860	1199	1403	1648
Range	230	172	168	230
Minimum	370	393	412	370
Maximum	600	565	580	600
Count	152	83	46	281

Table 3 *Summary of number of whitefish captured, by location, Lake of Bays, 2009-2011. Includes fish that were released and transit mortalities.*

	2009	2010	2011
Dorset	136	19	
Elizabeth Point	12	35	
South Shore Bigwin	1		
Paint L Creek mouth	5		
Dwight Bay; Oxtongue River delta, lake trout shoal 12		15	
Trading Bay; Hollow River mouth		3	
Lake trout shoal 14 and 17		8	8
Gull Rocks			33
Bigwin Buoy (shoal 20)			4
Lake trout shoal 51			1
Total	154	80	46

Table 4 *Summary of total number of adult whitefish stocked into Mary Lake, by sex, 2009-2011.*

	Male	Female	Total
2009	79	62	141
2010	40	40	80
2011	35	10	45
Total	154	112	266

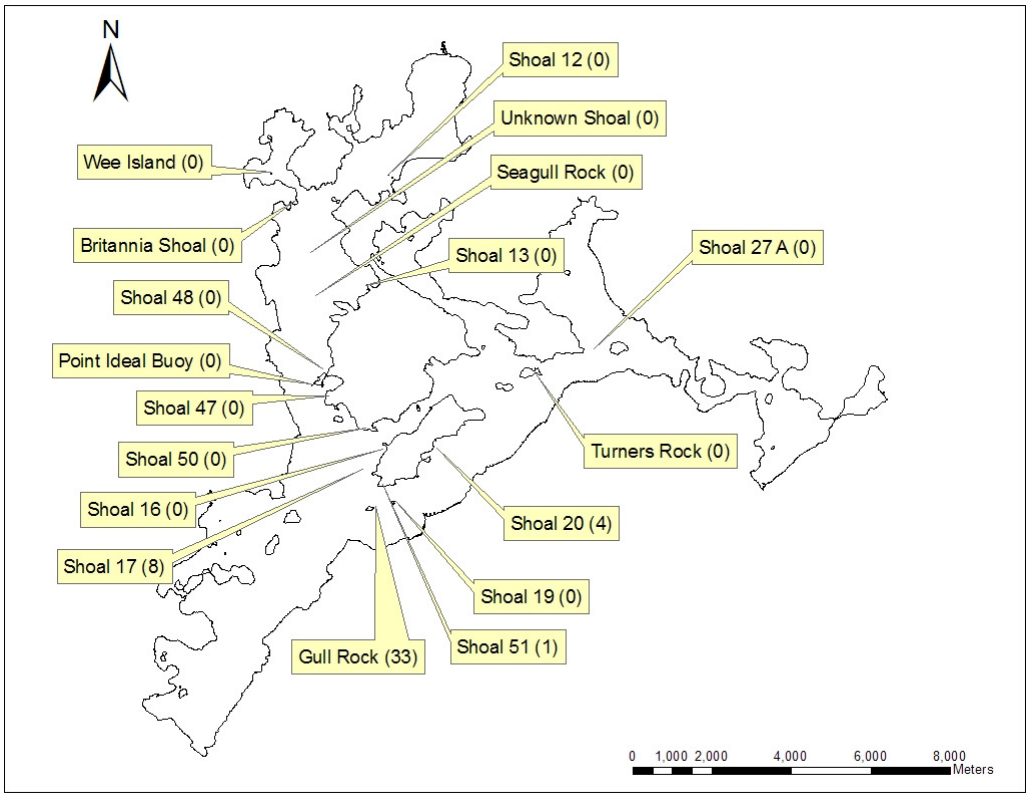


Figure 1 *Map of Lake of Bays showing locations where netting occurred and whitefish were captured in 2011. Numbers of fish caught are shown in brackets. Netting effort varied between locations.*

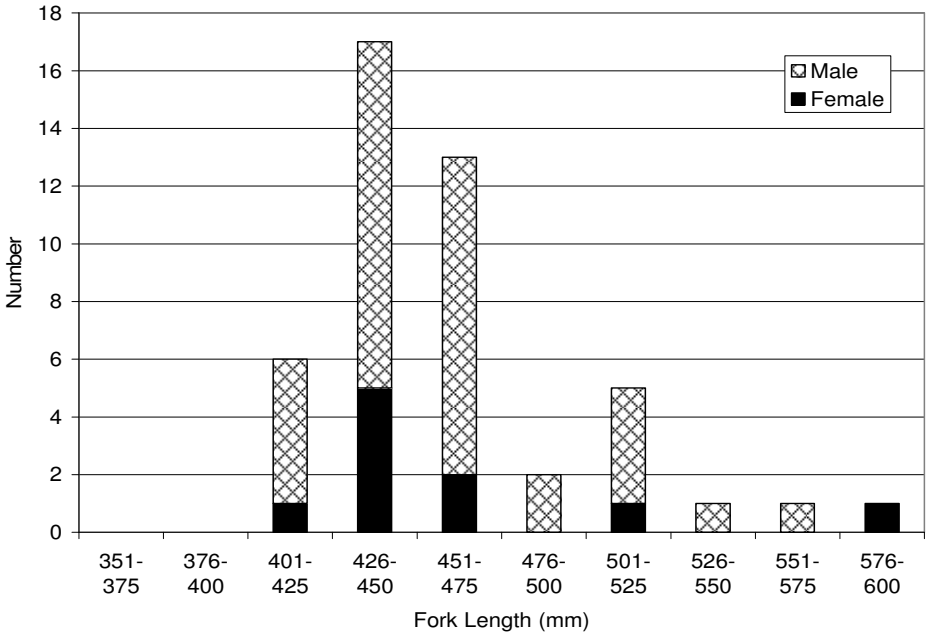


Figure 2 *Fork length composition, by sex, of lake whitefish captured in Lake of Bays and stocked into Mary Lake, November/December, 2011.*

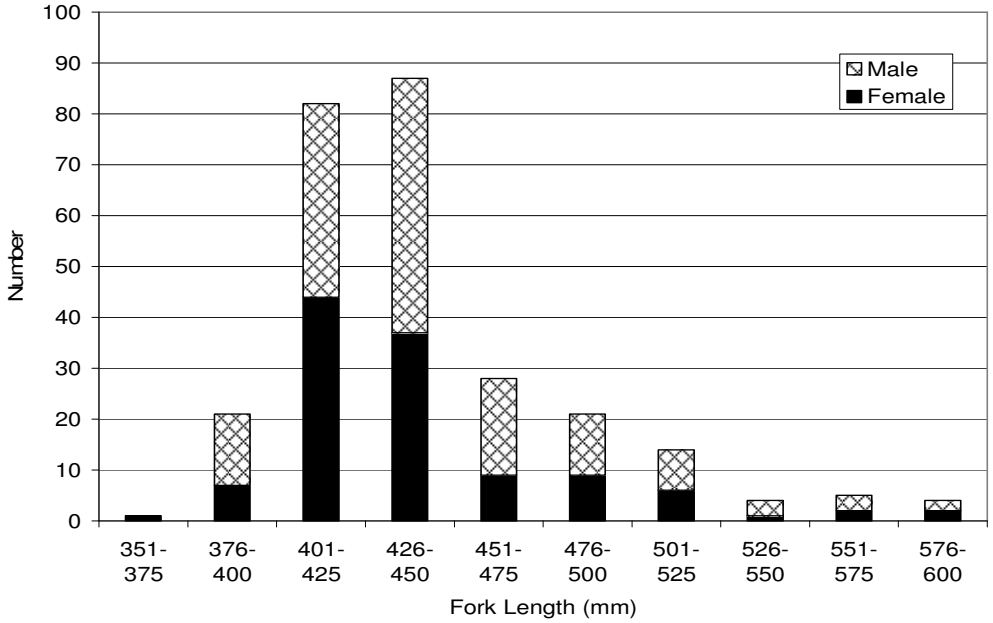


Figure 3 *Fork length composition, by sex, of lake whitefish captured in Lake of Bays and stocked into Mary Lake, overall totals for 3 year project.*

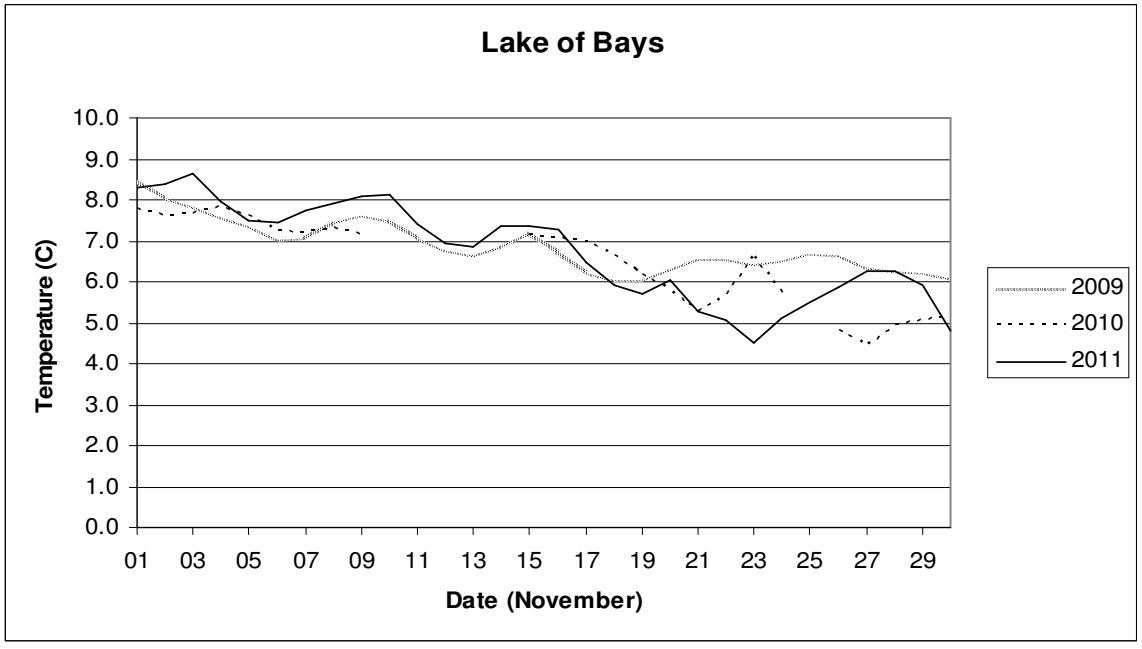


Figure 4 *Daily average water temperatures measured at water level gauges on Lake of Bays, November/December 2011.*

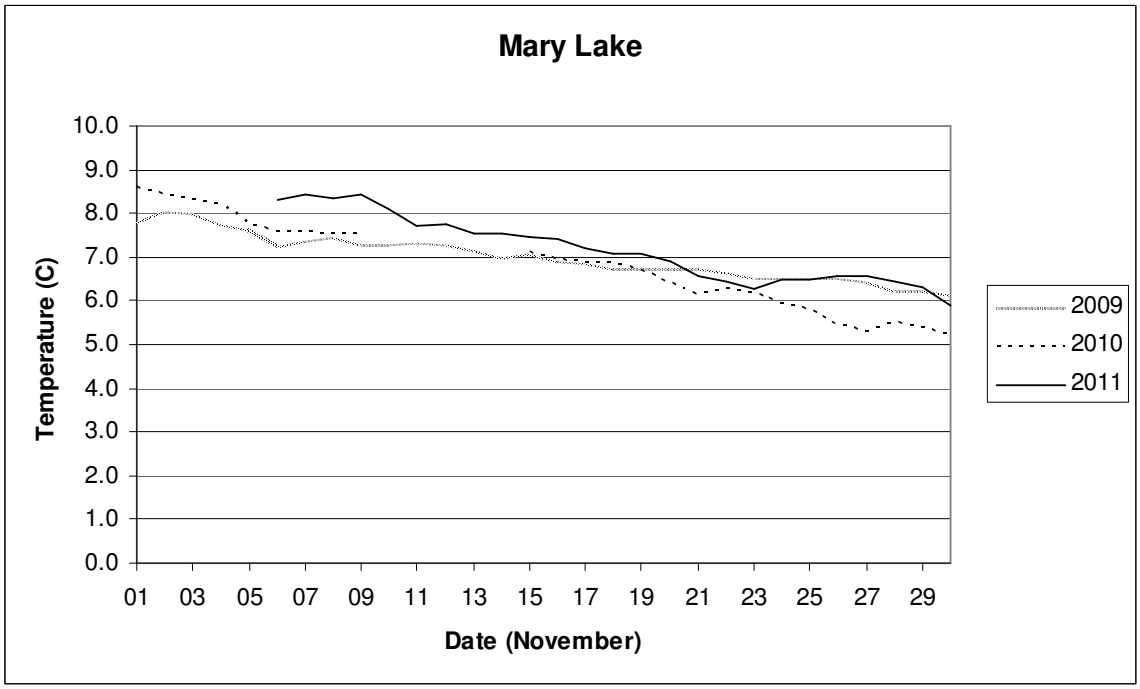


Figure 5 *Daily average water temperatures measured at water level gauges on Mary Lake, November/December 2011.*

Appendix *Raw data for lake whitefish captured in Lake of Bays, November/December 2011.*

Date	Location	Fish	Fork Length	Estimated Weight (g)	Sex	Comment
28-Nov-11	Gull Rock	1	580	3056	F	
28-Nov-11	Gull Rock	2	564	2792	M	
28-Nov-11	Gull Rock	3	498	1868	M	
28-Nov-11	Gull Rock	4	420	1078	M	
28-Nov-11	Gull Rock	5	412	1013	M	
02-Dec-11	Gull Rock/Bigwin	6	468	1528	F	green
02-Dec-11	Gull Rock/Bigwin	7	418	1061	M	
02-Dec-11	Gull Rock/Bigwin	8	462	1466	M	
02-Dec-11	Gull Rock/Bigwin	9	428	1145	M	
02-Dec-11	Gull Rock/Bigwin	10	435	1207	M	
02-Dec-11	Gull Rock/Bigwin	11	470	1550	M	
02-Dec-11	Gull Rock/Bigwin	12	440	1252	F	ripe
02-Dec-11	Gull Rock/Bigwin	13	505	1954	M	
02-Dec-11	Gull Rock/Bigwin	14	520	2148	M	
02-Dec-11	Gull Rock/Bigwin	15	418	1061	M	
02-Dec-11	Gull Rock/Bigwin	16	445	1299	F	green
02-Dec-11	Gull Rock/Bigwin	17	435	1207	M	
02-Dec-11	Gull Rock/Bigwin	18	445	1299	M	
02-Dec-11	Gull Rock/Bigwin	19	450	1347	M	
02-Dec-11	Gull Rock/Bigwin	20	420	1078	F	ripe
02-Dec-11	Gull Rock/Bigwin	21	460	1446	M	
02-Dec-11	Gull Rock/Bigwin	22	450	1347	F	green
02-Dec-11	Shoal 17	23	470	1550	M	
02-Dec-11	Shoal 17	24	450	1347	F	green
02-Dec-11	Shoal 17	25	460	1446	F	ripe
05-Dec-11	Gull Rock	26	430	1163	M	
05-Dec-11	Gull Rock	27	450	1347	M	
05-Dec-11	Gull Rock	28	518	2121	F	ripe
05-Dec-11	Gull Rock	29	510	2017	M	
05-Dec-11	Gull Rock	30	460	1446	M	
05-Dec-11	Gull Rock	31	460	1446	M	
05-Dec-11	Gull Rock	32	505	1954	M	
05-Dec-11	Gull Rock	33	465	1497	M	
05-Dec-11	Gull Rock	34	475	1603	M	
05-Dec-11	Gull Rock	35	455	1395	M	
05-Dec-11	Gull Rock	36	425	1120	M	
05-Dec-11	Gull Rock	37	530	2284	M	
05-Dec-11	Gull Rock	38	480	1659	M	
05-Dec-11	Gull Rock	39	465	1497	M	
05-Dec-11	Gull Rock	40	460	1446	M	
05-Dec-11	Gull Rock	41	435	1207	M	
05-Dec-11	Gull Rock	42	440	1252	M	
05-Dec-11	Gull Rock	43	435	1207	M	
05-Dec-11	Gull Rock	44	440	1252	M	
05-Dec-11	Gull Rock	45	440	1252	F	
05-Dec-11	Gull Rock	46	448	1327	M	

Appendix *Daily average water temperatures recorded at the water level gauges on Lake of Bays and Mary Lake, November, 2011.*

	Lake of Bays			Mary Lake		
	2009	2010	2011	2009	2010	2011
01-Nov	8.5	7.8	8.3	7.8	8.6	
02-Nov	8.1	7.6	8.4	8.0	8.4	
03-Nov	7.8	7.7	8.6	8.0	8.3	
04-Nov	7.6	7.8	7.9	7.8	8.2	
05-Nov	7.4	7.6	7.5	7.6	7.7	
06-Nov	7.0	7.3	7.4	7.3	7.6	8.3
07-Nov	7.1	7.2	7.8	7.4	7.6	8.4
08-Nov	7.4	7.3	7.9	7.4	7.6	8.3
09-Nov	7.6	7.2	8.1	7.3	7.5	8.4
10-Nov	7.5		8.1	7.3		8.1
11-Nov	7.1		7.4	7.3		7.7
12-Nov	6.8		6.9	7.3		7.8
13-Nov	6.6		6.9	7.2		7.5
14-Nov	6.8		7.4	7.0		7.6
15-Nov	7.2	7.2	7.4	7.1	7.1	7.5
16-Nov	6.7	7.1	7.3	6.9	7.0	7.4
17-Nov	6.2	7.0	6.5	6.9	6.9	7.2
18-Nov	6.0	6.7	5.9	6.7	6.9	7.1
19-Nov	6.0	6.2	5.7	6.7	6.7	7.1
20-Nov	6.3	5.8	6.0	6.7	6.4	6.9
21-Nov	6.5	5.3	5.3	6.7	6.1	6.6
22-Nov	6.5	5.7	5.1	6.7	6.3	6.4
23-Nov	6.4	6.6	4.5	6.5	6.2	6.3
24-Nov	6.5	5.8	5.1	6.5	5.9	6.5
25-Nov	6.7		5.5	6.5	5.8	6.5
26-Nov	6.6	4.8	5.9	6.5	5.5	6.6
27-Nov	6.4	4.4	6.3	6.4	5.3	6.6
28-Nov	6.3	4.9	6.2	6.2	5.5	6.5
29-Nov	6.2	5.1	5.9	6.2	5.4	6.3
30-Nov	6.1	5.1	4.8	6.1	5.2	5.9