Nekton Survey of Two Natural Salt Marshes at Ducks Unlimited Canada's Beausejour/Aulac Marshland

Prepared for
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By

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SUMMARY

As part of a salt marsh restoration project located at Ducks Unlimited Canada's Beausejour/Aulac marshland, two natural salt marshes located adjacent to an area of agricultural dykeland scheduled for restoration were monitored for the presence of nekton species composition and abundance. Three surveys were carried out, one in late spring, one in mid-summer and one in late summer, using fyke nets and minnow traps. Six species of fish and one species of crustacean were captured over the entire survey period. There was generally little seasonal variation in the species captured, but the abundance of organisms captured was greater during the early spring and late summer than during the mid-summer.

Table of Contents

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1. Background

In the fall of 2010, as part of its wetland restoration program, Ducks Unlimited Canada breached an existing agricultural dike located at the Beausejour/Aulac Marshland located within their Beaubasin field station in southwestern New Brunswick. This resulted in nearly 17 hectares of dykeland being restored to its original tidal influence. As part of this project, a number of processes will be monitored to better understand how the physical and biological characteristics of the restoration site develop, as well as the time required for the restored site to develop salt marsh characteristics similar to those of existing salt marsh wetlands located in the same area. In order to carry out this assessment a monitoring program was carried out in 2010 prior to breaching of the dyke at two natural salt marshes located directly adjacent to the restoration site (Fig. 1). This report presents the results of the monitoring program carried out to obtain baseline information on the nekton species composition and their relative abundance at the two adjacent natural salt marshes.

Fig. 1. Aerial photo showing the restoration site and adjacent natural salt mashes

2. Methodology

The nekton surveys were carried out at three times during 2010: late spring (15-17 June); mid-summer (27-29 July); and late summer (7-9 September). These times corresponded to periods of spring tides which are generally associated with the periods when nekton are most abundant within tidal salt marshes. The methods employed to capture nekton included fyke nets and minnow traps. One fyke net having a main hoop diameter of 0.6 metres and wings of 2.4 metres in length was set across a main channel at each of the two salt marsh sites (Fig.2), and five minnow traps, baited with bread and sardines, were deployed at each site. One minnow trap was set at the same location as the fyke net and the remainder were located landward of the fyke net in smaller channels draining the salt marsh. The UTM coordinates and locations of each fyke net and minnow trap are shown in Table 1 and Fig.3, respectively.

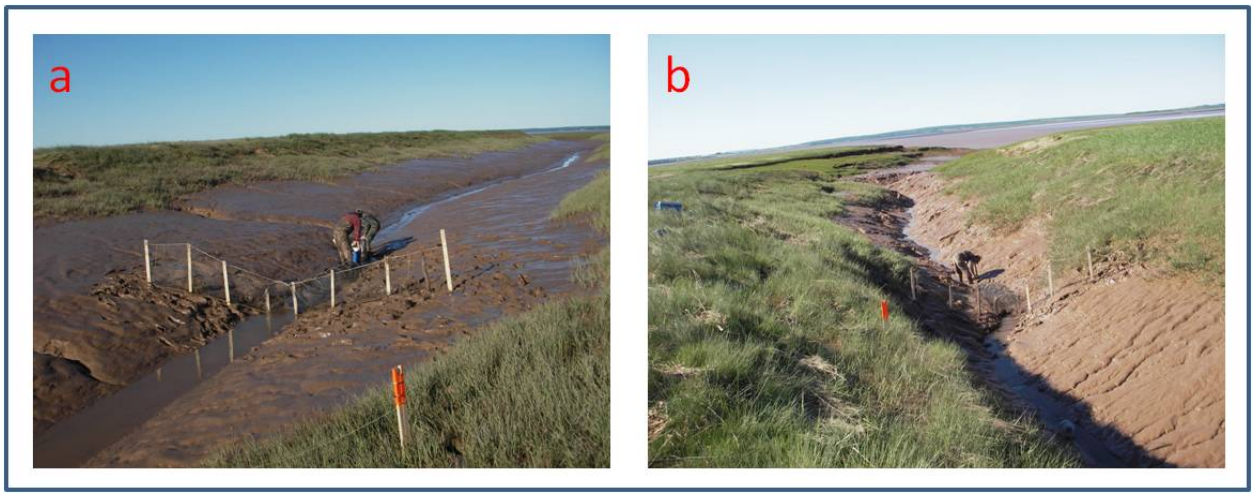

Fig. 2. Fyke nets at Reference Site #1 (a) and Reference Site #2 (b).

Table 1. UTM coordinates for each sample station.

Reference Site #1			**Reference Site #2**		
Station*	**UTM Coordinates**		**Station***	**UTM Coordinates**	
F1 and M1-1	20 T 399849	5077891	F2 and M2-1	20 T 398323	5079491
M1-2	20 T 399869	5077850	M2-2	20 T 398398	5079526
M1-3	20 T 399781	5078067	M2-3	20 T 398403	5079500
M1-4	20 T 399837	5078080	M2-4	20 T 398432	5079535
M1-5	20 T 398470	5079486	M2-5	20 T 398456	5079367

*Station prefixes represent fyke nets (F) and minnow traps (M).

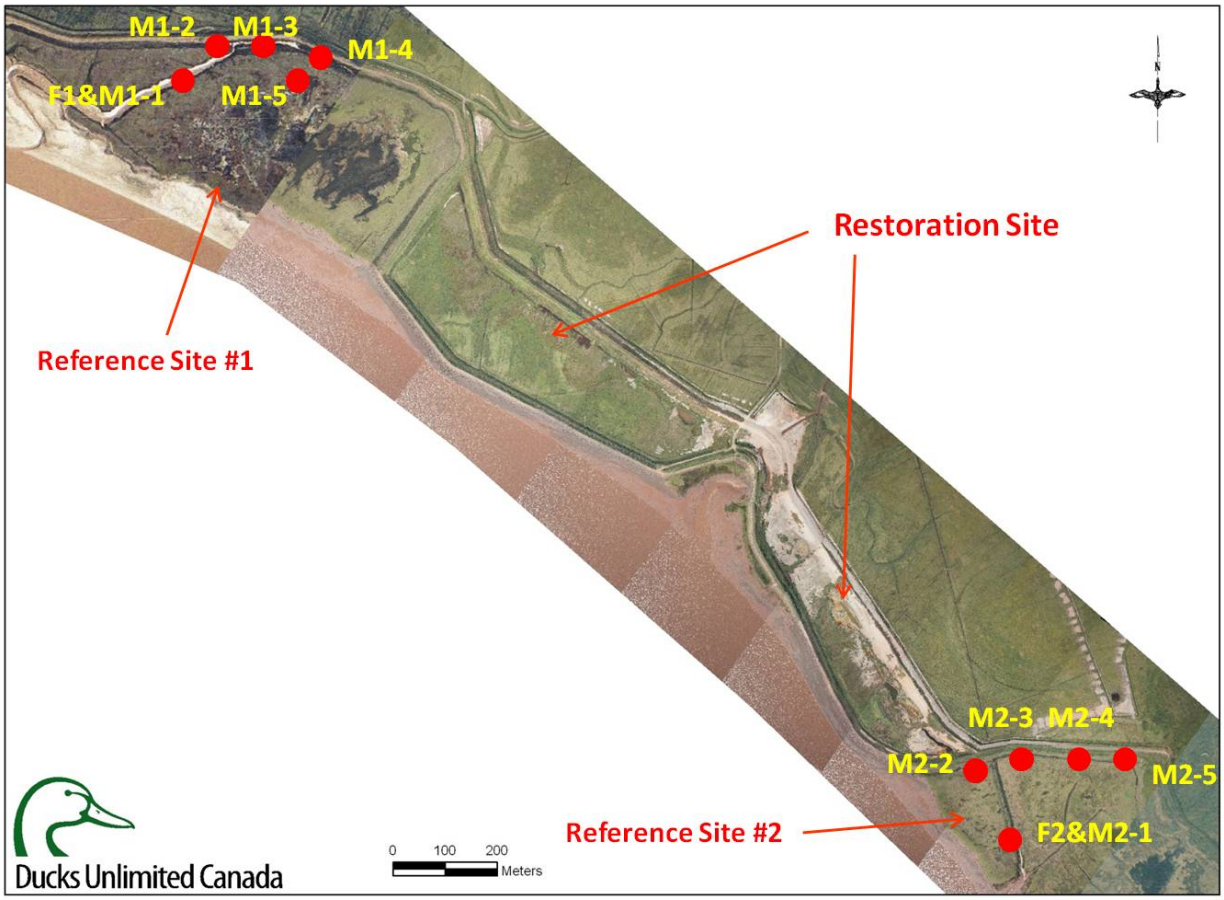

Fig.3. Location of sample stations - prefixes represent fyke nets (F) and minnow traps (M).

The fyke nets and minnow traps were deployed at low tide on the evening of the first day of each sampling period, and were removed at low tide on the morning of the last day of each sampling period. This resulted in the three capture periods, each 12 hours duration, for each survey period.

All organisms captured were returned live to the water at the same place at which they were collected.

3. Results and Discussion

A total of 432 organisms were captured during the entire survey. These consisted of six species of fish: *Microgadus tomcod* (tomcod); *Anguilla rostrata* (American eel); *Fundulus heteroclitus* (mummichog); *Gasterosteus aculeatus* (three spine stickleback); *Pungitius pungitus* (nine spine stickleback) and; *Menidia menidia* (Atlantic silverside). One large crustacean, *Crangon septemspinosa* (sand shrimp), was also captured, but only during the late summer survey. There was, surprisingly, no difference in the total number of organisms captured at each site (216 at each). In contrast, there was considerable variation in the total numbers captured during each

survey period (Fig. 3.1). The greatest number captured was during the late summer survey and the lowest number captured was during the mid-summer survey.

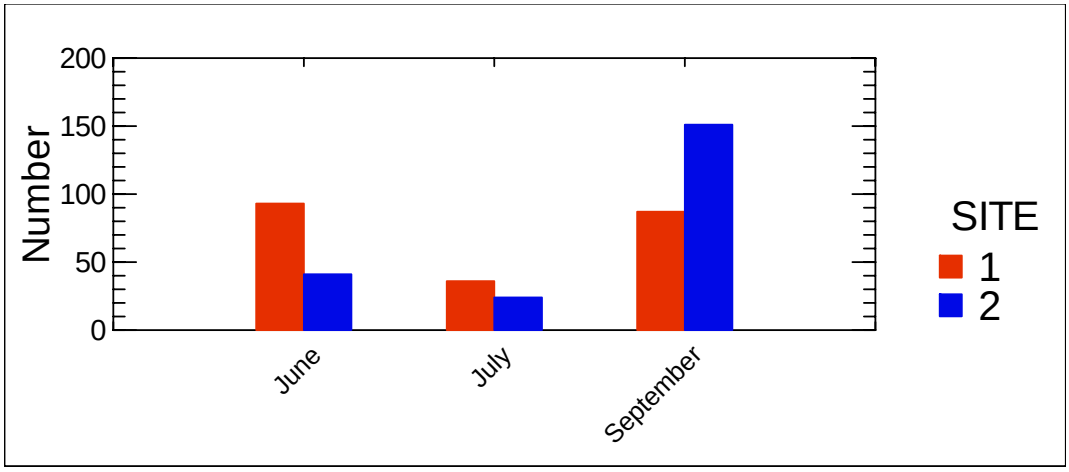

Fig. 3.1. Total number of organisms captured during each survey period at each Reference Site.

With the exception of sticklebacks and sand shrimp, there was little variation in the species composition captured at each site. Sticklebacks were most abundant at Reference Site 1 and sand shrimp were most abundant at Reference Site 2 (Fig 3.2).

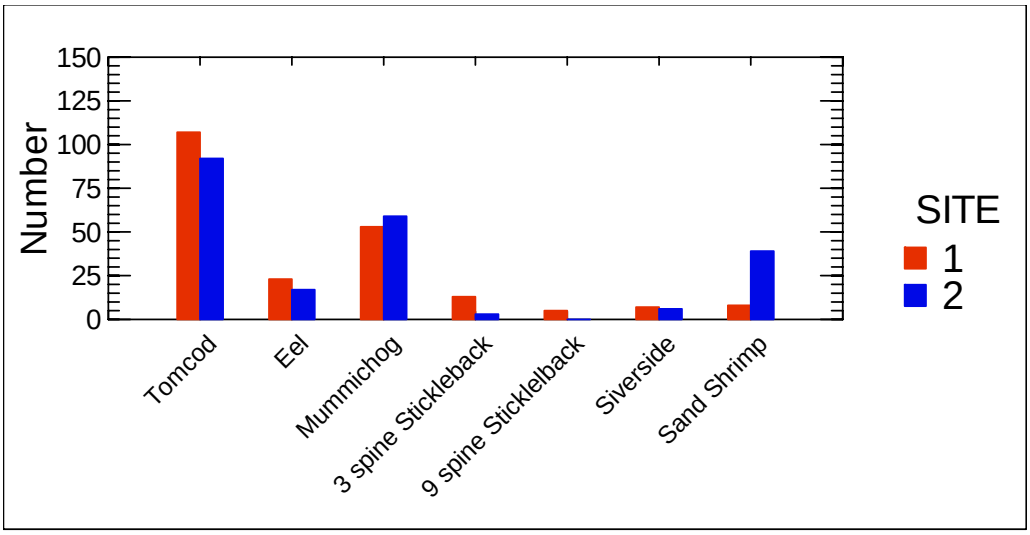

Fig. 3.2. Total number of each species captured at each reference site.

There was, in contrast, considerable seasonal variation in the species captured during the three sampling periods (Fig. 3.4). Tomcod were common over the entire sampling period and were captured mainly in the fyke nets. Mummichogs were most abundant during the late-summer survey, and sticklebacks were most abundant during the early summer. Sand shrimp were only present during the last survey period,

most likely as a result of the relatively high tidal amplitude (>38 metres) at that time. All of these species were captured mostly in the minnow traps.

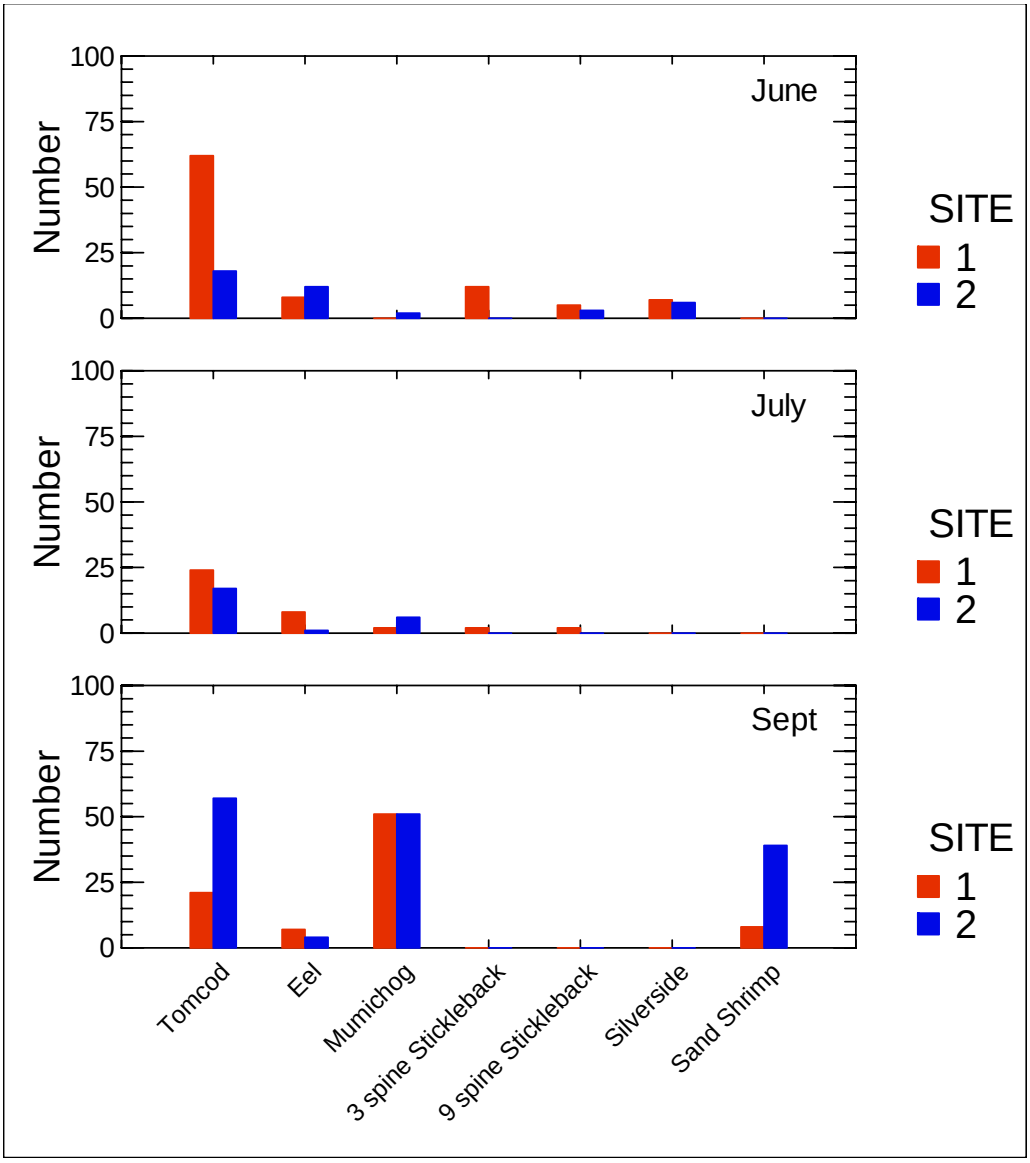

Fig 3.3. Relative abundance of species captured during the three sampling periods.

4. Acknowledgements

I would like to thank Wade Lewis of Ducks Unlimited Canada for arranging accommodations at the Beaubasin field station, and Jana Cheverie, also of ducks Unlimited Canada, for preparing the images of the study site. Thanks are due Jeremy Broome, Colin Buhariwalla and Peter Porskamp of Acadia University for their able assistance in the field work.

5. Appendix I. Summary of organisms captured at each sampling station during each sampling period.

SITE	Date	Low Tide Time	Previous High Tide Height (meters)	Station	***Microgadus tomcod*** (Atlantic Tomcod)	***Anguilla rostrata*** (American Eel)	***Fundulus heteroclitus*** (Mummichog)	***Gasterosteus aculeatus*** (3 spine Stickleback)	***Pungitius pungitius*** (9 spine Stickleback)	***Menidia menidia*** (Silverside)	***Crangon septemspinosa*** (Sand shrimp)
Reference Site #1	16-Jun	9:51	35.4	F1	31			4	2	7	
	16-Jun	9:51	35.4	M1-1							
	16-Jun	9:51	35.4	M1-2							
	16-Jun	9:51	35.4	M1-3							
	16-Jun	9:51	35.4	M1-4		1					
	16-Jun	9:51	35.4	M1-5							
Reference Site #2	16-Jun	9:51	35.4	F2	6	1					
	16-Jun	9:51	35.4	M2-1							
	16-Jun	9:51	35.4	M2-2							
	16-Jun	9:51	35.4	M2-3	1			1			
	16-Jun	9:51	35.4	M2-4							
	16-Jun	9:51	35.4	M2-5							
Reference Site #1	16-Jun	22:16	36.9	F1	8	4		1			
	16-Jun	22:16	36.9	M1-1							
	16-Jun	22:16	36.9	M1-2							
	16-Jun	22:16	36.9	M1-3							
	16-Jun	22:16	36.9	M1-4				6	3		
	16-Jun	22:16	36.9	M1-5							
Reference Site #2	16-Jun	22:16	36.9	F2	3	1					
	16-Jun	22:16	36.9	M2-1							
	16-Jun	22:16	36.9	M2-2							
	16-Jun	22:16	36.9	M2-3		2	2			5	
	16-Jun	22:16	36.9	M2-4		4					
	16-Jun	22:16	36.9	M2-5							
Reference Site #1	17-Jun	10:49	35.7	F1	23	2					
	17-Jun	10:49	35.7	M1-1		1					
	17-Jun	10:49	35.7	M1-2							
	17-Jun	10:49	35.7	M1-3							
	17-Jun	10:49	35.7	M1-4							
	17-Jun	10:49	35.7	M1-5							
Reference	17-Jun	10:49	35.7	F2	8			2		1	

Site #2	17-Jun	10:49	35.7	M2-1							
	17-Jun	10:49	35.7	M2-2							
	17-Jun	10:49	35.7	M2-3							
	17-Jun	10:49	35.7	M2-4		4					
	17-Jun	10:49	35.7	M2-5							
Reference Site #1	28-Jul	8:18	34.9	F1	4						
	28-Jul	8:18	34.9	M1-1	1						
	28-Jul	8:18	34.9	M1-2							
	28-Jul	8:18	34.9	M1-3							
	28-Jul	8:18	34.9	M1-4		1					
	28-Jul	8:18	34.9	M1-5	1						
Reference Site #2	28-Jul	8:18	34.9	F2	10						
	28-Jul	8:18	34.9	M2-1							
	28-Jul	8:18	34.9	M2-2							
	28-Jul	8:18	34.9	M2-3							
	28-Jul	8:18	34.9	M2-4							
	28-Jul	8:18	34.9	M2-5							
Reference Site #1	28-Jul	16:33	33.8	F1	8			2			
	28-Jul	16:33	33.8	M1-1							
	28-Jul	16:33	33.8	M1-2							
	28-Jul	16:33	33.8	M1-3		2					
	28-Jul	16:33	33.8	M1-4							
	28-Jul	16:33	33.8	M1-5							
Reference Site #2	28-Jul	16:33	33.8	F2	3						
	28-Jul	16:33	33.8	M2-1							
	28-Jul	16:33	33.8	M2-2							
	28-Jul	16:33	33.8	M2-3							
	28-Jul	16:33	33.8	M2-4		1	2				
	28-Jul	16:33	33.8	M2-5			2				
Reference Site #1	29-Jul	8:51	34.6	F1							
	29-Jul	8:51	34.6	M1-1							
	29-Jul	8:51	34.6	M1-2		3					
	29-Jul	8:51	34.6	M1-3			2				
	29-Jul	8:51	34.6	M1-4		2					
	29-Jul	8:51	34.6	M1-5							
Reference Site #2	29-Jul	8:51	34.6	F2	2						
	29-Jul	8:51	34.6	M2-1							
	29-Jul	8:51	34.6	M2-2							
	29-Jul	8:51	34.6	M2-3							
	29-Jul	8:51	34.6	M2-4			2				
	29-Jul	8:51	34.6	M2-5	2		2				
Reference Site #1	8-Sep	7:15	38.4	F1							
	8-Sep	7:15	38.4	M1-1							1

	8-Sep	7:15	38.4	M1-2		1					
	8-Sep	7:15	38.4	M1-3							1
	8-Sep	7:15	38.4	M1-4							
	8-Sep	7:15	38.4	M1-5							
Reference Site #2	8-Sep	7:15	38.4	F2							
	8-Sep	7:15	38.4	M2-1							1
	8-Sep	7:15	38.4	M2-2							
	8-Sep	7:15	38.4	M2-3							3
	8-Sep	7:15	38.4	M2-4			2				13
	8-Sep	7:15	38.4	M2-5							9
Reference Site #1	8-Sep	19:39	38.5	F1	12	3	1				2
	8-Sep	19:39	38.5	M1-1							
	8-Sep	19:39	38.5	M1-2			6				
	8-Sep	19:39	38.5	M1-3			16				
	8-Sep	19:39	38.5	M1-4							
	8-Sep	19:39	38.5	M1-5			13				
Reference Site #2	8-Sep	19:39	38.5	F2	42	1					1
	8-Sep	19:39	38.5	M2-1							1
	8-Sep	19:39	38.5	M2-2							1
	8-Sep	19:39	38.5	M2-3			4				1
	8-Sep	19:39	38.5	M2-4	4						
	8-Sep	19:39	38.5	M2-5	2	1					
Reference Site #1	9-Sep	8:02	38.7	F1	9		1				4
	9-Sep	8:02	38.7	M1-1							
	9-Sep	8:02	38.7	M1-2		3	22				
	9-Sep	8:02	38.7	M1-3			1				
	9-Sep	8:02	38.7	M1-4			1				
	9-Sep	8:02	38.7	M1-5			3				
Reference Site #2	9-Sep	8:02	38.7	F2	9	2					1
	9-Sep	8:02	38.7	M2-1							1
	9-Sep	8:02	38.7	M2-2							1
	9-Sep	8:02	38.7	M2-3			41				
	9-Sep	8:02	38.7	M2-4			2				3
	9-Sep	8:02	38.7	M2-5			2				3