

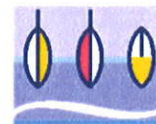


The basis of the above traffic generation rates is not clear. We have reviewed the survey data that is quoted. The Pittwater boat usage data was collected for Sunday 15/1/78, Saturday 21/1/78 and Monday 30/1/78, the Australia Day public holiday. As such, they are peak usage days. The overall boat usage rate of 30% is for marina berths only. Swing moorings were not separately assessed. Car usage was not surveyed. This information was presented in a Marina Development Seminar in 1985. The survey of the Middle Harbour Yacht Club in 1990 (by Stapleton & Hallam – Chris Hallam) covered the usage of racing yachts only, since the objective of the commission was to recommend additional parking for the extension of a hardstand area used for storing racing yachts. As such, the data was only relevant for such a use, where racing yachts, whether on hardstands, wet berths or moorings, were very highly utilised on race days. This survey did not cover recreational boating, or other uses at Middle Harbour.

As a check, if there were 100 boats in a marina, with 30% used on a peak day, and say 1.5 cars per boat, there would be 0.9 car movements per berth per day. For 100 boats on swing moorings, if 30% were used on a peak day, and say 1.0 car per boat, there would be 0.6 car movements per mooring per day. The rates of 2.7 and 1.4 cannot be substantiated. Even the relativities are wrong, if the assumption is that boats on moorings only attract one third the number of cars parked compared with boats in berths.

The key issue is that where there is no actual survey data available, surveys should be undertaken of other similar marinas. Data collected on boat usage over three days some 30 years ago, and on racing yacht usage at Middle Harbour Yacht Club some 16 years ago, does not provide adequate data for assessing the impact of replacing swing moorings with marina berths. The surveys undertaken in 2000/2001 and 2006 of marinas in the Sydney region is vastly more comprehensive.

Marinas are like any land uses. There are expectations about user behaviour. Compared to the actual survey data, the most obvious miscomprehension is that boats on marina berths are used more than boats on swing moorings, because the berths makes them more accessible. This is simply not true, as is further discussed in detail. People use their boats for a number of reasons, including the time of year, the weather on the day and the owner's time availability on the day. When boats are in a marina berth, the owner and friends walk along the wharf to their berth and get on. When boats are on a swing mooring serviced by a commercial marina, the owner and friends walk along the wharf and transfer into a tender, to be taken out to their boat. On return, they ring up the marina and request tender pick up. Note that the discussion in this Section only deals with swing moorings that are attached to commercial marinas. It does not deal in any way with "private" moorings. Based on the extensive surveys and analysis discussed in the following Section, we are strongly of the opinion that the convenience factor of berths compared to moorings is a minor factor in the decision of the boat owner to use their boat on a particular day.



2.2 Boat Usage Surveys

In December 2000/January 2001, we undertook surveys of Dolans Bay Marina on 12 weekend days. Tables 2.1 and 2.2 set out the results:

**TABLE 2.1 Dolans Bay Marina: Surveys of Swing Mooring Usage
(22 moorings in use)**

Day/Time	Total Boats	Boats@Time	Total Cars	Cars@Time
Sat 2/12/00	4	4	5	5
Sun 3/12	6	5	6	5
Sat 9/12	7	6	7	6
Sun 10/12	10	7	10	7
Sat 16/12	7	6	7	6
Sun 17/12	6	5	6	5
Sat 23/12	3	3	3	3
Sun 24/12	5	4	4	3
Sat 30/12	5	3	5	3
Sun 31/12/00	5	3	5	3
Sat 6/1/01	3	3	4	4
Sun 7/1/01	3	3	2	2

Weekends (12)	0.242 boats used/mooring (22)
	0.197 boats used at one time/mooring
	0.242 cars parked/mooring (22)
	0.197 cars parked at one time/mooring (22)
	<u>Average cars/boat used = 1.00</u>
	<u>Average group size = 2.08</u>

Table 2.1 indicates that over a weekend day, 0.242 boats/mooring were in use, based on the 22 moorings currently leased. However when the hourly pattern of use is considered, with some boats back before others go out, the usage rate at any point in time was 0.197 boats used/mooring.



**TABLE 2.2 Dolans Bay Marina: Survey of Marina Berth Usage
(24 berths in use)**

Day/Date	Total Boats	Boats@Time	Total Cars	Cars@Time
Sat 2/12/00	3	3	3	3
Sun 3/12	5	5	5	5
Sat 9/12	7	5	7	5
Sun 10/12	8	6	8	6
Sat 16/12	6	5	6	5
Sun 17/12	9	4	9	4
Sat 23/12	5	2	6	2
Sun 24/12	6	5	6	5
Sat 30/12	7	6	9	8
Sun 31/12/00	5	4	5	4
Sat 6/1/01	4	4	4	4
Sun 7/1/01	3	3	3	3

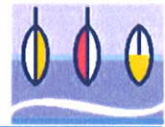
Weekends 0.236 boats used/mooring
 0.181 boats used at any one time/mooring
 0.246 cars parked/mooring
 0.188 cars parked at any one time/mooring

Average cars/boat used = 1.04
Average group size = 1.66

Comparing Tables 2.1 and 2.2, the boats on the swing moorings are used slightly more than the boats in the marina berths. The peak parking demand of the swing moorings was 0.197 cars/mooring, compared with 0.188 cars/marina berth. What this means is that boats in marina berths are not used more than boats on swing moorings, despite the greater convenience of the berths.

The smaller average group size for marina boats, and the slightly lower number of cars parked per marina boat is not explained by the relative boat lengths. In theory, a longer boat could take extra persons. However on the 22 moorings surveyed, the boat length ranged from 16 foot to 40 foot, with an average of 26 foot, while for the marina berths the range at the time of the survey was 18 foot to 40 foot, with an average of 30 foot.

We undertook surveys of Double Bay Marina at Easter 2006 and in early December 2006. Surveys at Rose Bay and Point Piper Marinas were initially undertaken over the two month period 1st July to 3rd September 2006. A parallel survey was undertaken at the Royal Motor Yacht Club, over the period 26th June to 27th August 2006. Further surveys at Rose Bay and Point Piper Marinas were subsequently undertaken over the Spring period 4th September to 19th October 2006, and then from 20th October to 13th December 2006. Double Bay, Rose Bay and Point Piper Marinas are all proposing alterations to provide additional wet berths. The data collected at these marinas is relevant to all marinas. With the substantially greater data base for the Rose Bay/Point Piper Marinas, these surveys are first discussed.



Over the Winter survey period, at Rose Bay and Point Piper Marinas, there was full occupancy in the berths, with 29 boats at Rose Bay and 23 boats at Point Piper. There were vacancies in the swing moorings. All of the following analysis is based on the actual berths/moorings occupied. A lower rate of boat usage would be calculated if the total mooring capacity was used.

We have combined both marinas in the analysis, since they are side by side and part of the same proposal. Improved accuracy follows from a larger sample size. The results for boat usage were:

**TABLE 2.3 ROSE BAY AND POINT PIPER MARINAS
BOAT USAGE PER DAY**

WINTER 2006			SPRING-SUMMER 2006		
Day	Moorings	Berths	Day	Moorings	Berths
Week days (45)	0.026 boats/mooring/day	0.011 boats/berth/day	Week Days (75)	0.039 boats/mooring/day	0.005 boats/berth/day
Week-end days(20)	0.068 boats/mooring/day	0.055 boats/berth/day	Week-end days (28)	0.072 boats/mooring/day	0.036 boats/berth/day

Table 2.3 shows the patterns found in previous surveys at these and other marinas, of a higher usage of boats on swing moorings than in berths. Weekend usage was of course higher than weekday usage. On weekdays, the usage rate of boats on moorings was over twice that of boats in berths. The relativities are also of interest. If the data for Winter and Spring-Summer is averaged, on moorings, the weekday boat usage rate is 49% of the weekend usage rate. For berths, the ratio is 17% on weekdays compared to weekend use.

Looking at the Weekend days, the Spring survey found an increased use of boats on moorings, compared with the Winter survey. The Spring figures for boats in berths showed a reduced usage.

At the Royal Motor Yacht Club there are 90 berths and 18 swing moorings. As with the other marinas, there is a low level of usage on weekdays. Over the 18 weekend days surveyed, the overall usage rate for all 108 of their berths and moorings was:

* RMYC Saturday & Sunday (18 days) 0.045 boats/berth/day used

Looking at the influence of the cars parked, Table 2.4 sets out the results over the three marinas, for all days surveyed, both weekday and weekend, for Winter 2006. This data is relevant to the question of the number of cars per berth type, with a reflection on group size.



TABLE 2.4 ROSE BAY, POINT PIPER AND RMYC MARINAS – WINTER 2006

Marina	Avg Group Size	Avg Cars/Berth or Mooring	Avg Cars/Person	Days Surveyed
RMYC Berth	3.79	1.08	0.32	114
RB/PP Berth	4.01	1.22	0.34	77
RB/PP Mooring	2.56	1.04	0.55	242

Table 2.4 indicates that the average group size – the number of people on each boat used - is lower for boats on swing moorings compared to boats in berths. The influence of boat length is further discussed in Section 2.3. However the cars used per person reduces with increases in group size. This can be explained simply. An average group size of 2.56 would include many groups of two, arriving in one car. As group size increases, there is a trend towards car sharing, or perhaps family groups arriving in the one car. Looking at the figures for Rose Bay and Point Piper, while the average group size for moorings is substantially lower than that for berths, with berths having a lower rate of cars per person, the difference between the cars/mooring used and cars/berth used is reduced. Note that the average cars/person has been calculated as the average over all boats in the survey, from the original survey data and does not necessarily give the same answer if working across the Table. The difference is not an issue because the figures for average cars/person are given as illustrations of patterns. The figures that are ultimately used in the analysis are the cars per berth/mooring, combined with the usage rates for each.

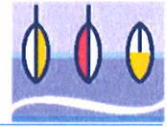
Table 2.5 presents equivalent information for the Spring-Summer 2006 survey.

**TABLE 2.5 ROSE BAY AND POINT PIPER MARINAS
SPRING-SUMMER 2006 (8/9/06 – 15/12/06)**

Type	Avg Group Size	Avg Cars/Berth or Mooring	Avg Cars/Person	Days Surveyed
Berth	4.51	1.41	0.31	103
Mooring	2.61	0.94	0.36	103

Table 2.5 shows similar trends to Table 2.4, with the average group size for the users of boats on berths being higher than the users of boats on moorings, but with this difference not fully reflected in the cars per berth or mooring because car usage decreases with increasing group size.

Putting these rates together, the parking demands for the critical weekend days are:



**TABLE 2.6 PARKING DEMAND PER MOORING/BERTH – WINTER 2006
POINT PIPER & ROSE BAY: SATURDAYS AND SUNDAYS**

Marina	Berth/Mooring	Boat Usage/Day	Cars/Boat Used	Cars/Mooring or Berth
Pt Piper + Rose Bay	Mooring	0.0679	1.04	0.071
Pt Piper + Rose Bay	Berth	0.0548	1.22	0.067
RMYC	Berth	0.0448	1.08	0.048

Table 2.6 indicates that while berths have a higher number of cars per group using berthed boats, when the boat usage is taken into account, the effect is that moored boats have a higher parking demand than berthed boats. The parking demand rates for the RMYC berths were lower again. The Spring-Summer 2006 figures show similar car parking demands per berth if the Table 2.6 berth figures are averaged. Just for Pt Piper + Rose Bay, the parking demand per berth is lower because of lower boat usage. The figures for moorings are similar.

**TABLE 2.7 PARKING DEMAND PER MOORING/BERTH
SPRING-SUMMER 2006: POINT PIPER & ROSE BAY
SATURDAYS AND SUNDAYS**

Berth/Mooring	Boat Usage/Day	Cars/Boat Used	Cars/Mooring or Berth
Mooring	0.0720	0.959	0.069
Berth	0.0364	1.472	0.054

Peak Period Surveys at Rose Bay and Point Piper Marinas

The surveys at Point Piper and Rose Bay Marinas have been on-going, with currently available data extending to 31 January 2007. In December 2006 there were 12 days that were either weekends or public holidays. In January 2007 there were 10 days that were either weekends or public holidays. These days are typically considered to be the peak times of the year of boat usage. Table 2.8 gives the equivalent data to Tables 2.6 and 2.7, for the weekend days and public holidays in December 2006 and January 2007. Note that there is some overlap of days with Table 2.7.