NSW GOVERNMENT | Maritime

NSW BOAT OWNERSHIP AND STORAGE: GROWTH FORECASTS TO 2026

JULY 2010

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1. Executive Summary

In 2009, partially in response to requests for data from industry, NSW Maritime undertook a study to project boat ownership and storage in this State to 2026. Apart from providing data to boating peak bodies, the intention was also to develop reliable projections to inform planning discussions at all levels of government.

Recreational boating – on which this report focuses – is an important leisure activity for the people of NSW. In July 2009 New South Wales had over 215,000 recreational vessels registered across 7 regions with another 7483 registered to interstate and overseas owners. Busy waterways host a huge variety of vessels from yachts to pleasure cruisers, recreational fishing boats, sailing skiffs, kayaks and dinghies. The first part of the report looks at the patterns of growth in recreational vessels over the period 1999 to 2009, regional differences in that growth, trends in the size of vessels registered and the different needs for storage. It also examines storage capacity and demand both on-water (for vessels over 6m) and off-water (for smaller 'trailerable' vessels).

The report acknowledges that there are a number of factors that may impact on the growth of boat numbers in NSW, with the potential extent of their impact largely unknown. These include economic growth (especially in regions), movements in population (particularly to the coast), age distribution and tourism. In addition the report mentions the effects of sea level rise associated with climate change from the point of view of the increase in extreme sea level events such as storm surges.

The report uses two methods to forecast growth. The first is linear projection and estimates the number of recreational boats each year up to 2026 based on the average compounded annual growth rate (2.9%) experienced across the State in the period 1999–2009. This projection method estimates that in 2026 the number of registered boats in NSW will have grown to 351,113. The second method is based on the proportion of the population who are boat owners and population forecasts to 2026 from the Australian Bureau of Statistics (ABS). Using that method, it is estimated there will be 334,470 recreational boats registered in NSW in 2026.

Either way, we face a significant boat storage challenge, and there is room for optimism in the boat storage sector of industry.

Further analysis estimates the numbers of large and small boats, region by region, to 2026. This will allow for a better understanding of regional demand for on-water or off-water storage and allow planning for upgrading of recreational boating facilities such as boat ramps. Finally, the report discusses the implications of this assessment of increases in boat numbers and storage demand on NSW Maritime strategic planning including potential reexamination of policies relating to moorings and marinas and the funding of recreational boating infrastructure across NSW.

1. National Marine Safety Committee (2003), National standard for the Australian builders plate for recreational boats. Final regulatory impact statement, NMSC, Sydney.
2. Follow-up study of hospital treated recreational boating injury – the long term effects of industry. Marine Safety Victoria May 2008.

2. Introduction

NSW Maritime has undertaken this report to provide information to stakeholders about trends and patterns in boat ownership and storage. The report has been long sought by industry for its own information and to assist future land use planning and decision making. Given up-to-date information, land use studies can take account of growing community demand for boats and boat storage in their considerations. This will assist in providing recognition for the important part recreational and commercial boating plays in the life of the State. The purpose of this report is in part to remedy the lack of readily available data, to show what information is available, and where and what it suggests. The report aims to quantify accurately the number and types of vessels currently owned and stored in the State and to provide an insight into indicative future needs in boat ownership and storage demand based on past trends. This will facilitate more informed decision making by government at all levels and assist the private sector – both developers and the boating industry.

The report provides a clear picture of the types and quantity of vessels owned and stored in NSW and uses this data to suggest trends in boat storage demand. The report supersedes the *2004 Boat Storage Policy for Sydney Harbour* and identifies future trends in ownership and the demands on storage capacity in NSW up to 2026.[1] The report does not attempt to dictate when, where or what storage infrastructure is required, what planning controls are needed or the strategy necessary to accommodate growth. It is a source of data to provide an informed basis for this planning.

For convenience, the report assesses boat storage and ownership across all of New South Wales using NSW Maritime's regional administrative areas (which largely reflect groupings of local council areas) shown on the following map[2]:

- North Coast
- Hunter Inland
- Hawkesbury/Broken Bay (including Pittwater)
- Sydney (divided into Sydney Harbour and Botany Bay/Port Hacking
- South Coast
- Murray Inland (identified as Murray Inland).

The data can, of course, be readily organised by other geographic areas to suit industry or Government needs.

Figure 1: Map showing NSW Maritime Regions

1 June 2004, *Boat Storage Policy for Sydney Harbour*, prepared by NSW Department of Infrastructure, Planning and Natural Resources and the Waterways Authority (now NSW Maritime).

2 In addition to regional analysis, the Boat Ownership and Storage Report also looks at ownership on a postcode basis for all of NSW.

Data

NSW Maritime's licensing and registration system holds a wide variety of current and historical data for the agency's central business functions including vessel registrations and private and commercial mooring licences. The report examined data on registrations between 1 July 1999 and 1 July 2009 allowing a sufficiently large sample to identify trends. In addition, because the storage needs of vessels change as vessels get larger, growth in vessel size has been examined to inform an understanding of developing storage needs. Likewise, the type of propulsion also affects a boat's storage profile; so the changing balance in ownership between powered and sail propelled vessels is also considered.

NSW Maritime does not require registered owners to indicate where a vessel is actually stored. Boat owners indicate their *intended* storage method when the vessel is first registered but there is no legal requirement to update this information as things change. In this respect therefore, the data should be treated with caution, as an indication only of an owner's storage intentions. The database also contains details of some (but not all) vessels used in NSW but registered in another jurisdiction.

Storage types differ in terms of their efficiency of waterway use, cost, environmental impacts and size and the examination of storage distribution shows differing levels of capacity and demand between the NSW Maritime regions. Forecasting regional storage needs is also related to population and socio/economic factors by region; these factors are used to forecast expected trends in vessel numbers by region.

Geographical references are on a NSW, regional and postcode basis.[3] Vessels registered with NSW Maritime include the postal address and postcode of the boat's owner. Because postcode boundaries change, postcodes for historical data relate to the boundaries of the code at the point of registration, not the current code for that area. In comparisons of recent and historical boat ownership, postcodes have been reconciled to place the location of the vessels in the postcode in place at the time of the most recent data sample.[4]

3 The Australian Bureau of Statistics (ABS) Census records Postal Areas not Postal Codes. A Postal Area is used where a Collection District (the smallest sample of Census data collection) is bisected by a Postal Code boundary.

4 Where this reconciliation has not been possible (such as an address in another jurisdiction or a Post Office Box address) the data has been excluded from the examination and clearly noted or included under the regional category of 'NSW Other'.

3. Boat ownership in NSW

Legislation administered by NSW Maritime requires that the following vessels must be registered when they are on navigable waters in NSW:

- commercial vessels
- power-driven vessels that are powered by an engine with a power rating of 4.0 kilowatts or more (greater than 5hp)
- power-driven or sailing vessels 5.5 metres or longer
- vessels subject to a mooring licence
- personal watercraft.[5]

At 1 July 2009 there were around 229,000 registered vessels, including over 223,000 recreational craft (97%) and 5,510 that are commercially registered (used for hire and reward).[6] There are also a large number of unregistered vessels, such as dinghies and similar small boats. This report is only concerned with registered vessels.

The types of boats operated in NSW waterways vary in size and complexity from small 'tinnies' to commercial charter vessels, sailing race boats and private super yachts. NSW Maritime collects data on vessel size, method of propulsion, material composition and intended usage. Most important to this report is vessel length, means of propulsion (powered craft or sailing vessel) and proximity to the water.

The number of boats registered in NSW has grown on average around 2.8% annually in the last decade, expanding more rapidly than the State's population and across every major vessel category. The table below gives a picture of boat ownership in NSW at 1 July 2009 with data broken down by region and into aggregated size categories. The table also shows the split between boats smaller and larger than 6m (considered the divide between on-water and off-water storage)[7]:

Figure 2: Recreational and commercial vessels registered in NSW 1 July 2009[8]

Region	Under 4m	4 to 6m	6 to 8m	8 to 10m	10 to 12m	12 to 14m	14m & Over	Total
Botany Bay/ Port Hacking	6 440	13 661	2 518	735	545	264	219	24 382
Hawkesbury/ Broken Bay	10 352	25 198	5 002	1 844	1 313	618	406	44 733
Interstate/ Overseas	2 116	4 040	630	234	192	231	345	7 788
Murray Inland	7 148	6 846	643	47	32	48	109	14 873
Hunter Inland	16 353	30 709	4 054	1 267	777	342	203	53 705
North Coast	12 650	15 959	1 605	394	349	196	176	31 329
NSW Other	89	172	33	11	11	4	6	326
South Coast	9 502	19 604	2 303	414	301	130	125	32 379
Sydney Harbour	3 534	7 459	3 142	2 019	1 467	704	803	19 128
NSW Total	68 184	123 648	19 930	6 965	4 987	2 537	2 392	228 643
% of NSW Total	30%	54%	9%	3%	2%	1%	1%	

5 Exemptions from this requirement include:
- off-the beach vessels unless subject to a mooring licence or similar authority (including marina wet berths and wetland lease);
- passive craft;
- seaplanes;
- vessels in charge of a trader being used for a specified commercial purpose of the vessel or of a trade article and displaying a trade plate; and
- visiting vessels in prescribed circumstances

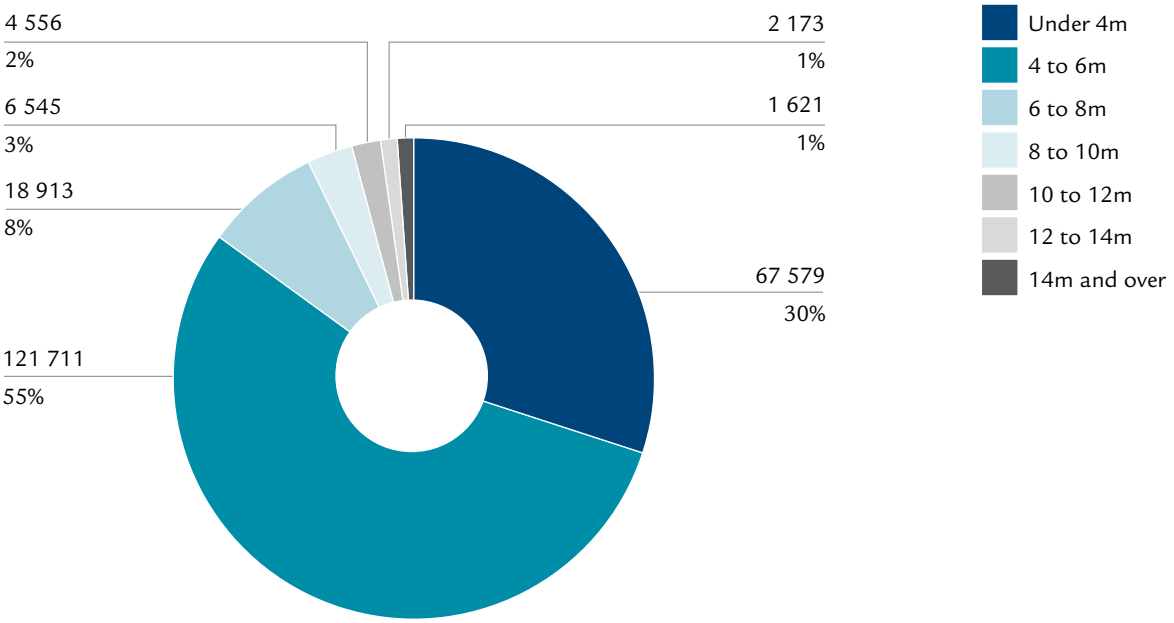
6 Figures for 1 July 2009 are the latest available. In 2010, NSW Maritime's registration and licensing database will be decommissioned and replaced by the Government Licensing System run by the Department of Services, Technology and Administration so more current data will not be available until 2011.

7 The regions depicted in the table below are based on the NSW Maritime regional administrative areas and represent the area in to which the address of the boats registered owner falls.

8 Tables showing regional breakdowns of recreational and commercial vessels are at Appendix A.

Another way of representing this data is in the following pie chart:

Figure 3: Registered vessels in each size category at 1 July 2009



As indicated in Figure 2, the regions Hawkesbury/Broken Bay and Hunter Inland have the largest number of boats. It is important to consider, however, that Sydney Harbour and Botany Bay/Port Hacking (when joined to become the Sydney region) represent a more compact area with a more densely concentrated boat owning community. Moreover, the Sydney Harbour region has a far greater proportion of large vessels than other regions. In addition, as outlined at Figure 4, while Sydney Harbour has only 8% (18,011) of the State's recreational vessels, it has 20% of its commercial boats.

Figure 4: Distribution of recreational and commercial vessels by region

Region	% of Total Recreational	% of Total Commercial
Botany Bay/Port Hacking	11%	7%
Hawkesbury/Broken Bay	20%	14%
Interstate/Overseas	3%	6%
Murray Inland	7%	3%
Hunter Inland	24%	15%
North Coast	13%	23%
NSW Other	0%	1%
South Coast	14%	12%
Sydney Harbour	8%	20%
NSW Total	223 098	5 510
% of NSW Total	97.6%	2.4%

Because of the small number of commercial vessels and their erratic growth rate in recent years, this report concentrates in its treatment on recreational boats only.

4. Types of boat storage

On-water

Private moorings

A mooring is a fixed point in the water to which a vessel can be tied when not in use. Swing moorings usually consist of a submerged concrete block, chain and buoy, but could be any fixed point in the water. A moored vessel is usually free to move around the fixed point and a mooring does not provide land or walkway access to the craft. NSW Maritime issues Private Mooring Licences (PML) which permits licensees to moor their vessels on navigable waters. Although a PML is renewable annually, it is not a lease of the seabed and there is no guarantee of tenure. There are around 15,800 private moorings in NSW. Waiting lists exist for private moorings in some locations while spare capacity is available in others

Figure 5: Bridle and beehive mooring

Commercial moorings

NSW Maritime also issues Commercial Mooring Licenses (CML) which are similar to PMLs but are issued to business entities trading to provide services to the boating public. CMLS are issued to bona fide marine businesses (for example, a boat repair facility). One licence may comprise a number of mooring sites. There are around 4,900 commercial mooring sites in NSW. Vessels on moorings are normally restricted to those greater than 5.2m in length (i.e. non-trailerable) and smaller vessels which must be stored in the water (e.g. timber vessels).

Club moorings

There are hundreds of moorings associated with boating and sailing clubs in NSW.

Commercial marinas

A marina is a boat storage facility consisting of jetties, pontoons, slipways, boatlifts and boat pens allowing walkway access to berthed vessels. Marinas are sometimes commercial operations although many are private marinas and those associated with boat clubs. A marina will often provide related services such as fuelling and pump out facilities.

Commercial marinas are defined in the Sydney Harbour Regional Environmental Plan (2005) as a permanent boat storage facility (whether located wholly on land, wholly on water or partly on land and partly on water) including:

(a) any facility for the construction, repair, maintenance, storage, sale or hire of boats

(b) any facility for providing fuelling, sewage pump-out or other services for boats

(c) any facility for launching or landing boats, such as slipways or hoists

(d) any associated car parking, commercial, tourist or recreational or club facility that is ancillary to a boat storage facility

(e) any associated single mooring.

Figure 6: Marina

Private marinas

A private marina is an apparatus or structure located on or in the waterway, used for restraining two or more vessels, which is not available for public use. Like their commercial counterparts, private marinas consist of jetties, pontoons and boat pens allowing walkway access to berthed vessels, but they do not normally have maritime support services attached to them. They are often associated with strata-titled private residences and are for their exclusive use.

Domestic waterfront tenancies

Private boating facilities sometimes front residential waterfront properties. They provide infrastructure such as jetties, ramps, pontoons, slipways, steps, landing platforms and boatsheds for the use of the property to which they are attached. Private facilities can include mooring pens which are an arrangement of freestanding piles or other devices within which a vessel is berthed.

Other facilities

For the purpose of this report other facilities include:

- Sailing clubs
- Temporary marinas
- Charter vessel facilities
- Government facilities such as NSW Police Marine Area Command stations.

Off-water

Commercial dry stack storage

With dry stack storage, boats are removed from the water (usually using forklift trucks) and stored in multilevel covered stacks. There are advantages to having boats stored out of water:

- Less fouling of waterways
- Reduced risk of damage
- Opportunities for vessel cleaning, refueling and maintenance.

Not all vessels – because of their size and shape – are suitable for commercial dry stack storage. There is one commercial dry stack facility in NSW at Akuna Bay on the Hawkesbury River/Broken Bay waterway. It has 175 storage berths. There is also planning approval for 600 dry storage berths at Rozelle on Sydney Harbour.

Figure 7: dry stack storage facility

Trailer storage

In July 2009, there were over 195,000 boat trailers registered with the Roads and Traffic Authority of NSW (RTA) making this the most popular method of vessel storage. At the waterside a vessel is transferred to and from the water using a boat ramp or similar facility (there are around 625 boat ramps in NSW). Because around 84% (191,832) of registered vessels were 6 metres or less in length, craft of this size are generally stored on trailers and transported to the waterway for launching.

Trailer storage is generally the least expensive storage option. Trailers, being dry storage, also avoid various fouling and corrosion problems connected with prolonged on-water storage. Some marine clubs offer 'hard stand' storage for members' boats: vessels are removed from the water and on to trailers which are permanently stored in parking lots near the water. Trailer storage has some disadvantages, however, including the need to transfer the vessel to the water and to load and unload it. Traffic and parking near boat ramps can inconvenience both boat owners and local residents. Another constraint is the limits the RTA imposes on trailer width: vehicles wider than 2.5 meters must apply for a special oversize permit to travel on NSW roads.[9] In addition, oversize permits are usually accompanied by travel restrictions.

Use of trailer storage is influenced by factors such as vessel size and style: sailing boats, for instance, which have keels and masts, are cumbersome to manage on trailers. The development of retractable keels and removable masts has facilitated trailer storage but adds to the work required each time the vessel is used.

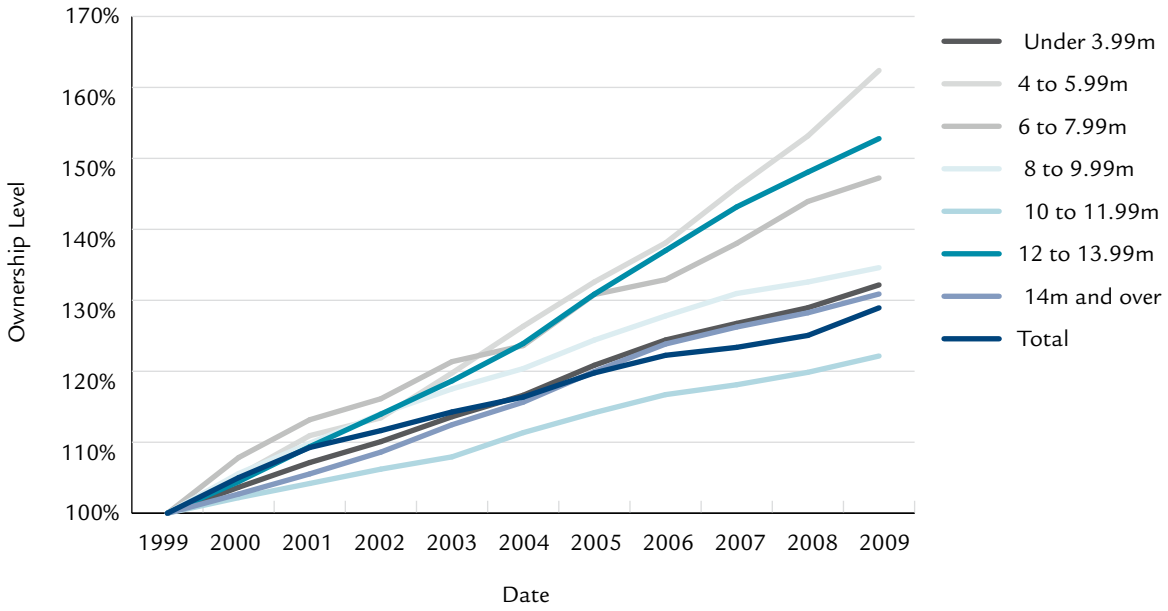
Likewise, there is a limit to the size of vessels which can be stored and transported on trailers. Beyond 5–7 metres, the costs of trailer storage increase rapidly along with technical complexity and cost of the vehicle and trailer required for transport. For the purpose of this report, 6 metres has been adopted as the maximum 'trailerable' limit for a vessel and assumes that vessels up to 6 metres in length are overwhelmingly stored on trailers and those of 6 metres and above require on-water storage, or off-water storage close to the waterway. Importantly, NSW Maritime data shows vessels less than 6 metres in length accounted for 84% (191,832) of registered boats at 1 July 2009.

9 See Vehicle Dimension Limits, 19 May 2010 at http://whome.rta.nsw.gov.au/registration/downloads/vsi/vsi_5_-_vehicle_dimension_limits_19_may_2010.pdf

5. Changes in boat ownership

Between 1 July 1999 and 1 July 2009, 55,645 more boats were registered in NSW. There have also been changes in the proportion of boats at different sizes.

Figure 8: Growth in boat sizes 1999–2009



Most significant growth appears to have occurred in small to medium size vessels.[10] In addition, the number of vessels in the 14m and over category has also seen a large relative increase over the past decade (although total numbers are small) with a 63% increase from 1,473 to 2,392.

10 See table at Appendix B.

6. The 6 metre mark

The principal factor in forecasting boat storage demand is the relationship between 'trailerable' and 'non-trailerable' vessel numbers. This is because, as we have seen, boats longer than 6m require on-water storage and an increase in numbers requires more water-based storage infrastructure. On the other hand, an increase in smaller boats requires access to other forms of boating infrastructure such as boat ramps and trailer parks.

Since 1999 there has been a trend towards registration of boats in the over 6m group: the proportion of the fleet over 6m has grown from 14.8% in 1999 (25,647 boats) to 16.1% in 2009 (or 36,811). This represents an additional 11,164 vessels in 10 years. However, this increase should be set against an increase in total boat numbers of 55,109 and a growth in boats less than 6m of 43,992. The growth in boats less than 6m has been at a ratio of 4:1 when compared with the 6m and over category. The table below shows the comparative growth in smaller and larger vessels, of all usage types, between 1999 and 2009 split regionally and shown with the related annual growth figure.

Figure 9: Distribution and growth in vessel size 1999–2009

	1/07/1999		1/07/2009		Average Annual Growth	
Region	6m and over	6m and under	6m and over	6m and under	6m and over	6m and under
Botany Bay/Port Hacking	3 202	17 865	4 281	20 101	2.9%	1.2%
Hawkesbury/Broken Bay	6 661	30 308	9 183	35 550	3.3%	1.6%
Murray Inland	318	9 957	879	13 994	10.7%	3.5%
Hunter Inland	4 070	34 468	6 643	47 062	5.0%	3.2%
North Coast	1 824	19 086	2 720	28 609	4.1%	4.1%
South Coast	1 859	20 386	3 273	29 106	5.8%	3.6%
Sydney Harbour	6 653	9 938	8 135	10 993	2.0%	1.0%
	25 647	147 351	36 811	191 832		

Every region except the North Coast has experienced higher than average growth in vessels over 6m. The statistics, however, mask growth in real terms. For example, Hunter Inland has experienced a growth of 2,573 vessels over 6m, an annual growth of 5.0% compared with average annual growth of 3.2% in vessels less than 6m long. However, this 3.2% average annual growth rate represents 12,594 – or nearly 5 times as many – boats over 10 years. Given that the provision of storage and the demand for infrastructure relate to actual numbers rather than proportions, it is important not to overstate the significance of a slight proportional shift towards larger vessels. Accordingly, analysis of change over the 10 year assessment period suggests a greater focus on smaller vessels.

Boats less than 6m are included in the appraisal of storage needs because, while they do not require a mooring or marina berth, smaller boats still require storage whether in a backyard, a driveway or often on a public road. They also require infrastructure such as boat ramps and trailer parking. Consequently, the increase in the number of <6m boats has a significant impact on overall boat storage. Stakeholder consultation indicated that some local government bodies were becoming concerned about the number of boats parked on local roads. In order to park legally, boat trailers need current vehicle registration in order to avoid action being taken against them.

7. Power vs. sail

As indicated previously, the type of propulsion used on a vessel affects its storage needs. Sail boats with fixed keels can be awkward to store on trailers and masts represent problems for dry stack storage. In addition, the fact that the majority of sail boats required to be registered are over 6m long, means it is reasonable to conclude that nearly all sailing vessels represented in NSW Maritime data require on-water storage.

The division between power and sail is therefore important when considering future trends in boat storage needs. Figure 10 below shows the increase in the numbers of power and sail boats registered in NSW between 1999 and 2009.[11]

Figure 10: Number of power and sail boats registered 1999 and 2009

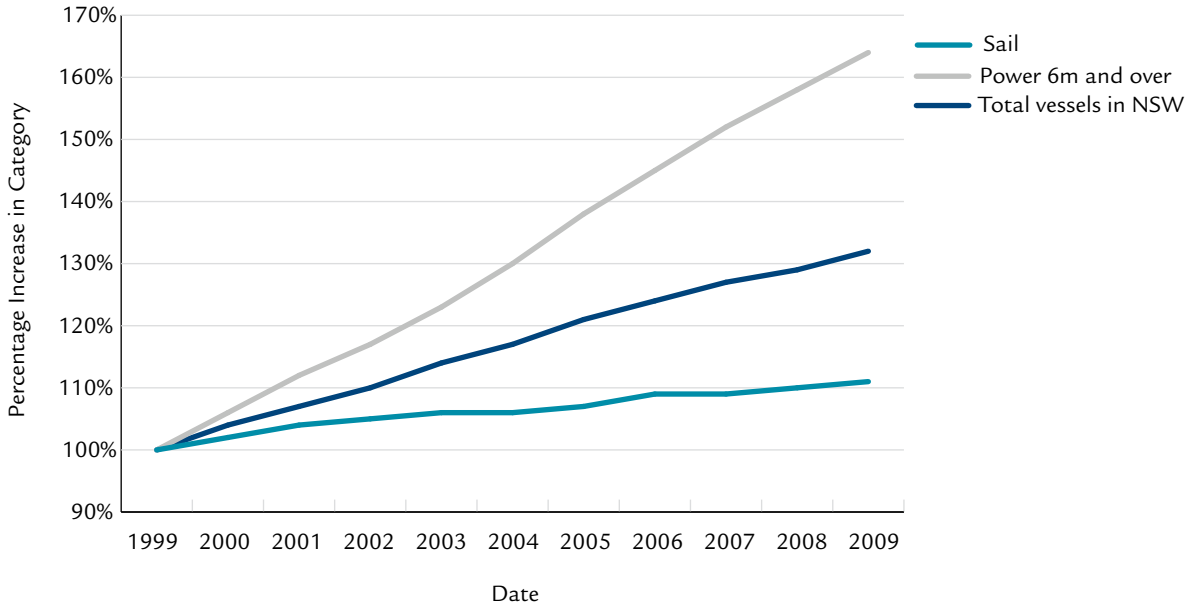
Propulsion Type	Mechanical		Sail	
Date	Under 6m	Over 6m	All	Total
1/07/1999	139 275	15 598	10 776	172 998
1/07/2009	183 326	25 566	11 917	228 643

There are considerably more mechanically powered boats than sail boats registered in NSW and there is a strong trend towards powered boats over time. Mechanically propelled boats of less than 6 metres in length dominate registrations at about 84% of total registered vessels. Because storing small powered boats in a marina berth or mooring would be very expensive, it is reasonable to assume that few of these <6 metre mechanically-propelled vessels are stored on-water.

Among boats over 6m, powered boats outnumber sail by a ratio that has risen from about 1.5:1 in 1999 to about 2.2:1 in 2009. This indicates the growing popularity of powered boating with the growth in powered boats outstripping the growth in recreational boats generally.[12]

The graph following (Figure 11) provides a clear indication of the trends in size and propulsion over time, showing the percentage growth of each category from 1 July 1999 plotted against the total growth in registered vessels over the same period:

Figure 11: Trends of growth between mechanically propelled boats over 6m and sailing vessels



Nevertheless, it is important to remember that sailing vessels and mechanically propelled vessels >6m represented only 16.4% of registered boats in NSW at 1 July 2009.

11 Mechanically propelled vessels have been divided into more or less than 6m with larger power boats, like sail, requiring on-water storage.
12 See table at Appendix C for more information.

8. Regional boat ownership

There are different patterns of boat ownership and storage across NSW and these require closer analysis for planning purposes.

Figure 12: Percentage growth in boat registrations by region 1999–2009

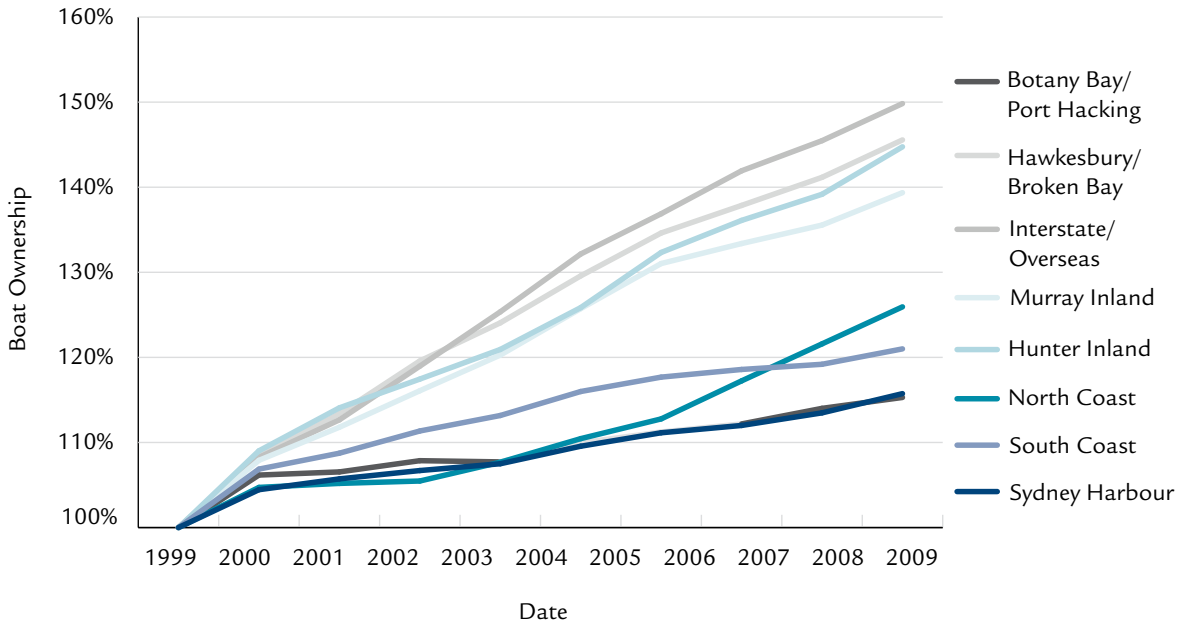


Figure 12 shows that the North Coast has experienced the most growth across all vessels while Sydney Harbour and Botany Bay/Port Hacking have had comparatively slow growth since 1999. However, this graph should be qualified in light of vessel numbers, with the 39.6% increase in the Hunter Inland representing 15,167 additional boats while a 44.7% increase in Murray Inland was made up of only 4598 boats.[13]

Regional Round Up

Figure 13: Growth rates across regions for recreational vessels 1999–2009

Region	1/07/1999	1/07/2009	Actual Change	% Change	Compound Annual Growth
Botany Bay/Port Hacking	20 734	23 977	3 243	15.6%	1.5%
Hawkesbury/Broken Bay	36 328	43 935	7 607	20.9%	1.9%
Interstate/Overseas	5 943	7 483	1 540	25.9%	2.3%
Murray Inland	10 156	14 711	4 555	44.8%	3.8%
Hunter Inland	37 729	52 889	15 160	40.2%	3.4%
North Coast	19 571	30 080	10 509	53.7%	4.4%
South Coast	21 598	31731	10 133	46.9%	3.9%
Sydney Harbour	15 798	18 011	2 213	14.0%	1.3%
Total	167 857	222 817	54 960	32.7%	2.9%

Substantial variations exist within and between NSW regions in terms of distribution and growth. Accordingly, demand must be forecast locally and any strategy for storage must pay attention to these regional differences.

13 For the analysis of individual regions the data for commercial vessels and ferries has been excluded – this step has been taken to normalise data across catchment areas because the regional distribution of commercial vessels is highly asymmetrical.

Botany Bay/Port Hacking[14]

NSW Maritime Region: Sydney/Botany Bay/Port Hacking

Botany Bay/Port Hacking forms part of the wider Sydney Region along with Sydney Harbour. Like Sydney Harbour, this Maritime Region has few boats relative to population with 29 vessels per 1,000 people over the age of 16 years (which is the minimum age that a person can register a boat).

However, there are 25 boats/km² – this compares with 51/km² in Sydney Harbour and just 0.05/km² in the Murray Inland. Botany Bay experienced relatively low growth of its recreational vessels at around 1.5% annually.

Figure 14: Statistics for Botany Bay/Port Hacking Region

Botany Bay/Port Hacking	1/07/1999	1/07/2009	Actual Change
Total Boats	20 734	23 977	3 243
% of NSW recreational total	12.3%	10.7%	–
Median boat length (metres)	4.55	4.62	0.07
Median owners' age (years)	48.5	49.8	1.37
Compound annual growth	–	–	1.5%
Rec boats/person aged 16+[15]	29/1000ppl	Rec Boats/km²	25/ km²
Date	**6m and under**	**6m and over**	**% > 6m**
1/07/1999	17 748	2 986	14.4%
1/07/2009	19 937	4 040	16.8%

14 The map of Sydney/Botany Bay/Port Hacking shows the full Sydney Region comprising Botany Bay/Port Hacking and Sydney Harbour regions used in this Report.

15 Population data taken from the ABS 2006 Census. For consistency, recreational boat numbers for this comparison (Recreational boats/Person) have been derived from the July 2006 fleet size statistics. 16 years of age is used because it is the minimum age at which an owner can register a boat.

Hawkesbury/Broken Bay

NSW Maritime Region: Hawkesbury/Broken Bay

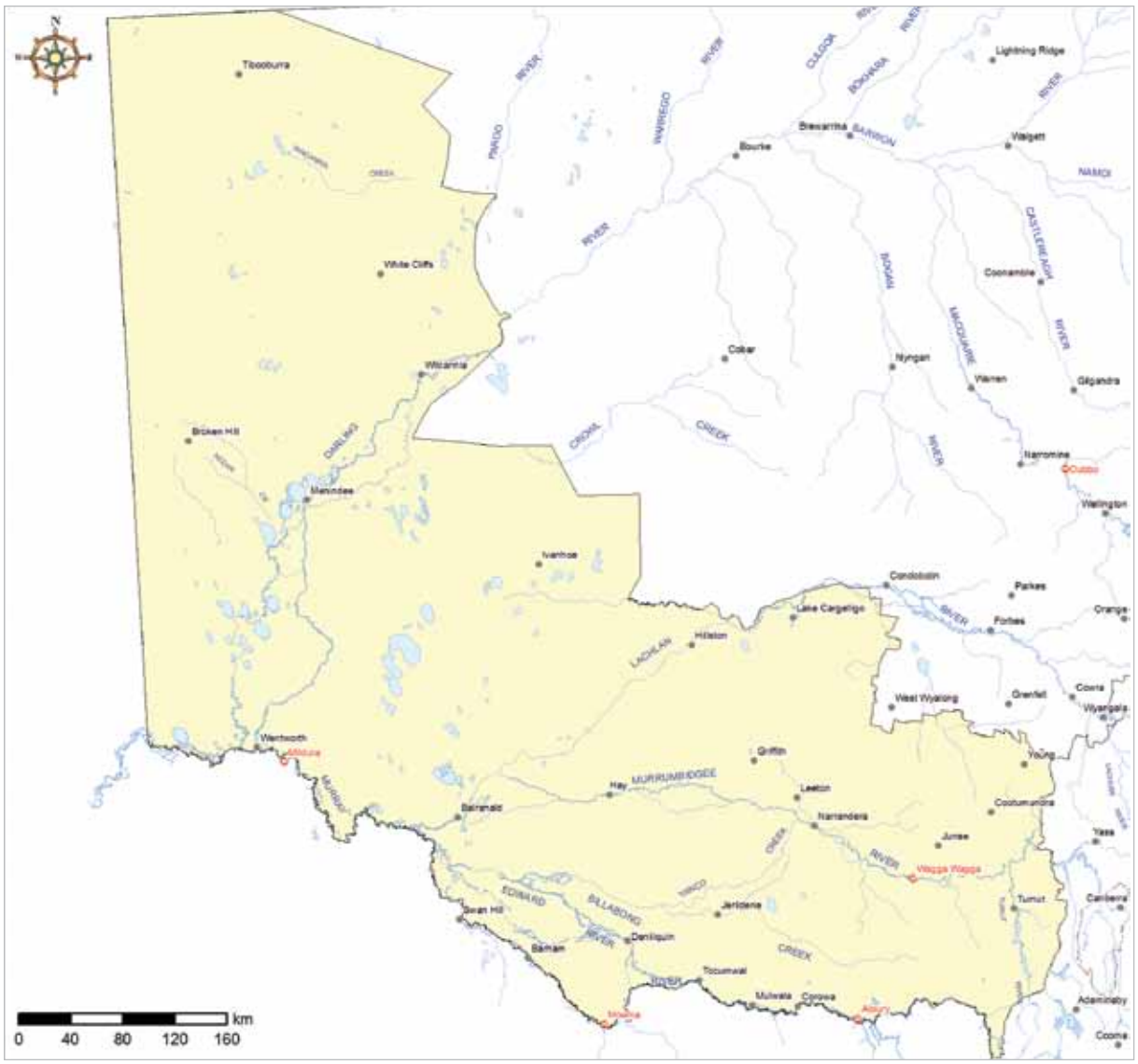
Hawkesbury/Broken Bay has the second largest number of boats among NSW regions and, while continuing to grow over the past 10 years, this region has held a declining proportion of the State's boats: from 21.6% in 1999 to 19.7% in 2009. Likewise, the Hawkesbury region has experienced relatively slow growth in recreational boating growing only 1.9% annually – while the growth rate for NSW as a whole has been 2.9%.

Figure 15: Statistics for Hawkesbury/Broken Bay Region

Hawkesbury/Broken Bay	1/07/1999	1/07/2009	Actual Change
Total Boats	36 328	43 935	7 607
% of NSW recreational total	21.6%	19.7%	–
Median boat length (metres)	4.60	4.72	0.12
Median owners' age (years)	48.6	50.4	1.85
Compound Annual Growth	–	–	1.9%
Rec boats/person aged 16+	35/1000ppl	Rec boats/km²	6.29/ km²
Date	**6m and under**	**6m and over**	**% > 6m**
1/07/1999	30 107	6 221	17.1%
1/07/2009	35 223	8 712	19.8%

Murray Inland

NSW Maritime Region: Murray River (Murray Inland)



While the Murray Inland region has the smallest number of recreational boats of any catchment area, because of low population densities, it has, on the other hand, the second highest number of boats per person in the State. From a very low base, the region has grown, in percentage terms, faster than the State average (3.8% over ten years compared with 2.9% for NSW). From a storage perspective, it should be noted that the number of boats over 6m in length has trebled since 1999.

Figure 16: Statistics for Murray Inland Region

Murray Inland	1/07/1999	1/07/2009	Actual Change
Total Boats	10 156	14 711	4 555
% of NSW recreational total	6.0%	6.6%	–
Median boat length (metres)	4.00	4.00	0.00
Median owners' age (years)	47.1	50.6	3.53
Compound Annual Growth	–	–	3.77%
Rec boats/person aged 16+	60/1000ppl	Rec boats/km²	0.05/ km²
Date	**6m and under**	**6m and over**	**% > 6m**
1/07/1999	9 893	263	2.6%
1/07/2009	13 908	803	5.5%

Hunter Inland

NSW Maritime Region: Hunter Inland

Hunter Inland is the 'powerhouse' of recreational boating in NSW with 23.7% of the State's recreational vessel fleet at 1 July 2009. In 1999 Hunter Inland had 1,400 more recreational boats than its nearest competitor – Hawkesbury/Broken Bay – but by 2009 Hunter Inland had extended the gap to some 9,000 vessels. Moreover, it had with twice the number of new boats and twice the growth rate. In real terms, the number of boats in Hunter Inland grew by 15,160 (or 3.4% annually between 1999 and 2009), the next highest absolute growth was in the North Coast region, with 10,509 additional vessels. Hunter Inland also maintains a reasonably high boat-to-population ratio at 56/1000ppl, but has just 0.12 vessels/km² across the region.

Figure 17: Statistics for Hunter Inland Region

Hunter Inland	1/07/1999	1/07/2009	Actual Change
Total Boats	37 729	52 889	15 160
% of NSW recreational total	22.5%	23.7%	–
Median boat length (metres)	4.42	4.45	0.03
Median owners' age (years)	48.4	51.1	2.7
Compound Annual Growth	–	–	3.44%
Rec boats/person aged 16+	56/1000ppl	Rec boats/km²	0.12/ km²
Date	**6m and under**	**6m and over**	**% > 6m**
1/07/1999	34 048	3 681	9.76%
1/07/2009	46 612	6 277	11.87%

North Coast

NSW Maritime Region: North Coast

The North Coast has had the largest growth in recreational vessels of all NSW regions to 2009 with 4.4% annually compounded. In real terms, that represents 10,509 additional boats. In addition, the region also has the highest number of vessels per person at 64/1000ppl.

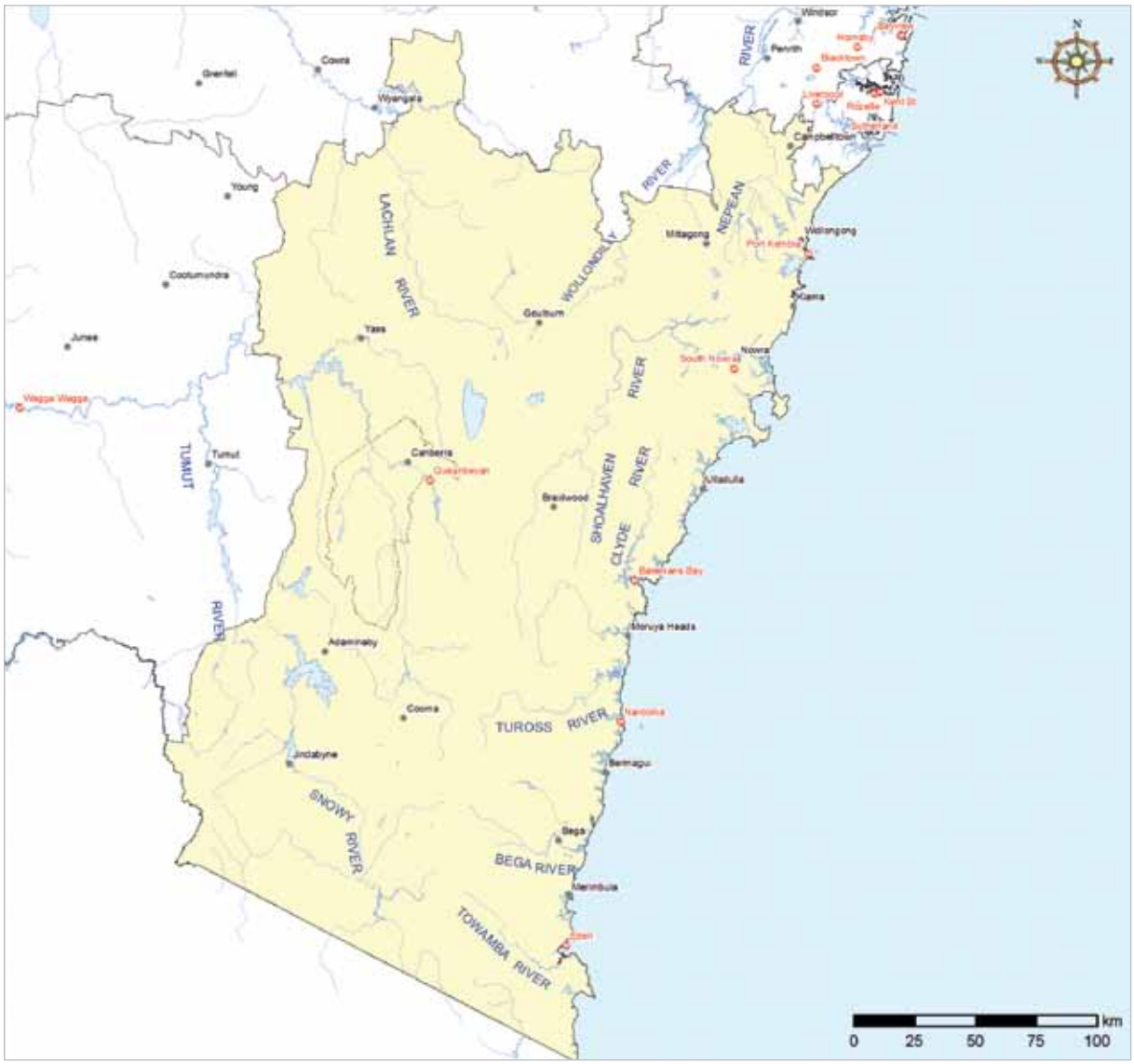
Nevertheless, despite this growth, it should be pointed out that the North Coast has the second smallest proportion of boats greater than 6m in length which suggests that most growth is in the <6m category.

Figure 18: Statistics for North Coast Region

North Coast	1/07/1999	1/07/2009	Actual Change
Total Boats	19 571	30 080	10 509
% of NSW recreational total	11.6%	13.5%	–
Median boats length (metres)	4.20	4.20	0.00
Median owner's age (years)	52.0	54.5	2.52
Compound Annual Growth	–	–	4.4%
Rec boats/person Aged 16+	64/1000ppl	Rec Boats/km²	0.66/ km²
Date	**6m and under**	**6m and over**	**% >6m**
1/07/1999	18 460	1 111	5.7%
1/07/2009	27 965	2 115	7.0%

South Coast

NSW Maritime Region: South Coast



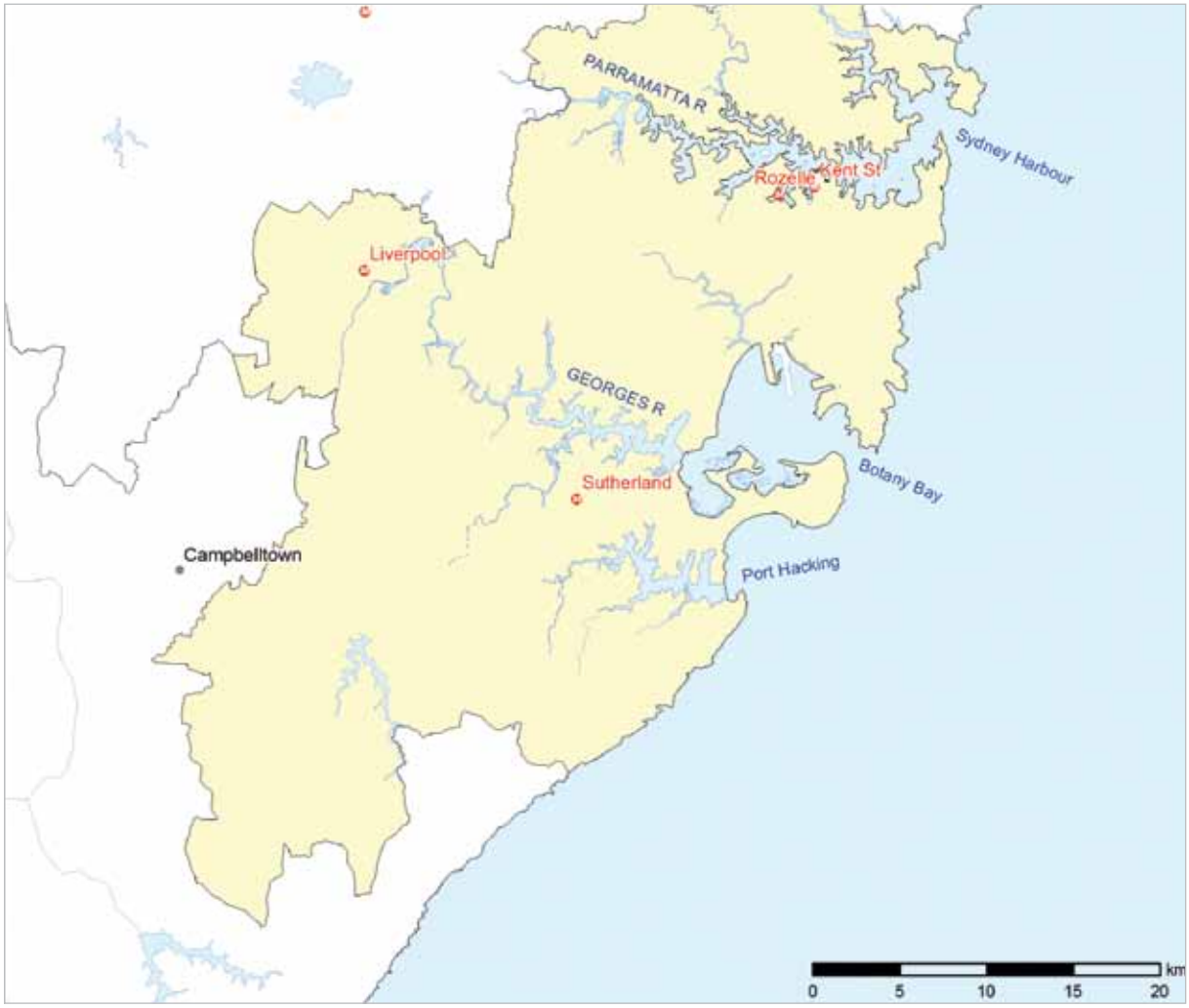
The South Coast had the second highest percentage growth (3.9%) of all regions and in 2009 had 31,731 registered recreational vessels and a density of 52/100ppl. Like the North Coast, South Coast – another low population density coastal region – has shown significant growth.

Figure 19: Statistics for South Coast Region

South Coast	1/07/1999	1/07/2009	Actual Change
Total Boats	21 598	31 731	10 133
% of NSW recreational total	12.9%	14.2%	–
Median boat length (metres)	4.42	4.45	0.03
Median owners' age (years)	49.3	52.1	2.76
Compound Annual Growth	–	–	3.9%
Rec boats/person aged 16+	52/1000ppl	Rec Boats/km²	0.44/ km²
Date	**6m and under**	**6m and over**	**% > 6m**
1/07/1999	20 085	1 513	7.0%
1/07/2009	28 781	2 950	9.3%

Sydney Harbour

NSW Maritime Region: Sydney/BotanyBay/Port Hacking



In many ways, the Sydney Harbour region is unique. Firstly, this outstanding environment is an extremely popular venue: the Boating Industry Association (BIA) estimated ten years ago that more than one million people use Sydney Harbour for water-based recreation activities each year.[16] This popularity has a number of consequences. Principal among these is the crowding of the waterway and a heightened risk of incidents in certain areas (Harbour Bridge-CBD) and at certain times (at night).

Congestion on the water is reflected by vehicle traffic volumes around popular boat ramp facilities (such as Lyne Park at Rose Bay), inadequate parking and increasing waiting times to launch vessels. In some areas, local councils have imposed restrictions on hours of use of boat ramps and parking in streets nearby. Moreover, the BIA has expressed the opinion in the past that the number of public boat ramp facilities within Sydney Harbour is inadequate to support existing, let alone future, demand.[17]

Secondly, Sydney Harbour's uniqueness is reflected in the fact that it has more large boats (proportionally) than the other regions with 41.5% of its boats in the 6m plus range in 2009. Indeed, of the 2,213 additional boats registered in Sydney Harbour between 1999 and 2009, 1,403 (or 63.4%) were over 6m in length. Thirdly, compared with other regions, Sydney Harbour has had the lowest annual growth at 1.3%. Consequently, its proportion of NSW recreational boats has fallen about 14% over the decade under review. Moreover, Sydney Harbour has the lowest number of boats per person at 19/1000ppl – compared with 64/1000ppl on the North Coast. As expected, given the region's population density and small size, the number of boats per square kilometre (at 51.4) is substantially higher than all other regions.

16 Quoted in accessUTS, *A Study of Public Use of Boat Ramps on Sydney Harbour: Final Report for Waterways Authority of NSW* [NSW Maritime], August 2004, p.7.
17 accessUTS, *A Study of Public Use of Boat Ramps on Sydney Harbour*, p7.

Importantly, the median recreational boat length within the Sydney Harbour area is the State's highest at 5.4 metres and has grown by 22cm since 1999 – nearly double the growth of any other region and over three times the State average. The comparatively slow growth of the recreational fleet in the Sydney Harbour region is probably due to a number of factors related to the region's popularity. These include the geographic limits of storage space (because of other competing land uses); lack of available on-water storage capacity; shortage of boat ramp facilities and space to store boat trailers on congested city streets.

Figure 20: Statistics for Sydney Harbour Region

Sydney Harbour	1/07/1999	1/07/2009	Actual Change
Total Boats	15 798	18 011	2 213
% of NSW recreational total	9.4%	8.1%	–
Median boats length (metres)	5.18	5.40	0.22
Median owners age (years)	50.5	52.4	1.87
Compound Annual Growth	–	–	1.3%
Rec boats/person aged 16+	19/1000ppl	Rec boats/km²	51.39/ km²
Date	**6m and under**	**6m and over**	**% >6m**
1/07/1999	9 733	6 065	38.4%
1/07/2009	10 543	7 468	41.5%

Interstate/Overseas

The Interstate/Overseas category includes boats registered to an address outside NSW. The trend in non-NSW ownership is accelerating with Interstate/Overseas registered vessels increasing over 11% in the ten year period. Moreover, a significant proportion of boats in this category tend to cluster over the 6m mark and have grown from 13.9% of Interstate/Overseas registered vessels in 1999 to 18.7% in 2009.

Figure 21: Statistics for Interstate/Overseas vessels

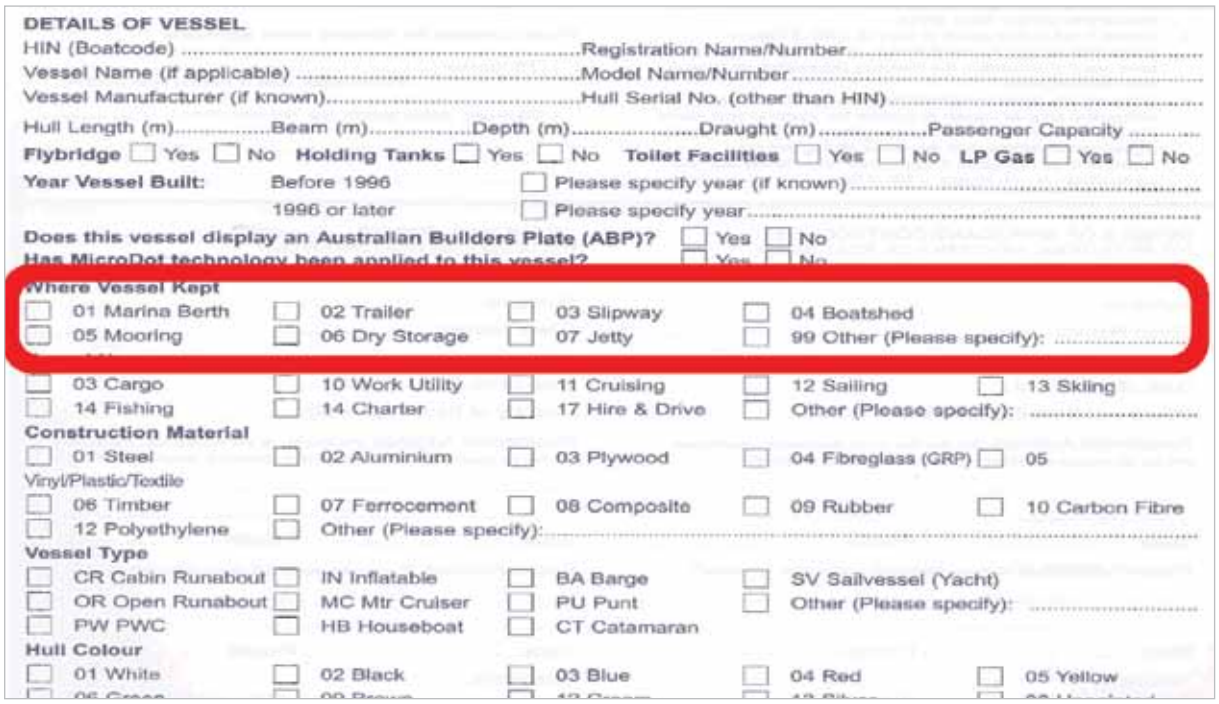
Interstate/Overseas	1/07/1999	1/07/2009	Actual Change
Total Boats	5 943	7 483	1 540
% of NSW recreational total	3.5%	3.3%	–
Median boats length (metres)	4.5	4.6	0.09
Median owners' age (years)	47.9	50.8	2.83
Compound Annual Growth	–	–	2.33%
Rec boats/person aged 16+	NA/1000ppl	Rec boats/km²	NA/ km²
Date	**6m and under**	**6m and over**	**% > 6m**
1/07/1999	5 117	826	13.9%
1/07/2009	6 083	1 400	18.7%

9. Current boat storage

Intended storage method

At a vessel's original registration, boat owners are invited to indicate their storage intentions. A copy of the form is at Figure 22 below. The field is not mandatory and contains the option "Other" which diffuses the accuracy of the data collected. Moreover, as indicated previously, there is no requirement for an owner to advise NSW Maritime should they change their storage method.

Figure 22: Registration form – indication of storage intention


DETAILS OF VESSEL
HIN (Boatcode) ..... Registration Name/Number .....
Vessel Name (if applicable) ..... Model Name/Number .....
Vessel Manufacturer (if known) ..... Hull Serial No. (other than HIN) .....
Hull Length (m) ..... Beam (m) ..... Depth (m) ..... Draught (m) ..... Passenger Capacity .....
Flybridge ☐ Yes ☐ No Holding Tanks ☐ Yes ☐ No Toilet Facilities ☐ Yes ☐ No LP Gas ☐ Yes ☐ No
Year Vessel Built: Before 1996 ☐ Please specify year (if known) .....
1996 or later ☐ Please specify year .....
Does this vessel display an Australian Builders Plate (ABP)? ☐ Yes ☐ No
Has MicroDot technology been applied to this vessel? ☐ Yes ☐ No
Where Vessel Kept
☐ 01 Marina Berth ☐ 02 Trailer ☐ 03 Slipway ☐ 04 Boatshed
☐ 05 Mooring ☐ 06 Dry Storage ☐ 07 Jetty ☐ 99 Other (Please specify): .....
☐ 03 Cargo ☐ 10 Work Utility ☐ 11 Cruising ☐ 12 Sailing ☐ 13 Skiing
☐ 14 Fishing ☐ 14 Charter ☐ 17 Hire & Drive ☐ Other (Please specify): .....
Construction Material
☐ 01 Steel ☐ 02 Aluminium ☐ 03 Plywood ☐ 04 Fibreglass (GRP) ☐ 05 Vinyl/Plastic/Textile
☐ 06 Timber ☐ 07 Ferrocement ☐ 08 Composite ☐ 09 Rubber ☐ 10 Carbon Fibre
☐ 12 Polyethylene ☐ Other (Please specify): .....
Vessel Type
☐ CR Cabin Runabout ☐ IN Inflatable ☐ BA Barge ☐ SV Sailvessel (Yacht)
☐ OR Open Runabout ☐ MC Mtr Cruiser ☐ PU Punt ☐ Other (Please specify): .....
☐ PW PWC ☐ HB Houseboat ☐ CT Catamaran
Hull Colour
☐ 01 White ☐ 02 Black ☐ 03 Blue ☐ 04 Red ☐ 05 Yellow

Despite these deficiencies, the data hold some value. The table at figure 23 below shows the intended method of storage indicated by owners of recreational vessels registered at 1 July 2009.

Figure 23: Intended storage method of registered vessels at 1 July 2009

Storage Method	Recreational Vessels
Boatshed	4 890
Dry Storage	4 866
Jetty	1 516
Marina Berth	5 951
Mooring	20 888
Not Known	1 118
Other	6 935
Slipway	767
Trailer	176 167
Total	223 098

Storage Capacity

Introduction

NSW Maritime administers wetland leases and licences on the land it owns, being Sydney Harbour, Botany Bay, Port Kembla and Newcastle Harbour while the Land and Property Management Authority (LPMA) is responsible for the rest of the State.

Domestic facilities

Domestic facilities cover boating infrastructure attached to residential waterfront properties such as jetties, ramps, pontoons, tidal baths, slipways, steps, landing platforms and boatsheds. In 2009 NSW Maritime administered approximately 1500 private wetland leases on Sydney Harbour and this number has remained relatively constant since 2004. Of these approximately 1400 include some form of vessel storage while the balance relates to non-boat storage leases such as tidal baths, reclaimed land etc. Additionally in 2009 there were 21 private marinas (ie those associated with strata developments) on Sydney Harbour, comprising 362 berths.

On land not owned by NSW Maritime, domestic waterfront licences are granted by the LPMA for the use of submerged and tidal Crown land where there is direct access to Crown land. LPMA domestic waterfront licences generally cover facilities such as jetties, boatsheds, berthing areas, boat ramps, slipways and pontoons on foreshore Crown land adjoining waterfront properties. At 1 July 2010, LPMA advises there were 6873 licensed domestic waterfront tenures of which 1810 (26%) included boat storage facilities. This number has also remained relatively stable over the past 5 years.

Commercial marina wet berths

Both NSW Maritime and the LPMA administer leases or licences for commercial marina wet berths.

Private mooring licences

At 1 July 2009, there were 15,834 private mooring licences in NSW.

Commercial moorings

At 1 July 2009 there were 4934 commercial mooring sites in NSW.

Trailer storage

NSW Maritime analysis of the distribution across NSW of registered vessels less than 6m and the distribution of registered boat trailers at 1 July 2009 shows, not surprisingly, a correlation between the two in terms of incidence and density. In other words, registered small boats are found with registered trailers.

Related to trailer storage is the condition of recreational boating infrastructure especially boat ramps. NSW Maritime has recently undertaken an internal study to identify popular areas of recreational boating, areas with low quality facilities and those that would benefit from infrastructure improvements, particularly under the Better Boating Program.[18] Of the 625 unrestricted public boat ramps, 107 were considered to have high recreational use (with delays in launching of 30 minutes or more, for example), 157 were considered to have inadequate parking and 166 were in poor or very poor condition requiring upgrading within a maximum of 1–2 years. In developing a draft Recreational Boating Facilities Plan, NSW Maritime has assembled information on these facilities and their condition in order to promote opportunities for boating facility improvements and to encourage councils and other facility owners to apply for funding assistance.

18 The Better Boating Program has been in operation since 1998. NSW Maritime provides funding on a 50-50 basis to local councils to upgrade recreational boating facilities throughout NSW.

10. Supply and demand

Moorings

Figure 24: Distribution of moorings

Region	PMLs	CML Sites	Total Moorings
Botany Bay/Port Hacking	1 698	511	2 209
Hawkesbury/Broken Bay	4 267	1 839	6 106
Murray Inland	386	204	590
Hunter Inland	3 260	518	3 778
North Coast	529	163	692
South Coast	945	221	1 166
Sydney Harbour	4 749	1 479	6 228
Total	15 834	4 935	20 769

NSW Maritime data shows that at 1 July 2009, there were 15,834 PMLs with 1,819 sites available and an overall waiting list of 2,057. These figures indicate a shortfall of 238.

These raw figures, however, probably disguise the real picture of mooring demand. Moorings are allocated on a 'first come, first serve' basis. Where space is available on a mooring site, boat owners can apply for a PML and (subject to certain conditions) immediately receive approval to moor their vessel.[19] Where space is not available at a preferred site, boat owners can apply for a site where moorings are available or join a priority waiting list at the preferred site.

Priority waiting lists exist for each mooring area where sites are not available. Applicants pay a fee (which is deducted from the eventual PML fee) to join a list and, when a site becomes available, it is offered to the applicant who has been on the list for the longest time. Should an applicant not exercise their right to the mooring when one becomes available, he or she falls to the end of the queue and the site is offered to the next eligible applicant.

Mooring areas in high demand have long priority waiting lists: at the end of 2009, North Harbour (Sydney) mooring area, with 111 moorings, had 102 applicants on its waiting list. While some areas can have rapid turnover, other locations have little movement. Johnstons Bay, at Balmain in Sydney Harbour, has 4 moorings but 20 applicants on its waiting list at the end of 2009. However, the last mooring re-allocation occurred in June 1991.

19 Up-to-date PML rules and conditions are available from www.maritime.nsw.gov.au

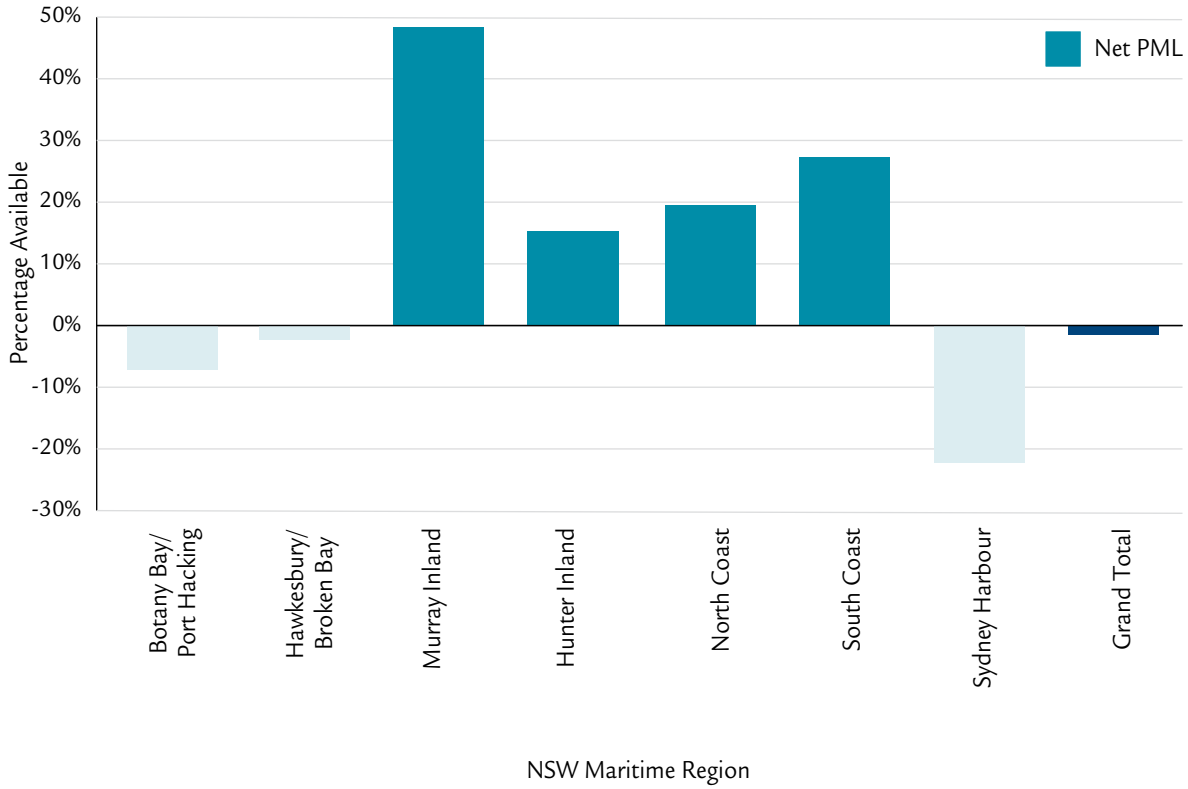
Across the state, there is varying degrees of capacity as demonstrated in Figure 25 below.

Figure 25: Aggregated PML capacity, waiting lists and available sites at 1 July 2009

Region	PML Sites	PML Sites Available	Waiting	Shortfall/ Surplus
Botany Bay/Port Hacking	1 698	145	268	-123
Hawkesbury/Broken Bay	4 267	288	390	-102
Murray Inland	386	216	29	187
Hunter Inland	3 260	587	89	498
North Coast	529	143	40	103
South Coast	945	315	57	258
Sydney Harbour	4 749	125	1 184	-1 059
Grand Total	15 834	1 819	2 057	-238

The graph below (Figure 26) shows the capacity in PML sites (or 'net PML'). Net PML is derived by subtracting the number of applicants on the priority waiting list from the number of available sites and aggregating them into regions. A negative percentage represents the size of the waiting list over capacity while a positive percentage indicates capacity available.

Figure 26: 'Net PML' showing PML demand and available capacity at 1 July 2009



As expected, the greatest demand is in Sydney Harbour (4,749 PMLs) while Murray Inland (386 PMLs) had 48% of sites unoccupied.

11. Forecasting trends and future needs

Forecasting methodology

The goal of forecasting future ownership and storage trends is to attempt to quantify boat storage needs to 2026. Ownership of recreational vessels across the State has grown consistently over the 10 years to mid 2009 with an annual growth rate of 2.9%. In attempting to forecast, this growth has been normalised against population data to extrapolate State-wide and regional projections of boat ownership.[20] The ownership and boat size forecasts can then be used to calculate demand for storage on a State and local basis.[21]

In general terms, growth in boat ownership in NSW has mirrored population growth. Moreover, there is little evidence on the effects of economic crises on boat ownership in Australia. While financial downturns have a lag effect on vessel ownership, there has been little suggestion that the Global Financial Crisis – even in its mild Australian form – has had any impact.

The projections in the report assume the availability of storage options will have the same impact on ownership decisions as they have in the past. Should the balance between supply and demand for storage change sufficiently, this could influence a boat owner's decision on the size of boat to buy or whether to buy at all.

Externalities

Certain variables may influence vessel numbers and storage infrastructure and impact upon future needs. Some of these externalities are difficult to forecast.

Local economic factors

Obviously, the broader performance of the NSW economy could have an effect on vessel ownership and demand for storage. Spending on recreational boating is clearly discretionary expenditure and, accordingly, a change in levels of disposable income – including the availability and cost of credit – could impact upon boat use. Small changes are likely to have little impact on registrations as the costs of entry (licence fees etc) and vessel disposal inhibit abrupt reactions to fluctuations. However, sustained changes in levels of disposable income could have the effect of discouraging or encouraging ownership growth in the state. Different levels of economic performance – reflected, say, in rates of unemployment – could exaggerate existing differences between regions.

Population, intrastate migration and age distribution

Population is used in this report's forecasts to normalise regional ownership data and allow more accurate planning for the storage of vessels in different areas of the State. Accordingly, ABS data, which makes broad assumptions and allowances, has been applied to the forecasts. Two components of population change worthy of specific mention are that of age distribution within the population and migration.

Like most Western nations, sustained low levels of fertility combined with increasing life expectancy at birth have contributed to an ageing Australian population.[22] By 2026, the median age of the Australian population will increase to about 40 years. However, the generation born 1946–1961 – known as the Baby Boomers – 'unlike previous generations of retirees, will be healthier for longer, more mobile and more engaged'.[23] Many will have considerable disposable income. This aspect of an ageing population is unlikely to impact adversely on boat ownership figures. Interstate migration is an interesting phenomenon. NSW has been losing population to other states (particularly Queensland) for a decade at least.[24] In 2003–4, for example, there were 120, 715 departures, a net loss (after arrivals including overseas immigrants) of 31, 098.[25] The ABS projections, however, indicate that population will continue to grow, albeit more slowly than Queensland in particular and Victoria. The following map from the ABS shows population growth across the state by local government area for 2007–08[26]:

20 Due to anomalies between the ABS census data and NSW Maritime data a small percentage of the population could not be directly attributed to a NSW Maritime administrative region. *Source*: Australian Bureau of Statistics 2006, '2006 Census of Population and Housing, Customised Data Report: Usual resident population aged 16 years and over for Postal Areas in New South Wales'. The anomalies are due to slight differences in the collection and recording of data between ABS and NSW Maritime.

21 The focus for forecasting purposes has been on recreational rather than commercial vessels because of the small size of the latter group, its volatility and the fact that commercial vessels are almost always stored on waterways.

22 ABS, 3222.0 – Population Projections, Australia, 2006 to 2101.

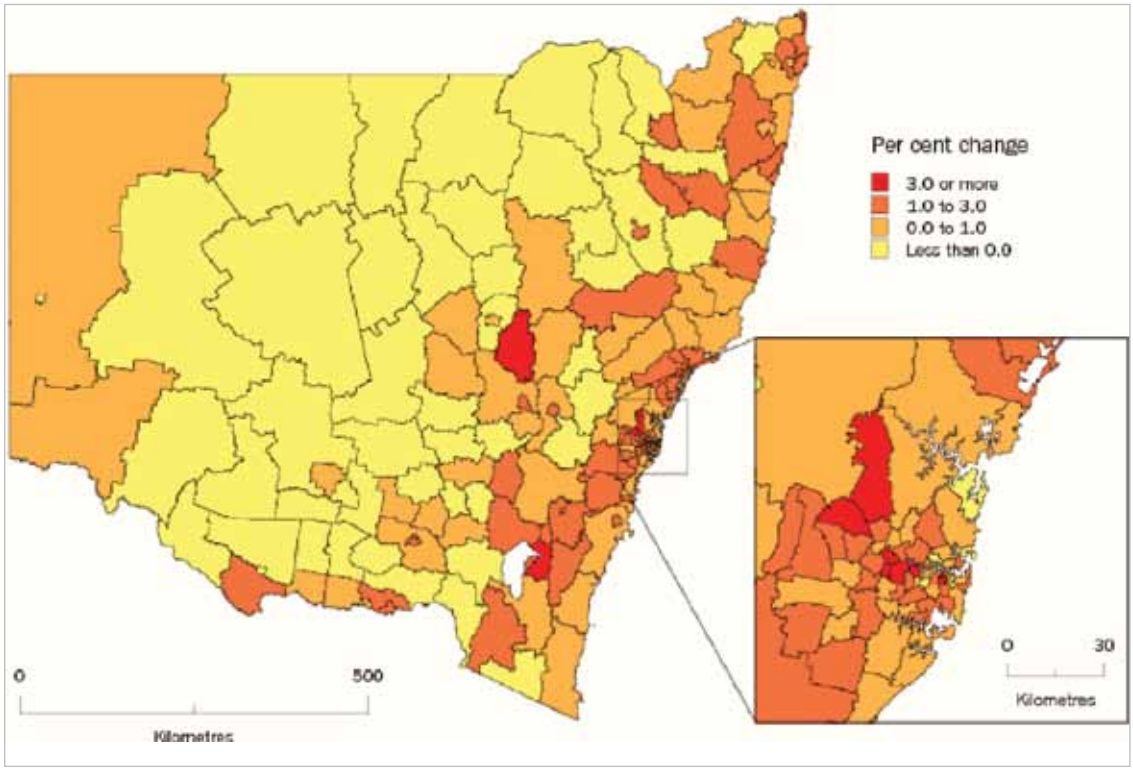
23 Quoted in Bernard Salt, KPMG *Monash Baby Boomer Study*, December 2009 at http://www.bernardsalt.com.au/media/09Monash-BabyBoomerStudy-BS0312-MAR.pdf

24 ABS, Migration 3412.0 2005–6.

25 ABS, 3101.0 – Australian Demographic Statistics, Interstate Departures NSW Sept 200–Sept 2009.

26 Australian Bureau of Statistics, 3218.0 – Regional Population Growth, Australia, 2007–08.

Figure 27: Population growth NSW



Importantly, the map shows a clear trend towards coastal population growth: this phenomenon could encourage boat ownership.

Tourism

Tourists may bring a boat to NSW (by road or sea), or hire a vessel for use on the State's waterways or use a commercial boat for water sports, eco-tourism, diving, whale watching or harbour cruising. The Tourism Forecasting Committee of Tourism Australia expects tourist activity in NSW to return to modest growth in 2011 after recent declines.[27] This indicates that tourism will probably have a negligible impact on the projections relating to recreational vessels in this document. However, as the global economy continues to strengthen, as expected, in future, international tourists may have an influence on the demand for commercial boat services in the State.

Effects of climate change

Climate change – particularly rising sea levels and changes in the height or frequency of extreme sea level events – could have significant consequences for boat ownership and storage. Global Mean Sea Level increased by 195mm between 1870 and 2004 and is continuing to rise, according to the Commonwealth Scientific and Industrial Research Organisation (CSIRO), at a 'fairly steady' rate of just over 3mm a year.[28] While the numbers relating to recent sea level rise seem trivial at first glance, the impacts of sea-level rise and how fast it is happening are significant.[29] Indeed, coastal observations confirm that sea levels have been rising around Australia since at least 1920.[30] In areas which have experienced large scale land subsidence, such as Gippsland in Victoria, sea level rise has been exacerbated.

Sea level rise has been brought about partly by melting of glaciers and ice sheets while 20th century sea-level rise has been heavily influenced by the thermal expansion of a warming ocean. During the 21st century, sea level will continue to rise. The most robust projections of 21st century sea-level rise are the Assessments of the Intergovernmental Panel on Climate Change (IPCC) of 2001 and 2007.[31]

27 *Forecast 2009 – Issue 1,* Page 92, Tourism Forecasting Committee, Tourism Research Australia.

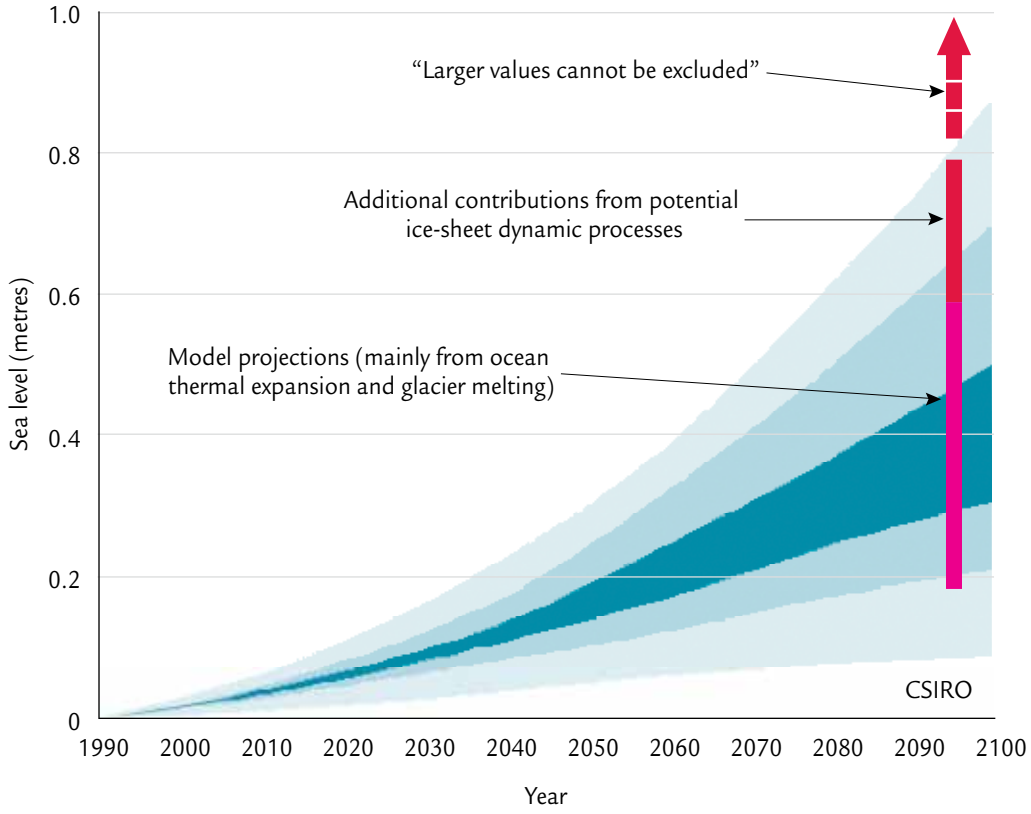
28 Sea Level Rise: Understanding the past – improving projections for the future at http://www.cmar.csiro.au/sealevel/index.html

29 *Sea-level rise: what does the future hold*, Antarctic Climate and Ecosystems Cooperative Research Centre (ACE CRC) at http://www.acecrc.org.au/uploaded/117/797532_01ib03_sealevelgeneral_07.pdf

30 ACE CRC *Briefing: A post IPCC AR4 update on sea level rise*, p.8 at http://www.acecrc.org.au/uploaded/117/797655_16br01_slr_080911.pdf

31 Sea level projections at http://www.cmar.csiro.au/sealevel/sl_proj_21st.html

Figure 28: Projections of sea level change



While sea-level rises may not be hugely significant by 2026, changes in the frequency of extreme sea level events will almost certainly become so because, as mean sea level rises, extreme events of a given height tend to become more frequent.

As CSIRO explains:

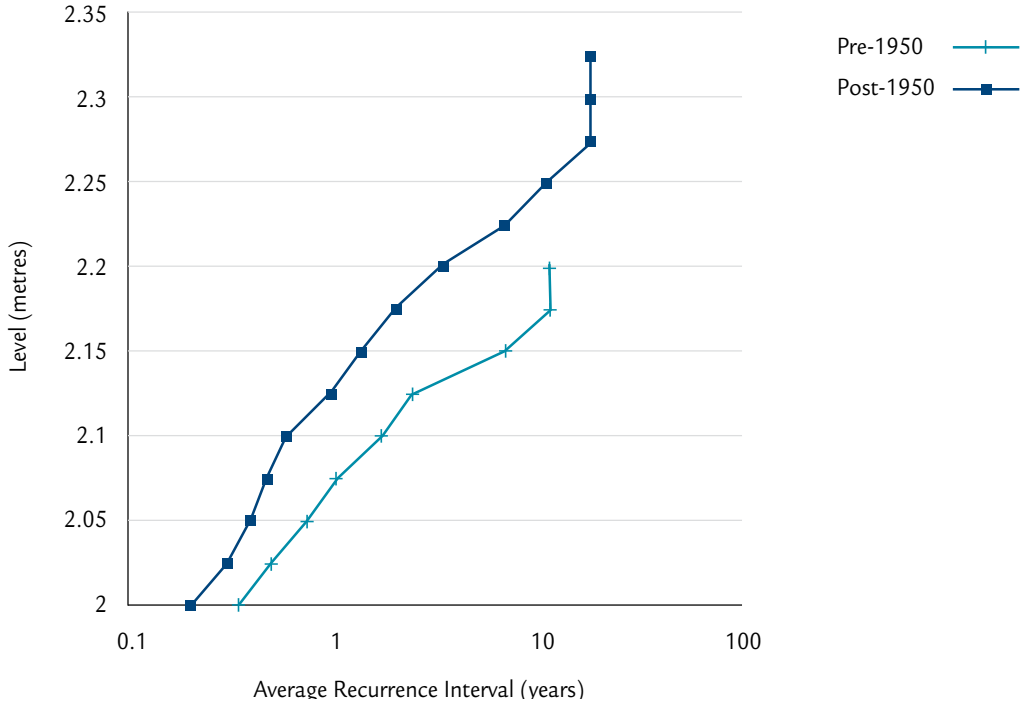
> The effect of rising mean sea levels will be felt most profoundly during extreme storm conditions when strong winds and falling pressure bring about a temporary and localised increase in sea level known as a storm surge. Storm surges occurring on higher mean sea levels will enable inundation and damaging waves to penetrate further inland increasing flooding, erosion and the subsequent detrimental impacts on built infrastructure and natural ecosystems. In the tropics storm surges are caused by tropical cyclones while elsewhere mid-latitude storms and their associated cold fronts are the main cause of storm surges.[32]

The effect of sea level rise during the 20th century is indicated in the following figure, which shows the change of 'Average Recurrence Interval' from the first half of the century to the second at Fort Denison. This Interval was reduced by a factor of around three, so that an extreme that used to occur, say, every three years, now occurs every year.[33]

32 Extreme events at http://www.cmar.csiro.au/sealevel/sl_impacts_extreme.html

33 Sea level impacts: extreme events at http://www.cmar.csiro.au/sealevel/sl_impacts_extreme.html

Figure 29: Recurrence of extreme events at Fort Denison



These events are likely to continue to increase in frequency and severity with impact upon the period of this report – one projection indicates that events that now happen very few years 'are likely to occur annually in just a decade or two…'[34] By the end of the century, the Garnaut Climate Change Review forecasts that 'Much coastal infrastructure along the early 21st century lines of settlement is likely to be at high risk of damage from storms and flooding'.[35]

The impact of climate change on inland waterways and recreational boating in NSW is likely to be no less profound. Without effective mitigation, the Garnaut Report projects that the Murray–Darling basin will, because of increased frequency of drought, reduced median rainfall and absence of runoff, lose half its agricultural production by the middle of the century and depopulation of the region will accelerate.[36] Other waterways will be similarly affected. It should be noted that these impacts have not been quantified in this report and will require further analysis which may require a future reassessment of the projections.

Forecasting boat numbers

The effect of population growth on boat ownership can be projected by taking regional population census data from 1996 and applying this to recreational vessel fleet numbers for the same regions.[37] As we have seen, the number of recreational boats in NSW has grown by 2.9% annually between 1999 and 2009.

The analysis below examines the contribution of population growth to vessel numbers between 2001 and 2009 by examining both raw data and growth normalised against available ABS population statistics.[38]

The first graph in the series (Figure 30) shows the growth in recreational vessel ownership between 1 July 2001 and 1 July 2006 for each NSW Maritime region.[39] The graph shows consistent linear growth of the recreational boat fleet in all regions of NSW.

34 ACE CRC *Sea-level rise: what does the future hold?*

35 Ross Garnaut, The Garnaut Climate Change Review: Final Report, chapter 6: Climate Change Impacts on Australia at http://www.garnautreview.org.au/domino/Web_Notes/Garnaut/garnautweb.html

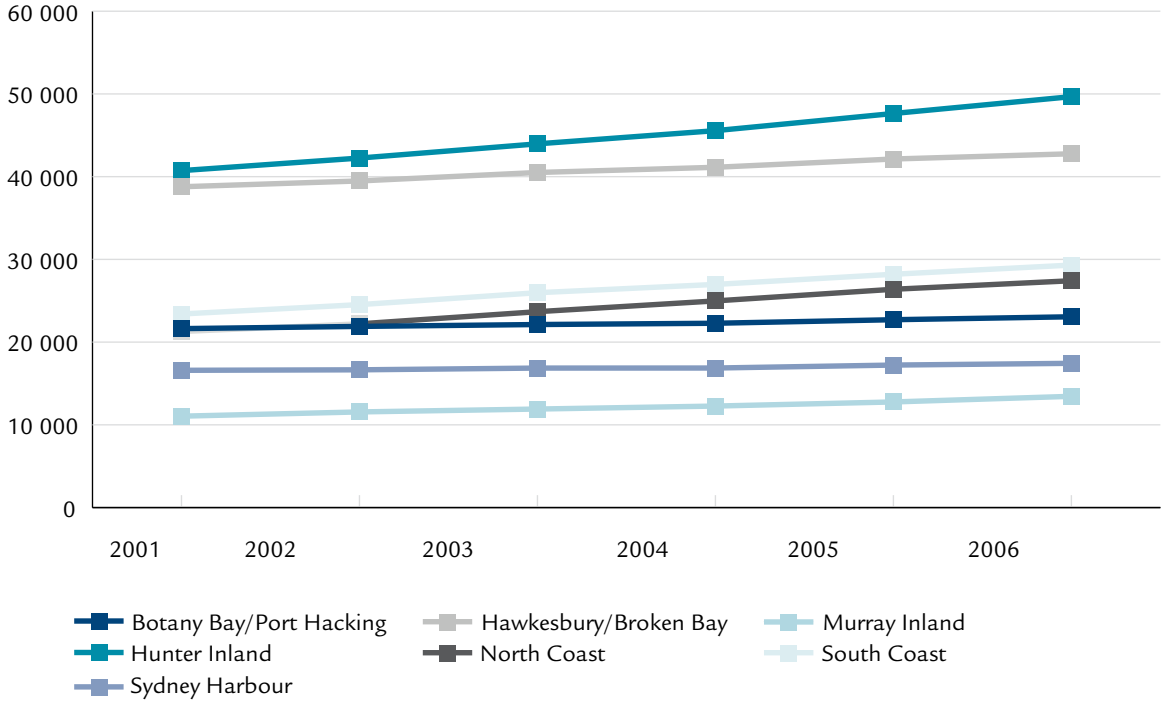
36 Garnaut Climate Change Review, Ch 6.

37 ABS, '2006 Census of Population and Housing, Customised Data Report: Usual resident population aged 16 years and over for Postal Areas in New South Wales'.

38 ABS, '2006 Census of Population and Housing, Customised Data Report: Usual resident population aged 16 years and over for Postal Areas in New South Wales'.

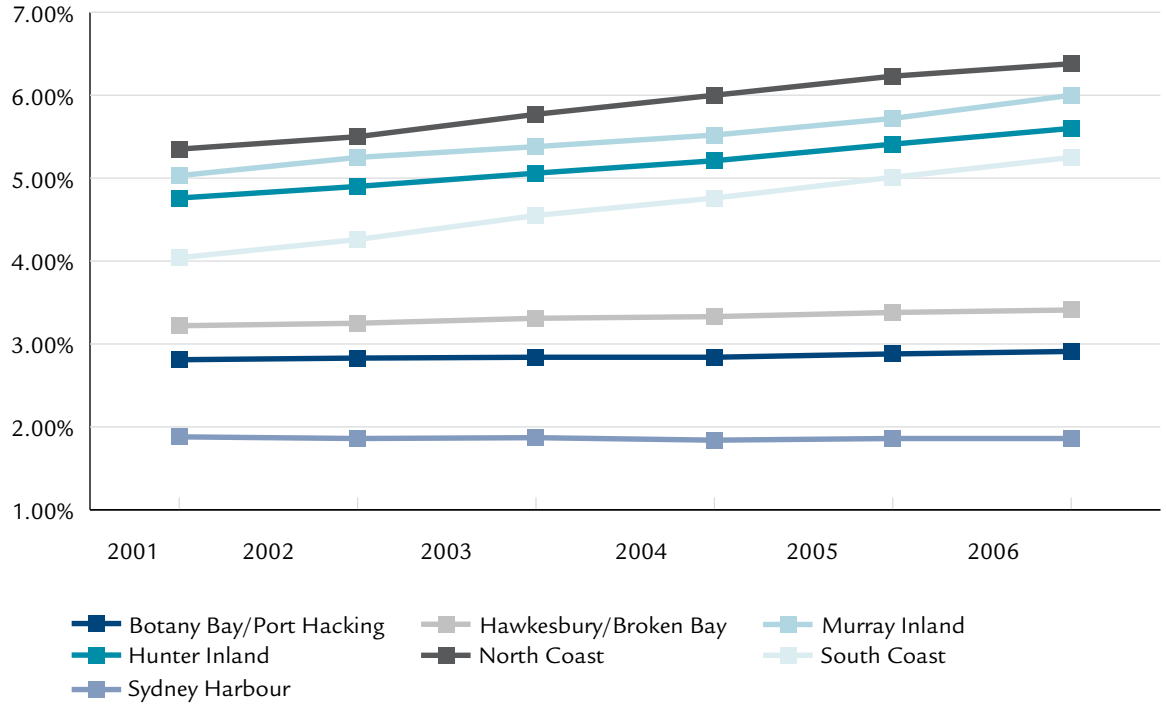
39 The timeframe has been chosen because it represents a period within which there is access to both comprehensive population statistics and reliable boat ownership data.

Figure 30: Growth in recreational vessel numbers 2001–2006



The next graph (Figure 31) normalises vessel number growth against population by showing the percentage of the population for each region which owned a boat on each sample date.[40]

Figure 31: Growth in recreational vessels normalised against population data 2001–6

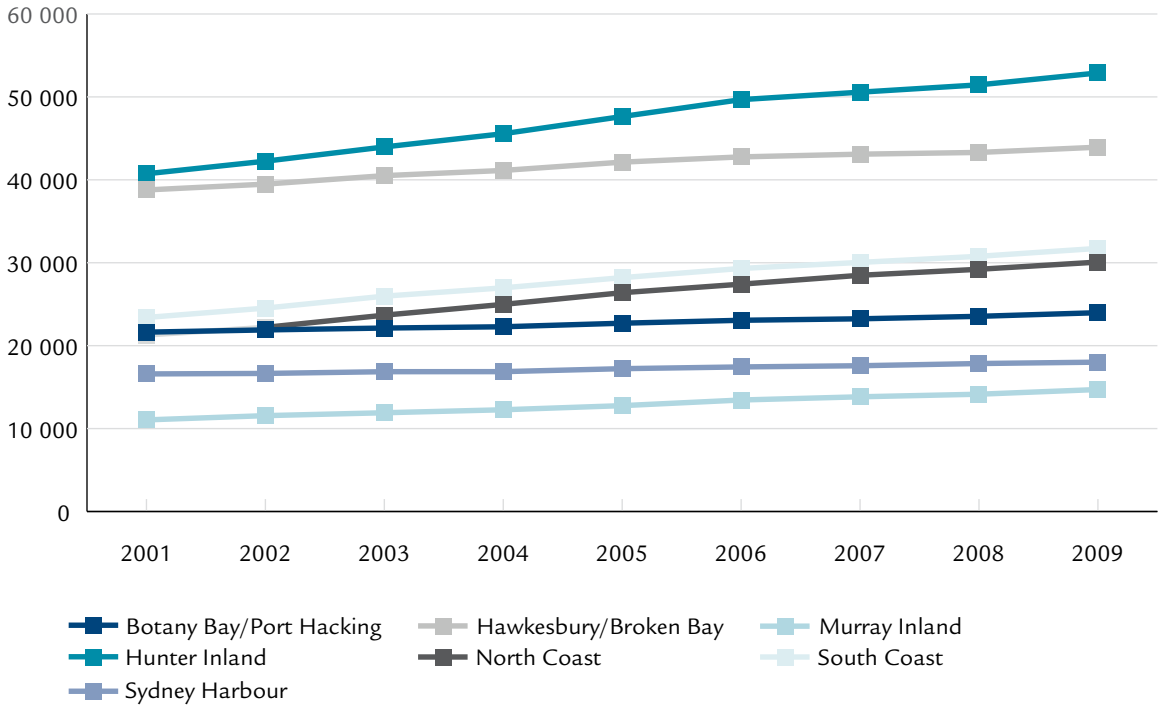


This graph demonstrates that in most regions, boat ownership has accelerated ahead of population growth in a reasonably consistent manner over the period of assessment.

40 Census information is only available for the 2001 and 2006 data samples, so for the intervening years the data has been applied as a linear extrapolation based on compound annual growth.

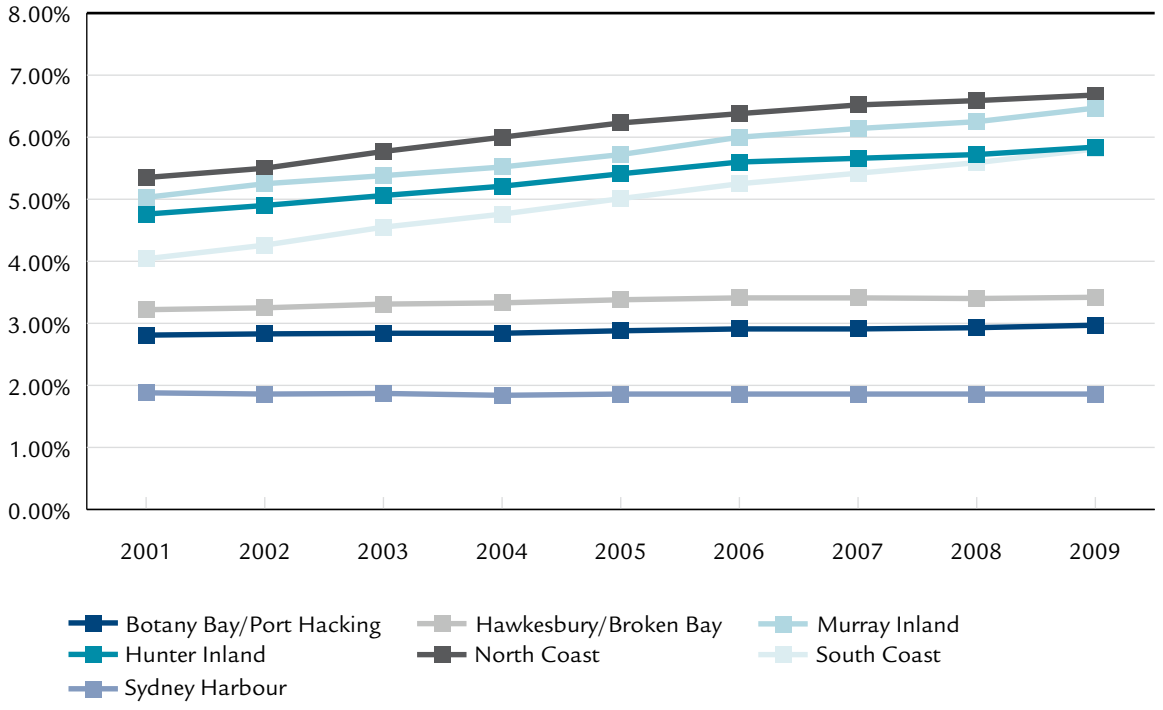
The next graph (Figure 32) shows the number of recreational boats in each NSW Maritime administrative region on 1 July of each year represented.

Figure 32: NSW Maritime regions – number of recreational boats 2001–09



This shows consistent linear growth across all regions. The following graph (figure 33) applies regional population data to the ownership statistics to illustrate population growth as an influence on fleet size.[41]

Figure 33: Population growth on fleet size by region



41 As the last available census information is from 2006, the 2007–2009 population data has been projected.

Forecast summary

Linear projection

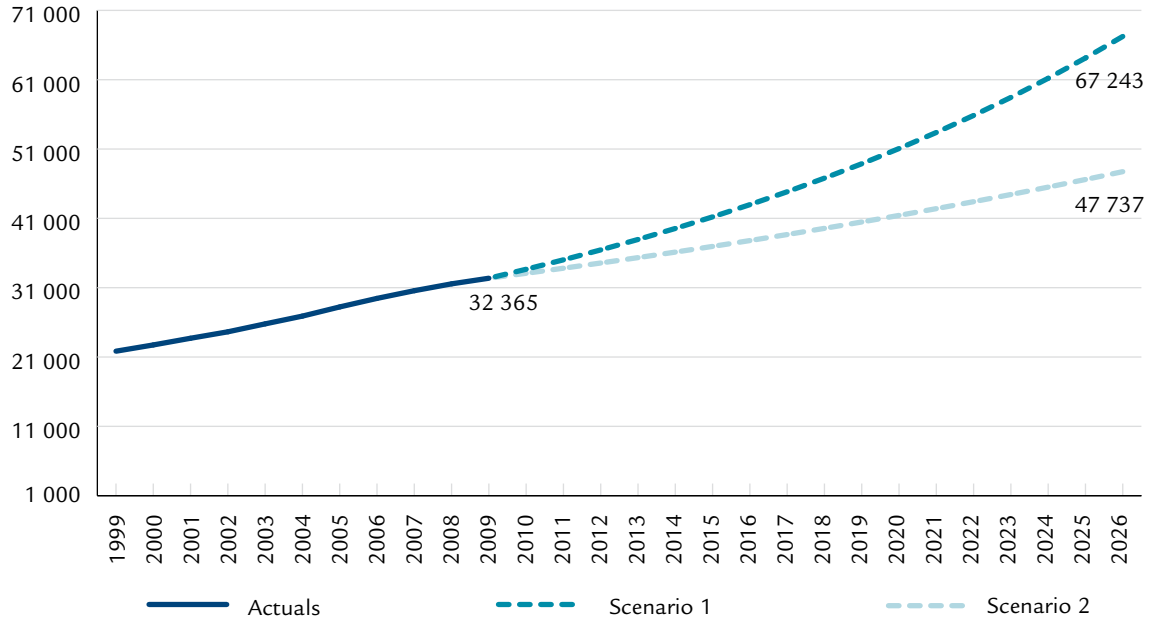
The base case scenario (or linear projection) is built on the strong historical linear growth rates for each region in New South Wales. While the percentage increases between 1999 and 2009 ranged from 1.7% to 3.7%, the compounded annual growth rate (CAGR) was around 2.9%. Based on this approach, the estimated total number of boats in New South Wales in 2026 is expected to reach **351,113**. The following table (Figure 34) summarises the forecast:

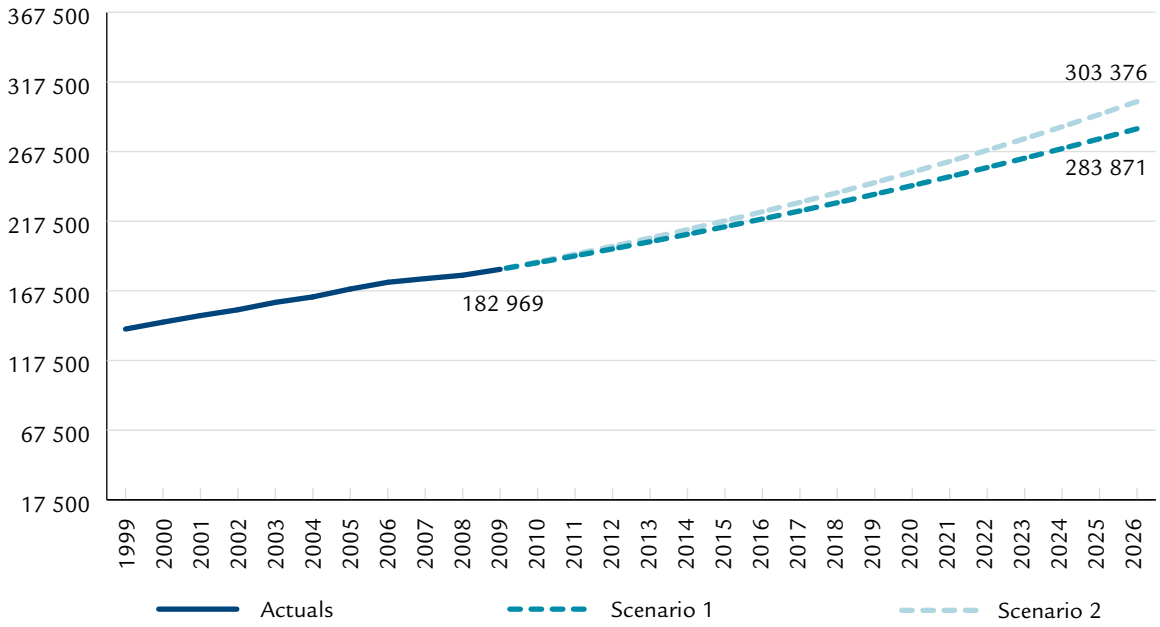
Figure 34: Forecast in number of registered vessels in NSW to 2026

Historical Data		Growth		Forecasts
1/07/1999	161 914		1/07/2010	221 374
1/07/2000	167 780	3.6%	1/07/2011	227 616
1/07/2001	173 458	3.4%	1/07/2012	234 066
1/07/2002	178 575	2.9%	1/07/2013	240 732
1/07/2003	185 013	3.6%	1/07/2014	247 622
1/07/2004	190 060	2.7%	1/07/2015	254 744
1/07/2005	197 056	3.7%	1/07/2016	262 108
1/07/2006	203 110	3.1%	1/07/2017	269 721
1/07/2007	206 844	1.8%	1/07/2018	277 593
1/07/2008	210 274	1.7%	1/07/2019	285 733
1/07/2009	215 334	2.4%	1/07/2020	294 151
			1/07/2021	302 858
CAGR 1999–2009:		2.9%	1/07/2022	311 865
			1/07/2023	321 182
			1/07/2024	330 821
			1/07/2025	340 794
			1/07/2026	351 113

The calculations in figure 34, however, distinguish between boats longer and shorter than six metres. In order to project this distribution, two different scenarios were used. The first scenario was based on the fact that the proportion of large boats to small has grown steadily over the last ten years (large boats grew from 13.5% in 1999 to 15.0% in 2009). This scenario assumed that this trend would continue in a linear fashion. The second scenario, however, assumed that the relative proportions at 1 July 2009, the latest date at which data is available, will not change in the future. The two approaches result in the same total number of boats for each year and region but with a different split between large and small boats. The two graphs (Figures 35 and 36) below show the differences for the State as a whole:

Figures 35 and 36: Projected large and small boats in NSW to 2026 using linear growth method





Projection based on population data

An alternative method is to project boat numbers based on the percentage of people who have owned boats in the past. This approach, however, lacks reliable data and a number of assumptions have to be made. As already indicated, the number of boats and the percentage of people owning boats have grown in a linear fashion. However, the latter is partly an effect of extrapolation of population data between ABS census data which is only available for 1996, 2001 and 2006. As a consequence, the percentage of people with boats in 2009 would have to be based on actual numbers for boats but only an estimate of boat owning population. The population for each region between 2006 and 2009 was estimated by calculating the annual growth rates between 2001 and 2006 for each region and then applying this growth rate on the 2006 levels. However, ABS has estimated the NSW population to 2026 (and beyond).[42] Using the percentage distribution of population by region in 2006, regional population distribution has been estimated for the entire forecast period.

The percentage of people with boats was calculated and averaged over the last six years (2004–2009). These averages were applied to population forecasts in order to estimate the number of boats in each region. The results of this analysis are shown below (Figure 37). The number of boats in 2026 is estimated to reach **334,470**, which is approximately 5% lower than in the case of linear projection. These results are subject to a number of broad assumptions, which, if they were altered, could produce very different results.[43]

Figure 37: Projection of boat numbers based on percentage of population with boats in 1996

Historical Data		Growth		Forecasts
1/07/1999	161 914		1/07/2010	224 375
1/07/2000	167 780	3.6%	1/07/2011	230 042
1/07/2001	173 458	3.4%	1/07/2012	235 852
1/07/2002	178 575	2.9%	1/07/2013	241 810
1/07/2003	185 013	3.6%	1/07/2014	247 918
1/07/2004	190 060	2.7%	1/07/2015	254 181
1/07/2005	197 056	3.7%	1/07/2016	260 602
1/07/2006	203 110	3.1%	1/07/2017	267 186
1/07/2007	206 844	1.8%	1/07/2018	273 936
1/07/2008	210 274	1.7%	1/07/2019	280 858
1/07/2009	215 334	2.4%	1/07/2020	287 954
			1/07/2021	295 231
CAGR 1999–2009:		2.9%	1/07/2022	302 691
			1/07/2023	310 340
			1/07/2024	318 183
			1/07/2025	326 225
			1/07/2026	334 470

Comment

The linear projection for determining boat numbers is probably superior to the alternative because of the lack of data and consequent assumptions in the population model. Even so, the number of boats arrived at using the linear forecast is a simplification. Nevertheless, a growth rate of 2.9% each year has been assumed and this is based on a solid historical pattern. Accordingly, by 2012 NSW will have around 18,500 additional boats while by 2026 it could have an additional 135,000.

42 ABS, 04/09/2008, 3222.0 – *Population Projections, Australia*, 2006 to 2101.

43 Alternative assumptions include, for instance, exponential population growth against linear population growth, the number of years included in the calculation of averages for percentages of people with a boat in each region, and much more.

Regional Overview

The table below (Figure 38) shows forecasts for the seven regions in New South Wales. The first section shows estimates which derive from growth rates from 1999 to 2009. Under this scenario, the number of boats in Sydney Harbour, for example, would grow from 18,011 in 2009 to 21,442 in 2026. The total estimated growth of approximately 3,400 boats should be compared with the 2,200 boats that were added between 1999 and 2009.

Figure 38: Forecasts of boat ownership for the seven regions in New South Wales

Total number of boats

Linear growth	Actuals				Forecasts			
Region	**1999**	**2003**	**2006**	**2009**	**2012**	**2015**	**2020**	**2026**
Botany Bay/Port Hacking	20 734	22 125	23 062	23 977	24 921	25 903	27 625	29 844
Hawkesbury/Broken Bay	36 328	40 504	42 766	43 935	46 041	48 248	52 164	57 285
Murray Inland	10 156	11 909	13 447	14 711	16 379	18 236	21 812	27 039
Hunter Inland	37 729	43 966	49 671	52 889	58 332	64 336	75 746	92 140
North Coast	19 571	23 678	27 417	30 080	34 247	38 991	48 402	62 741
South Coast	21 598	25 970	29 312	31 731	35 571	39 876	48 240	60 622
Sydney Harbour	15 798	16 861	17 435	18 011	18 574	19 154	20 162	21 442
Total	161 914	185 013	203 110	215 334	234 066	254 744	294 151	351 113

Population driven	Actuals				Forecasts			
Region	**1999**	**2003**	**2006**	**2009**	**2012**	**2015**	**2020**	**2026**
Botany Bay/Port Hacking	20 734	22 125	23 062	23 977	26 859	28 984	32 908	38 323
Hawkesbury/Broken Bay	36 328	40 504	42 766	43 935	49 261	53 003	59 883	69 326
Murray Inland	10 156	11 909	13 447	14 711	15 787	17 077	19 464	22 773
Hunter Inland	37 729	43 966	49 671	52 889	57 374	61 811	69 982	81 226
North Coast	19 571	23 678	27 417	30 080	31 643	33 937	38 136	43 867
South Coast	21 598	25 970	29 312	31 731	34 822	37 746	43 173	50 726
Sydney Harbour	15 798	16 861	17 435	18 011	20 107	21 623	24 408	28 228
Total	161 914	185 013	203 110	215 334	235 852	254 181	287 954	334 470

Difference between liner growth and population scenarios				
Region	**2012**	**2015**	**2020**	**2026**
Botany Bay/Port Hacking	-7.2%	-10.6%	-16.1%	-22.1%
Hawkesbury/Broken Bay	-6.5%	-9.0%	-12.9%	-17.4%
Murray Inland	3.7%	6.8%	12.1%	18.7%
Hunter Inland	1.7%	4.1%	8.2%	13.4%
North Coast	8.2%	14.9%	26.9%	43.0%
South Coast	2.2%	5.6%	11.7%	19.5%
Sydney Harbour	-7.6%	-11.4%	-17.4%	-24.0%
Total	-0.8%	0.2%	2.2%	5.0%

The second approach is based on projected population growth. Accordingly, the number of boats in Sydney Harbour would grow to 28,228 by 2026 (compared with 21,442 in the first). The last section of the table shows the difference between the two alternatives.

Regional forecast scenarios: large vs small boats

This report has already considered differences between NSW Maritime regions relating to boat ownership. The next section looks at regional projections using the first forecast alternative – linear projection of growth. Importantly, it uses two methods to evaluate the balance between smaller and larger vessels to give projections of the number of boats requiring off-water and on-water storage throughout the forecast period.

The first scenario is based on the finding that, across all regions, the proportion of large boats to small boats has grown steadily over the last 10 years. Scenario 1 models large to small vessels in each region based on linear growth of overall numbers.

Scenario 2 also uses linear growth of overall numbers but is based on the proportional difference between large and small boats at 1 July 2009. It assumes a continuation of this proportion throughout the forecast period.

The two scenarios – with different results for small and large vessels – should assist in developing a picture of possible future storage demand within each region. A comparative table of the outcomes for each region under both scenarios can be found at Appendix D.

Forecast: Hawkesbury/Broken Bay

Figure 39: Forecast for Hawkesbury/Broken Bay

Scenario 1	Actuals					Forecasts				
Hawkesbury/ Broken Bay	1999	2003	2006	2009	%	2012	2015	2020	2026	%
> 6	6 221	7 399	8 270	8 712	19.8%	9 540	10 447	12 154	14 575	25.4%
< 5.99	30 107	33 105	34 496	35 223	80.2%	36 501	37 801	40 009	42 709	74.6%
Total	36 328	40 504	42 766	43 935	100%	46 041	48 248	52 164	57 285	100%

Scenario 2	Actuals					Forecasts				
Hawkesbury/ Broken Bay	1999	2003	2006	2009	%	2012	2015	2020	2026	%
> 6	6 221	7 399	8 270	8 712	19.8%	9 130	9 567	10 344	11 359	19.8%
< 5.99	30 107	33 105	34 496	35 223	80.2%	36 911	38 681	41 820	45 926	80.2%
Total	36 328	40 504	42 766	43 935	100%	46 041	48 248	52 164	57 285	100%

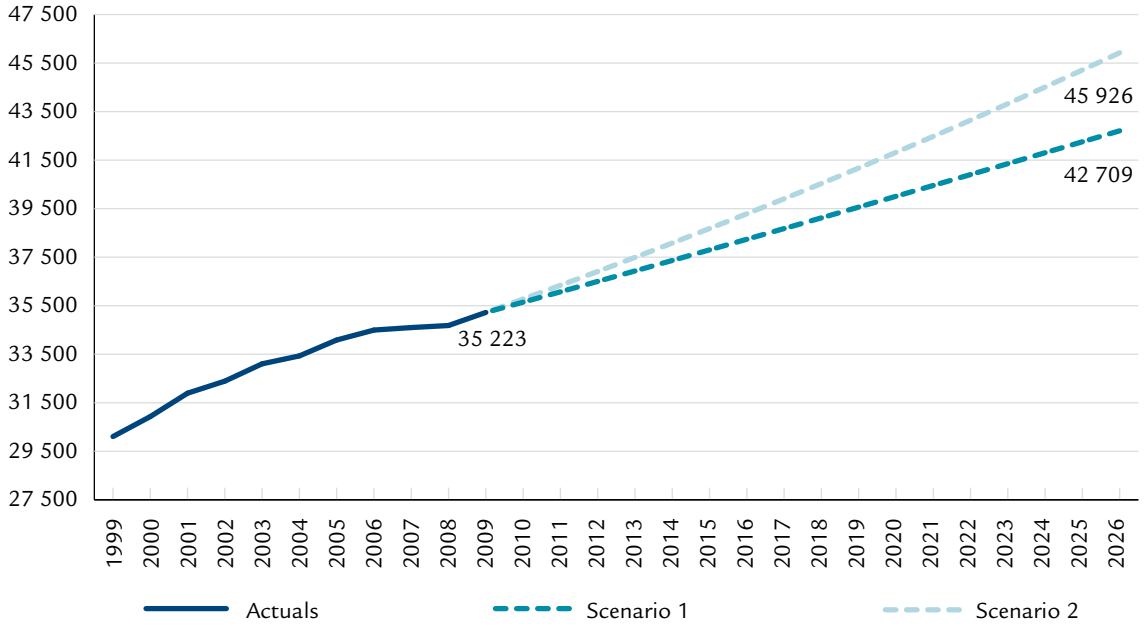
Under the linear growth model, Hawkesbury/Broken Bay would go from having the second largest numbers of boats in NSW to fourth in the table, because of its below average growth in the past. On the other hand, the size distribution projections present different outcomes for storage demand in the region.

In Hawkesbury/Broken Bay it is estimated that the total recreational vessel fleet would increase from 43,935 on 1 July 2009 to 57,285 at 1 July 2026.[44]

44 See graph at Appendix D

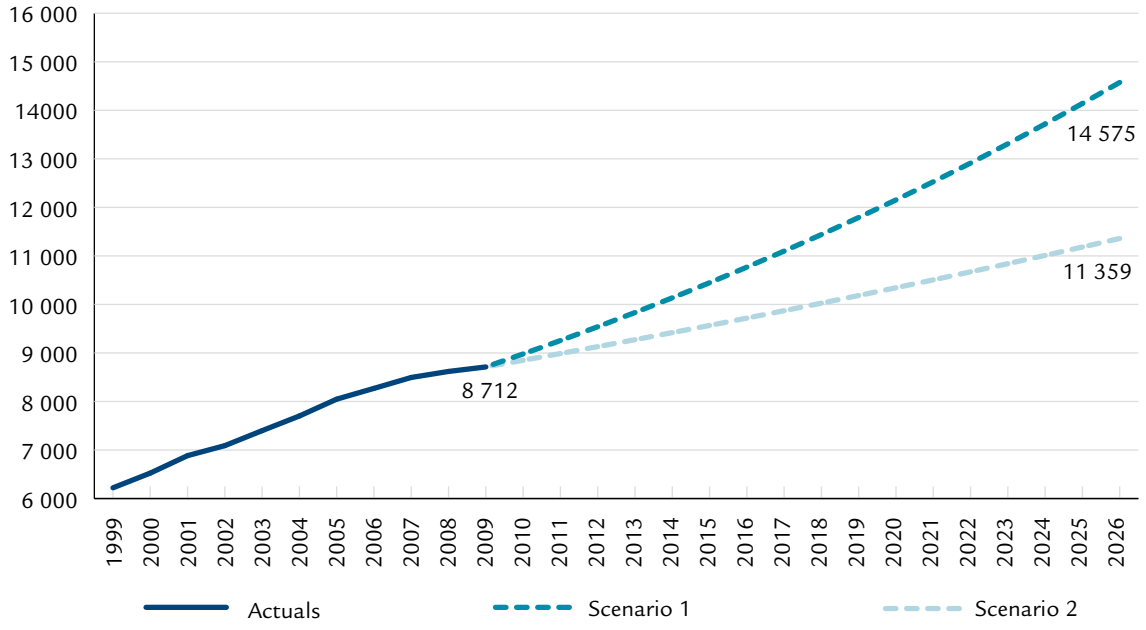
The following graph (Figure 40) shows a plot of Scenarios 1 and 2 for recreational vessels that are less 6 metres in length.

Figure 40: Projected increase small vessels Hawkesbury/Broken Bay



Scenario 1, which assumes a continuing shift towards larger vessels, shows a projected difference in boats less than 6m boats of 3,217 from Scenario 2.

Figure 41: Projected increase large vessels Hawkesbury/Broken Bay



Under Scenario 1, boats over 6m would account for 25.4% of vessels in the Hawkesbury/Broken Bay region by 2026 with 5,683 additional boats requiring on-water, or near-water, storage facilities.

Forecast: Murray Inland

Figure 42: Fleet increase Murray Inland including projection to 2026

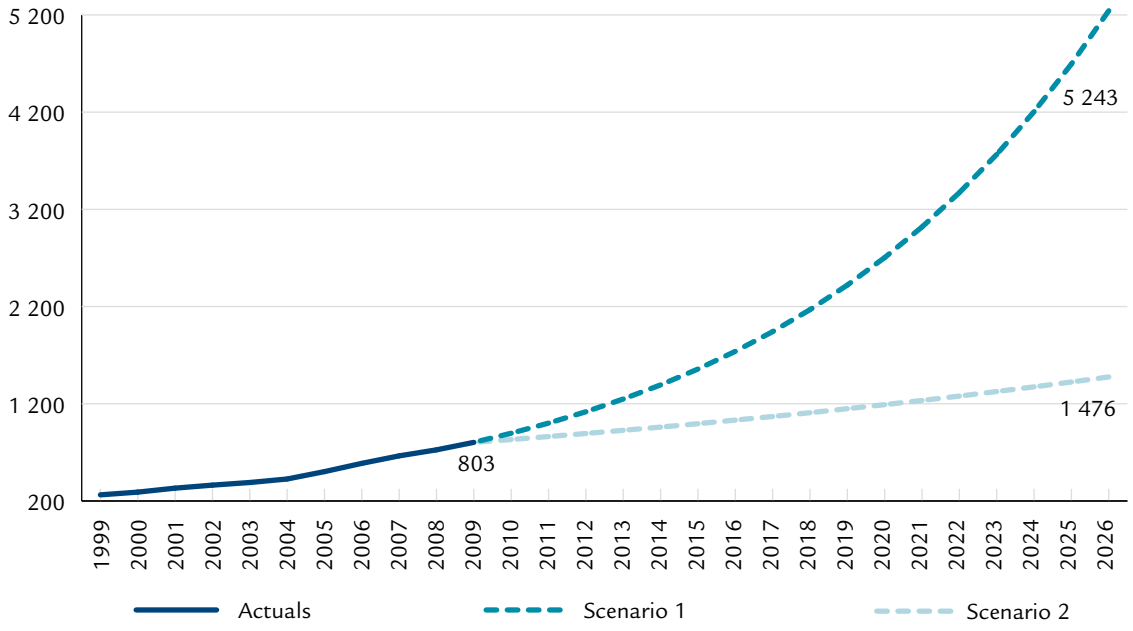
Scenario 1	Actuals					Forecasts				
Murray Inland	1999	2003	2006	2009	%	2012	2015	2020	2026	%
> 6	263	390	587	803	5.5%	1 118	1 557	2 704	5 243	19.4%
< 5.99	9 893	11 519	12 860	13 908	94.5%	15 261	16 679	19 108	21 796	80.6%
Total	10 156	11 909	13 447	14 711	100%	16 379	18 236	21 812	27 039	100%

Scenario 2	Actuals					Forecasts				
Murray Inland	1999	2003	2006	2009	%	2012	2015	2020	2026	%
> 6	263	390	587	803	5.5%	894	995	1 191	1 476	5.5%
< 5.99	9 893	11 519	12 860	13 908	94.5%	15 485	17 241	20 621	25 563	94.5%
Total	10 156	11 909	13 447	14 711	100%	16 379	18 237	21 812	27 039	100%

Murray Inland produces different results using the linear growth model and population based alternative: in the former, the region's recreational fleet grows to **27,039** by 2026 while in the latter, it reaches only **22,773**. The linear growth model, however, probably presents an optimistic view of ownership growth in the Murray region.

Turning to projections for large and small boats, Scenario 1 (as depicted by the red dotted line below) projects the distribution of boats over 6m in length by continuing the trend of balance occurring in the 10 years to 2009:

Figure 43: projected increase in large vessels Murray Inland

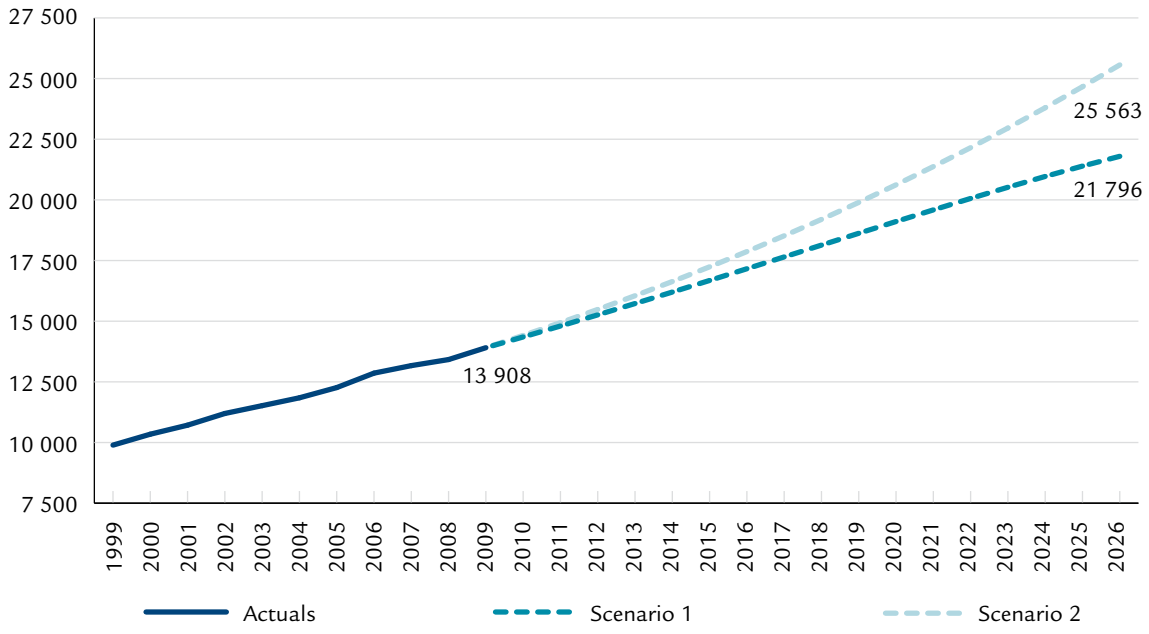


The Murray Inland region experienced annual growth in the part of its fleet over 6m of around 11.7% p.a. between 1999 and 2009 resulting in a sizable proportional shift in larger boats over a relatively short period. Scenario 1 projects this proportional difference out to 2026. As a result, the change in the relative percentage of boats longer than 6m from 5.5% of total vessels in 2009 goes to 19.4% in 2026. In real terms, this would see larger boats increase from 803 at 1 July 2009 to over 5,200 in 2026.

It is conceivable that the growth in larger boats could continue. However, the likelihood of unabated double digit growth to 2026 diminishes as the actual number of vessels rises.

Scenario 2 factors in the 2009 proportional distribution of vessel sizes (with 5.5% of the total recreational vessel fleet over 6m) and projects boat numbers accordingly. This results in a more plausible growth rate for these boats with 1,476 at 2026 (compared with more than 5200).

Figure 44: Projected increase in small vessels Murray Inland



Forecast: Hunter Inland

Figure 45: Fleet increase Hunter Inland including projection to 2026

Scenario 1	Actuals					Forecasts				
Hunter Inland	1999	2003	2006	2009	%	2012	2015	2020	2026	%
> 6	3 681	4 426	5 471	6 277	11.9%	7 342	8 588	11 152	15 258	16.6%
< 5.99	34 048	39 540	44 200	46 612	88.1%	50 990	55 748	64 594	76 882	83.4%
Total	37 729	43 966	49 671	52 889	100%	58 332	64 336	75 746	92 140	100%

Scenario 2	Actuals					Forecasts				
Hunter Inland	1999	2003	2006	2009	%	2012	2015	2020	2026	%
> 6	3 681	4 426	5 471	6 277	11.9%	6 923	7 636	8 990	10 935	11.9%
< 5.99	34 048	39 540	44 200	46 612	88.1%	51 409	56 700	66 756	81 205	88.1%
Total	37 729	43 966	49 671	52 889	100%	58 332	64 336	75 746	92 140	100%

At 1 July 2009, the Hunter Inland was the largest region for boat ownership in NSW; under both projection models used in this report it will continue its dominance. Under the linear projection alternative, the Hunter Inland recreational vessel fleet is forecast to reach **92,140** by 2026.

Furthermore, Scenario 1 projects a growth in the over 6m recreational vessel fleet from 6,277 in 2009 to 8,588 in 2015 and 15,258 in 2026. As discussed previously, Hunter Inland is the powerhouse of recreational boating in the State. This is projected to continue through the forecast period. This trend is a bit slower in the proportion-driven projections of Scenario 2.

Figure 46: projected increase in large vessels Hunter Inland

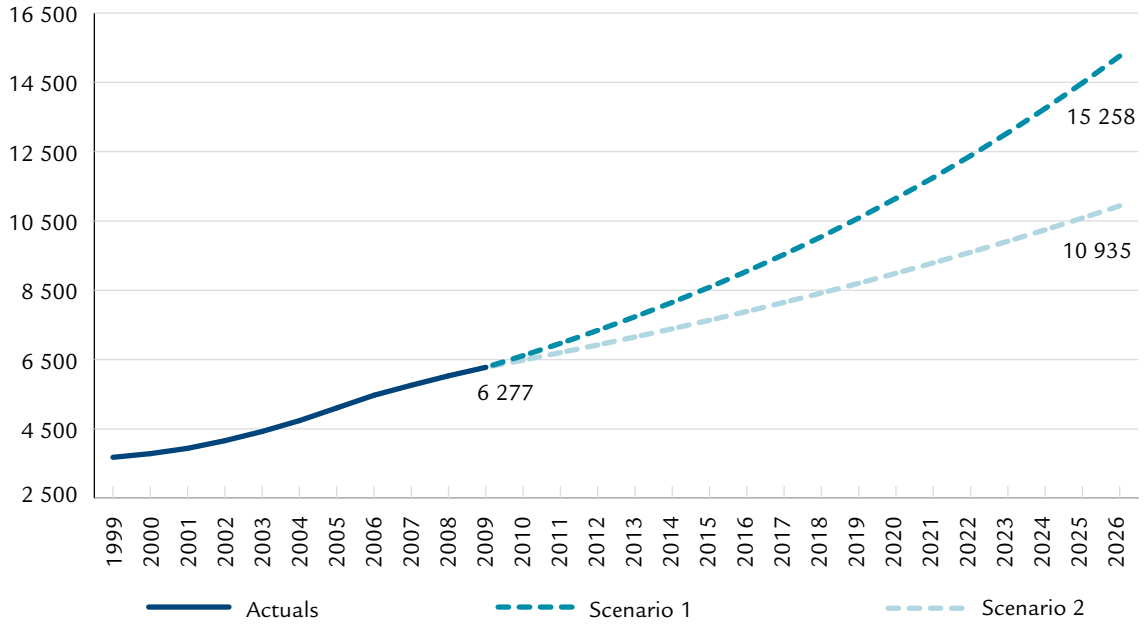
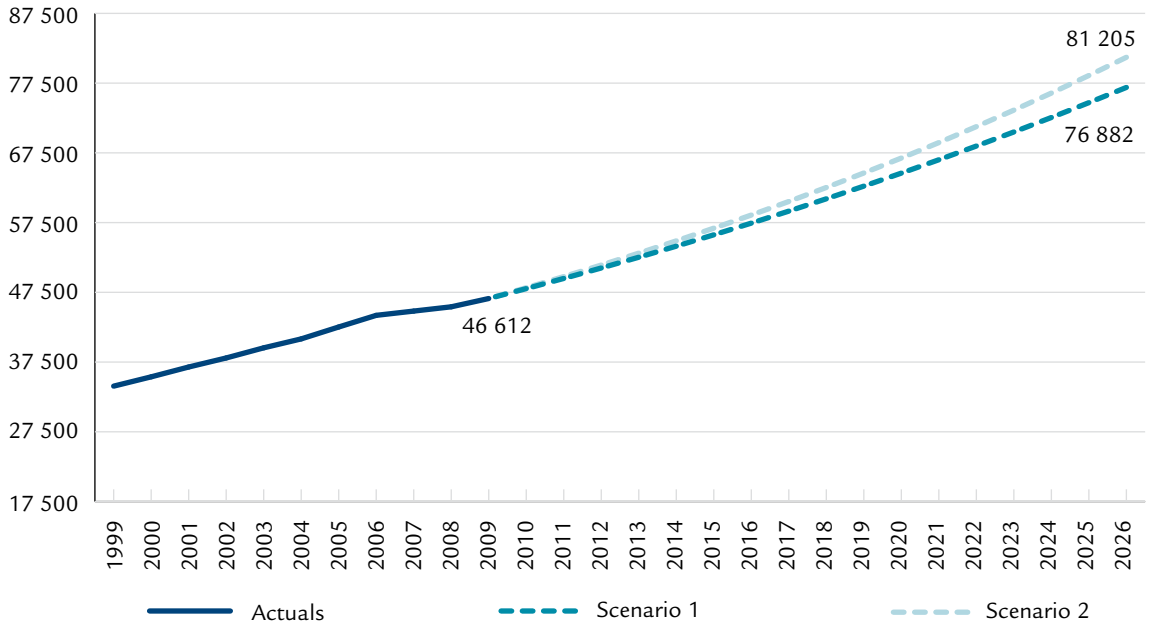


Figure 47: projected increase in small vessels Hunter Inland



Forecast: Sydney Harbour

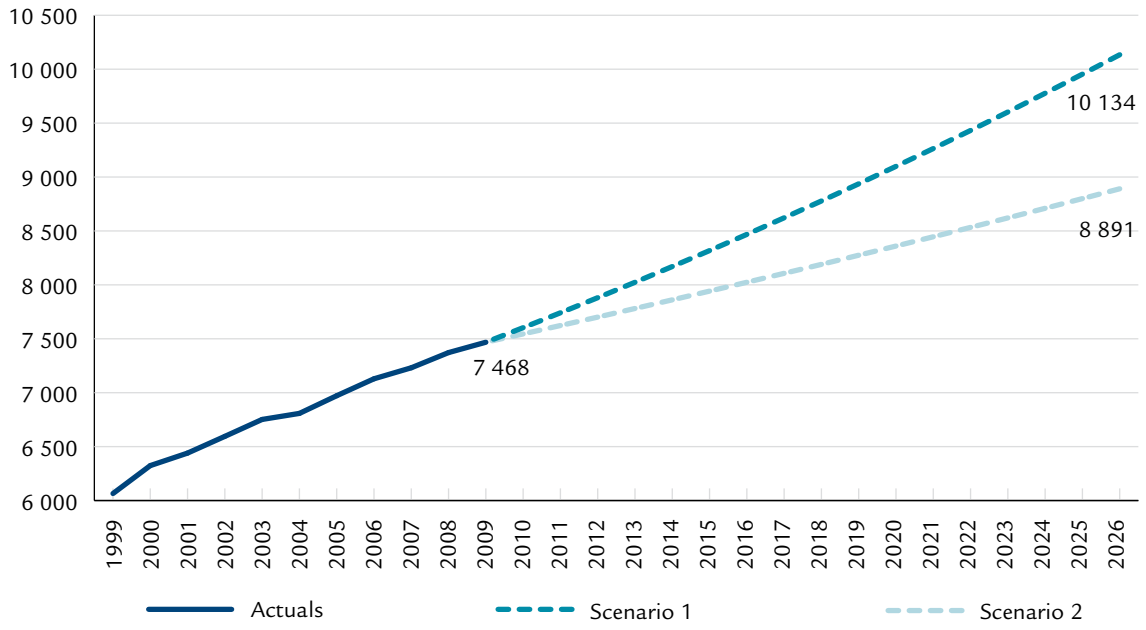
Figure 48: Fleet increase Sydney Harbour including projection to 2026

Scenario 1	Actuals					Forecasts				
Sydney Harbour	1999	2003	2006	2009	%	2012	2015	2020	2026	%
> 6	6 065	6 752	7 129	7 468	41.5%	7 881	8 318	9 099	10 134	47.3%
< 5.99	9 733	10 109	10 306	10 543	58.5%	10 693	10 837	11 063	11 308	52.7%
Total	15 798	16 861	17 435	18 011	100%	18 574	19 154	20 162	21 442	100%

Scenario 2	Actuals					Forecasts				
Sydney Harbour	1999	2003	2006	2009	%	2012	2015	2020	2026	%
> 6	6 065	6 752	7 129	7 468	41.5%	7 701	7 942	8 360	8 891	51.5%
< 5.99	9 733	10 109	10 306	10 543	58.5%	10 872	11 212	11 802	12 551	58.5%
Total	15 798	16 861	17 435	18 011	100%	18 574	19 154	20 162	21 442	100%

As already discussed, in the ten years to 2009, Sydney Harbour region exhibited a number of unique characteristics. Using Scenario 1, projections indicate that the split between large and small boats in Sydney Harbour could be close to parity by 2026: 47.3% will be over 6m in length. Of the additional 3,431 recreational boats projected for Sydney Harbour, 2,666 (or around 77%) are expected to be large boats.

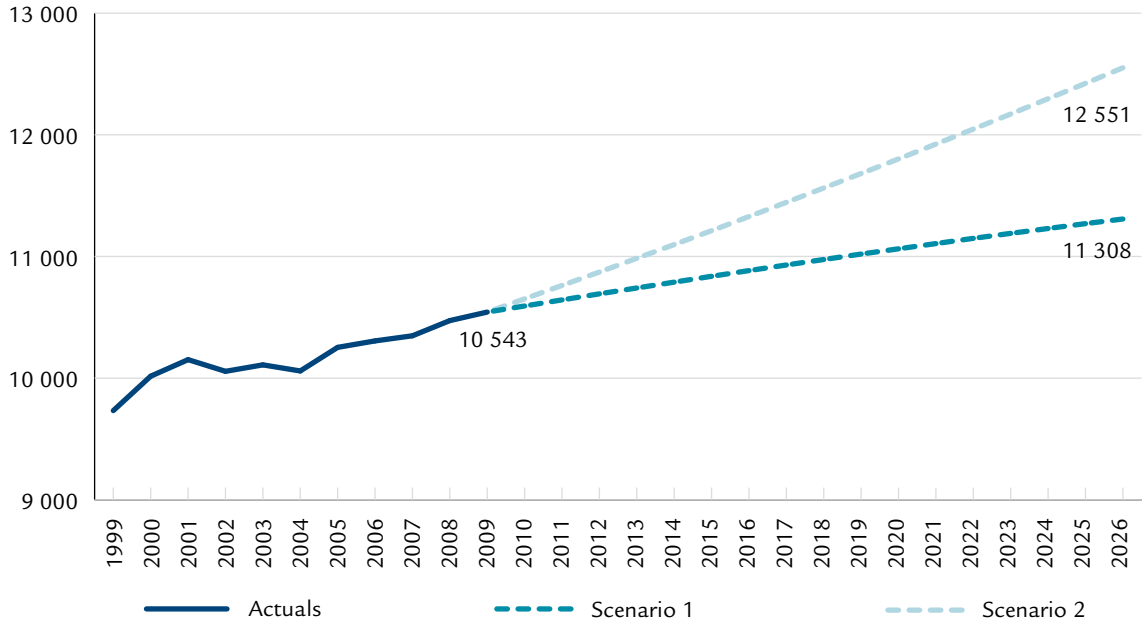
Figure 49: Projected increase in large vessels Sydney Harbour



Overall growth in Sydney Harbour is projected to be relatively modest with an annual growth rate around 1% and a growth to 2026 of around 19%. While this growth is comparatively subdued, Sydney Harbour has, nevertheless, the highest demand for on-water storage of any region in the state and relatively few avenues for expansion.

The following graph, Figure 50, demonstrates the projected scenarios for recreational vessels in Sydney Harbour under 6m in length.

Figure 50: Projected increase small vessels Sydney Harbour

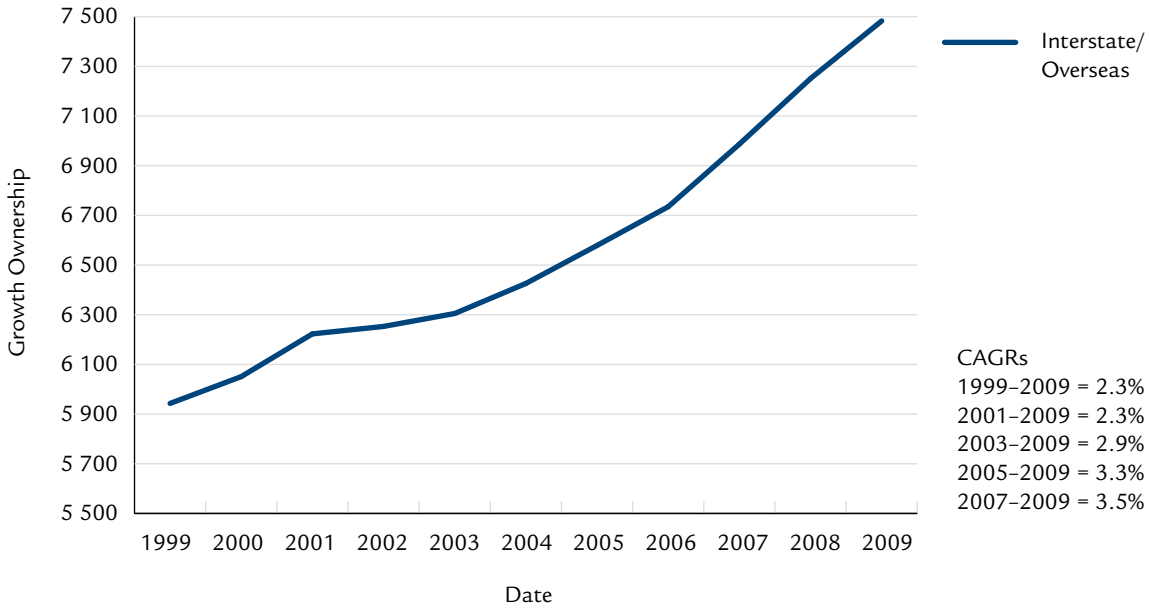


Forecast: Interstate/overseas

The number of boats owned by interstate/overseas residents has increased steadily over the last ten years. The annual growth rate from 1999–2009 was 2.3%, rising to 3.5% for 2007–2009.

The graph (Figure 51) shows the steady growth in the number of boats (the columns) and the year-on-year growth rates. These reveal that while the number of boats has increased every year, the growth rates have decreased twice: after 2001 and 2008.

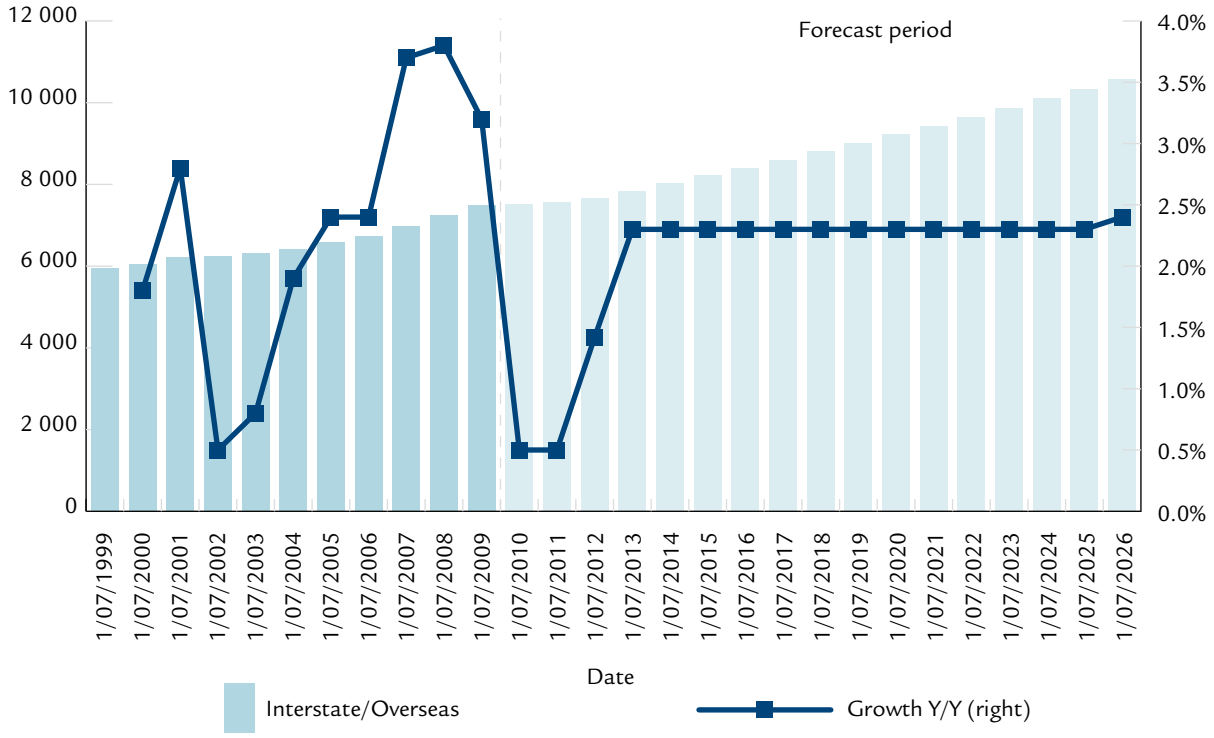
Figure 51: Growth in boats owned by interstate/overseas residents



Assuming that overseas boat ownership is sensitive to global economic cycles and the fact that there is no population forecast for this boat category, a slightly different approach has been used to that for New South Wales regions. Because of the uncertainty of the future health of the global economy, pace of growth has been forecast at only 0.5% in 2010 and 2011 before returning to the annual growth rate of 2.3% p.a experienced between 1999 and 2009. Based on these assumptions, the number of boats will increase from 7,483 to about 8,000 in 2014 and may pass the 10,000-mark by 2026.

The table (figure 52) shows the base case (linear projection) scenario:

Figure 52: Forecast for interstate/overseas vessels



Without reductions in the annual growth rate in 2010–2012, the total number of boats by 2026 would be 11,071.[45]

In terms of boat size, the proportion of boats above six metres has increased from 13.9% in 1999 to 18.7% in 2009. It should be noted, however, that this growth occurred from a relatively low base. Appendix E presents three alternative forecasts to 2026 for the number of large and small boats, registered to interstate/overseas owners.

Regional trends for each boat size category

Appendix F contains graphs which provide an overview of the number of boats for each category (above and below six metres) and year-on-year growth for each per boat size category between 1999 and 2009.

It is evident that results are similar across most regions: year-on-year growth rates for both categories of boats, while fluctuating, have always stayed positive. More importantly, the absolute number of boats in almost every category and in every region experienced positive growth between 1999 and 2009. The exception is Sydney Harbour where year-on-year growth rates for boats less than 6 metres twice dipped below the zero-mark in 2002 and 2004. However, as we have seen, Sydney Harbour is unique, not only because of the predominance of large boats. Lastly, the proportion of larger boats has grown almost constantly in each region in every year with the growth rates for larger boats, in almost every instance, remaining above that of smaller boats.[46]

45 Assuming slower growth to 2013 restricts the projected growth to 10,583 vessels in 2026.

46 Only in Hawkesbury / Broken Bay did the year-on-year growth rate for small boats exceed that of large boats in the year ended June 2009.

12. Discussion

This report is intended to provide reliable projections for use in planning discussions. It is not a strategy document, but a resource for future planning and policy work.

Clearly these projections have a number of implications for NSW Maritime as well as the other various stakeholders involved in recreational boating in NSW. Set out below, as examples, are issues arising for NSW Maritime from this report. This is not a comprehensive list, but some of the implications NSW Maritime will address in its short and medium term planning. A broader range of government agencies and industry bodies will need to use this data to inform their own policy development.

1. Mooring policy and planning

It is probable that NSW Maritime's policies relating to moorings will be reviewed in the light of increasing numbers of large boats, especially in waterways already subjected to strong demand. Issues which would need review could include:

- Consideration of how mooring ceilings are set at locations (depth of water, space, swing patterns, size of vessels) and how to increase capacity
- Priority areas for the development of mooring management plans
- Potential for changes in mooring styles to create greater efficiency and capacity
- Implications of increasing turnover in mooring sites and application of market pricing ('congestion tax' for areas in high demand)
- Development of mooring management plans for regional waterways (e.g. Hunter).

2. Sydney Harbour

Given Sydney Harbour's unique position among NSW Maritime Regions, development of strategies for better integrated planning, management and satisfaction of demand are needed:

- Integrated urban planning for the Sydney Metropolitan area taking into consideration increasing demand for recreational boating and related storage needs
- Encouragement of development of boating facilities in areas on the outskirts of Sydney including Port Hacking, Botany Bay and Broken Bay
- Matching supply of marina berths with demand
- Consultation with local councils for boat ramp traffic and trailer parking management to prevent undue waiting times at congested locations, especially at holiday and weekend peaks
- Identification of new sites and funding sources for moorings and other options such as dry stack storage for smaller boats such as dinghies
- Consideration of alternative strategies for increasing on-water storage such as converting swing moorings to marina style moorings
- Local Councils dealing effectively and equitably with dinghy storage around foreshores and trailer parking on city and suburban streets
- Expanding spare capacity of transient boating infrastructure for visiting vessels.

3. Congestion management

As shown previously, with increasing and competing use of waterways, incidents involving collisions between vessels become more frequent and will continue to do so as waterways other than Sydney Harbour become more congested. The implications of this are:

- The ongoing need for a boating regulator
- Priority areas for the development of safe boating plans for usage and congestion management strategies
- The needs for safety on and around the water to become a paramount consideration in the development of sites
- Consideration of strategies which limit the growth of vessel traffic and usage in certain areas which may reach capacity
- The development of education programs for vessel operators.

4. Recreational boat ramps

NSW Maritime studies (as previously indicated) show that many facilities already need to be better maintained or are unable to cope with current usage levels. Ongoing investment in boating infrastructure will be important.

5. Regional opportunities

The increasing number of recreational boats represents opportunities for regions – especially outside Sydney Harbour – to meet the needs of local communities and attract tourists and holiday makers to their waterways. The implications of this are:

- The need to develop boating facilities (such as the redevelopment of the Greenwell Point boat ramp on the Shoalhaven waterways) to boost regional tourist potential
- The opportunities for local government in Northern New South Wales to benefit from the saturation of the Queensland Gold Coast as a recreational boating destination by the maintenance and development of recreational boating facilities
- The opportunity to direct recreational boat owners away from environmentally sensitive areas (such as Clarence Town in the Hunter) towards more robust waterfronts
- Whether the funds available under the Better Boating Program are sufficient to meet demand, whether funding matches areas of demand and whether other sources are available for infrastructure development and maintenance.

13. Conclusion

This report has demonstrated that growth in recreational vessel numbers in NSW is expected to continue strongly into the 2020s. This will create demand for on-water storage infrastructure such as marinas as well as upgraded and expanded recreational boating facilities such as boat ramps. Impacts on local traffic and parking can be anticipated along with competing demands for residential amenity at popular waterway venues. With the information in this report, all those involved in land use planning and waterways management in NSW can be better prepared to provide for orderly development and to make the most of opportunities for urban and regional growth and renewal.

Appendix A

Vessels by region and size

Recreational vessels in NSW by region and size:

Region	Under 4m	4 to 6m	6 to 8m	8 to 10m	10 to 12m	12 to 14m	14m and over	Total
Botany Bay/ Port Hacking	6 404	13 533	2 430	707	514	228	161	**23 977**
Hawkesbury/ Broken Bay	10 277	24 946	4 842	1 780	1 225	523	342	**43 935**
Interstate/Overseas	2 096	3 987	574	219	162	204	241	**7 483**
Murray Inland	7 108	6 800	633	46	29	40	55	**14 711**
Hunter Inland	16 248	30 364	3 907	1192	734	305	139	**52 889**
North Coast	12 564	15 401	1 351	283	260	148	73	**30 080**
NSW Other	79	159	26	7	7	2	1	**281**
South Coast	9 439	19 342	2 162	381	250	88	69	**31 731**
Sydney Harbour	3 364	7 179	2 988	1 930	1 375	635	540	**18 011**
NSW Total	67 579	121 711	18 913	6 545	4 556	2 173	1 621	223 098
% of NSW Total	30%	55%	8%	3%	2%	1%	1%	

Commercial vessels in NSW by region and size:

Region	Under 4m	4 to 6m	6 to 8m	8 to 10m	10 to 12m	12 to 14m	14m and over	Total
Botany Bay/ Port Hacking	36	128	88	28	31	36	58	**405**
Hawkesbury/ Broken Bay	75	252	160	64	88	95	64	**798**
Interstate/Overseas	20	53	56	15	30	27	104	**305**
Murray Inland	40	46	10	1	3	8	54	**162**
Hunter Inland	105	345	147	75	43	37	62	**814**
North Coast	86	558	254	111	89	48	103	**1 249**
NSW Other	10	13	7	4	4	2	5	**45**
South Coast	63	262	141	33	51	42	56	**648**
Sydney Harbour	170	280	152	89	92	69	232	**1 084**
NSW Total	605	1 937	1 015	420	431	364	738	5 510
% of NSW Total	11%	35%	18%	8%	8%	7%	13%	

Appendix B

Growth in numbers of medium sized boats 1999–2009

Length	1/07/1999	1/07/2009
Under 3m	6 658	4 409
3 to 4m	46 224	63 775
4 to 5m	63 609	80 121
5 to 6m	30 860	43 527
6 to 7m	**7 382**	**13 397**
7 to 8m	5 662	6 533
8 to 9m	3 010	3 670
9 to 10m	2 692	3 295

Appendix C

Comparison of growth between sail and powered vessels

Comparison of growth between sail and powered vessels greater than 6m 1999–2009

Propulsion Type	1/07/1999	1/07/2001	1/07/2003	1/07/2005	1/07/2007	1/07/2009
Sail	10 776	11 156	11 437	11 575	11 786	11 917
Powered 6m and Over	15 598	17 451	19 123	21 524	23 699	25 566
Total Vessels	172 998	185 349	196 518	209 064	219 282	228 643

Propulsion Type	1/07/1999	1/07/2001	1/07/2003	1/07/2005	1/07/2007	1/07/2009
Sail	100%	104%	106%	107%	109%	111%
Powered 6m and Over	100%	112%	123%	138%	152%	164%
Total Vessels in NSW	100%	107%	114%	121%	127%	132%

Appendix D

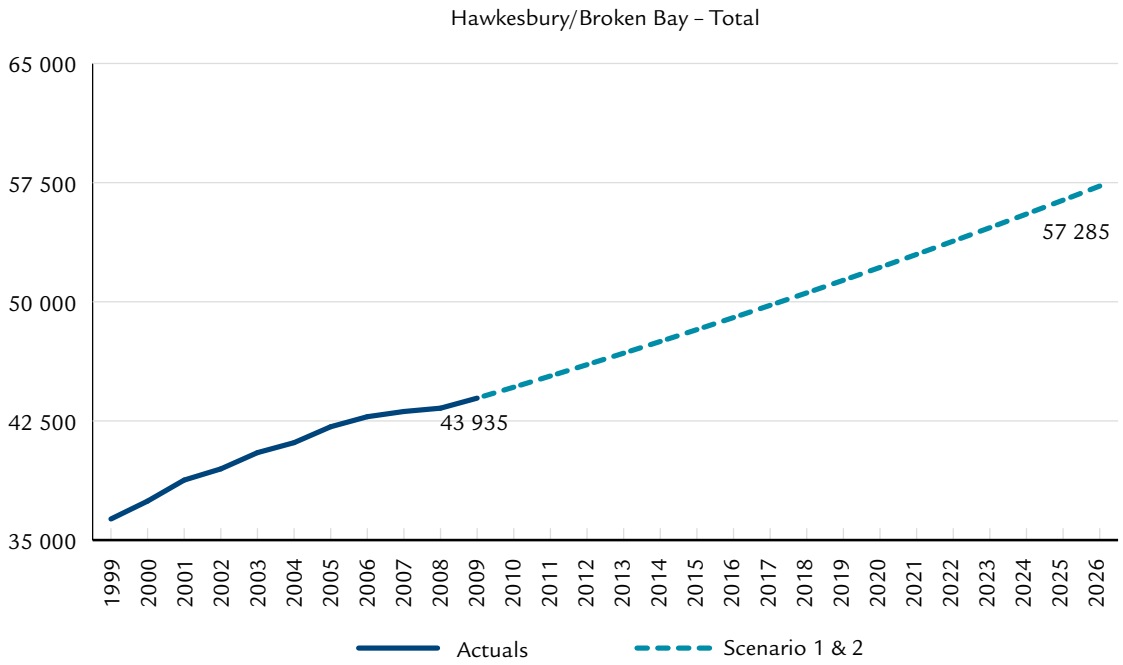
Regional fleet projections to 2026

The following table gives projections under Scenarios 1 & 2 split regionally, by size and against observed statistics for the ten years of data.

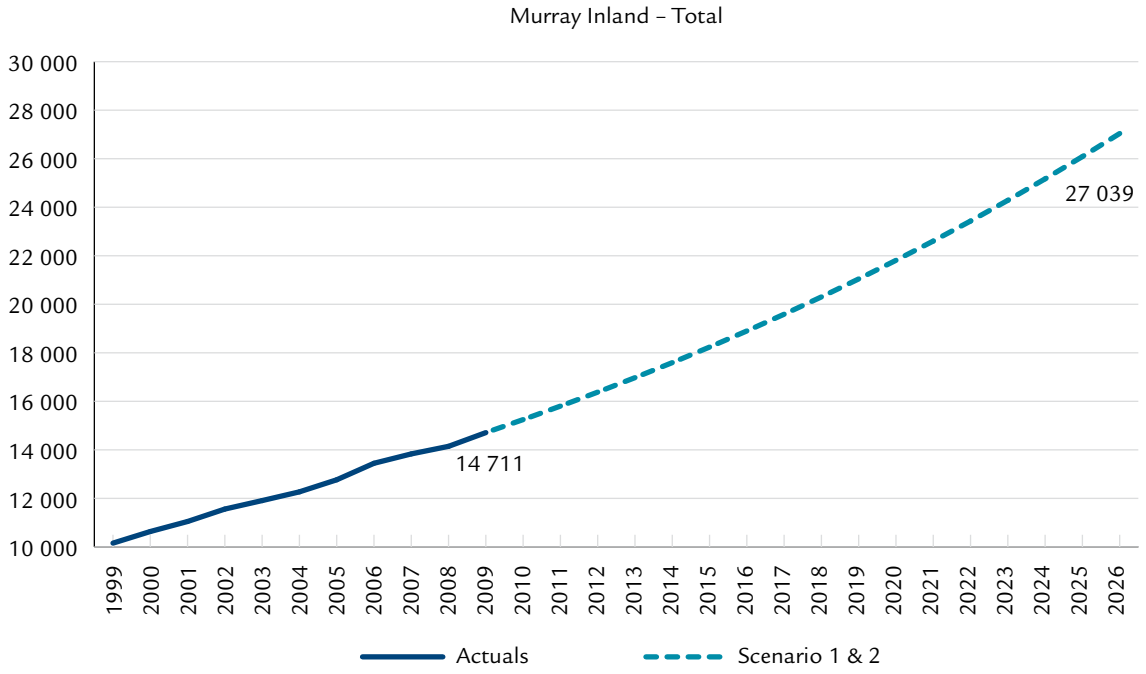
Scenario 1	Actuals					Forecasts				
	1999	2003	2006	2009	%	2012	2015	2020	2026	%
Botany Bay/Port Hacking										
> 6	2 986	3 422	3 718	4 040	16.8%	4 402	4 796	5 532	6 567	22.0%
< 5.99	17 748	18 703	19 344	19 937	83.2%	20 520	21 107	22 093	23 278	78.0%
Total	20 734	22 125	23 062	23 977	100%	24 921	25 903	27 625	29 844	100%
Hawkesbury/Broken Bay										
> 6	6 221	7 399	8 270	8 712	19.8%	9 540	10 447	12 154	14 575	25.4%
< 5.99	30 107	33 105	34 496	35 223	80.2%	36 501	37 801	40 009	42 709	74.6%
Total	36 328	40 504	42 766	43 935	100%	46 041	48 248	52 164	57 285	100%
Murray Inland										
> 6	263	390	587	803	5.5%	1 118	1 557	2 704	5 243	19.4%
< 5.99	9 893	11 519	12 860	13 908	94.5%	15 261	16 679	19 108	21 796	80.6%
Total	10 156	11 909	13 447	14 711	100%	16 379	18 236	21 812	27 039	100%
Hunter Inland										
> 6	3 681	4 426	5 471	6 277	11.9%	7 342	8 588	11 152	15 258	16.6%
< 5.99	34 048	39 540	44 200	46 612	88.1%	50 990	55 748	64 594	76 882	83.4%
Total	37 729	43 966	49 671	52 889	100%	58 332	64 336	75 746	92 140	100%
North Coast										
> 6	1 111	1 355	1 771	2 115	7.0%	2 568	3 117	4 306	6 347	10.1%
< 5.99	18 460	22 323	25 646	27 965	93.0%	31 679	35 874	44 096	56 394	89.9%
Total	19 571	23 678	27 417	30 080	100%	34 247	38 991	48 402	62 741	100%
South Coast										
> 6	1 513	2 036	2 511	2 950	9.3%	3 600	4 393	6 123	9 118	15.0%
< 5.99	20 085	23 934	26 801	28 781	90.7%	31 971	35 483	42 117	51 504	85.0%
Total	21 598	25 970	29 312	31 731	100%	35 571	39 876	48 240	60 622	100%
Sydney Harbour										
> 6	6 065	6 752	7 129	7 468	41.5%	7 881	8 318	9 099	10 134	47.3%
< 5.99	9 733	10 109	10 306	10 543	58.5%	10 693	10 837	11 063	11 308	52.7%
Total	15 798	16 861	17 435	18 011	100%	18 574	19 154	20 162	21 442	100%
Total										
> 6	21 840	25 780	29 457	32 365	15.0%	36 451	41 216	51 071	67 243	19.2%
< 5.99	140 074	159 233	173 653	182 969	85.0%	197 614	213 528	243 081	283 871	80.8%
Total	161 914	185 013	203 110	215 334	100%	234 066	254 744	294 151	351 113	100%

Scenario 2	Actuals					Forecasts				
	1999	2003	2006	2009	%	2012	2015	2020	2026	%
Botany Bay/Port Hacking										
> 6	2 986	3 422	3 718	4 040	16.8%	4 199	4 364	4 655	5 029	16.8%
< 5.99	17 748	18 703	19 344	19 937	83.2%	20 722	21 538	22 971	24 815	83.2%
Total	20 734	22 125	23 062	23 977	100%	24 921	25 903	27 625	29 844	100%
Hawkesbury/Broken Bay										
> 6	6 221	7 399	8 270	8 712	19.8%	9 130	9 567	10 344	11 359	19.8%
< 5.99	30 107	33 105	34 496	35 223	80.2%	36 911	38 681	41 820	45 926	80.2%
Total	36 328	40 504	42 766	43 935	100%	46 041	48 248	52 164	57 285	100%
Murray Inland										
> 6	263	390	587	803	5.5%	894	995	1 191	1 476	5.5%
< 5.99	9 893	11 519	12 860	13 908	94.5%	15 485	17 241	20 621	25 563	94.5%
Total	10 156	11 909	13 447	14 711	100%	16 379	18 237	21 812	27 039	100%
Hunter Inland										
> 6	3 681	4 426	5 471	6 277	11.9%	6 923	7 636	8 990	10 935	11.9%
< 5.99	34 048	39 540	44 200	46 612	88.1%	51 409	56 700	66 756	81 205	88.1%
Total	37 729	43 966	49 671	52 889	100%	58 332	64 336	75 746	92 140	100%
North Coast										
> 6	1 111	1 355	1 771	2 115	7.0%	2 408	2 742	3 403	4 411	7.0%
< 5.99	18 460	22 323	25 646	27 965	93.0%	31 839	36 249	44 999	58 330	93.0%
Total	19 571	23 678	27 417	30 080	100%	34 247	38 991	48 402	62 741	100%
South Coast										
> 6	1 513	2 036	2 511	2 950	9.3%	3 307	3 707	4 485	5 636	9.3%
< 5.99	20 085	23 934	26 801	28 781	90.7%	32 264	36 169	43 755	54 986	90.7%
Total	21 598	25 970	29 312	31 731	100%	35 571	39 876	48 239	60 622	100%
Sydney Harbour										
> 6	6 065	6 752	7 129	7 468	41.5%	7 701	7 942	8 360	8 891	51.5%
< 5.99	9 733	10 109	10 306	10 543	58.5%	10 872	11 212	11 802	12 551	58.5%
Total	15 798	16 861	17 435	18 011	100%	18 574	19 154	20 162	21 442	100%
Total										
> 6	21 840	25 780	29 457	32 365	15.0%	34 562	39 954	41 427	47 737	13.6%
< 5.99	140 074	159 233	173 653	182 969	85.0%	199 503	217 791	252 724	303 376	86.4%
Total	161 914	185 013	203 110	215 334	100%	234 066	254 744	294 151	351 113	100%

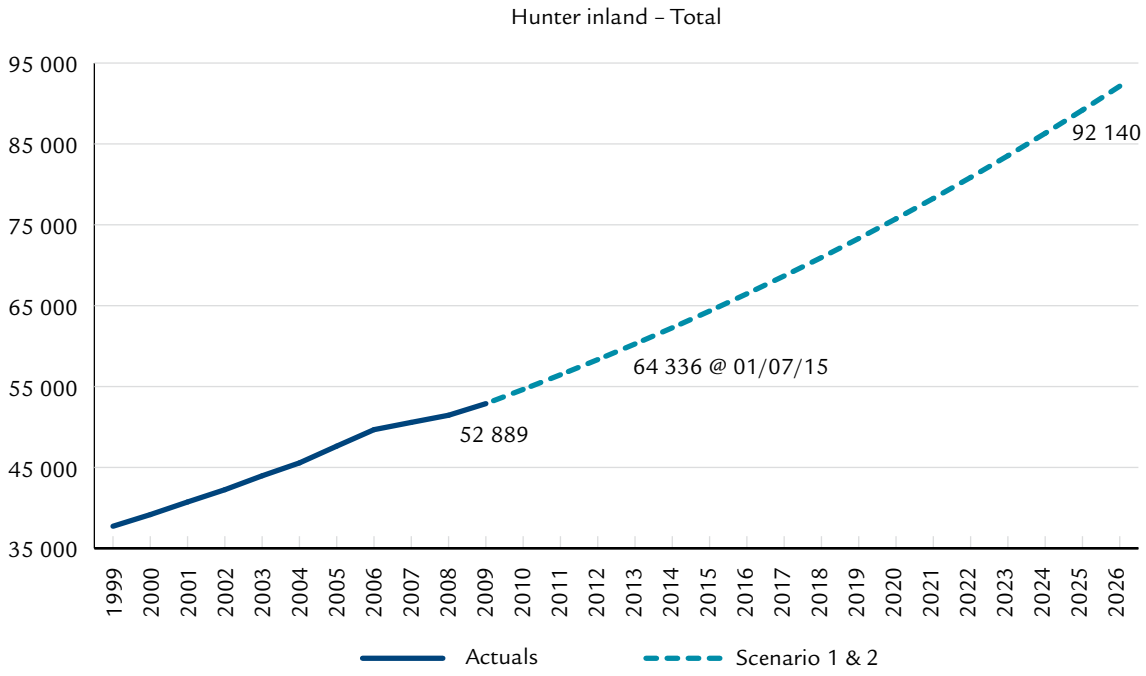
Total increase Hawkesbury/Broken Bay including projection to 2026



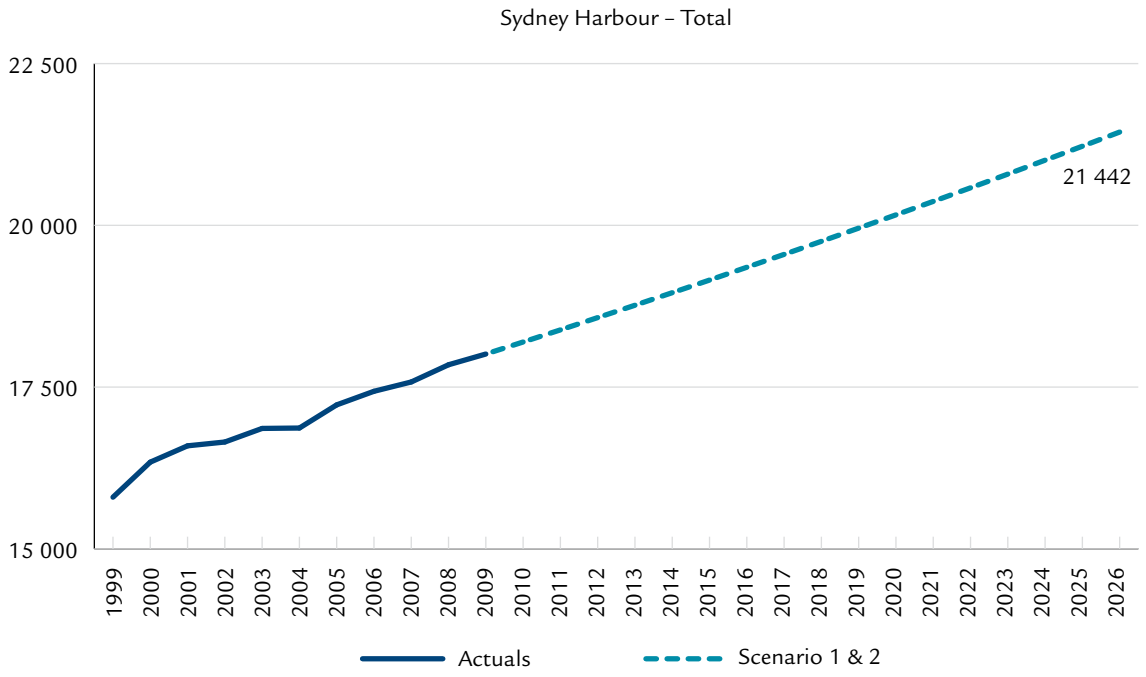
Total increase Murray Inland including projection to 2026



Total increase Hunter Inland including projection to 2026



Total increase all recreational vessels Sydney Harbour including projection to 2026



Appendix E

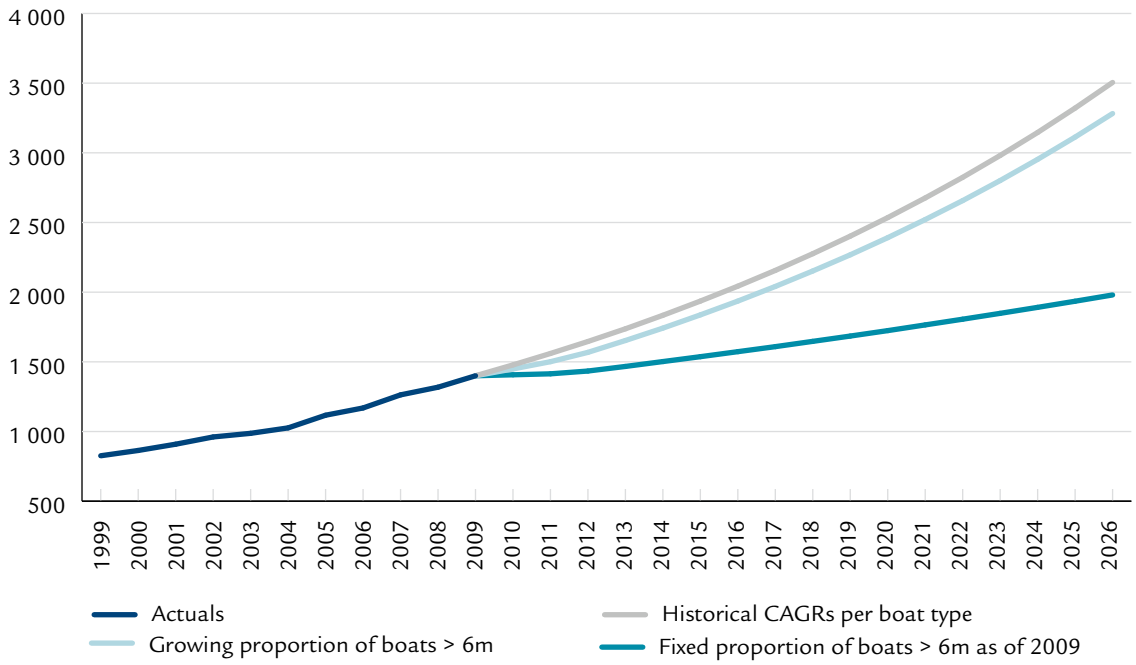
Interstate and overseas vessels: forecasts to 2026

Note: Scenario A assumes that the relative proportion of boats longer than six metres continues to grow in line with historical trends. Scenario B uses relative proportions as they were in 2009. Finally, Scenario C applies the historical compounded annual growth rates from the period 1999 to 2009 to the values in 2009. As noted previously, it is reasonable to predict a slight decrease in the annual growth rate for this category (because the 'overseas' component could be influenced by global economic uncertainty) so Scenarios A or B are preferred. While the annual growth rates for larger boats have been significant over the last ten years, it is questionable whether this growth is sustainable in the long run.

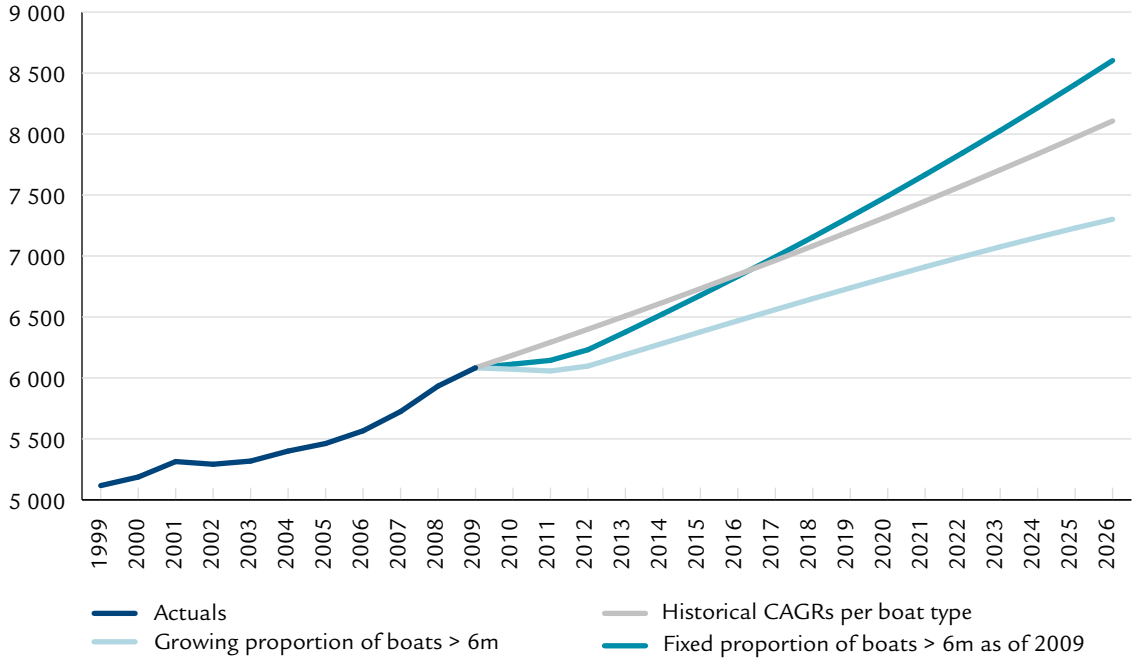
Interstate/overseas vessels: Scenarios for the boats over 6m and under 6m to 2026

	Actuals			Proportions		A			B			C		
	> 6m	<5.99m	Total	> 6m	<5.99m	> 6m	<5.99m	Total	> 6m	<5.99m	Total	> 6m	<5.99m	Total
1/7/99	826	5,117	**5,943**	13.9%	86.1%									
1/7/00	864	5,187	**6,051**	14.3%	85.7%									
1/7/01	909	5,314	**6,223**	14.6%	85.4%									
1/7/02	961	5,292	**6,253**	15.4%	84.6%									
1/7/03	987	5,318	**6,305**	15.7%	84.3%									
1/7/04	1,026	5,400	**6,426**	16.0%	84.0%									
1/7/05	1,117	5,462	**6,579**	17.0%	83.0%									
1/7/06	1,169	5,566	**6,735**	17.4%	82.6%									
1/7/07	1,263	5,724	**6,987**	18.1%	81.9%									
1/7/08	1,318	5,933	**7,251**	18.2%	81.8%									
1/7/09	1,400	6,083	**7,483**	18.7%	81.3%									
1/7/10						1,449	6,071	**7,520**	1,407	6,113	**7,520**	1,478	6,187	**7,664**
1/7/11						1,501	6,057	**7,558**	1,414	6,144	**7,558**	1,560	6,292	**7,852**
1/7/12						1,568	6,097	**7,665**	1,434	6,231	**7,665**	1,646	6,399	**8,045**
1/7/13						1,653	6,191	**7,844**	1,467	6,376	**7,844**	1,737	6,508	**8,246**
1/7/14						1,742	6,284	**8,026**	1,502	6,525	**8,026**	1,834	6,619	**8,453**
1/7/15						1,837	6,377	**8,214**	1,537	6,677	**8,214**	1,936	6,732	**8,667**
1/7/16						1,936	6,469	**8,405**	1,573	6,833	**8,405**	2,043	6,847	**8,890**
1/7/17						2,041	6,560	**8,601**	1,609	6,992	**8,601**	2,156	6,963	**9,119**
1/7/18						2,152	6,650	**8,801**	1,647	7,155	**8,801**	2,276	7,082	**9,358**
1/7/19						2,268	6,738	**9,007**	1,685	7,322	**9,007**	2,402	7,203	**9,605**
1/7/20						2,391	6,825	**9,217**	1,724	7,492	**9,217**	2,535	7,325	**9,861**
1/7/21						2,521	6,911	**9,431**	1,765	7,667	**9,431**	2,676	7,450	**10,126**
1/7/22						2,657	6,994	**9,651**	1,806	7,846	**9,651**	2,824	7,577	**10,401**
1/7/23						2,801	7,075	**9,876**	1,848	8,028	**9,876**	2,981	7,706	**10,687**
1/7/24						2,953	7,153	**10,106**	1,891	8,216	**10,106**	3,146	7,837	**10,984**
1/7/25						3,113	7,229	**10,342**	1,935	8,407	**10,342**	3,321	7,971	**11,292**
1/7/26						3,282	7,301	**10,583**	1,980	8,603	**10,583**	3,505	8,107	**11,612**

Interstate/Overseas – boats > 6m



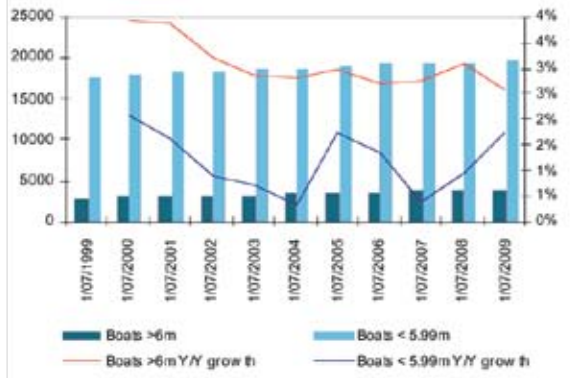
Interstate/Overseas – boats 5.99m



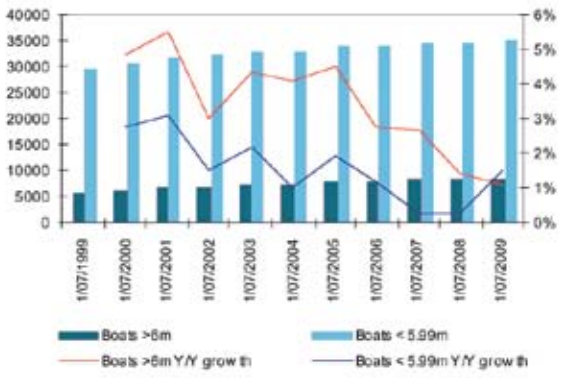
Appendix F

Regional trends by boat size 1999–2009

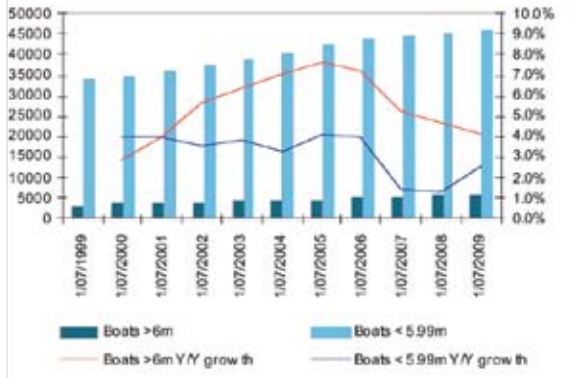
Botany Bay / Port Hacking



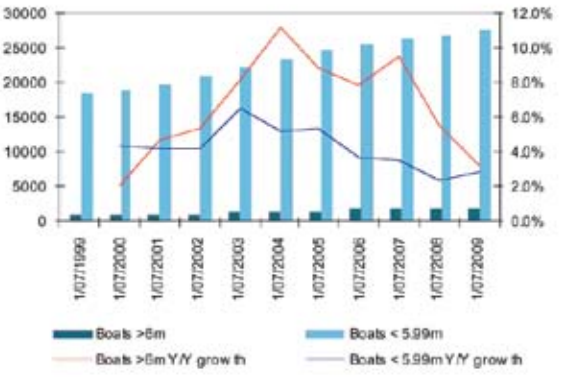
Hawkesbury / Broken Bay



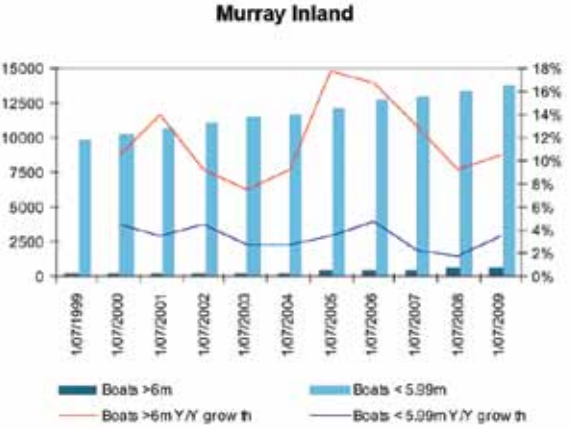
Hunter Inland



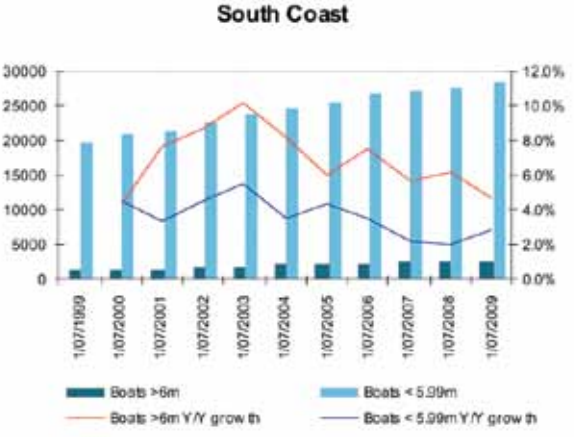
North Coast

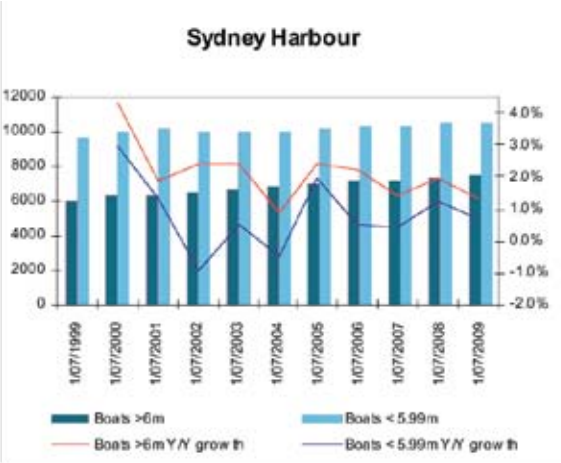


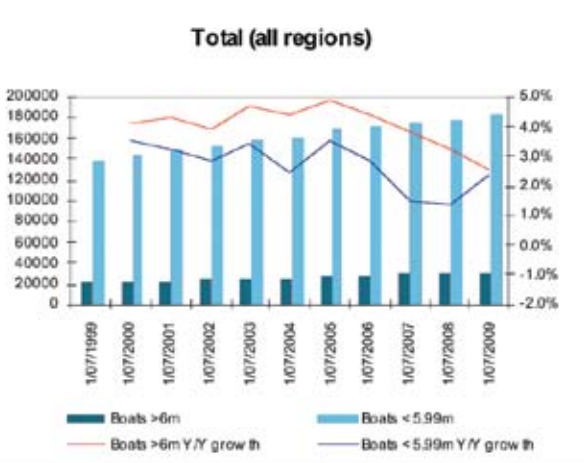
Murray Inland

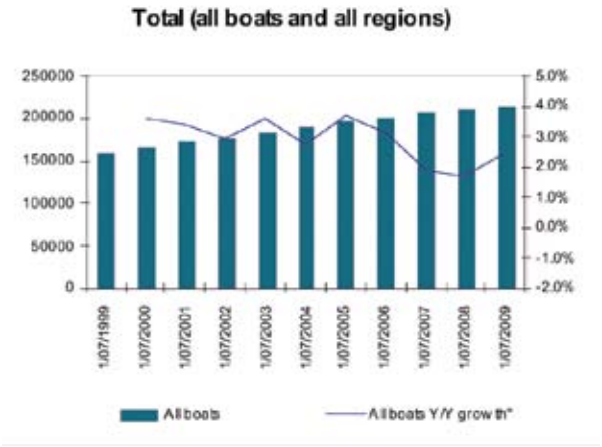


South Coast




Sydney Harbour
12000
10000
8000
6000
4000
2000
0
4.0%
3.0%
2.0%
1.0%
0.0%
-1.0%
-2.0%
1/07/1999
1/07/2000
1/07/2001
1/07/2002
1/07/2003
1/07/2004
1/07/2005
1/07/2006
1/07/2007
1/07/2008
1/07/2009
Boats >6m
Boats < 5.99m
Boats >6m Y/Y growth
Boats < 5.99m Y/Y growth


Total (all regions)
200000
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
-1.0%
-2.0%
1/07/1999
1/07/2000
1/07/2001
1/07/2002
1/07/2003
1/07/2004
1/07/2005
1/07/2006
1/07/2007
1/07/2008
1/07/2009
Boats >6m
Boats < 5.99m
Boats >6m Y/Y growth
Boats < 5.99m Y/Y growth


Total (all boats and all regions)
250000
200000
150000
100000
50000
0
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
-1.0%
-2.0%
1/07/1999
1/07/2000
1/07/2001
1/07/2002
1/07/2003
1/07/2004
1/07/2005
1/07/2006
1/07/2007
1/07/2008
1/07/2009
All boats
All boats Y/Y growth*