Government of **Western Australia**
Department for **Planning and Infrastructure**

The Perth Recreational Boating Facilities Study 2008

Technical Report Number 444
February 2009

Department for Planning and Infrastructure
New Coastal Assets Branch
Coastal Infrastructure Business Unit
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Executive Summary

The Perth Recreational Boating Facilities Study (the Study) examines the recreational boating facility needs of the Perth metropolitan area to 2025 and proposes a schedule of development options to meet the growing demand. The Study was prepared and presented in draft form to community workshops in Port Kennedy and Hillarys Boat Harbour in May 2007 in conjunction with the Western Australian Planning Commission's Perth Coastal Planning Strategy. The draft Study was subsequently released for comment, being advertised in the public notices of the West Australian Newspaper and made available on the web. Mail outs to industry groups and presentations to Yacht Club managers were also provided. Forty two submissions were received and these are summarised in Appendix 3.

In the course of this Study there has been a number of new facility initiatives proposed. These have been considered within this update.

Recreational boating facilities, for the purpose of this Study, comprise of formal structures such as boat ramps and associated infrastructure including car and trailer parking, swing moorings, boat storage and boat pens. When these facilities are provided on the coast they generally require protection from waves via the construction of small harbours.

Historic recreational boating registration statistics provide an indication of the rate of growth in recreational boating numbers for the Perth metropolitan area. As the numbers of recreational craft increase, so does the requirement to provide appropriately sized and located facilities. Perth's recreational boating facilities are now under heavy demand pressure. An analysis of Perth's boat registration statistics in combination with published population projections across Perth provides a sound basis to estimate the future growth in recreational boat numbers. These statistics and their projections show that recreational boat numbers in Perth will continue to increase from 48,468 in 2007 to a projected 84,857 in 2025.

This Study provides a development strategy to meet the demand from now until 2025. The development options put forward are all considered to be feasible, but are not intended to be exhaustive or exclusive. Other viable options or alternatives to meet the current and projected demands may emerge over the course of the Study period (to 2025) and these should be encouraged.

This Study has been undertaken by the New Coastal Assets Branch of the Department for Planning and Infrastructure (DPI) and is intended to serve as a guide to where, when and how new recreational boating facilities are required. Many of the development options considered do not have approvals in place and would require detailed planning, investigation and consultation to occur before they could proceed.

It is recommended that the schedule of development options (shown below) be pursued in order to ensure that the facilities that are needed to meet Perth's recreational boating demand from now to 2025 are planned and provided in a timely way. The recommendations are defined across a time scale ranging from the short to medium to long terms. The short term recommendations, in particular, now need to be given priority.

Details of the full program of development options to meet the demand for recreational boat moorings, storage and public ramps are contained in Section 10 of this Study.

The data and strategy reported in this Study should be reviewed and updated periodically and a forward program of works adjusted accordingly to ensure that the necessary facilities are planned. Consideration should be given to extending the planning horizon to 2031 in future revisions of this study.

Short Term Initiatives (to 2012)

Government funded facilities:

Expand the numbers of boat pens in the Hillarys Boat Harbour.

Expand the facilities within the Woodman Point (Jervoise Bay) Recreational Boating Precinct, including construction of further ramps and a boat stacking facility.

Expand the number of boat pens and support the establishment of leased dry facilities storage (boat stackers) within the Fremantle Fishing Boat Harbour.

Develop a coastal public boat launching facility in the Fremantle area (Stage 1).

Upgrade the boat ramp at the Two Rocks Boat Harbour.

Privately funded facilities: (based on known proposals)

Expand the number of boat pens within the Mindarie Marina.

Develop the private marina pens and residential berths at Port Coogee. (Part 1)

Develop the Eglinton Marina including ramps and pens.

Develop the Port Kennedy public boat ramps.

Expand the number of boat pens within the Ascot Waters Marina

Expand and/or the re-organise the pen capacity of Yacht Clubs (Part 1)

Medium Term Initiatives (to 2018)

Government funded facilities:

Develop a marina in Mangles Bay.

Develop a coastal public boat launching facility in the Fremantle area (Stage 2).

Develop a new public harbour near Alkimos on the north Metropolitan coast (Stage 1)

Privately funded facilities

Expand the number of boat pens in Two Rocks Boat Harbour.

Expand and/or re-organise the pen capacity of Yacht Clubs. (Part 2)

Port Coogee (part 2)

Expand the number of pens within the Fremantle Sailing Club.

Long Term Initiatives (to 2025)

Government funded facilities:

Expand the number of ramps within the Point Peron Boat launching harbour.

Develop a new harbour with pens, incorporating the existing the Ocean Reef boat launching facility.

Develop a new public harbour near Alkimos on the north Metropolitan coast (Stage 2).

Commence Stage 1 of the expansion to the Fremantle Boat Harbours (as per a Harbours Policy currently under development).

Privately funded facilities

None currently identified

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1. Introduction

The Perth Metropolitan Region has one of the fastest growing populations in Australia. This is in part due to its strong economy and attractive setting amongst a healthy river and coastal environment. For the year ending September 2007 more than 2.187 million intrastate visitors, 1.093 million interstate visitors and over 624,000 international visitors stayed in Perth[1] spending some $2.735 million. A major attraction of Perth is its waterways, including the Swan and Canning Rivers, the extensive beaches and accessible offshore recreational boating destinations such as Rottnest Island. Water based activities include a number of popular recreational boating pursuits including fishing (river, estuary and sea), snorkelling and scuba diving, sailing, power boating, rowing, yachting and water-skiing.

Perth's recreational boating facilities have traditionally been centred on the Swan and Canning Rivers together with Fremantle small boat harbours where numerous yacht clubs, mooring areas and public boat launching facilities exist. However most of these facilities are now at capacity and have restricted expansion potential. The establishment of Hillarys public Boat Harbour in the 1980's provided a much needed facility expansion on the coast to Perth's north, however this facility too has reached capacity. As Perth continues to develop along the coast, both to the north and south there is an increasing demand for access to public boating facilities with ocean access.

While Perth's population is predicted to increase by some 30 per cent from 2006 to 2025, the number of recreational boats over the same period is predicted to increase by 82% under a under the growth scenario presented in this report. This Study identifies that there is the need to provide for an estimated further 4,600 boat moorings and 34 boat ramp lanes strategically located across the Perth metropolitan area within the next two decades. It is noteworthy that 89.5% of Perth's registered recreational boats are less than 7.5 metres and therefore are generally kept on trailers requiring access to boat launching facilities.

Some of the existing boating facilities in Perth have the capacity to expand to accommodate part of this demand and there are a number of planned maritime developments that will deliver a range of new facilities. These initiatives have the potential to provide 50% to 60% of Perth's recreational boat mooring and launching needs to 2025. The realisation of this potential would only occur if all of the sites identified, including the 'privately' owned marinas, proceed as proposed.

A number of new initiatives have been identified in this Study to fill the "gap" between the known (existing and proposed) development options and the predicted need. As it may take up to 10 years to provide the first of these new initiatives the necessary investigation, consultation and (where required) land acquisition activity needs to commence as soon as possible.

This study looks at the growth of recreational boat numbers in Perth from 2006 to 2025 against the capacity of existing and proposed facilities and puts forward initiatives to meet the shortfall or "gap" that has been identified.

[1] www.tourism.wa.gov.au

2. Study Parameters

2.1 Study Area

The Study area is defined as being the navigable waters and shores of the Perth Metropolitan area including the near-shore waters of the Indian Ocean from Two Rocks in the north to Singleton in the south, together with the Swan River up to the Whiteman Bridge and the Canning River up to the Kent Street weir (refer to Map 1).

2.2 Recreational Boating Defined

The term recreational boating as used in this Study refers to the vessels that navigate the waterways of the Study Area, predominately for recreational purposes and that require formal boating facilities. The definition does not include commercial vessels (such as fishing boats, charter boats and ferries), shipping and port related service vessels. Generally, all powered recreational vessels in Western Australia are required to be registered with DPI.

2.3 Planning Horizon

For the purposes of this study a planning horizon to 2025 has been selected. This timeframe aligns with current population growth predictions and provides a reasonable timeframe for the development of short, medium and long term plans. This planning horizon will need to extend further as work continues in relation to future investigations and planning.

2.4 Climate

Perth has a Mediterranean climate, with mild winters and hot dry summers. It is the sunniest capital in Australia with an average of eight hours sunshine a day. Perth's weather and coastal and river environments lend it to recreational activities associated with its coast, islands, foreshores and waterways.

The summer months are hot with an average temperature of 29 degrees Celsius during the day and 17 degrees Celsius at night. During the summer months Perth experiences strong afternoon sea breezes blowing from the southwest. The onset of this often strong breeze generally makes boating offshore uncomfortable and this frequently leads to congestion at boating facilities as boats return to shore *en-mass*. The sea breeze is well received by kite and wind surfers and those sailing on the Swan River.

The winter months in Perth from June to August are mild, with an average temperature of 18 degrees Celsius during the day, and 9 degrees Celsius at night. The wettest month of the year is July, and the average yearly rainfall is around 880 millimetres. Recreational boating activities in Perth predominately occur over the summer months, but subject to conditions can be undertaken all year round, particularly on the rivers.

3. Relevant Studies and Previous Research

There are a number of current and previous studies and research that are relevant to this Report. A brief discussion on these is provided below.

3.1 Draft Swan River Trust Management Plan for the Swan and Canning Rivers

This plan was initiated by the Trust to address the following boating issues and activities which may affect the enjoyment and health of the Swan and Canning River waterways:

- Boat accommodation including moorings and marina;
- Dinghy storage on foreshores;
- Boat maintenance practices;
- Boat wash and noise;
- Fuel and oil discharge;
- Boat launching facilities;
- Sewage disposal;
- Jetties; and
- Anchor and boat damage to the riverbed

Some of these items have been dealt with in Section 7.

3.2 The "Perth Coastal Planning Strategy" (PCPS)[2]

This was a priority recommendation to come out of the Ministerial Taskforce Review of the structural arrangements for coastal planning and management in WA (2002). It was committed to by Cabinet in its endorsement of the Western Australian Government's Response to the Coastal Taskforce Report (WA Government 2003). The Taskforce acknowledged and reiterated the recommendations to come out of the Coastal Planning Program annual audits, which were to "coordinate and promote integrated coastal zone management in the metropolitan area".

The PCPS itself will provide guidance and support to decision making on the future land use, conservation and development of the Perth metropolitan coast.

An input to the Perth Coastal Planning Strategy "Tourism, Recreation, Public Use and Access" (Issues Paper 4)[3] concluded that boating traffic would increase by 173% to 261% within the next twenty years. Consequently the provision of boat launching facilities will become an issue of importance in the context of planning for coastal access and use. These facilities should be sited in areas designated for recreational use of nearshore waters.

[2] www.wapc.wa.gov.au/Coast/Perth+coastal+planning+strategy/default.aspx
[3] www.wapc.wa.gov.au/Initiatives/Perth+coastal+planning+strategy/310.aspx

3.3 "Recreational Boating Facilities, A Study of User Needs"

In April 2000 a report was prepared for the Maritime Division of the Department of Transport to examine the level of usage of recreational boating facilities in the Perth area. The report was in part derived from a statistically managed mail out and telephone survey of random metropolitan houses.

The key findings of the report are as follows:

- Boat ownership increases will be directly influenced by population increases;
- Power boats dominate the fleet of recreational boats using coastal and river waterways;
- January and February are the most popular months for recreational boating;
- The most frequently requested improvement was the need for more ramps. The most requested location was on the coast in the Fremantle area (Rous Head).
- The Woodman Point (Jervoise Bay) public boat launching area was raised most frequently as the facility requiring improvement.

3.4 "A Strategic Plan for Maritime Facilities"

This report was produced by the former Department of Transport (the "Department") in 1995. It proposed strategies for developing new facilities that are still considered valid. Some of these are:

Public Boat Harbours. The Department will seek government funds to construct, operate and maintain public boat harbours subject to considerations of the level of community support, the financial and economic viability, boating safety, statutory planning and environmental factors.

Marinas. A marina is a discrete set of facilities operating under one management within a boat harbour which provides safe permanent moorings (including both swing and fixed moorings) and other boat related services. Where possible the Department will encourage private operators to establish and manage the facility. The Department will determine development standards and be the approving authority.

Public Boat Ramps. The majority of public ramps are developed by Local Governments for recreational use on foreshore land vested for that purpose. The Department will seek funds from the Government for 50% of the costs, the Local Authority the remainder. (This arrangement is now largely accommodated by the Department for Planning and Infrastructure's Recreational Boating Facilities Scheme).

3.5 Statements Relating to Current Developments

1. In the course of this study, a private proposal for a marina to be located at Swanbourne emerged. The proposal was rejected by the Nedlands City Council in August 2007 and has not been presented to the DPI for review. As such this proposal has not been considered within this report. It is to be acknowledged that private facility proposals such as this will emerge over the life of this study. Where such proposals are prepared on sound planning, research, have community support and deliver public benefit they should be supported.
2. In 2007 the private proponents of the Wanliss Street jetty site expanded their proposal to a 500 berth marina in Rockingham. Rockingham is also the site for an existing Marina development proposal in Mangles Bay (Cape Peron Tourist Park). Mangles Bay with its north facing coastline and excellent boating environment is considered a good location for a marina. The recommendations in this study include, as a Medium Term initiative; "The development of a marina in Mangles Bay".
3. The Mangles Bay Mooring Control Area has been formally created by DPI in 2007. This has effectively restricted the installation of further new moorings and better controls the existing moorings in this area.
4. In the course of this Study DPI commenced work on the Fremantle Boat Harbours Policy, a master planning exercise established to investigate and guide the future development of Fremantle's three existing boat harbours; Fishing Boat Harbour, Success Harbour and Challenger Harbour. There is potential for some of the associated boating infrastructure to be delivered towards the second half of the Study period. The current proposals indicate an expansion that may ultimately deliver between 1200 and 1700 pens. The possible expansion of the Fremantle Sailing Club within Success Harbour forms part of the developing Policy. [redacted]
5. A public boat launching facility on the coast in the Fremantle area has been keenly sought by the recreational boating community in Perth for many years and supported by a policy statement from the current government in 2005[1]. There are no public boat launching facilities on the metropolitan coast between Woodman Point and Hillarys Boat Harbour (approximately 35km). A survey by DPI in 2000 revealed that Rous Head was the most favoured site[4], although this location is not supported by the Fremantle Port Authority. DPI has identified five sites that are feasible from an engineering perspective, including Rous Head that ranged from South Cottesloe to Port Coogee. One of the sites identified was attached to the south side of the existing Fremantle harbours as part of the Fremantle Harbours Policy. Following public comment on the Policy, this option now appears unlikely. A new facility on the coast will help to address the congestion and conflict that currently occurs where a large number of boats launched at the Leeuwin ramp (in the Swan River at East Fremantle) and travel 4 kilometres downstream to reach the ocean via Fremantle Port's Inner Harbour. All locations have some constraints and further work is required.
6. There are a number of facility upgrades (both government and private) in either the advanced planning or development stage including expansion of pens in the Fremantle Fishing Boat Harbour, Hillarys Boat Harbour, Mindarie Marina and at a number of Swan

[4] Market Equity Pty Ltd *Recreational Boating Facilities, A Study of User Needs* Transport 2000

River Yacht Clubs. New boat launching facilities are due for construction at Woodman Point in 2008. The State Government is seeking expressions of interest for the establishment of a boat stacking facility at Woodman Point for at least 300 boats.

7. The Port Coogee Boat Harbour is currently under construction. The seaward component involves significant breakwaters and reclamation in the relatively deep near-shore waters of Owen Anchorage. The boat harbour will provide a 300 boat marina and around 60 residential canal berths by 2010. Boat ramps are not included at this site but a funding contribution is to be made towards a ramp development in the vicinity.
8. The development of the Becher Point precinct in Port Kennedy is currently being progressed. As a part of this project a two lane boat launching facility will provided.
9. Major coastal land developments are proposed in Perth's northern suburbs. These developments are the subject of Metropolitan Region Scheme amendments and include provision for a new privately developed marina at Eglinton. The developers of this marina are currently working towards gaining the necessary approvals to commence work. Current indications are that approximately 200 pens and small boat launching facility may be provided.
10. High population growth is currently underway in the northern suburbs and this, coupled with the recommendations from "Network City", (a Metropolitan planning consultative process for a new strategic framework for guiding Perth and Peel Regions to a sustainable future), has identified a new town centre to be established at Alkimos. DPI is working with the planners and developers of this area to integrate a substantial new public marina into the town development. Whilst suitable sites for new marinas are rare, the Alkimos site has been under investigation for some time and is considered suited. A two stage development is proposed over the Medium and Long term as part of this Study.
11. A large private development called "North Port Quay" was announced in May 2008. This proposal is essentially a medium sized coastal town that would be developed over reclaimed seabed adjacent to Rous Head and Port Beach, North Fremantle. The site is mostly within Fremantle Port Waters and the Port has indicated their opposition. Significant recreational boating facilities such as boat pens and ramps are included in the proposal.

4. Funding Options for Boating Related Infrastructure

Funding may be available for the development of maritime infrastructure in Western Australia via State, Federal and Local Government agencies, as well as from the private sector. Joint funding opportunities also exist.

4.1 Government Funding

4.1.1 Capital Works Programs

Major works programs for maritime facilities are generated by government agencies including the Department for Planning and Infrastructure (DPI). In past decades the DPI's predecessors (the Departments of Transport, Marine and Harbours, and Public Works) also funded, planned and delivered numerous boat harbours throughout the State. The majority of these were established primarily to support local fishing and commercial marine industries. Sustainable fisheries practices have reduced the number of fishing vessels operating from DPI boat harbours over the past five years and this trend is likely to continue. In contrast recreational demands are increasing. Given this changing scenario Governments may be less inclined to invest in facility developments that are predominantly recreationally focussed and that might otherwise be commercially attractive to the private sector. Arrangements that include a mix of public / private funding may provide one model for the delivery of major new initiatives. In recent times LandCorp, a WA Government land and property development agency, has been active in fulfilling this role with marina development projects in Mandurah and Albany.

4.1.2 The Recreational Boating Facilities Scheme

The Recreational Boating Facilities Scheme (RBFS) is a State Government grants program providing improved boating infrastructure through joint funding arrangements which benefit recreational boat users. The scheme is funded from recreational boat registration fees, and provides up to 50 per cent funding assistance ($1 for $1 basis) for Major Works projects and up to 75 per cent funding assistance for Minor Works and strategic Planning Studies to Local Government authorities, State Government departments, and statutory authorities. There is one funding round per financial year and the maximum grant allowance is currently $500,000 (ex GST).

The RBFS aims to:

- Provide project funding to improve recreational boating access to navigable waters;
- Enhance the safety of recreational boating infrastructure;
- Ensure that the environmental impact of recreational boating facilities is acceptable;
- Provide a catalyst for new and upgraded recreational boating infrastructure; and
- Ensure consultation with the community.

Since its inception in 1998/99 the scheme has enabled significant improvements in safety and convenience for the recreational boating community with a total of $7.5 million granted to 189 projects to improve the facilities throughout Western Australia from Wyndham in the north to

Eucla in the south. However the scheme budget is such that it cannot, on its own, fund the major expense of developing new marinas or harbours.

4.2 Private Sector Projects

Private sector waterfront developments (with access to safe navigable waters) can deliver significant community benefit via the inclusion of public recreational boating facilities. An example of this is the Port Coogee development currently in construction. Due to the recreational boating facility demand in Perth it could be argued that such developments should continue to provide more in the way of public facilities including boat pens and boat launching facilities.

The permanent loss of public foreshore (and adjoining seabed) to these private sector developments is considered justification for this argument.

With continued interest in waterfront land developments, increases in pen fees and shortages of facilities it is anticipated that it will be increasingly attractive for commercial interests to include more boating infrastructure. However it is clearly evident that boat launching facilities are currently not well supported within private developments due to the land area required for trailer parking.

The establishment of boat launching facilities has typically remained a responsibility of State and Local Governments. It is noteworthy that 90% of Perth's registered recreational boats are kept on trailers and require boat launching facilities.

It is recommended that; private marina developments maximise public access and amenity by providing general access to boat pens and boat launching facilities. Since suitable locations for boating facilities on the waterfront (river or ocean) are rare, where these developments are proposed they should include an appropriate level of recreational boating infrastructure to the extent that further facilities do not need to be developed nearby to meet a shortfall.

5. Existing Boating Facilities in Perth

5.1 Boat Launching Facilities

In 2004, DPI undertook audits of all boat launching facilities in the Perth Metropolitan area and these were reviewed again in 2006. The location of Perth's boat ramps are shown on the attached maps at the end of this report. The reports produced are referenced as the Perth Metropolitan Coastal Public Boat Launching Facilities Audit (Technical Report 438) and the Swan and Canning River Public Boat Launching Facilities Audit (Technical Report 437).

The majority of Perth's boat ramps are formal structures and are considered to be the primary means by which the public are provided trailer boat access to the navigable waters of Perth. Public boat ramps are available for use 24 hours a day. Some sites charge for their use.

There are a number of private boat launching facilities in Perth, generally within yacht club facilities. The largest of these is located within the Fremantle Sailing Club. The restricted area (of both access and size) at most of them usually means that there is limited opportunity for further expansion.

In general private ramps have little capacity to address the growing public demand. The Cockburn Power Boat Association (CPBA) located within DPI's Recreational Boating Precinct at Woodman Point is possibly one exception. This private trailer-boat club has a four lane boat ramp for use by its members. This private facility records a similar volume of boat launching to the highly utilised four lane public launching facility immediately adjacent. It also provides substantial trailer parking onsite, with some potential for future expansion.

For planning purposes it is considered that there are currently a total of 32 public boat launching sites that service Perth's trailer-boat community. These include 14 ramps on the coast (with 45 lanes) and 18 ramps on the rivers (with 28 lanes). These 73 lanes cater for Perth's public boat launching needs to currently service around 43,000 trailed vessels. The DPI conducts regular surveys of actual boat ramp usage and this data assists with the forward planning for future requirements.

Figure 1 is an example of a well designed 8 lane ocean ramp with associated facilities. This photograph depicts the high level of demand experienced at all similar facilities in Perth during peak boating seasons. There is a breakwater for protection against ocean waves, finger jetties that provide easy and safe access to a launched boat, dedicated lanes for backing up to launch and retrieve and a well designed albeit undersized trailer park. Facilities that are not obvious from the aerial photograph include toilets and lighting. Provided also are landscaped areas, shady trees, sandy beaches, rubbish bins and reserved areas for boat rigging and de-rigging.

Figure 1: Aerial View of the Ocean Reef Boat Launching Facility

5.2 Boat Ramp Usage

During peak periods users of public boat launching facilities often complain that they are overcrowded, have long wait times and parking facilities are inadequate. A launching facility's ability to cope with peak demand can be affected by many factors including; the number of ramp lanes available, provision of holding jetties, the design of traffic flow, car park layout and capacity.

Periods of congestion regularly occur, particularly during holiday periods with good boating conditions. On a typical summer's day in Perth there is often two peak periods at boat launching facilities, including early in the morning for launching and at the onset of the sea breeze which generally arrives in the afternoon and is often strong enough to make boating uncomfortable. Ideally, launching facilities should be able to cope with periods of high demand. The Australian Standard, *Guideline for the Design of Marinas* (AS3962-2001) provides a good source of reference for the appropriate design of boat launching facilities.

To gain a better understanding of the periods of peak boat ramp usage in Perth, DPI has undertaken facility surveys during the summers of 2003/04, 2004/05, 2005/06, 2006/07 and 2007/08. These surveys were undertaken during the long weekends around Boxing Day, New Year's Day and Australia Day. These weekends were targeted as they represent the busiest periods for Perth's boat ramps. Typically the busiest days coincided with the most favourable boating conditions.

Figure 2: Typical Two-Lane Ramp With Finger Jetty On The Swan River

Generally, all the trailer parking areas associated with Perth's launching facilities were occupied to at least their capacity during the peak boating period recorded in January 2005. Subsequent annual surveys have confirmed similar levels of peak usage despite cooler summers in 2006 / 2007 and 2008. When a trailer park exceeds its capacity, it is common for surrounding areas to be subject to trailer parking overflow. At some sites this peak overflow is

managed by utilising adjacent reserves, parks and additional on street parking. Overflow that leads to impacts on nearby residents and traffic congestion can occur in some locations.

The total peak number of car/trailer units recorded at the boat ramp sites above (ocean and river) in January 2005 was 1,944 (506 river + 1438 ocean).

This suggests that as a percentage of the then total of 38,970 registered recreational boats in the summer of 2004 / 2005 (less than 7.5 metres in length[5]) a maximum of about 5% use Perth's public boat launching facilities on a peak boating day.

Based on research to date it is proposed that for forward planning purposes a figure of 5.0% of the total registered boating fleet less than 7.5 metres in length, be used to indicate the peak number of boats using public ramps at any one time.

5.3 Boat Mooring Facilities (Pens and Swing Moorings)

It is apparent from audits of existing facilities that virtually all available marina pens and swing moorings in the Perth metropolitan area were taken up by the end of 2006. Boat registration figures indicate that from year end 2006 to year end 2007 there were approximately 450 new large boats registered. By contrast, over the same period there were very few new pens developed in Perth; these craft were either trailerable or were moored outside of Metropolitan Perth or took up moorings being used by small boats that could revert to trailers. This situation clearly highlights the current shortage of pens in Perth.

Yacht clubs (in both the river and ocean) provide a significant contribution to Perth's capacity to moor and store non-trailered recreational boats. Currently many yacht clubs are re-developing within their available land and water leases in order to maximise pen and boat storage capacity. This practice is common particularly where older jetty structures approach the end of their effective lives. Despite the expected increase in both registered and non-registered vessels within the Perth Metropolitan area, the likely expansion of mooring facilities within most river based yacht clubs while important is expected to be small.

Some coastal facilities are in the process of either development or expansion and there is additional capacity in some sites. Notably the Port Coogee development is underway and will have an ultimate capacity of approximately 360 pens. The development of significant numbers of new pens at the Mindarie Marina is also progressing. Minor expansions are planned at Hillarys Boat Harbour and the Marina at Two Rocks has capacity for approximately 250 additional pens. A number of new marina proposals across the metropolitan area (such as in Woodman Point and Port Coogee) are in the preliminary stages of planning and some of these are expected to proceed to development in the course of this Study. All proposals are discussed in more detail in later sections of this report.

The DPI licences swing moorings within gazetted mooring control areas on the Swan and Canning Rivers and at Mangles Bay. On application DPI approves and registers moorings in these areas which are now considered to be at capacity with no further expansion or establishment of new areas planned. There are (in January, 2008) 1,112 registered moorings.

[5] The Perth Recreational Boating Facilities Study identifies that at about 7.5 metres in length there is a transition from storage of boats on trailers to water based pens or moorings.

Of these only about 40% appear to be used as a primary boat storage facility - refer to Section 7.4.2.

The current management arrangements in place for swing moorings allows for the licensee of a mooring to transfer that licence to another person. At present and given the shortage of boating facilities in Perth this arrangement generally involves an unregulated payment between the old and new licence holders. This is an undesirable situation because waitlists become meaningless and cost escalations often put the facilities out of reach of many boat owners.

It is recommended that; the management of swing moorings in Perth, including those on the Swan and Canning Rivers and in Mangles Bay be reviewed to ensure that the use of these facilities is maximised. The review should examine the licensing process (including the transfer of licences) to ensure the system is equitable in terms of public access.

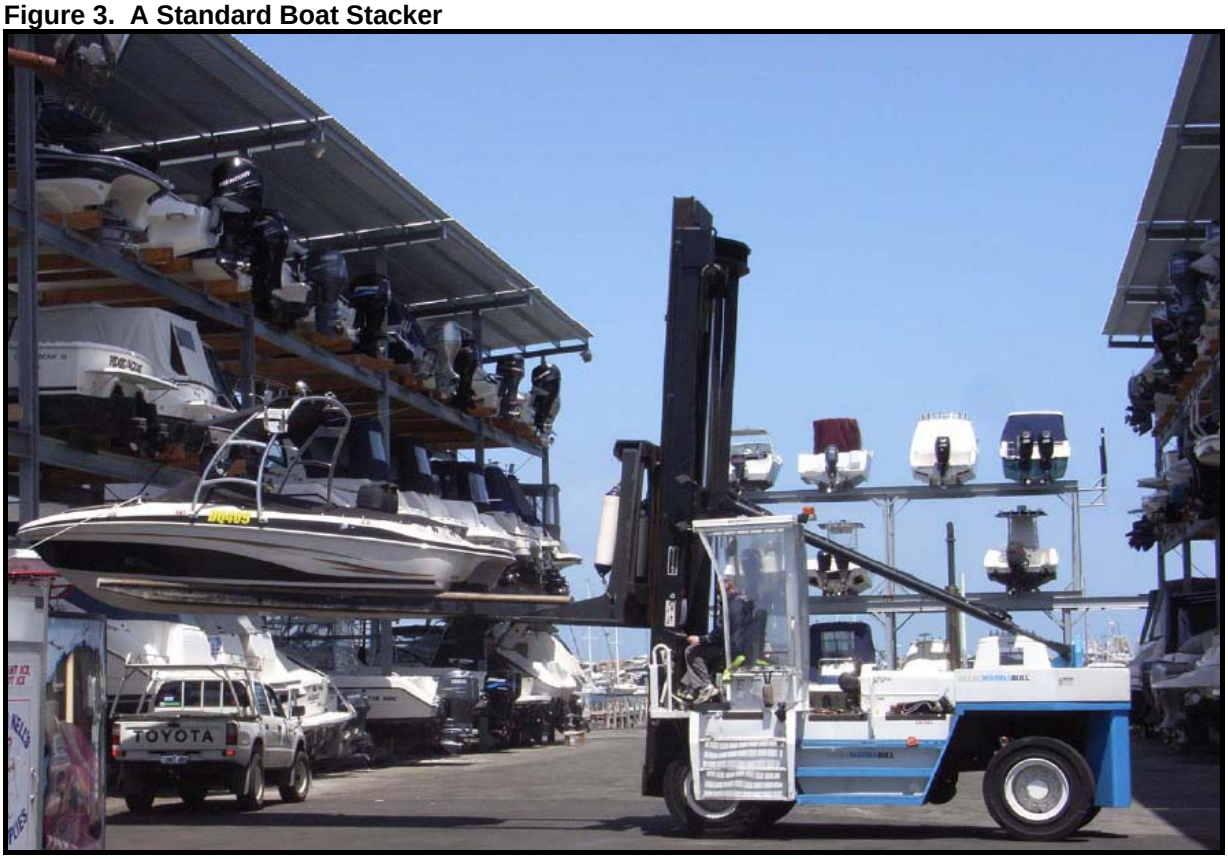
5.4 Boat Stackers

Several new boat stacking facilities have recently been developed in Perth, perhaps reflecting that facility shortages (pens and ramps), decreasing lot sizes and increasing pen fees have made this option more attractive to boat owners and commercially viable to the providers of such facilities. Boat stacking systems can deliver substantial numbers of dry storage spaces and have the potential to play a significant future role in boat storage. Approximately 50% of the boats in the stacker bays have been observed to be greater than 7.5m[6]; this indicates that 50% of the bays are mooring or pen equivalents and should be counted as such.

However the visual impact of such systems in urban areas requires careful planning as the standard boat stacker (Figure 3) is not particularly aesthetically pleasing and would most likely not be accepted on the Swan River banks. This could possibly be overcome by locating the stacks against a cliff and careful design (Figure 4).

Boat stacking systems currently exist at East Fremantle (Aquarama), two facilities within the Fremantle Fishing Boat Harbour and the Aquastack Marina at Henderson. Aquastack differs in that the boats are stored on their trailers in the racking system and the storage facilities are not located with direct ocean access.

Figure 3. A Standard Boat Stacker



[6] *Personal Communication* Aquastack Marina and Fremantle Boat Lifters

The following table details the existing and proposed bays currently in Perth.

Table 1. Existing And Proposed Boat Stackers

		Existing Bays	Proposed Bays
Fremantle Fishing Boat Harbour (DPI)	Fremantle Boat Park	230	50
	Fremantle Boat Lifters	51	233
Woodman Pt Boat Launching Facility (Jervoise Bay)			300
Aquarama Marina (East Fremantle)		50	
Aquastack (Henderson)		220	
TOTAL		**551**	**583**

Figure 4. Two Boat Stackers With Reduced Visual Impact

5.5 Summary of Existing Facilities

Table 2 summarises the total available boat storage and launching facilities across Perth compiled from DPI records. Refer to Appendix 2. As previously discussed, due to the high level of use, the private ramps located within the Cockburn Power Boat Association (CPBA), located at Woodman Point within DPI's recently established Recreational Boating Precinct have been included in the overall numbers of launching lanes available.

Table 2. Summary Of Existing Recreational Boating Facilities

Location	Public Boat Ramp Lanes	Recreational Boat Moorings		
		Boat Pens + Residential Moorings	Swing Moorings (40% of Total in permanent use)	Boat Stackers (50% of berths in waterfront facilities)
Coastal Locations	45 (Including CPBA)	1,923	269	140
River Locations	28	2,536	445	25
Total	73	5,338		

6. Growth in the Number of Recreational Boats

Registered recreational boats range in size from small dinghies to large luxury power boats. As a general rule and for the purpose of this study, boats over 7.5 metres in length are considered as being too large to transport on a trailer and therefore will require a pen or mooring. However there is no finite boat size division between trailer, pen and stacker storage types.

Boats over 24 metres in length are commonly referred to as Super Yachts. Whilst Perth is home to relatively few Super Yachts (18) there is evidence that this is a growth area and some facilities are required for boats of this size in Perth and in the Regions (see Section 7.4.4).

6.1 Boat Registrations

Table 3 shows the number and percentage of recreational boats in each Local Government Area within the Perth Metropolitan region. The distribution is derived from the home address post code for each boat as extracted from DPI's recreational boat registration database.

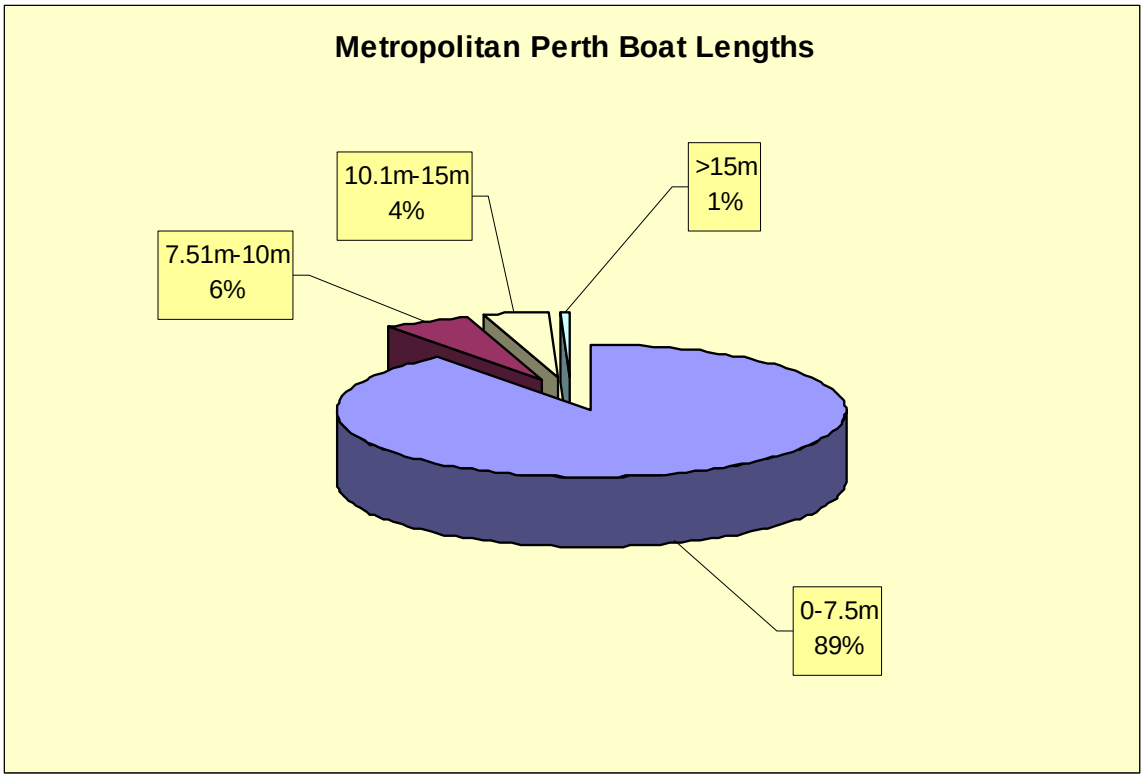
Table 3. Boat Registration By Local Government, December 2007

Local Government	Boats 0.01 - 7.50m		Boats > 7.50m		Total	
	Numbers	Per Cent	Numbers	Per Cent	Numbers	Per Cent
ARMADALE	1,398	3.2%	52	1.0%	1,450	3.0%
BASSENDEAN	439	1.0%	19	0.4%	458	0.9%
BAYSWATER	1,162	2.7%	94	1.9%	1,256	2.6%
BELMONT	732	1.7%	57	1.1%	789	1.6%
CAMBRIDGE	754	1.7%	190	3.8%	944	1.9%
CANNING	1,996	4.6%	155	3.1%	2,151	4.4%
CLAREMONT	343	0.8%	107	2.1%	450	0.9%
COCKBURN	2,882	6.6%	262	5.2%	3,144	6.5%
COTTESLOE	286	0.7%	134	2.7%	420	0.9%
EAST FREMANTLE	342	0.8%	96	1.9%	438	0.9%
FREMANTLE	1,049	2.4%	331	6.6%	1,380	2.8%
GOSNELLS	2,160	5.0%	128	2.5%	2,288	4.7%
JOONDALUP	5,524	12.7%	567	11.2%	6,091	12.6%
KALAMUNDA	1,449	3.3%	103	2.0%	1,552	3.2%
KWINANA	775	1.8%	39	0.8%	814	1.7%
MELVILLE	3,079	7.1%	646	12.8%	3,725	7.7%
MOSMAN PARK	374	0.9%	148	2.9%	522	1.1%
MUNDARING	1,094	2.5%	65	1.3%	1,159	2.4%
NEDLANDS	794	1.8%	264	5.2%	1,058	2.2%
PEPPERMINT GROVE	190	0.4%	88	1.7%	278	0.6%
PERTH	252	0.6%	66	1.3%	318	0.7%
ROCKINGHAM	4,519	10.4%	249	4.9%	4,768	9.8%
SERPENTINE-JARRAHDALE	664	1.5%	56	1.1%	720	1.5%
SOUTH PERTH	893	2.1%	161	3.2%	1,054	2.2%
STIRLING	3,999	9.2%	482	9.6%	4,481	9.2%
SUBIACO	296	0.7%	95	1.9%	391	0.8%
SWAN	2,213	5.1%	120	2.4%	2,333	4.8%
VICTORIA PARK	388	0.9%	37	0.7%	425	0.9%
VINCENT	259	0.6%	43	0.9%	302	0.6%
WANNEROO	3,116	7.2%	193	3.8%	3,309	6.8%
GRAND TOTALS	**43,421**	**100%**	**5,047**	**100%**	**48,468**	**100%**

At the end of December 2007 there were some 48,468 licensed recreational boats in the Perth metropolitan area, with 89.7% being less than 7.5 metres in length. The boats listed in Table 3 are those registered with the DPI. Boat registration is required if a boat has a motor or is fitted for one; yachts, canoes, surf cats and tenders to larger vessels are not required to be licensed, and as such are unlikely to have been reflected in the statistics provided. The smaller of these craft often utilise public boat launching facilities.

It has been noted that it is common for some larger boats, registered in the Perth Metropolitan area, to be moored elsewhere, such as in Mandurah. The numbers of boats kept outside the Perth Metropolitan area are considered low in the context of all boats registered in Perth.

Diagram 1. A Break-Down Of Boat Lengths For Boats Registered In Perth



6.2 Boat Registrations and Population

Table 4 shows DPI's historical recreational boat registration data broken down into size groupings against population figures for the Perth metropolitan area from 1990 to 2007.

Table 4. Historical Perth Boat Registration And Population Records

Year	0-7.5m	>7.5m	Total	Perth Population	Total <7.5m Boats/1000 of Population	Total >7.5m Boats/1000 of Population	Total Boats/1000 of Population
1990	25,683	2,315	27,997	1,109,138	23.2	2.1	25.2
1991	27,027	2,573	29,600	1,149,858	23.5	2.2	25.7
1992	27,015	2,560	29,575	1,180,701	22.9	2.2	25
1993	27,574	2,713	30,287	1,207,842	22.8	2.2	25.1
1994	28,285	2,736	31,021	1,233,024	22.9	2.2	25.2
1995	28,380	2,836	31,217	1,257,028	22.6	2.3	24.8
1996	30,494	2,998	33,493	1,285,551	23.7	2.3	26.1
1997	31,964	3,205	35,168	1,303,001	24.5	2.5	27
1998	32,455	3,271	35,725	1,325,389	24.5	2.5	27
1999	33,858	3,420	37,278	1,347,544	25.1	2.5	27.7
2000	34,382	3,537	37,918	1,369,547	25.1	2.6	27.7
2001	35,464	3,649	39,113	1,385,779	25.6	2.6	28.2
2002	36,461	3,835	40,296	1,413,336	25.8	2.7	28.5
2003	37,467	3,904	41,371	1,435,207	26.1	2.7	28.8
2004	38,970	4,046	43,015	1,454,300	26.8	2.8	29.6
2005	40,310	4,285	44,596	1,479,065	27.3	2.9	30.2
2006	41,316	4,598	45,914	1,498,000	27.6	3.1	30.7
2007	43,420	5,048	48,468	1,523,238	28.5	3.3	31.8

An annual re-projection of growth utilising new registration data available at the end of each calendar year (for recent years) is demonstrated by Table 5. The forward projection of Perth's recreational boat numbers derived from each of the separate data-sets;1990-2004, 1990-2005, 1990-2006 and 1990-2007 out to 2025 yields (understandably) slightly different results highlighting the need to maintain a regular check and review of the forward projection figures aligned to long term planning initiatives.

Table 5. Previous (And Current) DPI Projections Of Boat Numbers

Year of prediction using data back to 1990	Predicted Numbers to 2025		Total Predicted to 2025
	0 to 7.5m	> 7.5m	
2004	74,156	7,510	81,666
2005	74,192	7,292	81,484
2006	72,205	8,163	80,368
2007	75,435	9,422	84,857

Further discussions on Growth Predictions follow in Section 6.3

6.3 Growth Predictions

There are a number of statistical models and approaches available that can be applied to this exercise. DPI has sought advice and investigated a number of alternative approaches so as to establish a level of confidence in the projection presented in this report.

6.3.1 A Discussion on the Statistical (Extrapolation) Process

A statistical study such as this utilises regression lines to project out to future events (extrapolation). The further the data is extrapolated the lower the confidence in predictions.

Factors that could lead to variable results in the predictions and that cannot be easily incorporated into the model might include:

- Economic changes (twenty years ago it would have been difficult to foresee the current economic boom in Western Australia, a situation very much dependent on decisions made in other countries and having an impact in many areas including boat sales and increasing rates of boat ownership).
- Changes to regulations and legislation including likely changes in recreational fishing legislation to restrict fish catches, countered perhaps by studies that indicate that there is a strong trend towards boating for purposes other than fishing, such as touring.
- Increasing fuel prices may have an impact.
- Large unexpected changes in population.
- Significant improvements in boat construction technology: better storage systems, improved fuel efficiency.
- A relative decrease in the price of boats (due to technological improvements in boat construction is already showing some signs of influencing the market (see Section 6).

Any method of projection can be affected in either a positive or negative manner by the types of unpredictable or unknown factors such as those listed above. For the purpose of developing long term plans, as are required for major new coastal assets such as boat harbours and marinas, long range estimates of future demand are essential.

6.3.2 Microsoft Excel Derived Statistics

Two projection methodologies using Microsoft Excel software were investigated and are discussed below under the headings Excel 1 and Excel 2.

Excel 1

Using historical Perth boat registration data and the metropolitan population data a regression line formula for **each Perth Local Government Area** (LGA) from 1990 to 2007 was obtained and used to calculate the projected growth to 2025.[7] Four different regression line formulas (Linear, Exponential, Logarithmic and Polynomial) were tested to obtain the 'best-fit' or R-Squared value for the projection, with the formula that provided the highest R-Squared value being selected. For the majority of the LGAs only two projections were found to be useful – either a Linear or Exponential projection. The results are shown in Table 6.

Excel 2

This methodology used the data for the Perth Metropolitan Area as a whole as a base for extrapolation. The results are shown in Table 6.

Community feedback received following the release of the initial draft of this Study suggested variously that the growth figures derived within the Study were either too high or too low (see Appendix 3).

In July 2007 DPI sought an independent review (of the methodology used) by the Department of Fisheries Recreational Fishing Research operation. The following advice was received:

"The analysis was suited to the available data on population and boat ownership for the Perth metropolitan area. The predictions assume that current trends will continue which is reasonable given the data available. The methodology is statistically sound and suitable for estimating growth in the number of recreational boats and future needs".

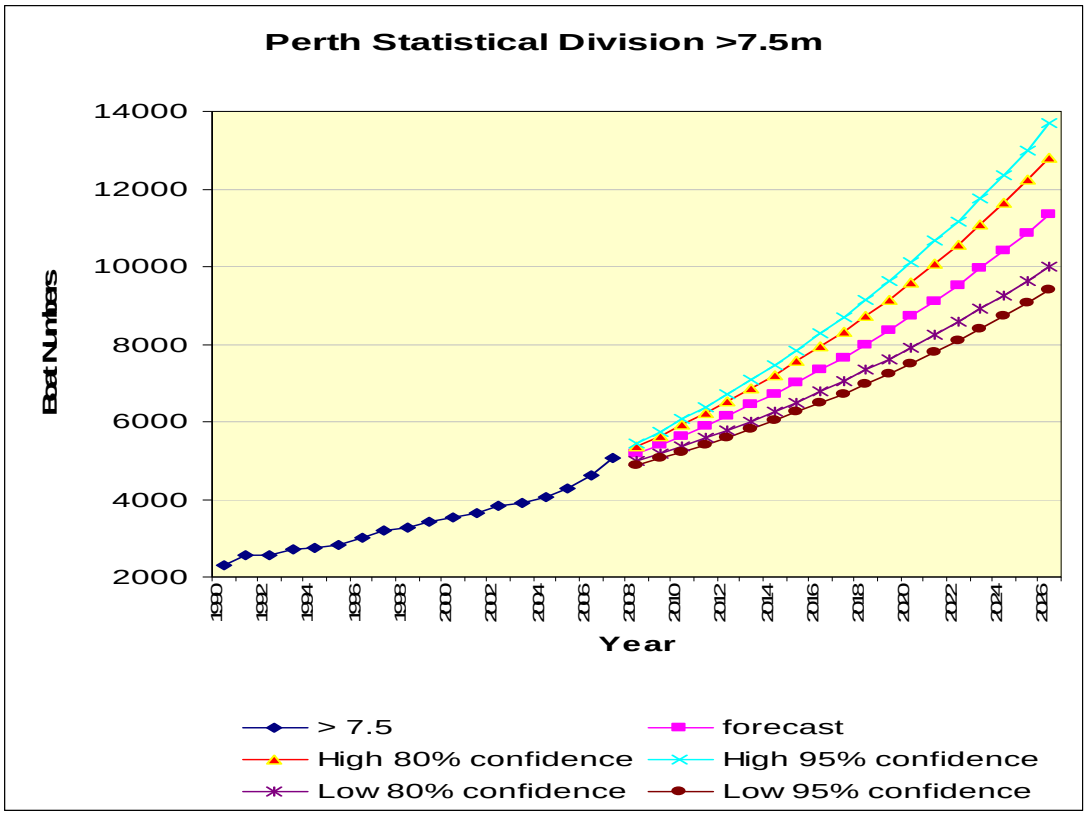
6.3.3 Forecasting with Exponential Smoothing State Space

As a check against the Excel derived projection models, an alternative forecasting system[8] recommended by the DPI's Demographic office utilising "Exponential Smoothing" was investigated. The Demographic office was engaged to independently model the data using this software. An extract of the results has been produced from this alternative and more complex modelling software and the results are summarised in the two charts below. These graphs show not only the projections to 2025 but also the 80% and 95% confidence limits as derived using this methodology. Table 6 shows the results in more detail.

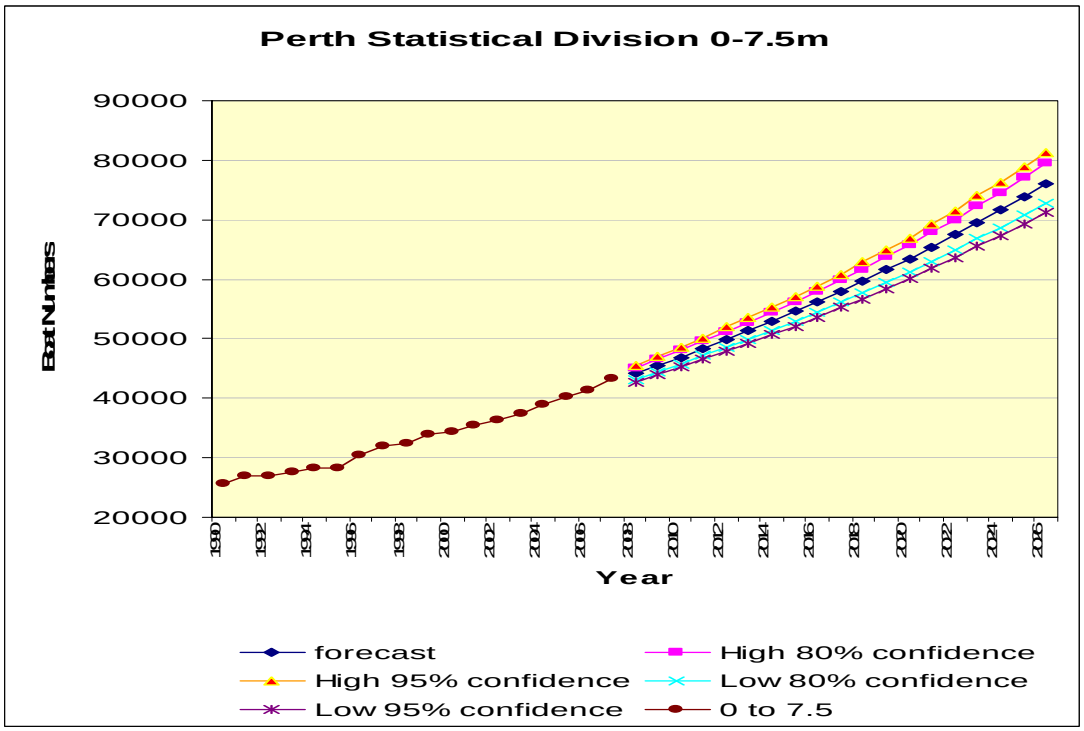
[7] *Metropolitan Local Government Areas, Recreational Boating Predictions 2008-2025* DPI Technical Report No 445 February 2008

[8] *Forecasting with Exponential Smoothing: the State Space approach* Hyndman R.J., Koehler A.B., Ord J.K., Snyder R.D. 2008 Springer

Graph 1. Metropolitan Perth Statistical (exponential smoothing) Projections for boat greater than 7.5 metres in length



Graph 2. Metropolitan Perth Statistical (exponential smoothing) Projections for boats 7.5 metres and less in length



.An analysis of the three methods reviewed shows the following:

Table 6. Comparison Of The Three Projection Models Tested

	Excel 1		Excel 2		Exponential Smoothing	
	0-7.5m	**>7.5m**	**0-7.5m**	**>7.5m**	**0-7.5m**	**>7.5m**
2007	43,420	5,048	43,420	5,048	43,420	5,048
2012	49,921	5,629	50,606	5,812	49,838	6,157
2018	60,266	6,998	61,196	7,433	59,756	7,999
2025	75,435	9,020	75,613	9,904	73,848	10,856

1. For boats less than 7.5 metres in length (approximately 90% of all Perth boats) there is a very high correlation between the three projection models. For planning purposes the Excel 1 range has been adopted. The chosen projection is provided in Appendix 1.

2. For the boats greater than 7.5 metres in length the following was determined:

- Sustained exponential growth to 2025 was considered unlikely, as per the Excel 2 and Exponential Smoothing models. These projections represent the more extreme growth prediction models.

- The Exponential Smoothing model puts emphasis on the more recent data (2004 to 2007) which are very high growth years.

- Both the Excel 1 and 2 methodologies tend to treat the high number of actual boat registrations in 2007 as an anomaly or spike as opposed to a major new trend.

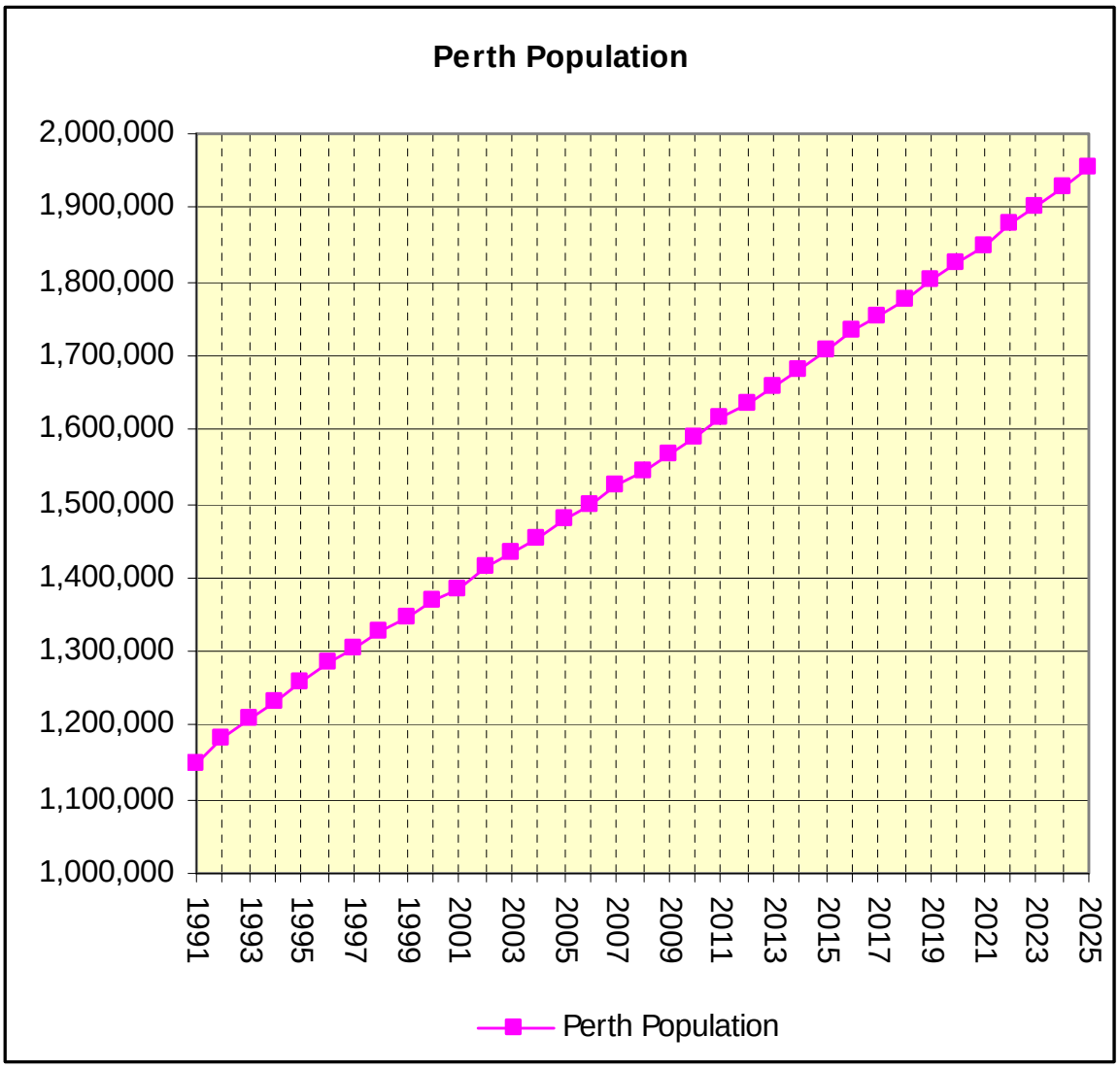
An approach that reflects a balance between the high and low growth models has been adopted for boats over 7.5 metres. This represents a context sensitive solution addressing the above considerations. An ongoing annual review of actual data against the available modelling approaches will be required to refine the projection confidence for large boats. The chosen projections for this current Study are provided in Appendix 1.

6.3.4 Population Growth Predictions

The population growth in Western Australia is projected to increase steadily over the next 20 years. The State recorded the second fastest population growth of all the States and Territories during the year 2003/04, increasing by 1.7% (32,300 people[9]). The current projections indicate that Perth's population is expected to grow at about 1.4 % per annum through to 2025[10]. The population prediction report gives data for the years 2004, 2006, 2011, 2016 and 2021 for each LGA. Regression analysis with interpolation and extrapolation is then used to estimate all the intervening years from 1990 to 2025.

If Perth's Local Government Areas are divided into three sectors, northern, central and southern (see Map 6) and using population statistics provided by the WA Planning Commission[10] to forecast resident populations (2004 to 2021) it can readily be deduced that the northern and southern sectors of the Perth metropolitan area are the high growth areas.

Graph 3. Projection Of Perth's Population



[9] Australian Bureau of Statistics *Western Australia at a Glance* Cat No. 1306.5 2005
[10] *Western Australia Tomorrow* WAPC Population Report No 6 November 2005

6.3.5 Boat Registration Predictions

In the initial draft of the Perth Recreational Boating Facility Study three growth scenarios were derived from historic boat registration data. These scenarios were intended to provide separate predictions in the growth in recreational boat registrations making allowance for accelerated high growth, continued steady growth or reduced growth depending on economic circumstances

Since the original draft report was prepared significant investigation into the various projection models has been conducted including seeking professional advice from the Department of Fisheries, DPI's Demographic Office, and observing the actual registration figures against the preferred model for the years 2006 and 2007. These processes were discussed in more detail in the previous section of this Report. DPI has therefore established some confidence in the "Mixed Projection" method or Medium Growth scenario as developed, noting of course the limitations as discussed in Section 6.3.1. The derived predictions have not been constrained or amplified as might occur if economic factors such as extraordinary increases in fees and charges or periods of prolonged economic boom are considered.

For the purpose of this Study DPI has elected to drop the former references to the High and Low Growth Scenarios. Annual reviews of the projected figures versus actual figures will continue to be monitored so as to provide an ongoing review of the validity of the chosen projection. It is important to appreciate that the variation in predictions considered possible would likely be accounted for by the difference of plus or minus a few years, which in the timeframe of planning required for major new facilities is not significant.

Table 7 shows the predictions of total boat numbers and the corresponding rate of boat ownership for DPI's selected growth scenario. This table is a summary of the information presented in Appendix 1.

Table 7. Predicted Boating Increases To 2025

Year	No of Boats			Population of Metro Perth	Boats per 1000 Population		
	<7.5m	>7.5 m	Total		<7.5m	>7.5 m	Total
2008	44,099	5,162	49,261	1,545,492	28.5	3.3	31.9
2012	49,921	6,035	55,956	1,636,004	30.5	3.5	34.0
2018	60,266	7,493	67,759	1,777,540	33.9	4.2	37.1
2025	75,435	9,422	84,857	1,954,331	38.6	4.8	43.4

When analysing predicted trends it should be noted that the rate of recreational boat ownership rises from about 32 boats per thousand in 2008 to 43 in 2025. This level of boat ownership is considered realistic when compared to the current level of ownership in other Australian States (see Table 9) and when factors such as the dramatic increase in Western Australia's prosperity are considered.

6.3.6 *Observations from the Data*

The recent history of growth in registered recreational boat ownership in Perth is discussed in Section 6Some trends observed are:

- Boat ownership is increasing every year both absolutely and relatively (boats per 1,000 of population) and with this comes a greater demand for boat launching and mooring facilities.
- Over the past 18 years there has been a small but noticeable trend towards larger boats as shown in Table 8.

Table 8. Boat Size Variation 1990-2007

	1990	1991	1992	1993	1994	1995	1996	1997	1998
to 7.5m	91.50%	91.30%	91.30%	91.10%	91.20%	91.00%	91.10%	90.90%	90.80%
> 7.5m	8.50%	8.70%	8.70%	8.90%	8.80%	9.00%	8.90%	9.10%	9.20%
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
to 7.5m	90.80%	90.70%	90.60%	90.50%	90.60%	90.60%	90.40%	89.90%	89.60%
> 7.5m	9.20%	9.30%	9.40%	9.50%	9.40%	9.40%	9.60%	10.10%	10.40%

- The increase in boat numbers can be attributed to both the general population growth and the increased popularity of recreational boating in Western Australia.
- Almost all yacht clubs on the River are operating at capacity and their expansion potential is limited due to available land and water areas.
- Boating facilities are regularly utilised to peak capacity with most yacht clubs and marinas not able to meet demand and many public boat ramps congested on good boating days.

As it is important to allocate resources to where the demand is strongest the Perth Metropolitan area was divided into three sectors that relate to their adjacent boating destinations; the Northern, Central and Southern Sectors (see Map 6). The Northern Sector relates to the waters in the vicinity of Hillarys and further north; the Central Sector to Gage Roads, the Swan and Canning Rivers and the Southern Sector to the Cockburn Sound and Rockingham. The overall demand for facilities within each sector was derived from the combination of LGA statistics in each sector (see Appendix 4).[11]

It is recommended that the projections, facility developments and the Short, Medium and Long Term development strategies reported in this Study continue to be closely monitored against;

- ***the analysis of each years growth statistics and updated projections***
- ***the completed delivery of new facilities and***
- ***the progression of existing or new proposals.***

A forward looking schedule of facility development should be maintained and adjusted as required to ensure that the necessary facilities are delivered in a timely manner.

[11] Metropolitan Perth Local Government Areas Recreational Boating Predictions 2007-2025 DPI Technical Report No 445 February 2008

6.4 Other Australian States - Boat Ownership per 1000 Population

Table 9 compares boat ownership trends in metropolitan Perth with other areas and States. This table indicates that the current figures and ultimate projections for Perth Metropolitan boat ownership are within the bounds of expectations.

Table 9: Comparison Of Boat Ownership Trends, Boats / 1000 Population

		2000	2001	2002	2003	2004	2005	2006
Western Australia Perth Metro Area	To 7.5 m	25	25.4	25.7	26	26.8	27.1	27.6
	> 7.5m	2.6	2.6	2.7	2.7	2.8	2.9	3.1
Western Australia Whole State	To 7.5 m	32.5	33.4	34	34.9	35.78	36.63	37.45
	> 7.5m	2.3	2.4	2.5	2.5	2.6	2.76	2.94
Queensland Whole State	To 8 m						47.56	48.75
	> 8 m						2.65	2.79
South Australia Whole State	To 8 m	30.8	31.3	31.9	32.3	33	33.23	33.51
	> 8 m	1.3	1.4	1.3	1.4	1.5	1.55	1.57
Tasmania Whole State	To 7.5 m	33.9	37.4	39.7	41.6	43.3	45.5	46
	> 7.5m	2.9	3.5	3.5	4	3.8	4	4.1
Victoria Whole State	To 8.5	27.7	28.2	28.9	29.26	29.66	30.31	30.14
	> 8.5	0.6	0.6	0.7	0.71	0.73	0.74	0.93
Peel Region WA	To 7.5 m	101	100	100.7	99.9	95.4	93.8	94
	> 7.5m	4.6	4.5	4.7	5.1	5.1	5.1	6

6.5 Considerations for Future Planning and Recreational Boating

Existing demographic data Western Australia provides insight into a number of emerging issues that are likely to have a direct impact on boating popularity and demand.

- Significant population growth is forecast for the Perth Metropolitan Region over the next 10 to 20 years.
- The availability (or shortage) of vacant boat pens has been considered during the course of this study. Terms such as 'latent demand' for pens have been used to describe that unmet demand such as described by people seeking pens and by boat retailers who require pens to sell boats. DPI appreciates the current supply shortage and is progressing with a number of government proposals to improve supply. Similarly DPI is aware of several private and club proposals to bring more pens to market in the near future. However, the fundamental focus of this Study is to concentrate on the longer term demand to ensure facilities are planned and delivered into the future when and where required. It is

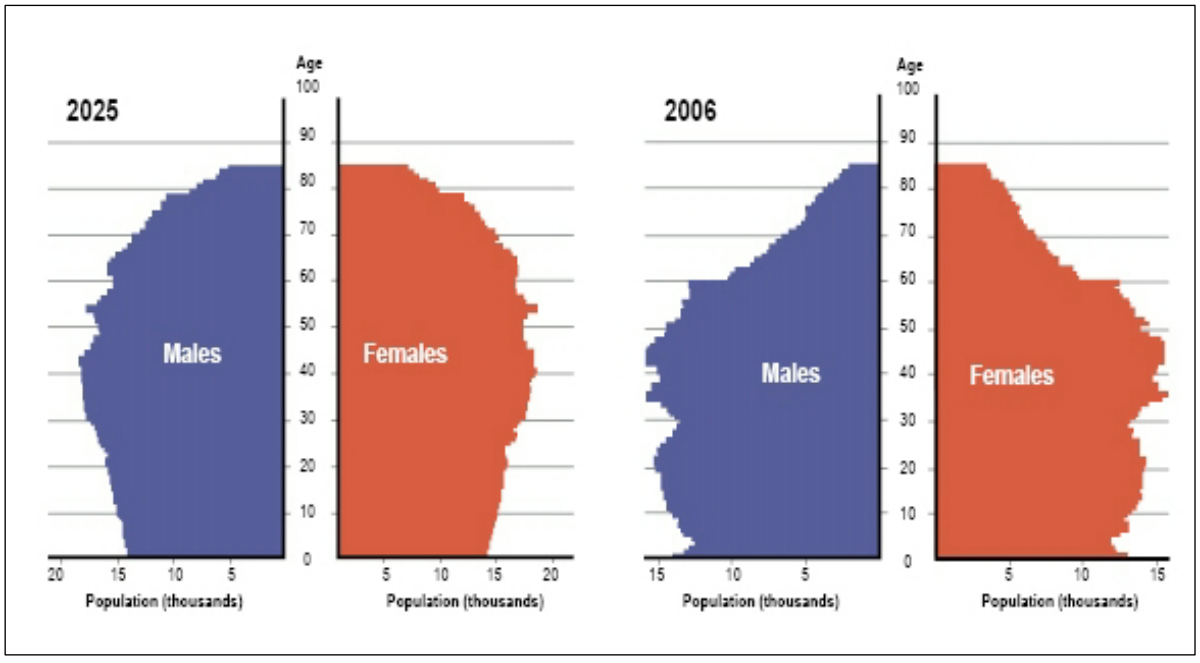
considered that if a long range vision can be maintained and proposals such as outlined in this study are delivered progressively, supply shortages will diminish over the life of this study.

- Fishing is the single largest recreational pursuit in the State, with an excess of 600,000 Western Australians and visitors involved in recreational fishing activities each year. Recreational fishing and the recreational boating industry generate $1,579 million in spending attributable to WA operations[12]. This includes industry turnover and also net additional tourist spending. It is recognised that pressures on some metropolitan fish stocks, is has increased restrictions on recreational fishing activity in Western Australia. Whether these restrictions are having or will have an impact on the forecast growth in boat registrations is not yet evident.

- The provision of new and improved support infrastructure at major waterfront public access nodes will be required to meet the demands of increased population growth. Many existing facilities are not up to current Australian Standards and lack the range of amenities that should be supplied, including lighting, jetties, ablutions, rigging and wash down bays. DPI's Recreational Boating Facilities Scheme is working with Local Governments to address some of these issues.

- There is a trend in Western Australia towards an 'older' population. The "Baby Boom" generation is reflected in age pyramids produced for Western Australia and it is this age bracket that is rapidly approaching retirement age. Recreational boating is already being reported as being a key activity for this increasingly healthy and affluent age group. Figure 5 shows that by 2025 the number of people at retirement age will have doubled from what it is now. From this factor alone an increase in boat numbers could reasonably be expected.

Figure 5. Western Australian Population Pyramid 2006 and 2025



[12] *Draft Report-The Economic Value of the WA Recreational Boat Industry* EMDA Sept. 2007

7. New Boating Facility Development Issues

7.1 Discussion

The selection of a site for development of a maritime facility is influenced by a number of factors and particularly by issues relating to shelter, safety and navigation and adjacent or existing uses of both land and water areas. These issues differ to solely land based development in that site selection is more critical noting that ideal sites on Perth's rivers and coastline are rare. Engineering and maintenance costs to develop and maintain facilities in less than ideal locations can be extremely high.

Favourable sites for new facility development must also be selected with regard to the broader Town Planning considerations. Perth's town planning schemes and policies (e.g. Network City) seek to pre-define future growth areas and include the establishment of development nodes, transport corridors and high activity areas.

It is a well accepted principle that the first priority in new facility development is to realise the potential of existing facilities. Suitable sites for new maritime facilities are limited, costly to develop, and subject to extensive and often lengthy approval processes. As a part of an overall development strategy for facilities in Perth:

It is recommended that; existing facilities should be developed to their potential and where possible considered for expansion before new facility proposals are pursued in nearby locations.

The aim is to develop selected locations encouraging complementary land use and also to divert activity away from places that impair the city's environmental health. A synergy will develop if there is a co-location of recreational boating facilities with tourist facilities and accommodation, a highly desirable outcome for the Government Tourist Planning Taskforce.

7.2 Perth's Rivers

7.2.1 The Swan River Trust

The Swan River Trust (SRT) was established in 1989 and constituted under the *Swan River Trust Act 1988*. In September 2007 the *Swan and Canning Rivers Management Act 2006* and associated legislation came into effect, replacing the previous Act. The SRT is a State Government agency responsible to the Minister for the Environment. This legislation ensures that the SRT will have a major input into any proposal to implement or change recreational boating facilities on the Swan and Canning River system.

The Trust:

- manages and protects the river system and works with State and local government and other bodies to provide facilities around the rivers
- advises the Minister for the Environment on development proposals within the Trust's Management Area
- controls and prevents pollution of the rivers and ensure they are kept clear of rubbish
- advises on and controls erosion of riverbanks
- provides advice to local governments and the Western Australian Planning Commission on town planning issues affecting the rivers

- promotes community awareness of issues affecting the health of the river system and increases community involvement in river protection and restoration.

7.2.2 Development of Perth's Rivers

While new recreational boating infrastructure along Perth's river foreshores may be considered desirable, an investigation into existing foreshore management plans and planning strategies, including consultation with Local Governments with river frontage, has revealed few initiatives or intentions to plan for new public boating facilities. The competition and regulation that now exists for Perth's rivers and foreshores presents a significant obstacle to the provision of additional public boating facilities. In particular the amount of land required to provide adequate trailer parking in areas associated with boat ramps is seen as a major issue.

The re-development of existing facilities, particularly at Yacht Clubs is the most likely option to increase facility capacity in Perth's rivers and a number of Clubs have moved to re-design their facilities to improve capacity and modernise their facilities. In some cases this includes investigation into the installation of modern boat stacking systems. The Swan River Trust, as the planning agency for the river is unlikely to grant approval for boat stackers unless environmental and amenity issues are adequately addressed, with no increase in alienation of foreshore land[13].

A facilities audit for the Swan and Canning River (See Appendix 2), completed in November 2004 and updated February 2008, revealed that only a few of the river based boat ramps appear to have the capacity to expand. The limiting factor in most cases is availability of parking space.

The development of new launching facilities within the Swan and Canning River could reduce facility congestion at existing sites. Most of the existing facilities contained along the river foreshore are subject to significant congestion problems during peak boating periods such as summer weekends.

Community feedback received on the draft Study provided the suggestion that a "Weekend and Public Holiday Only Ramp" be established on Perth City's foreshore that would utilise available open space and or city foreshore car parks. Whilst this suggestion has merit a practical site is not clearly evident. Such a facility could provide access to the Swan River for north-side residents who have a shortage of river launching facilities.

The Swan River Trust (SRT) has recommended only an upgrade to existing facilities where feasible as parking availability is a serious constraint at most ramps. The SRT has expressed a preference for new launching facilities to be located on the coast to relieve the pressure on the rivers.

7.2.3 River (Water Area) Capacity

In considering potential sites for facility development on Perth's rivers, the threshold capacity of the waterway is a frequently raised issue. To date no such assessment has been successfully undertaken, however regulatory authorities resist most new development proposals including the expansion of existing facilities for this reason. Threshold capacity in

[13] *Draft Boating Management Strategy for the Swan and Canning Rivers* Jan 2008 Swan River Trust

this context refers to the maximum number of craft that should be in operation on the waterway. At present on water activities are largely governed by DPI's navigable water regulations which are able to define and or restrict activity areas and boat speeds in the rivers.

The number of river users varies quite markedly in respect to seasons and days of the week. Peak traffic usually occurs during weekends, particularly in spring, summer and autumn months where recreational activities of all forms are active, including yachting, powerboats, swimmers, rowers, jet skis, fishing, wind and kite surfing and water-skiing etc. At other times there can be few users. These variations in user patterns can result in launching facilities experiencing congested conditions one day and being virtually empty the next.

Any attempt to define river boating capacity would need to consider environmental and social factors, which tend to be difficult to quantify. A preliminary examination of the potential environmental factors affecting the river led to discussions with leading environmental consultants and management agencies. The major environmental issues that were raised are summarised below.

- Increasing hydrocarbons resulting from increased power boat traffic.
- Increasing contaminants such as heavy metals and anti-foulants affecting organisms.
- Riverbank damage due to boat wash and launching over the foreshore, particularly smaller craft in upstream regions. A study conducted in 1990 by Pattiaratchi and Hegge[14] found that, in areas of open water exposed to a large degree of wind energy, boat wash has a negligible effect on the foreshore. In protected water areas, generally associated with the upper reaches of the river however, boat wash is a significant factor in foreshore erosion.
- Damage to foreshore vegetation, particularly in the upper reaches of the rivers.
- Decreased fish population as a result of propeller action on fish larvae and increased fishing activities
- Sullage discharge introduces pollutants into aquatic environment

Social factors are also difficult to measure and quantify. Establishing criteria for factors such as noise levels, boating safety, accessibility to the river and amenity for all river users would need to be considered within such an assessment.

7.3 Perth's Coast

Perth's boating facilities have traditionally been centred around Fremantle for commercial operations and the Swan and Canning Rivers for recreational boating.

In the 1980's recognising that existing facilities on the Swan and Canning Rivers and in Fremantle were reaching capacity and that Perth was rapidly growing, particularly northward the State Government constructed the Hillarys Boat Harbour, which was completed in 1984. This public harbour by all measures has been significantly successful and popular, now becoming one of the States most popular tourist attractions and a well patronised recreational centre as well as home to some 710 boats.

[14] Pattiaratchi C., Hegge B .*Impact of Ferry and Large Vessel Traffic on Swan River Foreshore Erosion* Sept 1990 Report WP 452 CP

Given the growing level of boat ownership new coastal communities will have an expectation that access to boating facilities will be provided as part of the range of community facilities and infrastructure delivered. As such the provision of well planned public facilities at appropriate and compatible locations along the coast is essential to meet community demand. Where private residential marina developments are proposed on Perth's coastline, they should include a significant element of public boating infrastructure to meet the broader community facility demands.

In this regard State and Local Governments should give careful consideration to the future approval of private maritime developments.

In the Perth metropolitan area there are a number of factors which affect the potential of a coastal site to be developed into a boating facility, including:

- The ability to utilise or establish sheltered water in a manner that delivers the best mix of low maintenance structures with environmental and social acceptability;
- Safe access to nearshore sheltered water areas as well as a safe route to the open sea;
- Availability of adequate water depths (including freedom from hidden hazards);
- Sufficient space within for the proposed development with allowance for future expansion which includes both land and water;
- The proximity to desirable boating activity destinations;
- The proximity to centres of present and future population, or in other words close to areas of demand;
- Good road access for vehicles towing trailer boats;
- Compatibility of adjacent land uses; and
- Environmental and social acceptability of the proposed development.

7.4 Planning for New Facilities

7.4.1 Boat Ramps

As it is unlikely that there will be many (if any) new boat launching sites established on Perth's rivers, most new boat launching facilities are likely to be located at ocean sites, in many cases closer to areas of new demand and population growth.

There is a fundamental difference between boating in the ocean and on the rivers. River conditions are conducive to spending longer periods on the water. The duration of ocean boating trips is largely influenced by weather and sea conditions. This typically means that during the popular summer boating season ocean boaters are likely to launch early and return before the sea breeze makes boating uncomfortable. This generally leads to a rush on access to ramp facilities over a short period of time following the onset of the sea breeze.

Major factors to be considered when planning for new or upgraded boat launching facilities are their capacity and efficiency. It is important that ocean ramps are designed with safety and efficiency (or handling capability) as the primary objectives. The efficiency of boat launching operations at major facilities can also be improved through traffic management, possibly including a traffic warden who can ensure that orderly and efficient car/trailer movements in the manoeuvring area of the ramp are maintained.

The Australian Standard Guidelines for the Design of Marinas; AS3962-2001 provides guidance on the number of parking bays that should be provided per boat ramp lane.

Table 10. Parking Recommendations At Boat Ramps

PARKING AT A PUBLIC BOAT LAUNCHING RAMP			
Area Classification	Number of car/trailer spaces for each ramp lane		
	Ramp only	With boat holding structures	With separate rigging and derigging areas
Urban	30-40	40-50	50-60
Rural	20-30	30-40	40-50

On the basis that most of the future boat ramps in Perth will be located at ocean sites and that these future facilities will be designed to permit efficient use, 50 car/trailer spaces per ramp lane has been selected for the planning purposes of this Study as provided in AS3962-2001.

In Appendix 4 the number of additional ramp lanes required to meet the demand by 2025 is calculated as follows:

1. The total increase in trailer boats in each Perth sector for the years 2012, 2018 and 2025 from 2006 have been identified.
2. From Section 5.2 the number of ramp lanes required is calculated from a combination of the following;

- Based on observations, on a good boating day approximately 5% of boats less than 7.5 metres are in use.
- The Australian Standard requires one ramp lane per 50 parked trailers.
- A resultant calculation that indicates that 1 ramp lane is required per 1000 registered boats.

7.4.2 Swing Moorings and Pens

In 1998 the Department of Transport moved to formalise all swing moorings by declaring parts of the Swan and Canning Rivers a mooring control area and creating 18 defined mooring areas (these do not include the areas allocated to private yacht clubs). The available space within these defined areas has since been rapidly filled and no new mooring areas are considered likely in Perth's rivers.

There are (in 2008) 1,112 registered swing moorings in the Swan and Canning Rivers. These are located within the defined mooring control areas managed by the DPI on behalf of the Swan River Trust. Based on the current management practice, it is unlikely that any further expansion to swing moorings will occur in the Rivers.

While all moorings are registered it has been noticeable that only about 40% of existing swing moorings appear to be used as the primary storage location for a boat. There are a number of possible reasons for this including that the mooring is not the primary mooring, the boat is normally held on a trailer or the mooring is only used during the boating season as a "destination" mooring. A more detailed investigation into swing mooring usage patterns on the rivers is required. The expansion of storage capacity on the Swan and Canning Rivers, in the short term, will be linked to the minor (but significant) additions planned at a number of Yacht Clubs.

The Community feedback in relation to swing moorings on the river included concern about the numbers of new moorings and inequities in relation to their availability and ownership.

In future it may be possible to increase the capacity of swing mooring areas by converting single moorings to multiple use (where a single mooring can hold several boats). Ownership issues surrounding moorings and their management and licensing regimes are currently being investigated by the Department for Planning and Infrastructure and the Swan River Trust.

In relation to swing moorings DPI has observed the following;

- Permanent use of swing moorings as the primary storage for a boat is running at about 40%.
- This rate is increasing as a result of the shortage of pens.
- Newer and more expensive boats are now using swing moorings.

7.4.3 Supporting facilities

The boating community, through the consultation phase of this Study, has expressed concerns about the availability of the following facilities in Perth.

- *Fuelling facilities:* There is a shortage of on-water public fuelling facilities in Perth. Increasingly there is a demand for petrol as well as the traditional diesel demand. Whilst yacht clubs generally provide facilities for their members, boats on moorings, have in many areas very limited access to fuelling facilities. Some marinas such as Hillary's and Aquarama have fuelling facilities run by private operators under a satisfactory model for the delivery of this service. The Fremantle Sailing Club also has a fuelling facility but due to the significant increase in public demand for fuel has withdrawn public access. An alternative proposal for a public fuelling facility is being investigated within the Fremantle Fishing Boat Harbour.

  It is recommended that; opportunities for the provision of additional on-water public fuelling facilities in the Fremantle area should be investigated.

- *Sullage Collection Points:* Increasingly modern powerboats and yachts are fitted with sullage tanks or have ablution facilities onboard. These tanks and waste storage facilities need to be emptied periodically. This waste is either disposed of offshore in the ocean or via sullage facilities. Most yacht clubs and private facilities have or are moving towards having sullage facilities provided for use by their members. However it needs to be recognised that increasing numbers of boats are permanently stored on swing moorings or in boat stacking facilities and may not have access to private sullage facilities. This is particularly relevant to the Swan and Canning Rivers. A facility at Barrack Square is available primarily for commercial use, but also to the public on a fee for service basis.

  It is recommended that; increased public access to existing sullage facilities be provided and further provision of new public facilities be supported in appropriate locations

- *Boat Stackers:* Increasingly Perth's residents live in higher density dwellings including apartments and on smaller suburban blocks. As such the ability for many boat owners to store their boat at home is diminishing. As 90% of Perth's registered boats are kept on trailers the demand for boat storage facilities is growing. Modern boat stackers are increasingly capable of storing larger boats and when considered against the shortage of on-water pens and moorings, the use of a boat stacker for storage of boats over 7.5 metres is also now attractive. Boats stored in stacks benefit from not having to worry about antifouling, are generally kept cleaner and are less exposed to the elements leading to deterioration and loss in value. Demand for these facilities is being partly addressed by the development of a number of privately owned boat stackers and an expression of interest process being run by DPI to develop a new facility within the Woodman Point Recreational Boating Precinct.

  These facilities provide a compact storage solution to significant numbers of boats including some that would otherwise require a water based pen or mooring. In future the migration of many smaller penned boats to stackers may free up on water pens for larger

boats in Perth.

It is recommended that; proposals for the installation boat stacking facilities in Perth be given consideration where they are sensitively located and designed.

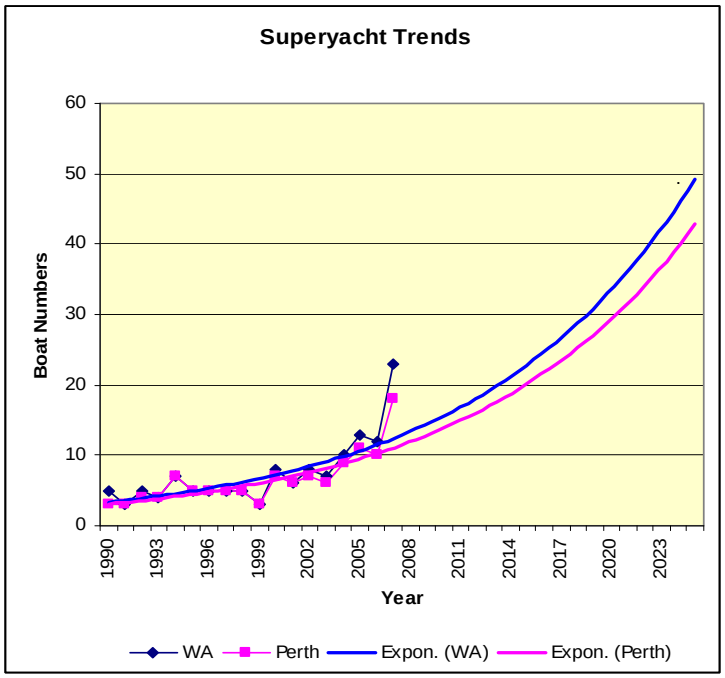
- *Boat lifters, servicing facilities and hardstand areas:* These facilities are usually associated with existing yacht clubs and the larger marinas. Existing boat lifting facilities with public access operate from locations including Hillarys, Fremantle Fishing Boat Harbour, Maylands Boat Yard and the Two Rocks Marina.

7.4.4 Superyachts

There are a small but increasing number of recreational boats that fall into the super yacht category in Western Australia. Many of these are registered in Perth. Superyachts have been defined as being those recreational boats which are over 24 metres in length. Table 11 lists the registered numbers of super yachts and their growth in Perth and WA over the past few years. The graph shows a possible projection to 2025.

Table 11. Superyachts: WA as a whole and for Perth

Year	WA	Perth
1990	5	3
1991	3	3
1992	5	4
1993	4	4
1994	7	7
1995	5	5
1996	5	5
1997	5	5
1998	5	5
1999	3	3
2000	8	7
2001	6	6
2002	8	7
2003	7	6
2004	10	9
2005	13	11
2006	12	10
2007	23	18



Perth's yacht clubs and marinas, often with berth limits of around 20 metres, are generally not designed for vessels of this size. Where practical developers of new facilities should consider incorporating a small number of pens that cater for vessels in this class. The Australian Maritime Complex in Henderson is currently providing opportunities for service industries for superyachts (both local and international) to be established.

8. Future Demand and the Benchmark or Datum Point

This Study examines the recreational boating requirements of the Perth Metropolitan area now and into the future, with the intention that this will be an ongoing study, reviewed regularly as new data becomes available. For this reason it is necessary to establish a benchmark or datum point from which to commence future assessment and planning. For the purpose of this Study the year ending 2006 has been chosen to represent this datum point. As 2006 represents a year in which many (perhaps most) facilities in Perth, including boat ramps, yacht clubs, moorings and marinas were reported to be at capacity, the selection of this year as a datum point is considered reasonable.

Individual Local Government Areas have been aggregated into the planning sectors North, Central and South (see Map 6). Table 12 (derived from Appendix 4) is the projected **absolute** demand for the facilities proposed for each planning sector based on the increased demand for lanes and pens (this includes swing moorings) from the year 2006.

Table 12. Forecast *Absolute* Demand by Planning Sectors from the end of 2006

	Short Term		Medium Term		Long Term	
	2012		2018		2025	
	Lanes	Pens	Lanes	Pens	Lanes	Pens
Northern Sector						
Demand (Accumulative)	4	456	9	900	16	1,469
Central Sector						
Demand (Accumulative)	2	551	5	1,325	9	2,446
Southern Sector						
Demand (Accumulative)	3	177	5	367	9	668
All Sectors						
Demand (Accumulative)	**9**	**1,184**	**19**	**2,592**	**34**	**4,583**

The 2006 **absolute** demand shown in Table 12 is then reduced by the facilities delivered after 2006 as listed in Table 13, noting that no new launching facilities were delivered in 2007. This information has been applied to the data in Table 17 further on in this report, which defines the **current** demand

Table 13. Pens and Swing Moorings installed since 2006

	Pens and Swing Moorings	
Northern Sector	18	New pens - Hillarys
Central Sector	140	50% of Boat Stacker - Fremantle
Southern Sector	53	40% of Swing Moorings - Mangles Bay
Total	**211**	

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8.1 Boating Facility Development Options to 2025

With the current and projected shortfall of 'supply versus demand' for moorings, pens and ramps, it is clear that there is a need to:

- Encourage the progressive expansion of existing facilities to their full potential.
- Have the confirmed facility proposals as listed in the previous section brought to fruition in the near future; and,
- Have new initiatives planned and progressively delivered over the next two decades.

A program to deliver additional facilities is provided in Table 14. This program lists projects which DPI's Maritime Facility Planners consider feasible. Most of the listed projects are well located, with access to semi-sheltered ocean water bodies, and have the capacity to provide recreational boating facilities for a large part of the boating community. These sites are also well distributed across the Metropolitan Area.

The following table summarises a potential schedule of development options designed to address the predicted demand to 2025 as outlined in this Study. Some of these proposals are yet to be approved and the list is not necessarily exhaustive. Proposals for expansion at Swan River yacht clubs have been combined due to the large number of relatively small additions. Refer to Appendix 2 for individual Yacht Club assessments.

Table 14. Boating Facility Development Strategy

Site	New Pens	New Moorings (includes 50% stackers)	New Ramp Lanes	Notes
Existing Sites - Planned Expansion				
Jervoise Bay (Woodman Point) boat launching harbour		150	4	50% of boats in Stacks are mooring equivalent. i.e. over 7.5 metres
Hillarys Boat Harbour (DPI & Yacht Club)	21		-	Space exists for some further minor pen expansion
Fremantle Fishing Boat Harbour	100	141	-	50% of boats in Stacks are mooring equivalent. i.e. over 7.5 metres
Mindarie Marina	256		-	246 marina pens + 10 residential berths. Protected water area is available for an increase in the number of pens. Parking for the extra ramps will need to be resolved.
Swan River Yacht Clubs (Combined)	317		-	Combined expansion
Ascot Waters Marina	62		-	Further stages of development
Sub-total	***756***	***291***	***4***	

Table 14, Contd.

Site	New Pens	New Moorings	New Ramp Lanes	Notes
Recognised Sites with Development Potential				
Fremantle Sailing Club	500		-	Current Planning
Point Peron boat launching harbour	-		2	Space exists to increase the existing 4 ramps to 6.
Port Coogee Boat Harbour	360		-	300 marina pens + 60 canal berths provided by the developer of Port Coogee in two stages.
Two Rocks Boat Harbour	250		2	Protected water area is available for an increase in the number of pens. Parking for the extra ramps will need to be resolved.
Port Kennedy boat ramp	-		2	Provided by the developer of Kennedy Bay.
Eglinton Marina (Pipidinny Road)	200		2	Planned marina, part of Alkimos Eglinton land development.
Sub-total	***1310***		***8***	

The corresponding predicted increase in demand for facilities for the period 2006 - 2025 under the projected Growth scenario is 4,583 pens/moorings and 34 ramp lanes. The table of all proposed development options (above) plus items installed since 2006 (Table 13) is designed to meet the demand requirements to 2025 as described in Appendix 4.

In considering development timeframes an indicative schedule has been prepared that breaks down the planning horizon of 2025 into three terms - Short Term (to 2012), Medium Term (to 2015) and Long Term (to 2025). Table 17 shows the proposed schedule based on the previously described sectors as shown in Map 6.

8.2 *Additional Facilities Required (the Gap)*

The current demand for recreational boating facilities, based on the preferred projection scenario as outlined in this report, establishes a current requirement for an additional 4,612 boat pens and an additional 34 boat ramp lanes to be provided across Perth by the year 2025. When the capacity of Perth's existing facilities is examined along with the potential provided by the planned facilities as detailed above, there is clearly a shortfall. This shortfall is described as being the "Gap". The Table 15 illustrates this statement.

Table 15. Recreational Boating Facilities Required By 2025

	Required Boat Moorings (Pens+ Swing Moorings)	Required Boat Ramp Lanes
Planned Expansion at Existing Sites (from Table 14)	1,047	4
Potential for Recognised Sites to Provide Facilities (from Table 14)	1,310	8
Totals	**2,357**	**12**
Facility target by 2025 (from Tables 12 and 13)	**4,612**	**34**
The 'GAP' (New initiatives beyond those already progressing, required to meet the shortfall to 2025)	**2,255**	**22**

Table 16 shows potential new facilities that are currently under consideration by the private sector and Government to bridge the "Gap'. Again, these proposals are yet to be approved and the list is not necessarily exhaustive.

Table 16. New Initiatives Proposed To Address "The Gap"

Site	New Pens	New Moorings	New Ramp Lanes	Notes
"Bridging The Gap" : Potential New Facility Proposals				
Fremantle area: Coastal Public Boat Launching Facility	-		8	A Government commitment. Site options are currently being investigated
New Marina in Mangles Bay	500		-	Net increase in moorings. Total pens provided 500, but 200 existing boats on moorings and hardstand assumed to relocate when built
Ocean Reef Boat Harbour	250		-	The City of Joondalup is investigating the feasibility to expand the existing boat launching harbour to include pens
North Metropolitan Boat Harbour near Alkimos Town Centre	800		8	Proposed public boat harbour near the Alkimos Town
Fremantle Harbour Policy	500	150 (stacker)		500 pens + 50% of a 300 boat stacker as part of the initial expansion project in the long term
Total	**2050**	**150**	**16**	

Table 17 summarises and compares the **current** demand (that is the demand generated from 2007 less items installed since 2006 as shown in Table 13) against the development options now proposed for each of the Planning Sectors for the Short, Medium and Long Term.

Table 18 provides a schedule of the development options.

Table 17. Forecast Demand versus Proposed Actions by Sector

	Short Term		Medium Term		Long Term	
	2012		2018		2025	
	Lanes	Pens	Lanes	Pens	Lanes	Pens
Northern Sector						
Demand (Accumulative)	4	438	9	882	16	1,451
Proposed	4	477	4	450	4	850
Proposed (Accumulative)	4	477	8	927	12	1,777
Central Sector						
Demand (Accumulative)	2	411	5	1,185	9	2,306
Proposed	4	718	4	762	0	650
Proposed (Accumulative)	4	718	8	1,480	8	2,130
Southern Sector						
Demand (Accumulative)	3	124	5	314	9	615
Proposed	6	150	0	500	2	0
Proposed (Accumulative)	6	150	6	650	8	650
All Sectors						
Demand (Accumulative)	9	973	19	2,381	34	4,372
Proposed	14	1,345	8	1,712	6	1,500
Proposed (Accumulative)	14	1,345	22	3,057	28	4,557

In the long term (to 2025) the proposed schedule of development options delivers sufficient pen numbers to closely match the forecast demand. However it is apparent that the number of proposed boat launching ramp lanes delivered in the same period fall short of demand by 6 lanes. Examining the data it is evident that the majority of this shortfall (4 ramp lanes) occurs in the Northern Metropolitan Sector after 2018.

This Sector is significantly undeveloped at present but current planning schemes indicate that major growth will be experienced over the period of this Study. It is largely from this forecast growth that the demand for the additional 6 ramp lanes has been derived. New or improved launching facilities have been identified at a number of sites currently being planned or reviewed for redevelopment in this Sector including new marinas at Alkimos and Eglinton and improvements to the facilities at Two Rocks and Ocean Reef. As planning progresses for these new facilities, opportunities to deliver additional ramp lanes will be explored to assist with the shortfall. In addition, given the extent of undeveloped and / or unplanned areas along the northern sector's coastline, it is possible that further new launching sites may be identified in time.

Table 18. Program and Schedule of Development Options

Site	Northern Sector						Central Sector						Southern Sector					
	Short		Medium		Long		Short		Medium		Long		Short		Medium		Long	
	Lanes	Pens	Lanes	Pens	Lanes	Pens	Lanes	Pens	Lanes	Pens	Lanes	Pens	Lanes	Pens	Lanes	Pens	Lanes	Pens
Existing Sites:Expansion Potential																		
Jervoise Bay (Woodman Point) boat launching harbour													4	150				
Hillarys boat harbour & Yacht Club		21																
Fremantle Fishing Boat Harbour								241										
Point Peron boat launching harbour																	2	
Mindarie Marina		256																
Two Rocks Boat Harbour	2			250														
All Swan River Yacht Clubs								235		82								
Fremantle Sailing Club										500								
Ascot Water Marina								62										
Planned Sites:Development Potential																		
Fremantle Boat Launching Harbour							4		4									
Port Kennedy boat ramp													2					
Eglinton Marina (Pipidinny Rd)	2	200																
Port Coogee Boat Harbour								180		180								
Mangles Bay Marina (or Wanliss St)																500		
New Initiatives																		
Ocean Reef Boat Harbour						250												
Alkimos			4	200	4	600												
Central Metropolitan Boat Harbour (currently Fremantle Harbour Policy)												650						
Total	**4**	**477**	**4**	**450**	**4**	**850**	**4**	**718**	**4**	**762**		**650**	**6**	**150**		**500**	**2**	

8.3 Proposed Facilities – Development Potential

The following summary of facility development options relate directly to the schedule of options (refer to Table 18) proposed within this Study. The proposals range from works in progress, to planned, to potential projects or concepts. In particular the delivery of new facilities from the potential list will prove critical in meeting Perth's long term boating facility demand. The Study finds that these new initiatives or equivalent alternatives will be essential to meet Perth's demand in the Long Term.

It is recommended that; the schedule of development options (detailed in this report) and comprising a mix of upgrades to existing facilities and delivery of new facilities (both by private enterprise and by government) be pursued to ensure that the facilities that are required to address Perth's growing recreational boating demand from now to 2025 are planned and provided in a timely manner.

The recommended development options are defined across a time scale ranging from the short term to medium to long terms. The short term recommendations, in particular, need to be given priority. Details of the full development strategy as proposed, to meet the demand for recreational boat moorings, storage and public ramps are contained in Section 10 of this Study.

8.3.1 Existing Sites – Expansion confirmed

Woodman Point: In 2007 DPI received management control over the land associated with the Woodman Point boat launching facilities. This land area is known as the Woodman Point Recreational Boating Precinct. DPI's vision for this precinct includes an expansion of the public boat launching facilities by adding a further 4 lanes, upgrades to the car parking and the establishment of at least a 300 bay boat stacking facility. DPI has called tenders for the new ramps and sought expressions of interest for the boat stacking facility.

Ascot Waters Marina: Further development of this marina is proposed and is expected to deliver approximately 62 new pens.

Hillarys Boat Harbour: DPI is progressing with plans to re-construct jetty systems in the harbour and combined with expansion to the Hillarys Yacht Club will deliver approximately 21 additional pens in 2008.

Swan and Canning River Yacht Clubs: Several yacht clubs are in the process of adding new pens or planning redevelopments which will result in more pens. These include Royal Perth, East Fremantle and South of Perth Yacht Clubs. In total approximately 317 more pens are expected to be delivered in the Short to Medium Terms.

Mindarie Marina: Work is progressing with the installation of further jetty and pen systems at Mindarie. In the Short Term approximately a further 256 pens are considered likely and have been included within this Study.

Fremantle Fishing Boat Harbour: Redevelopment of the old mooring jetties in the Fishing Boat Harbour will result in approximately 100 new recreational pens in the Short Term. A public ballot for the first issue of pens (65) was undertaken in June 2008. The increase in boats being stacked would moor an additional 141 boats.

8.3.2 New Facilities: planning confirmed or Existing Facilities: expansion feasible

Two Rocks Marina: The marina at Two Rocks has expansion capacity for an estimated further 250 pens. As demand grows in the north metropolitan area in the Medium Term it is anticipated that more pens will be made available in this harbour. These pens have been included in the Study proposals. An additional two ramp lanes with accompanying trailer parking is also planned.

Point Peron Launching Ramps: The Boat Launching facility has the capacity to add two additional launching lanes. Trailer parking expansion to match will be required. This upgrade has been included within the Long Term proposals within this Study.

Port Kennedy: The redevelopment of the Becher Point precinct of Kennedy Bay is currently being progressed by Government agencies. As a part of the project agreement the developer is required to provide public infrastructure items, including a public boat ramp and associated parking. The two lane ramp is envisaged to be a jetty style structure that will be built over the beach. This facility has been included within the Short Term development proposals in this Study.

Eglinton Marina: A number of approvals are in place for the development of a small new marina at Eglinton. Current plans indicate that a two lane ramp and approximately 200 pens will be included in the marina. Eglinton Estates Pty Ltd is currently working to secure the balance of approvals to commence work on the breakwaters. These are proposed to be established towards the end of the Short Term period within this Study.

The Port Coogee Boat Harbour is currently under construction. The boat harbour will provide approximately 60 residential canal berths and a marina with about 300 boat pens. The first half of these facilities may not be available until 2010 followed some years later by the second half. Boat ramps are not included at this site but a funding contribution is to be made towards the new ramp development at Woodman Point.

The Fremantle Sailing Club is seeking to expand its operational area with current estimates of about 500 additional pens. This expansion may be achieved in conjunction with the implementation of the Fremantle Harbours Policy. This Study has factored in an expansion of 500 pens over the Medium Term.

8.3.3 Bridging the Gap: Proposed New Initiatives

Fremantle Boat Launching Facility: A public boat launching facility on the coast in the Fremantle area has been sought by the recreational boating community of Perth for many years. In April 2000, the findings of a marketing survey of registered recreational boat owners found that the most commonly requested boating facility improvement was for the provision of more public boat ramps in the Fremantle area. If successfully developed such a facility should deliver between 6 and 8 ramp lanes.

Some of the demand for this facility can be defined by the following issues:

- There are no safe public boat launching facilities located on the Metropolitan coast between Woodman Point and Hillarys Boat Harbour (over 35 kilometres apart).
- The closest boat launching facility in the Swan River to the coast is the Leeuwin boat ramp in East Fremantle. This ramp is located approximately 4 kilometres upriver. Reaching the ocean involves negotiating Fremantle Port's Inner Harbour. By 2025 it is estimated that there will be an additional 30,000 boats in the Perth Metropolitan area requiring access to boat launching facilities

The Department for Planning and Infrastructure has conducted a preliminary engineering investigation into potential sites for a boat launching facility in the Fremantle area. Five potential sites were identified. These are located as follows:

- North Port Coogee (Port Coogee)
- Catherine Point
- South Fremantle (Fremantle Harbours)
- North Fremantle (Rous Head)
- South Cottesloe

Each of these sites has constraints and an approved location has yet to be found.

A 2005 Western Australian Labor Party policy (Labor Plan for Fisheries), proposed to "Build a new boat ramp at a suitable site on the coast in the Fremantle area - but not at Rous Head where there is potential for serious congestion and injury from the interaction of cars with boat trailers and heavy haulage vehicles using the Rous Head industrial area". Since this statement Fremantle Ports has progressed with its plans for the Port (including the outer harbour development) and implemented improvements to traffic management in North Fremantle.

This Study has factored in the development of this facility (8 lanes) over the Short to Medium Terms. However a location needs to be confirmed soon to meet these timeframes.

This Study recommends that the potential sites for a boat launching facility in the Fremantle area be re-examined and a preferred site be established by Government.

Ocean Reef Boat Harbour: The City of Joondalup is currently working on a feasibility study to determine if an expansion to the Ocean Reef boat launching harbour can deliver a substantial number of boat pens. An estimated 250 pens may be possible and this number has been factored into the development options within this Study in the Long Term.

Alkimos Boat Harbour: A large new public boat harbour is proposed in Perth's northern suburbs at Alkimos as part of the major new land development associated with Eglinton Estates and LandCorp. The Alkimos land development is proposed to include a high intensity town centre with good access to the coast. The Draft Perth Coastal Planning Strategy has identified Alkimos as being a site under consideration for a public boating facility. Preliminary investigation by DPI has confirmed that the demand for facilities in this area will be significant and that the coast and boating conditions off this coast are suited to a marina development in the long term. DPI is working with the developers of this area to incorporate this public facility. This Study has factored in a marina development over the medium to long term delivering approximately 800 pens and an 8-lane ramp.

Mangles Bay Marina: A boat harbour in Mangles Bay has for many years been under consideration by State and Local Governments. The existing original proposal marina known as the Cape Peron Tourist Park has progressed slowly due to environmental concerns. A more recent alternative proposal has emerged for a new marina to be located off Wanliss Street in Rockingham. This Study has factored in the successful establishment of a marina in Mangles Bay in the Medium Term to provide around 500 pens

Fremantle Harbours Policy: In May 2007 a DPI Working paper was formulated to provide the background and context to current work being undertaken by the Department for Planning and Infrastructure (Coastal Facilities Fremantle). The Department is in the process of formulating a Policy to be known as the Fremantle Harbours Policy to guide the future development and expansion of the harbours.

It is envisioned that most development (likely to result from the implementation of this policy) will occur outside of the timeframe of this Study (2025). However some preliminary development and provision of new pens is considered possible within the "Long Term" planning for this Study. The Policy, once finalised and endorsed by the Western Australian Planning Commission and the Minister for Planning and Infrastructure will be given statutory status. A number of concepts are currently being formulated including options that deliver an estimated 1,200 to 1,700 new pens. Approximately 650 pens or pen equivalents (boat stacking facilities) have been factored into the Study as a long term development option.

Should the Policy not successfully deliver a major expansion to the mooring capacity then an alternative facility in the central metropolitan area is considered necessary.

Currently boat launching facilities within this complex have been rejected.

8.3.4 Supply and Demand Summary

The following chart (Chart 1) depicts the forecast scenario for pens given the current approved supply of new facilities. Demand significantly outstrips supply in the Medium and Long Terms.

Chart 1 : Forecast Pen Supply versus Demand (confirmed projects only)

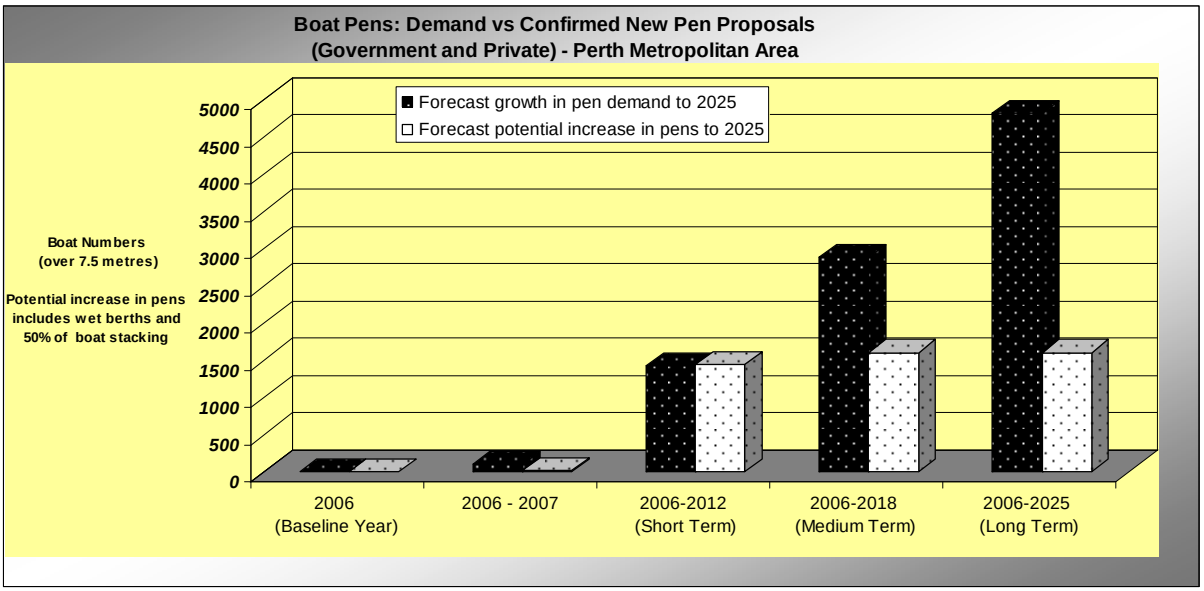
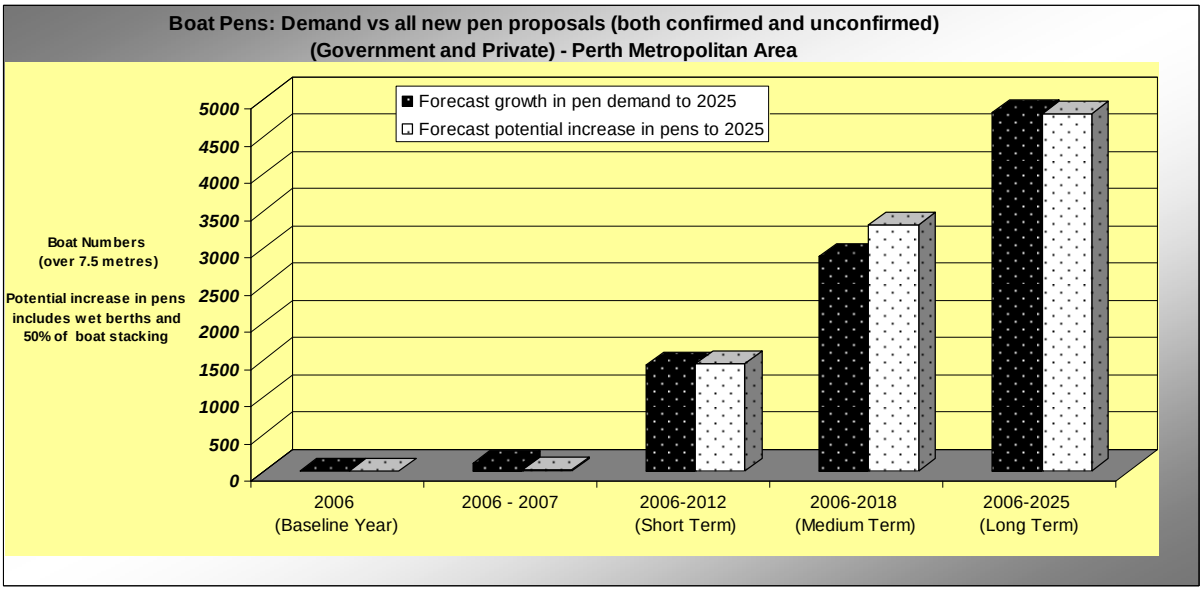


Chart 2 depicts the forecast scenario for pens given the current approved supply of new facilities and including all known proposals considered feasible but not necessarily approved or confirmed. Supply catches up with demand in the Short term and then meets demand over all time frames.

Chart 2 : Forecast Pen Supply versus Demand (confirmed projects + proposed new initiatives)



The following chart (Chart 3) depicts the forecast scenario for boat ramp lanes given the

current approved supply of new facilities. Supply falls well short of forecast demand.

Chart 3 : Forecast Ramp Supply Versus Demand (confirmed projects only)

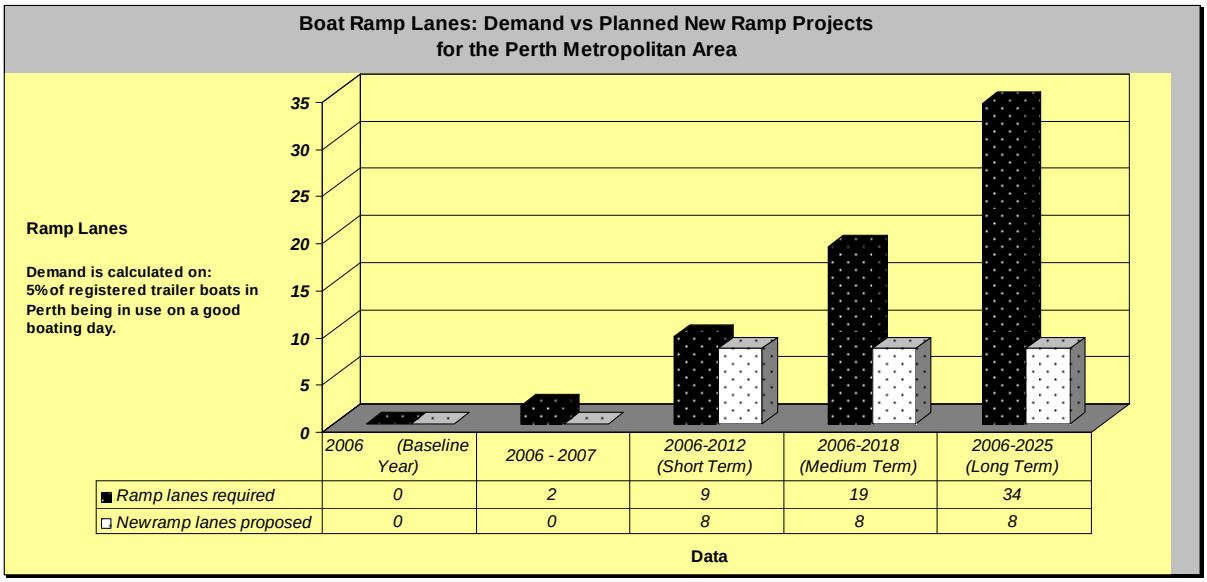
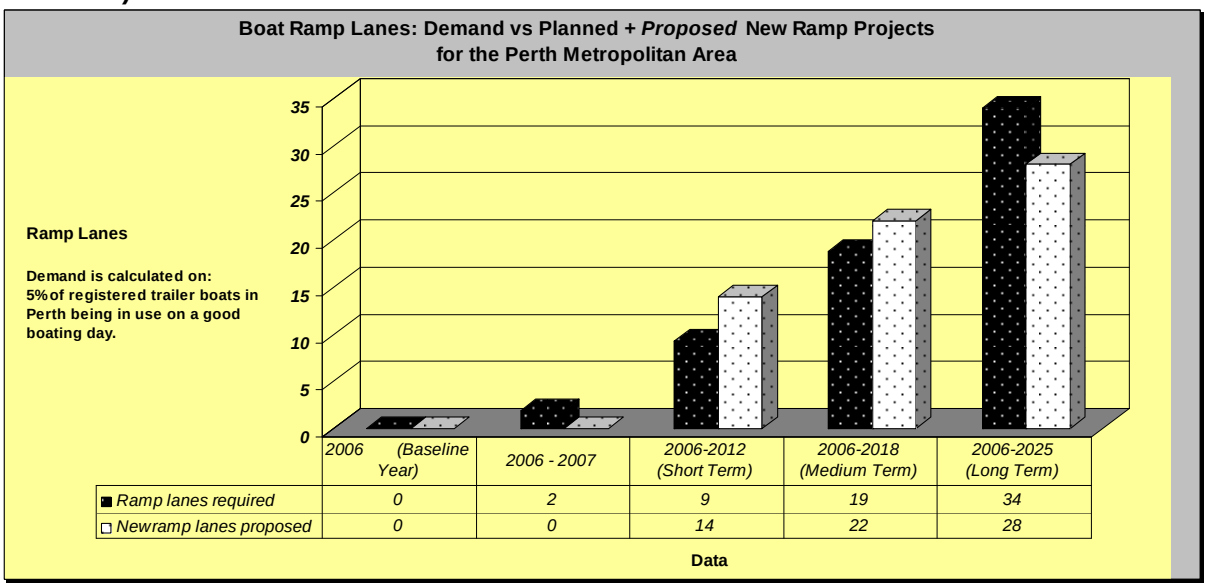


Chart 4 depicts the forecast scenario for boat ramp lanes given the current approved supply of new facilities and including all known proposals considered feasible but not necessarily approved or confirmed. Supply meets demand until the long term where it falls short of forecast demand by 6 ramp lanes.

Chart 4 : Forecast Ramp Supply versus Demand (confirmed projects + proposed new initiatives)



9. Conclusions

This report identifies that recreational boating numbers in the Perth metropolitan area are increasing at a faster rate than population growth. The demand for recreational boating facilities from now to 2025 will further outstrip the supply of the existing recreational boating facilities across Perth unless planning initiatives are put in place now to ensure that safe, appropriately located and efficient boating facilities are provided for Perth's recreational boating community. The responsibility for delivering these new facilities is shared between the State Government, Local Governments and the private sector.

It is clear that the sheltered waters of the Swan and Canning Rivers are heavily utilised on weekends and during holiday periods in the summer but further boating facility development is heavily constrained. However many existing swing moorings in the Swan and Canning Rivers are under utilised and efforts to improve the usage rates of these moorings should be pursued.

Development of most new facilities for Perth will need to occur along the metropolitan coast where existing facilities can be improved and where development and planning allows for new facilities to be constructed.

There is a need to improve access to fuel and sullage facilities and these should be provided where possible as part of any new facility development.

This study is designed with a planning horizon to 2025. Recommended development options have been grouped into timeframes; Short Term being to 2012, the Medium Term to 2018 and the Long Term to 2025. The Short Term recommendations should be pursued immediately. The planning for the Medium and Long Term proposals need to be given priority now as the planning and approvals required typically involve a number of years.

This study will require periodic review to assess ongoing growth against the provision of facilities as may be provided by State and Local Government initiatives or private development.

The Schedule below is dependant on many factors particularly approvals, resources and funding. Recommendations that relate to private facilities can only be implemented by their owners. Where appropriate DPI can support development and provide guidance.

10. Recommendations

It is the recommendations of this Study that:

- Private marina developments maximise public access and amenity. Since suitable locations for boating facilities on the waterfront (river or ocean) are rare, where these developments are proposed they should include an appropriate level of recreational boating infrastructure to the extent that further facilities do not need to be developed nearby to meet the shortfall. (Refer to 4.2)
- There is a review of the management of swing moorings in Perth, including on the Swan and Canning Rivers and in Mangles Bay to ensure that the use of these facilities is maximised. The review should also examine the licensing process (including the transfer of licences) to ensure the system is equitable in terms of public access. (Refer to 5.3)
- The projections, facility developments and the Short, Medium and Long Term development strategies reported in this Study continue to be closely monitored against;
  1. the analysis of each years growth statistics and updated projections
  2. the completed delivery of new facilities and
  3. the progression of existing or new proposals.

  A forward looking schedule of facility development should be maintained and adjusted as required to ensure that the necessary facilities are delivered in a timely manner. (Refer to 6.3.6)
- The development of existing facilities is carried out to their potential before new facilities are proposed in nearby locations. (Refer to 7.1).
- Opportunities for the provision of additional on-water public fuelling facilities in the Fremantle area be investigated. (Refer to 7.4.3)
- Increased public access to existing sullage facilities be provided and further provision of new public facilities be supported in appropriate locations. (Refer to 7.4.3)
- Proposals for the installation boat stacking facilities in Perth be given consideration where they are sensitively located and designed. (Refer to 7.4.3)
- The schedule of development options (detailed in this report) and comprising a mix of upgrades to existing facilities and delivery of new facilities (both by private enterprise and by government) be pursued to ensure that the facilities that are required to address Perth's growing recreational boating demand from now to 2025 are planned and provided in a timely manner. (Refer to 8.3)
- Potential site for a boat launching facility in the Fremantle area be re-examined and a preferred site be established by Government. (Refer to 8.3.3)

Proposed Schedule of Facility Development Options

Short Term Initiatives (to 2012)

Government funded facilities:	**Item**	**Section**
Expand the numbers of boat pens in the Hillarys Boat Harbour.	21 pens	8.3.1
Expand the facilities within the Woodman Point (Jervoise Bay) Recreational Boating Precinct, including construction of further ramps and a boat stacking facility.	4 lanes & 300 stacker	8.3.1
Expand the number of boat pens and support the establishment leased dry facilities storage (boat stackers) within the Fremantle Fishing Boat Harbour.	242 pens	8.3.1
Develop a coastal public boat launching facility in the Fremantle area (Stage 1).	4 lanes	8.3.3
Upgrade the boat ramp at the Two Rocks Boat Harbour.	2 lanes	8.3.2
Privately funded facilities: (based on known proposals)		
Expand the number of boat pens within the Mindarie Marina.	256	8.3.1
Develop private marina pens and residential berths at Port Coogee. (Part 1)	180	8.3.2
Develop the Eglinton Marina including ramps and pens.	200 + 2 lanes	8.3.2
Develop the Port Kennedy public boat ramps.	2 lanes	8.3.2
Expand the number of boat pens within the Ascot Waters Marina	62	8.3.1
Expand and or re-organise the pen capacity of yacht clubs (Part 1)	235 in the short term, 82 in the medium term	8.3.1

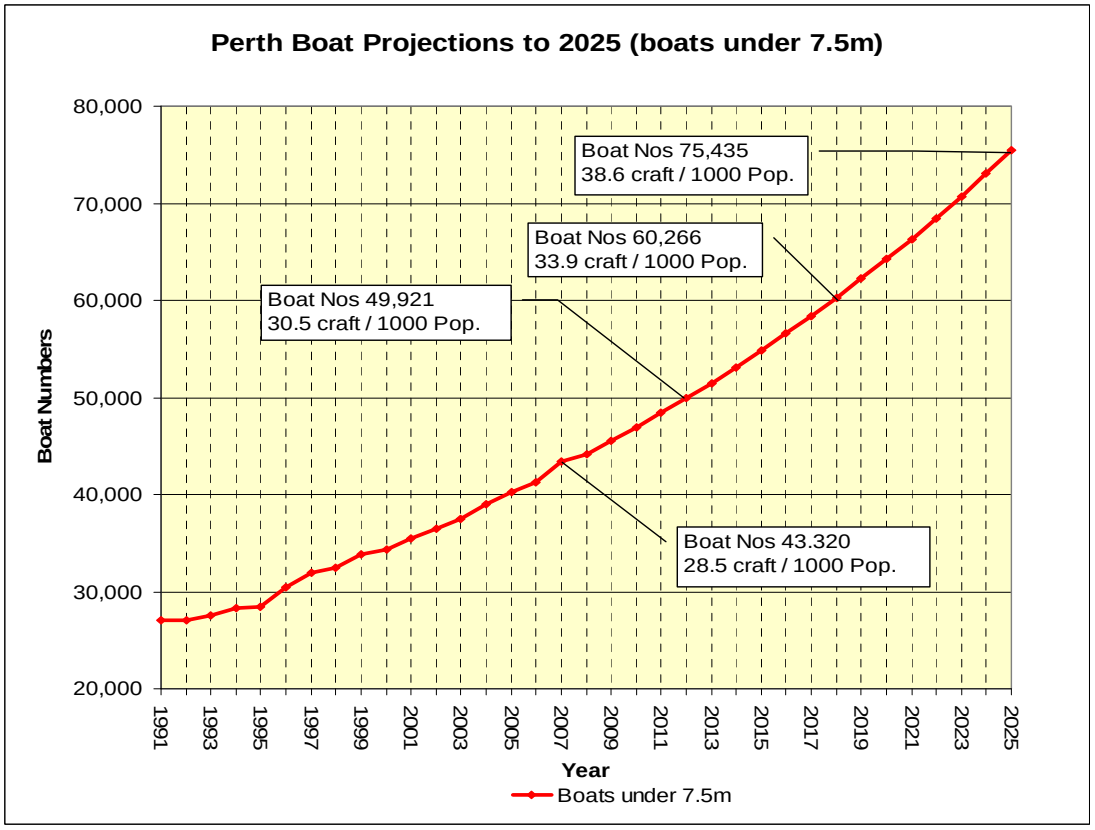
Medium Term Initiatives (to 2018)

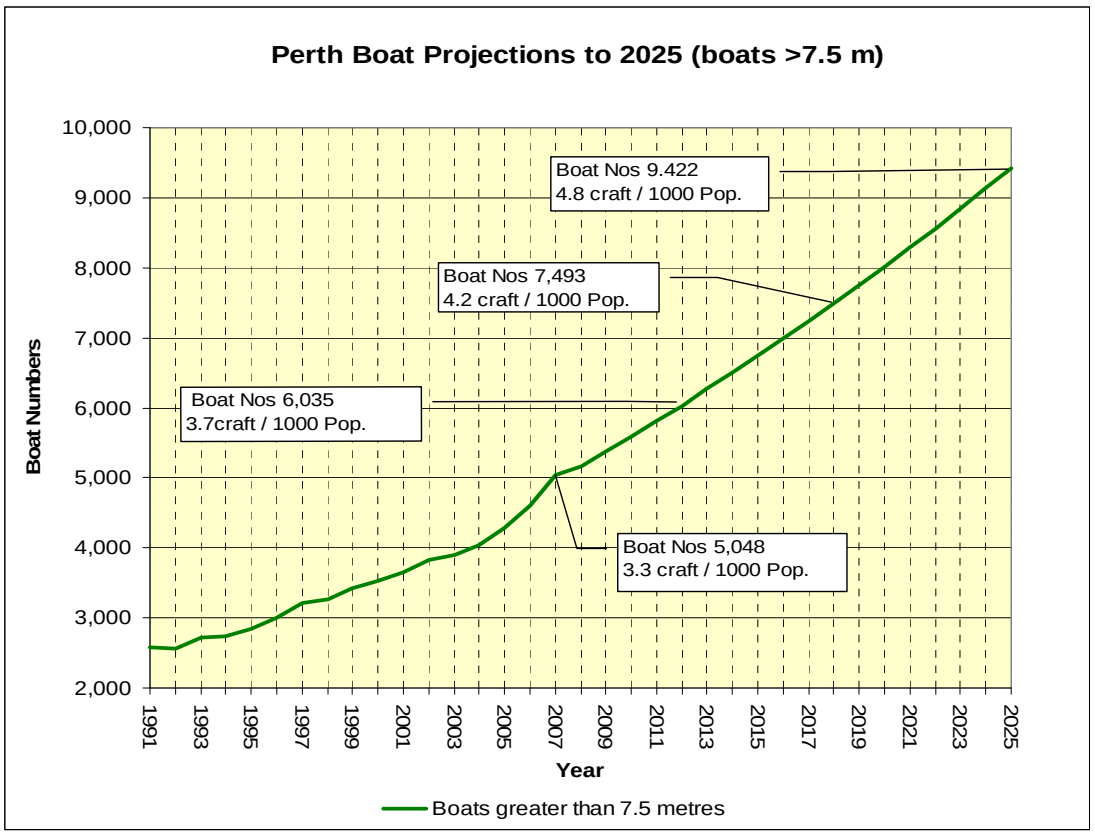
Government funded facilities:	**Item**	**Section**
Develop a marina in Mangles Bay.	500 pens	8.3.3
Develop a coastal public boat launching facility in the Fremantle area (Stage 2).	4 lanes	8.3.3
Develop a new public harbour near Alkimos on the north Metropolitan coast (Stage 1).	4 lanes,200 pens	8.3.3
Privately funded facilities		
Expand the number of boat pens in Two Rocks Boat Harbour.	2 lanes, 250 pens	8.3.2
Expand and or re-organise the pen capacity of Yacht Clubs. (Part 2)	82 pens	8.3.1
Develop private marina pens and residential berths at Port Coogee (Part 2)	180 pens	8.3.2
Expand the number of pens within the Fremantle Sailing Club.	500 pens	8.3.2

Long Term Initiatives (to 2025)

Government funded facilities:		
Expand the number of ramps within the Point Peron Boat launching harbour.	2 lanes	8.3.2
Develop a new harbour with pens, incorporating the existing Ocean Reef boat launching facility.	250 pens	8.3.3
Develop a new public harbour near Alkimos on the north Metropolitan coast (Stage 2).	4 lanes,600 pens	8.3.3
Commence Stage 1 of the expansion to the Fremantle Boat Harbours (as per the Harbours Policy).	500 pens	8.3.3
Privately funded facilities		
None currently identified		

Appendix 1. Boat Registration Projections 2008-2025





Appendix 2. Existing Facilities - Expansion Potential Pens

Existing Coastal Sites

	Ramp Lanes			Moorings		
Location	**Existing Lanes 2006**	**Lanes installed after 2006**	**Expansion Potential**	**Existing Moorings 2006**	**Moorings installed after 2006**	**Expansion Potential**
Two Rocks Boat Harbour	2		2	124		250
Mindarie Marina	4		-	61 marina pens + 40 residential berths		246 marina + 10 residential
Ocean Reef Boat Launching Harbour	8		-	N/A		250
Hillarys Boat Harbour (DPI)	6		-	430		6
Hillarys Yacht Club	N/A		N/A	255		15
Hillarys Martin Box	N/A		N/A	25	18	-
Challenger Boat Harbour (DPI)	N/A		N/A	130		-
Challenger Cruising YC	N/A		N/A	55		-
Challenger – RPYC Annexe	N/A		N/A	100		-
Fremantle Fishing Boat Harbour (DPI)	N/A		N/A	35	140 (50% of a 230 Boat Stacker at Freo Boat Park+ 51 at Boat Lifters)	241 (DPI,100)+ 141 (50% of a 283 Boat Stackers in FFBH)
Fremantle Sailing Club	N/A		N/A	650		500
Jervoise Bay Boat Launching Facility (Woodman Pt)	4		4	N/A		150 (50% 0f a 300 Boat stacker)
Cockburn Power Boats Assn (Jervoise Bay)	4		-	N/A		N/A
Challenger Beach Ramp	1		-	N/A		N/A
Kwinana Beach Ramp	2		-	N/A		N/A
Palm Beach Ramps	4		-	N/A		N/A
Mangles Bay swing mooring area	N/A		N/A	173 (40% of 433)	53 (40% of 133)	-
Shoalwater Bay swing mooring area	N/A		N/A	14(40% of 35)		-
Safety Bay swing mooring area	N/A		N/A	29(40% of 73)		-
Point Peron Boat Launching Harbour	4		2	N/A		N/A
Safety Bay Ramps - Carlisle, Bent & Donald Streets	6		-	N/A		N/A

Existing River Sites

	Ramp Lanes			Moorings		
Location	**Existing Lanes 2006**	**Lanes constructed after 2006**	**Expansion Potential**	**Existing Moorings 2006**	**Moorings installed after 2006**	**Expansion Potential**
Claremont Yacht Club	N/A		N/A	185		12
East Fremantle Yacht Club	N/A		N/A	124		73
Mounts Bay Sailing Club	N/A		N/A	67		62
Nedlands Yacht Club	N/A		N/A	40		10
Perth Flying Squadron (Nedlands)	N/A		N/A	196		Planning to be confirmed
Royal Freshwater Bay Yacht Club (Peppermint Grove)	N/A		N/A	354		-
Royal Perth Yacht Club (Nedlands)	N/A		N/A	311		60
South of Perth Yacht Club (Applecross)	N/A		N/A	451		100
Swan Yacht Club (East Fremantle)	N/A		N/A	229		-
Ascot Waters Marina (Belmont)	N/A		N/A	40		62
Aquarama Marina (East Fremantle)	N/A		N/A	235 (210 + 25 (50% of 50 boat stacker))		-
Portside Marina (Clough)	N/A		N/A	17		-
East Fremantle (East Side Angling Club)	N/A		N/A	29		-
East Fremantle (adjacent Stirling Bridge)	N/A		N/A	40		-
Northbank (Fremantle)	N/A		N/A	18		-
Jo Jo's (Nedlands)	N/A		N/A	30		Reduction proposed
Maylands Boat Yard	N/A		N/A	21		-
Pier 21 Marina (North Fremantle)	N/A		N/A	167		-
Leeuwin Ramp (East Fremantle)	3		-	N/A		N/A
Bicton Ramps (West & East)	3		-	N/A		N/A
Deepwater Point Ramp (Mt Pleasant)	2		-	N/A		N/A
Riverton Bridge Ramp (Riverton)	1		-	N/A		N/A
Manning Ramp	1		-	N/A		N/A
Mill Point Ramp (South Perth)	1		-	N/A		N/A

Existing River Sites (continued)

	Ramp Lanes			Moorings		
Location	**Existing Lanes 2006**	**Lanes constructed after 2006**	**Expansion Potential**	**Existing Moorings 2006**	**Moorings installed after 2006**	**Expansion Potential**
Mosman Park (Meads)	-		-	7		-
Coode St. Ramp (South Perth)	1		-	N/A		N/A
Goodwood Parade Ramp (Belmont)	2		-	N/A		N/A
Abernethy Rd Ramp (Belmont)	1		-	N/A		N/A
Fish Market Reserve Ramp (Guildford)	1		-	N/A		N/A
Pickering Park Ramp (Bassendean)	1		-	N/A		N/A
Claughton Reserve Ramp (Bayswater)	2		-	N/A		N/A
Memorial Drive Ramp (Bayswater)	2		-	N/A		N/A
Clarkson Road Ramp (Maylands)	2		-	N/A		N/A
Matilda Bay Ramp (Nedlands)	2		-	N/A		N/A
Qantas Ramp (Nedlands)	2		-	N/A		N/A
Johnston St. Ramp (Mosman Park)	1		-	N/A		N/A
Swan and Canning River Formal Swing Moorings (DPI)	N/A		N/A	445 (40% of 1,112)		–

Appendix 3. Summary of the Public Submissions to the Initial Draft

Number	Institution	Ramps	Concerns				
			Moorings	Statistics	Marinas	Environment	Other
1	Swan River Trust	Put ramps on Coast	No support for increased moorings in Rivers				Support Fremantle Fishing Boat Harbour
2	Landcorp				Supports Alkimos Harbour		
3	Allen Park Bushland Group			States statistics **over** estimates future boat numbers	Reject Swanbourne Accepts Rous Head		
4	Friends of Lake Claremont			States statistics **over** estimates future boat numbers	Reject Swanbourne Accepts Rous Head		As per No 3
5	City of Rockingham	Mangles support, Port Kennedy Support,Cape Peron ramp expansion support but defer			Mangles Bay to be fast tracked		Officer assessment only, Council assessment after Aug 28th.
6	Canning River Residents EPA Inc		Withdraw extra river moorings				
7	Canning River Residents EPA Inc					Environmental concerns have not been incorporated into conclusions	
8	Fisheries			Congratulates the statistical analysis			
9	Tourism WA						Supportive but tourist needs not considered enough

Number	Institution	Ramps	Concerns				
			Moorings	Statistics	Marinas	Environment	Other
10	Woodsome Management				Eglinton marina data to be incorporated		
11	Allen Park Bushland Group			States statistics **over** estimates future boat numbers	Reject Swanbourne Accepts Rous Head		As per No 3
12	Pvt	East Freo lack of Parking					
13	Pvt	Leeuwin Oval for Car Parking					Lack of Fuelling facilities
14	Pvt	East Freo lack of Parking					
15	Pvt	Leeuwin Oval for Car Parking					Lack of Fuelling facilities
16	Pvt					Concerned with boat speed limits on Swan	
17	Pvt				Mangles Bay to be fast tracked		
18	Pvt		Shortage of pens				Water depth in pens
19	Pvt		Shortage of pens				
20	Pvt		Shortage of pens				
21	Pvt		Shortage of pens				Rottnest style leasing of moorings
24	BIA WA			States statistics **under** estimates future boat numbers	Require new marinas at Swanbourne, North Mole, Rockingham, Swan & Canning River		

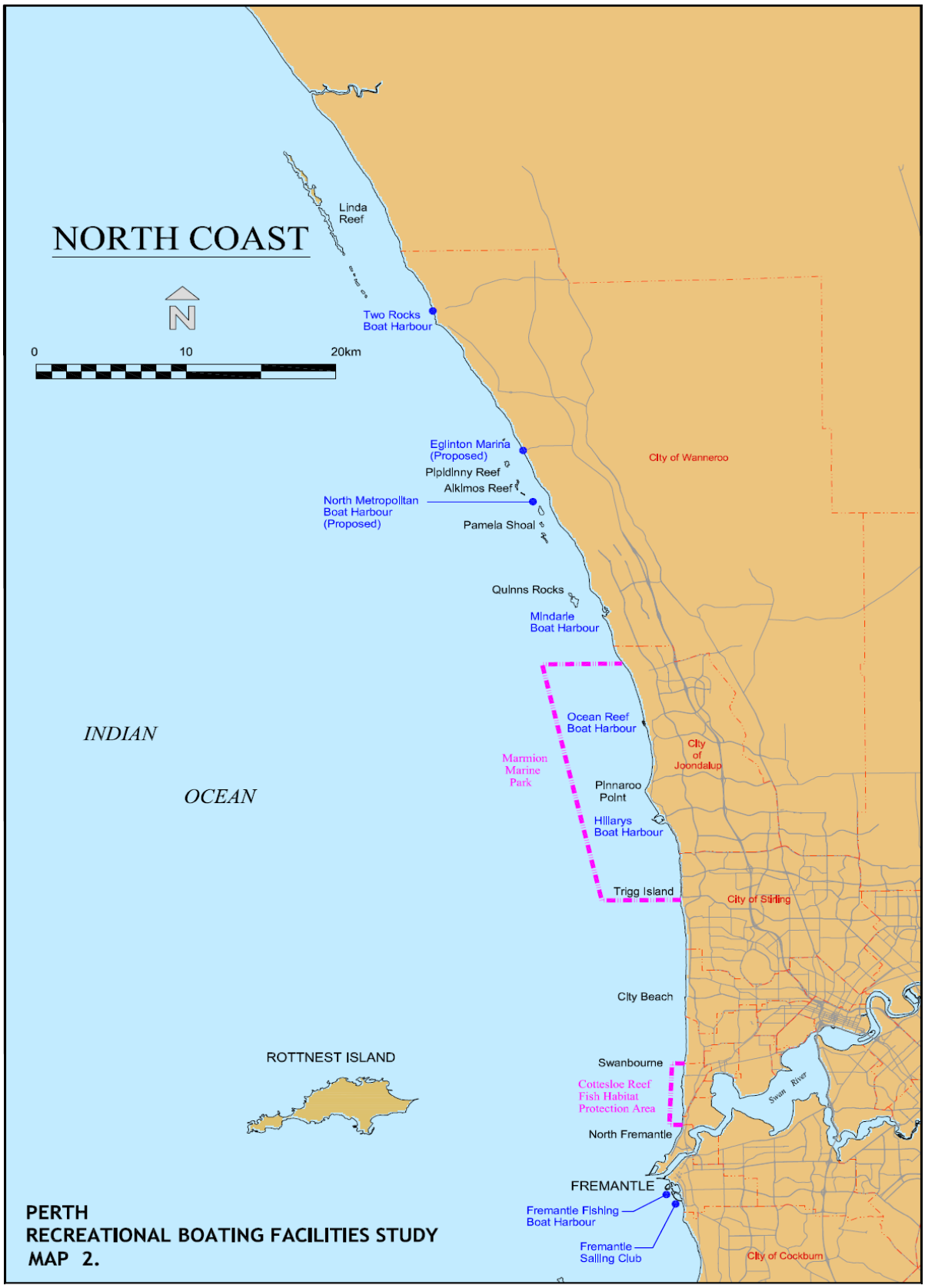
Number	Institution	Ramps	Concerns				
			Moorings	Statistics	Marinas	Environment	Other
25	Marine Biologist				Reject Swanbourne		
26	Swanbourne Coastal Alliance			States statistics **over** estimates future boat numbers	Reject Swanbourne Accepts Rous Head		As per No 3
27	Engineer			States statistics **over** estimates future boat numbers			
28	Swanbourne Nedlands Surf Life Saving Club				Reject Swanbourne Accepts Rous Head		As per No 3
29	Allen Park Bushland Group			States statistics **over** estimates future boat numbers	Reject Swanbourne Accepts Rous Head		As per No 3
30	Swanbourne Coastal Alliance			States statistics **over** estimates future boat numbers	Reject Swanbourne Accepts Rous Head		As per No 3
31	Environmental Scientist			States statistics **over** estimates future boat numbers	Reject Swanbourne Accepts Rous Head		As per No 3
34	Friends of Lake Claremont			States statistics **over** estimates future boat numbers	Reject Swanbourne Accept Rous Head		As per No 3
35	Pvt			States statistics are "Deeply Flawed"			

Number	Institution	Ramps	Concerns				
			Moorings	Statistics	Marinas	Environment	Other
36	Pvt		Replace swing moorings with pens on the Swan River				
37	Cockburn Sound Management Council	Woodman Point Expansion supported	Moorings to be better controlled	Approves the statistics	Cannot support Mangles Bay- include Wanless St		Wanless St to be included
38	Allen Park Bushland Group			States statistics **over** estimates future boat numbers	Reject Swanbourne Accepts Rous Head		As per No 3
39	Pvt			States statistics **over** estimates future boat numbers	Reject Swanbourne Accepts Rous Head		As per No 3
40	Swanbourne Coastal Alliance			States statistics **over** estimates future boat numbers	Reject Swanbourne Accepts Rous Head		As per No 3
41	City of Nedlands				Council Resolution rejects a marina at Swanbourne		Supports the thrust of the document
42	Network City DPI		Create opportunities for house boats	Recommend Level 6 ramps at Two Rocks, Mindarie, Hillarys and Fremantle Use industrial sites for Level 4/5 e.g. Kwinana Beach,Challanger Beach & Nth Fremantle (Rous Head)		Nurture the environment by careful management	Design soft scrape overflow parking areas Boat Pooling Boat Hiring Boat Stackers Duel use parking TOURISM

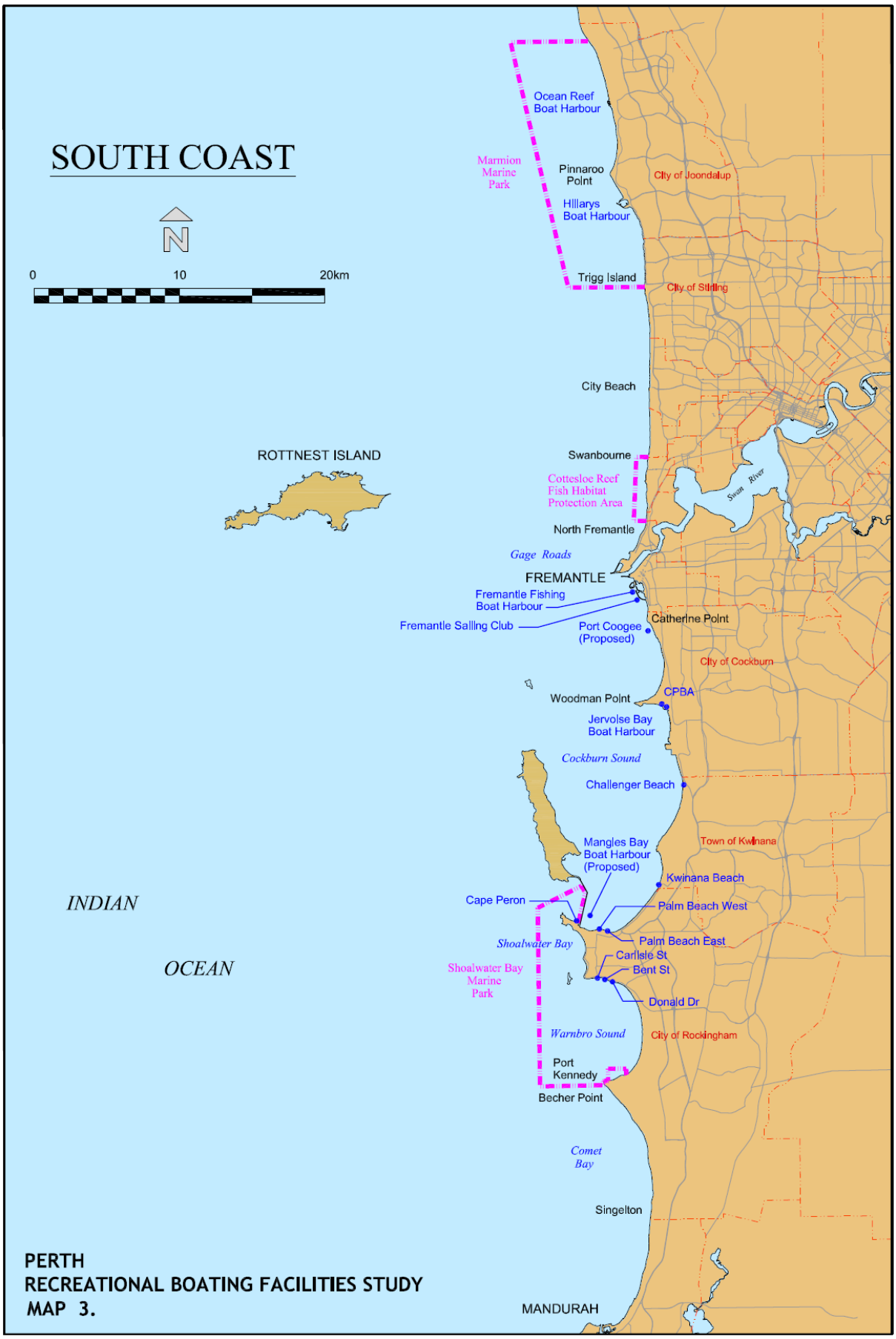
Appendix 4 Absolute Demand for Lanes and Moorings								
Northern Sector	**2006**		**2012**		**2018**		**2025**	
	0-7.5m	**>7.5m**	**0-7.5m**	**>7.5m**	**0-7.5m**	**>7.5m**	**0-7.5m**	**>7.5m**
Joondalup	5,173	518	6,496	696	7,949	838	9,885	980
Stirling	3,898	433	4,134	593	4,451	760	4,851	993
Swan	2,041	102	2,843	144	3,805	176	5,347	208
Wanneroo	2,810	177	4,216	253	6,249	355	9,891	517
Total	13,921	1,229	17,688	1,685	22,454	2,129	29,974	2,698
Actual Increase	T		3,767	456	8,532	900	16,053	1,469
Boats in use 5% of Total	B=0.05xT		188		427		803	
No of Lanes required	B/50		**4**		**9**		**16**	
No of Moorings or Pens Required				**456**		**900**		**1,469**
Central Sector	**2006**		**2012**		**2018**		**2025**	
	0-7.5m	**>7.5m**	**0-7.5m**	**>7.5m**	**0-7.5m**	**>7.5m**	**0-7.5m**	**>7.5m**
Bassendean	527	21	522	23	617	27	749	31
Bayswater	1,263	82	1,254	92	1,348	107	1,468	127
Belmont	705	60	790	69	859	84	946	101
Cambridge	702	163	751	184	805	202	874	226
Canning	1,945	139	2,178	161	2,396	190	2,650	232
Claremont	334	103	384	117	425	145	472	187
Cockburn 50%	1,362	114	1,595	137	1,823	160	2,089	187
Cottesloe	272	114	315	142	354	174	399	220
East Fremantle	348	93	390	113	441	131	501	152
Fremantle	1,006	306	1,164	376	1,309	479	1,477	637
Gosnells	2,124	118	2,600	147	3,145	191	3,927	260
Kalamunda	1,407	82	1,701	101	2,037	126	2,515	163
Melville	3,019	629	3,278	743	3,619	928	4,063	1,204
Mosman Park	361	133	413	173	468	226	531	308
Mundaring	1,022	54	1,243	71	1,538	90	1,971	117
Nedlands	773	248	849	277	949	317	1,081	370
Peppermint Grove	181	75	209	94	235	115	264	146
Perth	270	70	251	88	256	125	261	189
South Perth	854	164	924	196	1,035	225	1,180	259
Subiaco	297	94	322	103	360	125	409	156
Victoria Park	374	37	373	43	386	47	401	54
Vincent	239	41	250	43	277	49	313	57
Total	19,385	2,940	21,757	3,491	24,681	4,265	28,542	5,386
Actual Increase	T		2,372	551	5,296	1,325	9,157	2,446
Boats in use 5% of Total	B=0.05xT		119		265		458	
No of Lanes required	B/50		**2**		**5**		**9**	
No of Moorings or Pens Required				**551**		**1,325**		**2,446**
Southern Sector	**2006**		**2012**		**2018**		**2025**	
	0-7.5m	**>7.5m**	**0-7.5m**	**>7.5m**	**0-7.5m**	**>7.5m**	**0-7.5m**	**>7.5m**
Armadale	1,319	47	1,786	65	2,353	75	3,165	84
Cockburn 50%	1,362	114	1,595	147	1,823	172	2,089	196
Kwinana	718	37	1,254	40	1,259	51	1,719	67
Rockingham	4,178	195	5,248	272	6,409	348	7,942	454
Serpentine-Jarrahdale	595	37	882	83	1,289	152	2,004	298
Total	8,172	430	10,766	607	13,132	797	16,919	1,098
Actual Increase	T		2,594	177	4,960	367	8,747	668
Boats in use 5% of Total	B=0.05xT		130		248		437	
No of Lanes required	B/50		**3**		**5**		**9**	
No of Moorings or Pens Required				**177**		**367**		**668**
All Metropolitan Perth								
No of Lanes required			**9**		**19**		**34**	
No of Moorings or Pens required				**1,184**		**2,591**		**4,582**

Maps

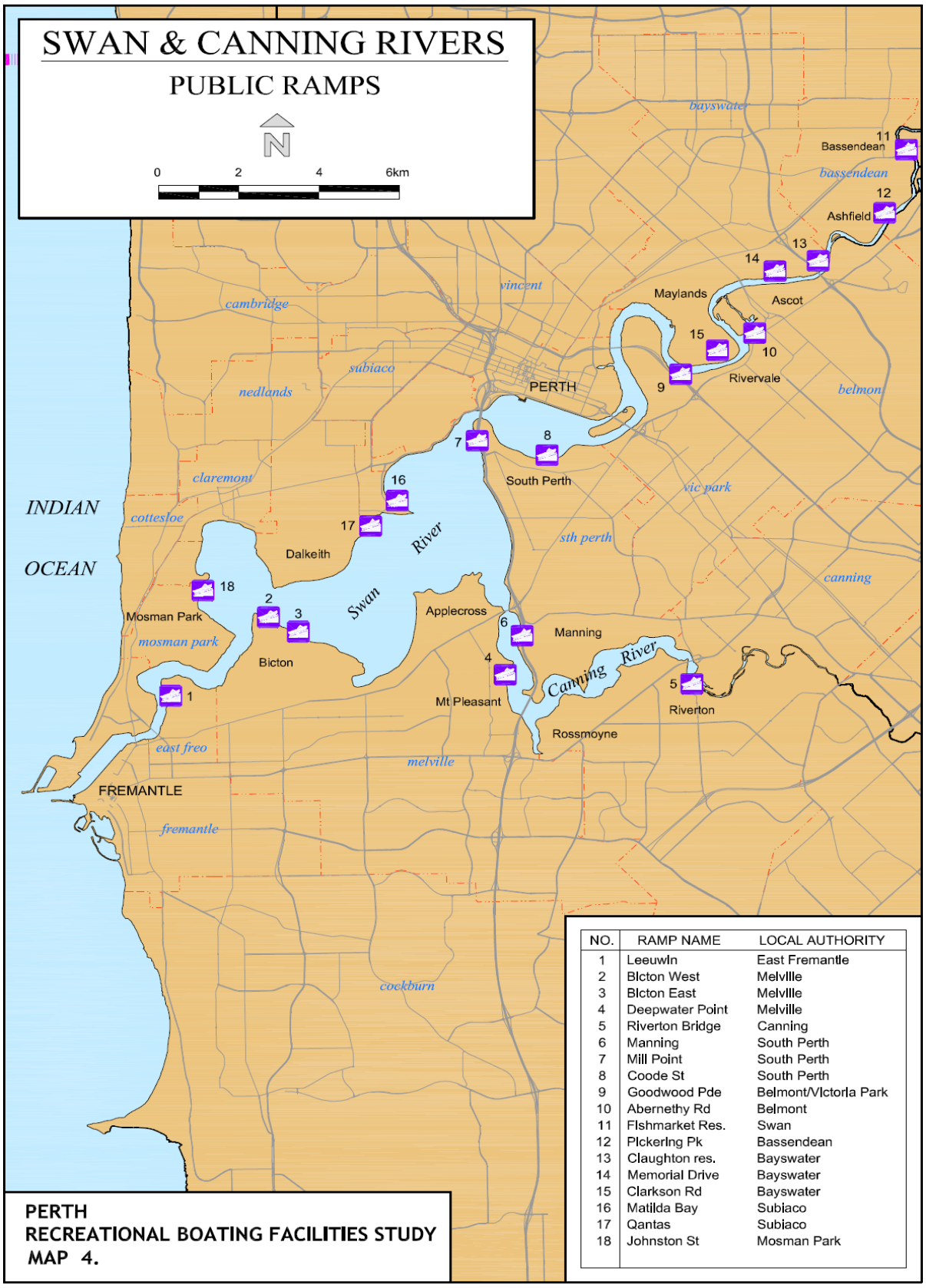
Map 1: The Study Area



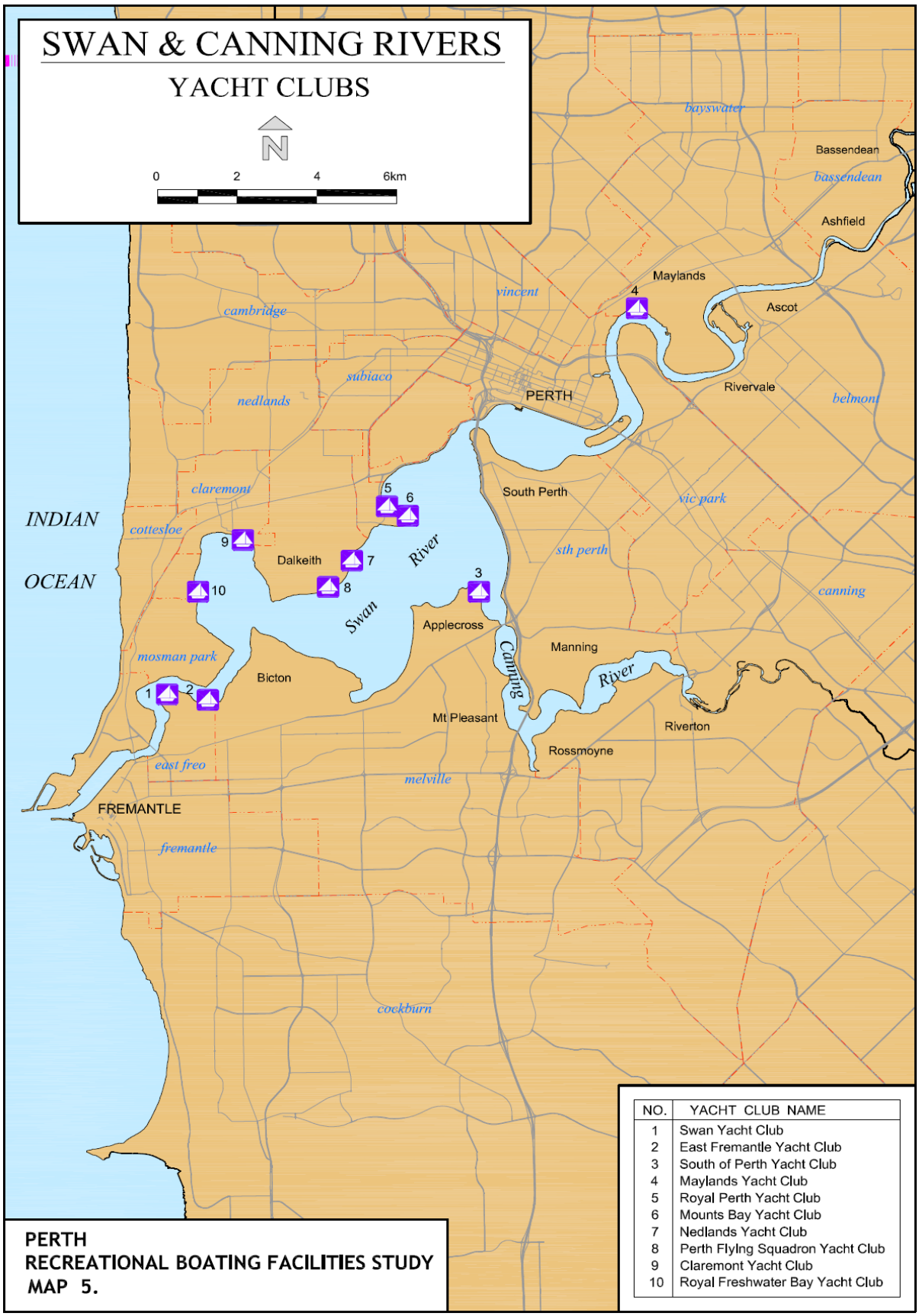
Map 2: The North Coast of the Study Area



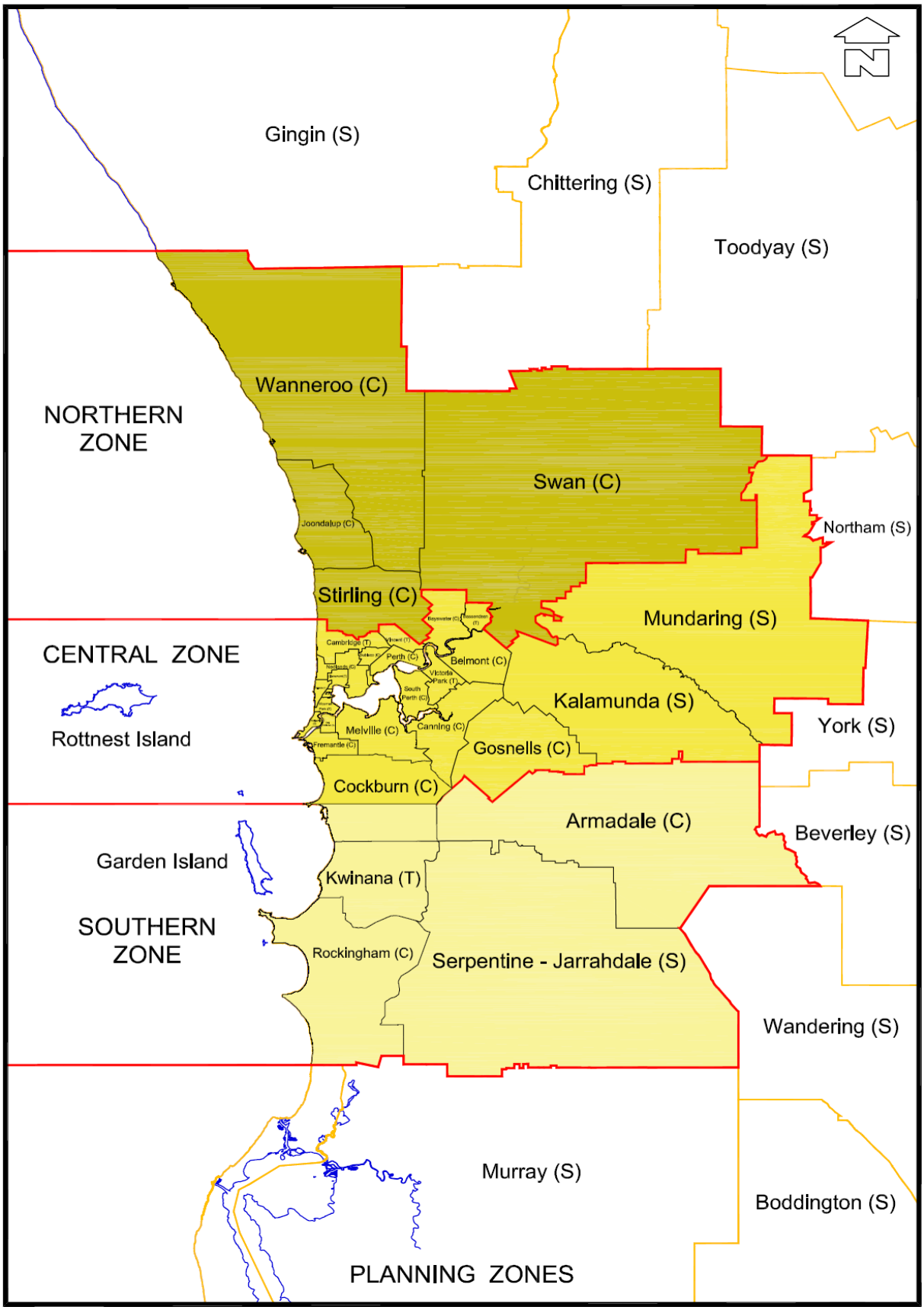
Map 3: The South Coast of the Study Area



Map 4: Swan and Canning River Public Ramps



Map 5: Swan and Canning River Yacht Clubs



Map 6: Local Government Areas and Sectors