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| Queensland Recreational Boating Facilities Demand Forecasting Study 2022  Napranum Aboriginal Shire Assessment |
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Executive Summary

This report, part of the Queensland Recreational Boating Facilities Demand Forecasting Study 2022 (‘the Study’), provides a summary of current and forecast demand on recreational boating facilities in Napranum Aboriginal Shire and the capacity of existing facilities to meet this demand. Where capacity is insufficient to meet current or forecast demand, recommendations have been made to improve existing facilities or for the construction of new facilities. This report is intended to support facility deliverers, owners, and managers over the next 20 years in their decision-making on development priorities for recreational boating facilities within Napranum Aboriginal Shire.

Key issues and attributes of recreational boating

Within Napranum Aboriginal Shire there is only one formal boat launching facility at Ooningan Street. Recreational boat users are sufficiently catered for by this facility, beach launching at Pennefather River and surrounds, and by travelling to other facilities in Weipa and Mapoon to launch vessels.

Demand summary

The assessment of recreational boating demand is centred on a statistical demand model that considers vessel registration data, population statistics, assumptions around local usage and the movement of vessels into and out of the LGA. Key parameters from this assessment for the Napranum Aboriginal Shire are:

* The population is 1,001 as at the 2021 census and is projected to be 1,052 by 2041.
* As of July 2022, there is a total of 48 vessels with a home registration within the LGA, with 100% being ‘trailable’ – and therefore requiring boat launching facilities.
* Napranum Aboriginal Shire is deemed to be Very Remote with an assumed vessel activation rate of 14% on a ‘good boating day’.
* Vessels are used within the LGA, with leakage to Weipa and Mapoon LGAs.
* Vessels from Weipa are expected to flow into the LGA and contribute to local demand.
* The existing demand for boat launching facilities is less than one for all Study timeframes, indicating that there is no statistical demand for additional boat launching facilities.

Priority recommendations

The statistical capacity of boat launching facilities within the Napranum Aboriginal Shire is adequate for the period of this Study, however a recommendation has been provided to improve the safety and amenity of the facility at Ooningan Street.

Contents

[Definitions 5](#_Toc134611084)

[1 Introduction 8](#_Toc134611085)

[2 Napranum Aboriginal Shire LGA Overview 9](#_Toc134611086)

[2.1 Key influences on recreational boating 9](#_Toc134611087)

[2.2 Capacity of existing recreational boating infrastructure 9](#_Toc134611088)

[3 Demand Assessment 11](#_Toc134611089)

[3.1 Activation rate 11](#_Toc134611090)

[3.2 Digital user survey 11](#_Toc134611091)

[3.3 Active fleet size 13](#_Toc134611092)

[3.4 Boat ramp lane demand 13](#_Toc134611093)

[4 Development Recommendations 14](#_Toc134611094)

[4.1 Priority recommendations 14](#_Toc134611095)

[4.2 Priority 1 recommendations 16](#_Toc134611096)

[5 References 19](#_Toc134611097)

[Annex A Capacity Assessment Methodology A-1](#_Toc134611098)

[Annex B Demand Study B-1](#_Toc134611099)

[Annex C Boat launching facility capacity C-1](#_Toc134611100)

[Annex D Facility Use D-1](#_Toc134611101)

Tables

[Table 3.1 LGA of origin for active fleet in Napranum Aboriginal Shire 12](#_Toc134611102)

[Table 3.2 Active fleet vessel size 13](#_Toc134611103)

[Table 4.1 Summary of recommendations for Napranum LGA 15](#_Toc134611104)

[Table 4.2 Napranum, Ooningan Street - (Priority 1) 16](#_Toc134611105)

[Table A.1. Queuing facility efficiency modifiers A-4](#_Toc134611106)

[Table C.1. Capacity of existing boat launching facilities C-1](#_Toc134611107)

[Table D.1. Boat launching facility usage statistics D-1](#_Toc134611108)

Figures

[Figure 2.1 Napranum Aboriginal Shire – Boat launching facilities. 10](#_Toc134611109)

[Figure 4.1 Priority 1 Recommendation – Napranum, Ooningan Street 18](#_Toc134611110)

Definitions

| Term | Definition |
| --- | --- |
| All‑tide (for boat ramps) | Access from a boat ramp to the open sea with an approach depth of 0.5m below LAT or deeper and a depth at boat ramp toe of 0.5m below LAT or deeper. |
| All-tide (for landings) | Access from a gangway‑access pontoon or jetty to the open sea with an approach depth of 1.5m below LAT or deeper and a depth on at least one face of the pontoon of 1.5m below LAT or deeper. |
| BIP | Boating Infrastructure Program – a sub‑program within MSQ's Maritime Assets and Infrastructure Program |
| Boat ramp | A foreshore concrete ramp with a slope designed for vehicular launching and retrieving of recreational boats. |
| Breakwater | A structure constructed over the seabed and/or the foreshore, usually rising to a height above high tide, designed to provide protection to landward areas by limiting penetration of wave action or currents. |
| CTU | Car-trailer unit space – a parking space for a typical car with a boat trailer attached. |
| Demand | Demand is the requirement of the boat‑owning population for facilities to launch/retrieve trailer boats and/or to berth suitable boats at a given year to service their average (non‑peak period) needs. In most locations demand is based on vessel registrations and is expressed in terms of boat ramp lanes or in number of 12m berths at landings. |
| Effective capacity | For a boat ramp, effective capacity (effective lanes) means the number of boat ramp lanes after adjusting for anticipated unavailability due to unacceptable wave action (>0.2m wave height) or water depth, usage constraints such as the lack of adequate parking, and improvements to efficiency or launch/retrieval throughput such as floating walkways or pontoons. |
| FHA | Fish Habitat Area, declared under the Fisheries Act, 1994 |
| FIFO | Fly‑in fly‑out, where skilled workers travel from their city or central location home communities to a remote site to perform their duties often in blocks of time that provide regular, non-weekend, days off. |
| Fixed sloping walkway | A fixed sloping structure installed at the side of a boat ramp to assist launching/retrieval of trailer boats, and dry embarkation/disembarkation from trailer boats. It is sloped to allow use at varying tide heights – sometimes with sections of different slope. |
| Floating walkway | Multiple connected/hinged flotation modules configured to assist launching/retrieval of trailer boats, and dry embarkation/disembarkation from trailer boats at most if not all stages of the tide. Floating walkways are connected to a concrete shore abutment allowing pedestrian and assisted wheelchair access. |
| Gangway access pontoon | A platform/module that always floats, where a boat can be secured alongside on one or more faces. Pontoons are usually separated from a boat ramp and have a hinged articulated gangway for access to the shore via an abutment. |
| GBR | Great Barrier Reef |
| GCWA | Gold Coast Waterways Authority |
| Landing | A landing is a jetty or gangway‑access pontoon that facilitates berthing of vessels and transfer of passengers and stores. They are most often associated with non-trailable vessels |
| Landside | Refers to areas above high-water mark, often used to denote the location of and type of infrastructure. |
| LAT | Lowest Astronomical Tide, used as Chart Datum on navigational charts. |
| LGA | Local Government Area |
| Managing authority | Councils, port authorities, water storage managers as listed in schedule 1 of the Transport Infrastructure (Public Marine Facilities) Regulation 2011 |
| MCU | Material change of use under the planning scheme |
| MNES | Matter of national environmental significance under the Environment Protection and Biodiversity Conservation Act 1999 |
| MSQ | Maritime Safety Queensland |
| NC Act | Nature Conservation Act 1992 |
| Near all‑tide | Access from a boat ramp to the open sea with a minimum approach depth of 0.5m below LAT and minimum depth at the boat ramp of 0.5m below LAT for 80 percent or more of the tidal range (time measured over a year). |
| Parking - Formalised | A sealed, line-marked parking area for car-trailer units, providing adequately sized parking spaces, roadways and turning circles. |
| Parking – Semi-formalised | An all-weather non-sealed parking area, with markers to delineate adequately sized car-trailer unit parking bays and turning circles. Markers can be concrete blocks, pavement markers (e.g., retro-reflective raised markers) or other permanent instalment to show parking bays. |
| Parking – Informal overflow | A naturally surfaced area available for use as overflow parking on the design boating day, signed as such. To have mixed-use purpose (e.g., parkland) when not being utilised as overflow parking. |
| Part‑tide | Boat ramps that do not meet near all-tide or near all-tide requirements. |
| PV | Passenger vehicle (i.e., car – as opposed to car-trailer unit). |
| Port Authority | An organisation that is responsible for the management of one or more ports on the Queensland coast. |
| Population Centre | Official named urban settlements (populated places) that have been sourced from the Queensland Place Names Database. |
| Registration activation rate | The percentage of registered vessels liable to be in use on any given good weather weekend day |
| Shortfall | The number of effective boat ramp lanes or landings required to meet demand for a given timeframe. Negative shortfall signifies an oversupply for the time period nominated. |
| SPL | Strategic Port Land |
| Study | The Recreational Boating Facility Demand Forecasting Study 2022, including this document. |
| TMR | Department of Transport and Main Roads |
| Water Storage Authority | Includes Seqwater, Sunwater |
| Waterside | Refers to areas below high-water mark, often used to denote the location of and type of infrastructure, including dredged channels and breakwaters. |
| WHA | World Heritage Area |
| # | Number |

# Introduction

BMT has been appointed to undertake the Recreational Boating Facilities Demand Forecasting Study 2022 (‘the Study’) by Maritime Safety Queensland (MSQ), a branch of the Queensland Department of Transport and Main Roads (TMR), on behalf of all public recreational boating facility managers and owners across Queensland. The Study supersedes the 2017 study of the same name and is intended to report on recreational boating facility demand, capacity, and shortfall over a 20-year period at a Local Government Area (LGA) scale across Queensland.

The Study has been developed using information from the 2021 Australian Census (ABS, 2021), recreational boat vessel registrations, consultation with facility owners, managers, and stakeholders, the 2022 Queensland Government Get-Involved recreational boating facilities survey (MSQ, 2022), and previous versions of this Study (2011, 2017). The Study is intended for use by deliverers, owners, managers, and key stakeholders of public recreational boating facilities across Queensland, namely state government agencies including MSQ and the Gold Coast Waterways Authority (GCWA), local governments, port authorities and water authorities. The Study is non-regulatory in nature and is intended to be used as part of a broader suite of information to identify priority investment in recreational boating infrastructure at a local and state level.

The Study establishes demand primarily on statistics derived from registration and population data. However, non-statistical forms of demand may also be reflected in Study recommendations. The Study evaluates existing and forecast demand over a 20-year period and makes recommendations on how this demand might be met over that period. Recommendations may include improvements to both landside and waterside capacity depending on the facility.

Recommendations are assigned a priority ranking, from 1 to 4, indicating if they are required immediately or in the next 5, 10 or 15 years respectively. To end 2022, 14% of recommendations from the 2017 study have been completed, comprising 11% of land-side recommendations and 18% of waterside recommendations and reflecting 22% of priority 1 the 2017 recommendations. A much greater percentage of the earlier 2011 study recommendations have now been implemented. Given the low uptake on existing/outstanding recommendations, this Study will review previous recommendations and carry forward, modify, or remove as required. The Study has also been tasked with reviewing specific wave exposed beach launching facilities across the state to determine their contribution to meeting boating facilities demand and make recommendations about their future.

The Study is comprised of a report for every LGA in Queensland and a state-wide summary report. Each LGA report summarises demand pressures from vessel registration data, population statistics, assumptions around local usage and the movement of vessels into and out of the LGA, and existing capacity and recommends opportunities to satisfy any shortfall. The state-wide report will support the LGA reports and provide context at a state level for demand pressures, current capacity, equity of access to facilities and state-wide priority for major boating facilities.

The Study is intended to report on publicly accessible recreational boating facilities for registered vessels. This includes boat ramps, floating walkways, pontoons, fixed sloping walkways and supporting car and trailer parking at each facility. The Study does not include recommendations for facilities that are used primarily for commercial purposes, private facilities, non-motorised recreation such as launching canoes and stand-up paddle boards, and fishing platforms.

# Napranum Aboriginal Shire LGA Overview

## Key influences on recreational boating

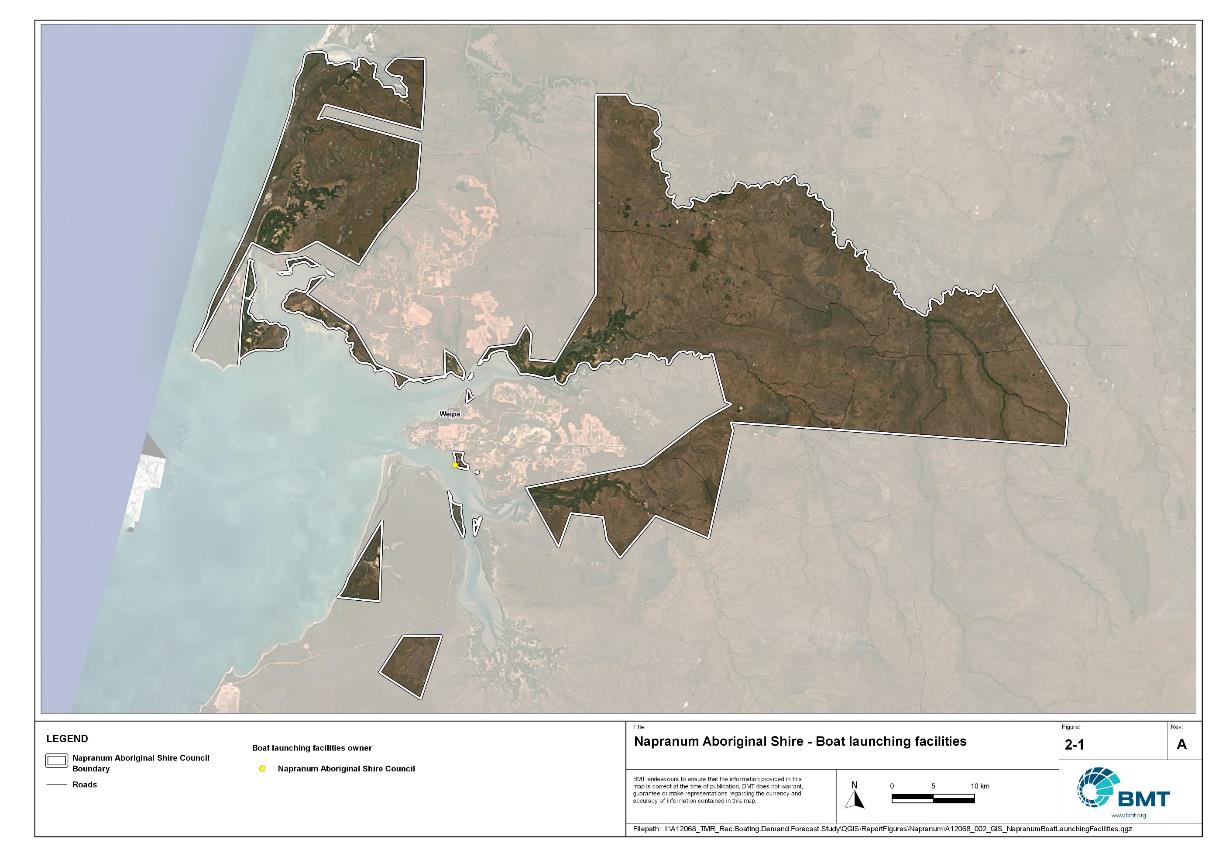
Within Napranum Aboriginal Shire, the principal attributes and influences that affect demand on recreational boating infrastructure include:

* The area is a Very Remote region under the remoteness measures used by the Australian Bureau of Statistics.
* The small population of the Napranum Aboriginal Shire.
* Good facilities are located in nearby Weipa. These are used by the local fleet and visitors to the area in preference to the Napranum facilities.

## Capacity of existing recreational boating infrastructure

The only formal recreational boating facility within Napranum Aboriginal Shire is shown in Figure 2.1. The one-lane boat ramp facility at Ooningan Street provides access to Embley River and offshore destinations and has an effective capacity of one lane. The facility at Ooningan Street is owned and managed by Napranum Aboriginal Shire Council.

For reference, the methodology for assessing boat ramp capacity is provided in Annex A.



Napranum Aboriginal Shire – Boat launching facilities.

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# Demand Assessment

The Study has developed a model to calculate statistical demand for boat launching facilities and deep-draught vessel landings at an LGA scale. Vessels that are less than 8m in length are considered trailable and drive demand for boat launching facilities such as boat ramps, while those over 8m are assumed to remain on water and drive demand for deep-draught landings.

Statistical demand is recognised at three different levels for public marine facilities within the TMR guidelines (TMR, 2020), which are:

* off-peak demand – typical weekday usage
* average demand – demand on ‘good boating days’, taken to be demand for a facility on weekends (and, for certain regional locations, other busy periods)
* peak demand – demand for a facility at peak holiday periods or for special events.

The demand model created for this Study is intended to provide information on demand pressures on ‘good boating days’ for all facilities as per the intentions of the guidelines. The model achieves this through a ‘registration activation rate’ that estimates the proportion of registered vessels in an LGA that are assumed to be active on a ‘good boating day’, as well as the exchange of vessels between LGAs, and general tourism pressures.

## Activation rate

The fleet size for each LGA is determined statistically from vessel registration numbers and the application of a vessel activation rate, while for future time horizons vessel registration and population growth estimates are also utilised. The methodology for determining the registration activation rate has been adopted from the previous study (GHD, 2017), with activation rates taken to be between 8% and 14% for a typical weekend. The variability of the activation rate is intended to capture the regional differences in vessel types, and is driven by the availability of access to open water, accessibility of other recreational opportunities, and likelihood of users’ available time for recreation, considering factors including:

* remoteness classification for the LGA
* incidence of blue-collar employment
* average age of residents
* whether the LGA is coastal.

Further information about the derivation of this rate can be found in Annex A. For Napranum Aboriginal Shire the activation rate is assumed to be 14%, with the key factors influencing the rate including its classification as Very Remote.

## Digital user survey

To gain an understanding of usage trends at existing formal recreational boating facilities across Queensland, the Study has considered the results of a digital user survey using human movement data, sourced through a third party. The data was acquired from a location data store with more than 13 trillion mobile location observations globally from 2019 to present, which were sourced from 250,000 different mobile phone applications that users ‘opted-in’ to use the location services under the application’s terms and conditions. All data received was deidentified and compliant with relevant data privacy regulations.

The analysis uses mobile devices (such as telephones) location data as a proxy for boat user traffic, however, this relationship has several limitations including, but not limited to:

* Mobile device users detected in the area of interest may not be boat users (for example, pedestrians not using vessels may walk through the detection area).
* The relationship between mobile device users and vessels may not be 1:1 (that is, there may be multiple mobile devices providing data for each vessel).
* Users of vessels may not have a mobile device, may not be using a mobile device or may not have provided permission to use their location data.

With these, and potentially other, limitations in mind, the Study compared this data against vessel launching counts provided by various facility managers and found that approximately 15-30% of vessels are captured using this digital survey method. This percentage can change from facility to facility and from day to day. Consequently, the Study has not relied on raw counts of users from this data, but instead considered the relative trends within the data, with the assumption that no groups (for example, users from a particular LGA or using a particular facility) within the data would be more or less likely to be captured by the technique.

The Study has used this data to identify the relative volume of users, the ‘home’ local government area of users and the popularity of destinations that users travel to once vessels have been launched.

* + 1. Inter-LGA demand

The human movement data has been interrogated to determine the LGA of origin for users of Napranum Aboriginal Shire LGA’s public boating facility to indicate the proportion of users from each LGA. Table 3.1 shows the active fleet proportion from the top 10 LGAs contributing to demand; all other sources have been grouped together.

LGA of origin for active fleet in Napranum Aboriginal Shire

| LGA of origin | Active fleet proportion |
| --- | --- |
| Weipa | 52.10% |
| Cairns | 8.90% |
| Napranum | 7.70% |
| Brisbane | 3.60% |
| Townsville | 2.40% |
| Cook | 2.40% |
| Mareeba | 2.40% |
| Gold Coast | 1.80% |
| Northern Peninsula Area | 1.80% |
| Mackay | 1.80% |
| Other LGAs | 15.40% |

Note: the above figures are calculated from only 169 total reports (see Annex D) across a four-year period, so it is unlikely they are providing an accurate reflection of use at the Napranum facility. However, it does indicate that there is some degree of visitation from outside the LGA using this facility.

## Active fleet size

The total ‘active’ fleet on a good boating day is derived from the activation rate of the total fleet of registered vessels within the LGA and the net inflow of visiting vessels. The total number of visiting vessels from each LGA is determined from the number of vessels in the resident active fleet and the relative proportion of resident to visiting vessels outlined in Table 3.1. The fleet size estimated from the registered vessels (Table 3.2) is expected to underestimate the number of vessels for Napranum, as there are likely to be a large proportion of unregistered vessels. Consultation with LGAs in north Queensland indicate that vessel ownership may be between 1 vessel for every 10 people and 1 vessel for every 5 people. Using these estimates, the total active fleet size is expected to be between double (14 vessels) and quadruple (28 vessels) the estimated amount from formal registrations. This fleet size is expected to remain stable over the Study period.

Active fleet vessel size

| Vessel Length | 2021 | 2026 | 2031 | 2036 | 2041 |
| --- | --- | --- | --- | --- | --- |
| 0 to 4.5m | 4 | 4 | 4 | 4 | 4 |
| 4.5m to 8m | 3 | 3 | 3 | 3 | 3 |
| >8m | 0 | 0 | 0 | 0 | 0 |
| Total | 7 | 7 | 7 | 7 | 7 |

## Boat ramp lane demand

The fleet size derived in Table 3.2 represents the statistical demand for the LGA, with vessels under 8m assumed to contribute to boat ramp demand, measured in boat ramp lanes. As outlined above the adopted capacity of each effective lane is 40 vessels per day, with each vessel assumed to both launch and retrieve, for a total of 80 vessel movements per day. The total boat ramp lane demand across the Study period for Napranum Aboriginal Shire is less than one effective lane for all timeframes, indicating that there is no statistical basis for the construction of further formal recreational boating facilities.

# Development Recommendations

## Priority recommendations

The selection and ranking of development priorities provides for progressive implementation of solutions to meet capacity shortfalls and/or resolve existing safety and usage issues at existing facilities over time. Recommendations have been split into four categories for implementation within the 20-year planning period of this study, with the following projected timelines:

* Priority 1: For immediate planning and design.
* Priority 2: Planning and design intended to provide capacity within 5-10 years.
* Priority 3: Planning and design intended to provide capacity within 10-15 years.
* Priority 4: Planning and design intended to provide capacity within 15-20 years.

The recommendations have been structured to include consideration of the reasonable timelines for implementation. This may include consideration for budgetary processes, planning, environmental approvals, consultation periods and construction. Furthermore, the priority selection of recommendations has been conducted in accordance with TMR’s Marine Infrastructure and Facilities Plan (TMR, 2020) guidelines, namely:

1. *priority to be given to the provision of sheltered all-tide or near all-tide launching facilities giving access to the open sea on an all-tide or near all-tide basis.*
2. *part-tide facilities (for launching or access) may be provided where there is demand and dredged access is not feasible. For instance, beach access or open beach ramps may be provided where there is sufficient demand and no suitable nearby sheltered waterway*
3. *the most economically viable options will take precedence, including the expansion of existing facilities, and the changing of existing foreshore land uses. In many cases, limiting or avoiding dredging and/or breakwater costs will be a crucial factor*
4. *a goal of providing access to sheltered all-tide or near all-tide boat launching facilities within one hour’s drive for significant communities*

Consequently, higher order recommendations need to address, where possible, the provision of facilities that provide maximum benefit in the widest range of conditions. Lower order recommendations will consist of solutions where there is reduced adherence to the TMR guidelines and/or there are constraints that may result in long lead times to resolve.

A review of the recreational boating needs of Napranum Aboriginal Shire indicates that there is currently no statistical basis to justify the further recommendations for upgrading the existing facility or construction of any new recreational boating facilities. However, within the community, there is some concern that using the existing facility may expose users to crocodiles that reside in this waterway. Feedback from community stakeholders suggested providing a floating walkway at this site would improve the safety and amenity of the facility, and the Study is supportive of providing an appropriate queuing facility, subject to a detailed wave and current assessment of the site. A summary of the recommendation is provided in Table 4.1 with full detail of the recommendation in the table that follows.

Summary of recommendations for Napranum LGA

| Priority | Description | Landside or waterside | Increased capacity  (effective lanes) |
| --- | --- | --- | --- |
| 1 | Napranum, Ooningan Street: Undertake a wave and current assessment to determine the suitability of either a floating walkway or fixed sloping walkway at the site, Install the most appropriate option. |  | 0.7 lanes  Amenity and safety improvements |

## Priority 1 recommendations

Napranum, Ooningan Street - (Priority 1)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| General Description | | | | |
| Location | Napranum QLD 4874 | | | |
| Existing Facility? | Yes | | | |
| Coordinates | -12.686088407979861, 141.88466616508495 | | | |
| Existing tidal status | All-tide | | | |
| Existing wave exposure | TBC | | | |
| Existing current exposure | Not known | | | |
| Proposed works | Install a floating walkway or fixed sloping walkway subject to a suitability assessment with respect to the wave and current conditions at the site. Reshape the existing eastern rock wall as required to accommodate the queuing structure without compromising wave or current protection. | | | |
| Increased effective capacity | 0.7 Lanes | | | |
| Capacity improvement position | Waterside | Landside | | Both |
| Rationale | The existing facility is the only formal facility providing recreational boat access for Napranum Aboriginal Shire. However, there is community concern that the high resident crocodile population presents a safety concern when using the facility, and it is consequently not used to its full capacity. The existing boat ramp is exposed to currents and waves from the south-east and west, so a wave and current assessment is recommended before selection of the appropriate queuing facility is confirmed. | | | |
| Anticipated Costs (+/- 50%) | Waterside infrastructure | | $830,000- | |
| Landside infrastructure | | N/A | |
| Planning, environmental and approvals constraints | | | | |
| Assessment | Requirement | Comments | | |
| Fish Habitat Zone | x | N/A | | |
| Native Title | x | N/A | | |
| MCU requirement | x | N/A | | |
| Clearing remnant vegetation | x | N/A | | |
| GBRWHA | x | N/A | | |
| Marine Park | x | N/A | | |
| Other as required | ü | Marine Plants – proposed works may be within footprint of marine plants (i.e., seagrass). A Development Permit may be required for disturbance or removal of marine plants. | | |
| Sea Level Rise | ü | The proposed work are within the boundaries of the erosion prone area subject to sea level rise. | | |
| Storm Tide Hazard | ü | The proposed work is within the boundaries of a high storm tide hazard area | | |
| Anticipated Complexity | Low | Medium | | High |



Priority 1 Recommendation – Napranum, Ooningan Street

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###### Capacity Assessment Methodology

* 1. Introduction

Boat ramps are facilities that are used for launching and retrieving trailable vessels, typically up to 8m in length (with some exceptions), to and from the water. Boat ramps consist of one or more lanes and their use is often supported by landside and waterside infrastructure to improve efficiency. In some instances, the usability of a facility can be adversely affected by environmental constraints such as low water levels, currents, or wave exposure, reducing the overall availability of the facility. Together, consideration of the number of boat ramp lanes, the supporting infrastructure, and environmental constraints results in the facility having a capacity described in terms of ‘effective lanes’ that may or may not be equal to the number of actual boat ramp lanes.

To maximise usage of each facility, the landside and waterside capacity should be balanced. Each facility will have a calculated ‘effective’ capacity for both the landside and waterside elements, with the limiting element dictating the facility's overall effective capacity. Recommendations for works or infrastructure promote balancing these two capacity elements by either improving the limiting element for increased facility effectiveness or by increasing the overall 'effective capacity' through changes to both elements.

* 1. Boat ramp capacity

The overall capacity of each boat launching facility is limited by the effective capacity of either the waterside or landside elements. The waterside capacity is informed by the number of boat ramp lanes and the number and type of queuing facilities, such as pontoons, floating walkways, queuing beaches and fixed sloping walkways. It may also be limited by the available water depth in the adjacent waterbody and exposure to environmental or other physical factors.

Landside capacity is governed by the availability of nearby CTU spaces for parking of cars and trailers, the provision of rigging and de-rigging facilities, and provision of single car parking spaces (single cars may otherwise be obliged to park in CTU spaces).

While it is expected that facilities will have their own characteristics influencing efficient use, this Study applies an approach that is consistent across the entire state as well as with previous editions of the Study. Accordingly, the effective waterside capacity of a boat launching facility is determined as being:

* the ability to support 40 vessels being launched and retrieved per day per boat ramp lane (see section A.3)
* influenced by water accessibility and exposure to wave and current conditions (see section A.4)
* supported by queuing facilities that assist in the efficient use of the boat ramp (see section A.4)

The calculation of landside capacity is in line with TMR guidance (TMR, 2020) which requires provision of CTU parking per lane lower than that provided by the Australian standard (AS3962 Table 7.1), advising:

* 10 CTUs for a single-lane boat ramp accessed by an unsealed road, or 15 CTUs accessed by a sealed road
* 45 CTUs for a two-lane boat ramp
* 70 CTUs for a three-lane boat ramp
* 90 CTUs for a four-lane boat ramp.

A notable difference from the 2017 study is the recognition and inclusion of areas close to existing boating facilities that are unsealed and/or not line marked where parking of cars with trailers occurs and is not discouraged. These areas of informal parking have been identified on aerial imagery and through discussions with managing authorities. Each informal area has been assumed to be available for CTU parking only 50% of the time to account for conflicts with other uses (for example, markets), inefficient parking practices, or poor ground conditions. The rate of parking has been calculated as:

* for linear areas where nose-to-tail parking is expected – 1 CTU per 13m length
* for linear areas with enough space to allow side-by-side parking – 1 CTU per 3m width, provided there is a minimum distance of 15m from the road or manoeuvring area
* for large areas – 1 CTU per 100m2.
  1. Boat ramp capacity calculation basis

The number of vessels per day that each boat ramp lane can support is based on the Australian Standard for the Design of Marinas (AS3962-2001) and as referenced in previous versions of this report (GHD, 2011 and 2017).

Research on boat ramp lane efficiency described in the previous report (GHD, 2017) identified that 40 vessels per lane per day was a reasonable compromise between 50 vessels per lane per day (representing congested conditions) and 30 vessels per lane per day (representing unhampered conditions). For context, the 40 vessels per lane per day rate represents a vessel launch or retrieval every 9 minutes per lane within an average normally used period of 12 hours per day.

During this Study, BMT has sought to validate the assumptions presented above, and those relating to capacity modification, by undertaking a literature review, conducting site visits that included observations of launching and retrieving manoeuvres, and reviewing video recordings of boats launching and retrieving at popular boating facilities. The literature review included a boat ramp efficiency investigation undertaken by BMT on the Mornington Peninsula, Victoria (BMT, 2015) and a review of standards from other Australian states and countries that undertake similar studies. The onsite and video analysis provided the opportunity to observe recreational boat operators using facilities included in the Study but did not include observation of total throughput during high demand periods. This assessment was undertaken during site visits across Queensland, and a full day of video recording at Manly Boat Harbour (north ramp) in Brisbane.

The New South Wales and Victoria governments are currently in a planning phase for boating infrastructure and there are presently no publicly accessible documents identifying how those jurisdictions calculate boat ramp lane capacity. The Western Australia government has commissioned studies of the Perth region and the southwest region (Western Australia Department of Transport, 2019 and 2021) that indicate a base rate of 50 vessels per lane per day, with no modifiers applied. Internationally, studies from Florida in the USA (Bell, 2022 and Swett et. al, 2012) assumed that total vessel launch plus retrieval time is between 20 to 40 minutes (18 to 36 vessels per day), although no evidence is provided to support this assumption.

The Mornington Peninsula report (BMT, 2015) collected boat launch and retrieval data for 6 boat ramp facilities on the Mornington Peninsula across 9 days, including the peak Australia Day holiday. Total throughput was assessed for each facility on days where there was constant pressure for launching and retrieving boats with results between 30 and 70 vessels per lane per day for the various facilities. When adjusted for queuing modifications, a baseline rate of between 20 and 50 vessels per lane per day was identified. Of the facilities, the higher rates were achieved where sufficient parking was provided and both waterside and landside queuing facilities existed.

Observations of recreational boat users launching and retrieving their vessels undertaken through the site visits and the analysis of video footage showed that:

* Most observed launches were of ‘multi-person’ boats, which made launching and retrieving boats more efficient.
* Almost all users were able to launch and/or retrieve their boat within the 9-minute target time, when adjusted for queuing facility efficiency.
* There was a preference to launch adjacent to a floating walkway, where one was available. At facilities where a queuing facility is not immediately adjacent to the lane it is expected that average launch times may slightly increase during busy periods.

While the observations that were made generally aligned with expectations, a more in-depth review of capacity assumptions was outside of the scope of the Study. For future studies there would be value in undertaking a more thorough, data-driven investigation of the assumptions about boat ramp lane capacity, both at its base level and modified by queuing facilities. Overall, the preliminary investigations undertaken as part of the Study suggest that the base rate of 40 vessels per lane per day adopted in previous studies is appropriate.

* 1. Boat ramp efficiency modifications

The waterside capacity of boat ramp lanes can be reduced by environmental factors that include:

* Water levels: Mainly relating to tidal areas this factor considers the reduction in the amount of time the boat ramp is available to launch and retrieve vessels over the full tidal cycle, thus reducing the overall capacity of the facility. For all-tide access, the boat ramp and connecting channel to the open sea is available during all tidal conditions and therefore available 100% of the time. For near all-tide access the boat ramp and the connecting channel to the open sea is assumed to be available, on average, for 80% of the tidal cycle. For part-tide access the boat ramp and its access channel is available less than 80% of the time. A modification factor of 0.8 is applied for near all-tide facilities and 0.5 for part-tide facilities.
* Wave and current conditions: In areas where vessel launching and retrieval may be intermittently impacted by waves (most commonly on beach ramps, but not exclusively) or strong currents (such as in rivers), a modification factor of 0.5 is applied.

Conversely, effective boat ramp capacity can be improved through the use of well-designed queuing facilities. Queuing facilities aim to improve amenity and efficient use of the boat ramp by accelerating one or more of the following phases of boat launching, with the opposite steps required for retrieval:

1. manoeuvring for launching, including for CTU entering the queuing area for the boat ramp and reversing into position for launch
2. launching and securing the launched vessel to the waterside queuing facility (if available)
3. moving the launch vehicle from the boat ramp to the parking area
4. removing the vessel from the waterside queuing facility.

A range of waterside queuing facilities are in use in Queensland boating facilities, which modify different phases of the total launching process. These include:

* Floating walkways and fixed sloping walkways: Positioned to abut a boat ramp lane, these structures aim to:
  + improve amenity – such as to assist embarking/disembarking passengers, provide a refuge from in-water contact with crocodiles, and so on.
  + make securing the vessel and removing the vehicle from the boat ramp more rapid, while freeing the boat ramp for subsequent users.
* Pontoons: Also used by deep-draught vessels, these structures improve the ability to secure the vessel and clear the boat ramp, but there is usually some time lost returning to recover the launch vehicle compared with the above options as they are generally positioned slightly further away from the ramp.
* Queuing beaches: These also provide a place to secure the vessel close to the boat ramp, although these are generally not as fast to use as pontoons.

As observed throughout the Study site visits, each of these queuing facility types can support a limited number of boat ramp lanes depending on the available space on the queuing facility. The 2017 edition of this Study applied a blanket uplift for all boat ramp lanes where a queuing facility was provided. However, the number of lanes each type of queuing facility can realistically support varies. Accordingly, this Study has provided limitations to the number of boat ramp lanes that can benefit from each queuing facility, based on the number of “working faces” (or area for a queuing beach) provided, where the “working face” is a face that allows temporary securing of vessels during launching or retrieval. The adopted improvement factors and supported lanes are summarised in Table A.1.

Queuing facility efficiency modifiers

| Queuing facility | Modification factor | Supported lanes |
| --- | --- | --- |
| Floating walkway (lanes adjacent to walkway) | 1.7 | 1 lane/face |
| Floating walkway (lanes not adjacent to walkway) | 1.3 | 1 lane/face |
| Fixed sloping walkway | 1.7 | 1 lane/face |
| Pontoon | 1.2 | 2 lanes/face |
| Queuing beach | 1.15 | site-based |

In other states in Australia, reversing queuing bays are more commonly used than in Queensland. These are CTU waiting bays at the head of the boat ramp that are aligned with each boat ramp lane to allow the user to reverse directly down the boat ramp once it is clear. CTU waiting bays reduce the time of the first phase of boat launching by allowing waiting CTU’s to be ready to reverse as soon as the lane becomes clear. The BMT (2015) study on the Mornington Peninsula included facilities with and without these bays. Boat ramps that included reversing queuing bays achieved 50% greater throughput. Facilities that have implemented this approach in Queensland include North Street Southport, Urangan Boat Harbour, Townsville Recreational Boating Park, and the (under construction late 2022) boat ramp at Yorkeys Knob.

* 1. Accessibility from boat launching facilities

Recreational boat users will typically select the boat launching facility most appropriate or convenient to the activity they are seeking to undertake, the anticipated weather/wave conditions, and their destination. Each of facility within an LGA will provide a varying degree of access to different destinations and for different activities. During the Study, consultation with stakeholders highlighted the following general types of destinations and activities:

* Open water/offshore: typically accessed for visiting offshore islands or remote beaches, snorkelling or diving locations, deep sea fishing and general recreation.
* Creeks and estuaries: typically accessed for fishing, crabbing, wildlife observation, skiing and general recreation.
* Freshwater: typically accessed for skiing, fishing, wildlife observation and general recreation.

These destinations are typically serviced by different types of recreational vessels. Inshore locations including creeks, estuaries and other freshwater locations are typically patronised by vessels less than 4.5m, except for ski boats, which can be much larger than this. Offshore locations typically require larger boats for access as these vessels are more capable of managing a wide range of wave conditions and can carry sufficient fuel to access distant destinations. Smaller vessels may be able to access close destinations on good weather days, and larger vessels may choose to access inshore destinations, particularly on poor weather days.

Consequently, the following aspects are used to classify how well a facility provides open water access:

* Open-water access: There are no restrictions between the facility and open water.
* Depth-limited access: There are depth restrictions between the facility and open water that limit navigable access to part of the tidal range. This differs from tidal constraints at the actual facility, which might be usable at all tides, but offshore access is limited by a downstream bar or delta.
* Distance-limited access: The distance from the facility to the open water is unrealistic for typical boat users. This distance is assumed to be about 4.5km between the facility and open water to rate as 'distance limited', with travel times increased further where portions of the access channel are regulated by speed limits.
* Infrastructure-limited access: There are man-made obstacles between the facility and open water, such as above-ground pipeline crossings, low bridges or weirs that impede navigable access to open water.
* Beach ramps: These provide open-water access but are typically constrained by environmental conditions such as wave exposure and tide levels. The capacity of these facilities has been individually assessed based on consultation and other data sources and is described in more detail in section 4.
* Freshwater: There is no access to open water.

Certain facilities, particularly those in freshwater, may be constrained by periods of drought, or debris deposition after rainfall events that limit access to destinations, and therefore whether a facility will provide useful boat launching capacity. While it is noted that drought and rainfall may affect the overall capacity of boat launching within an LGA, and given that the timing of such events is not readily predictable, their impact on capacity has not been evaluated.

###### Demand Study

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###### Boat launching facility capacity

Capacity of existing boat launching facilities

| Facility ID | Facility name | No. lanes | Tidal access  at ramp | Tidal access to open water | Queuing facility | Formal CTUs | Informal CTUs | Waterside capacity | Landside capacity | | Effective capacity | | Constraint |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Open Water Access** | | | | | | | | | | | | | |
| NA10 | Napranum, Ooningan Street | 1 | All-Tide | All-Tide | None | 9 | 0 | 1 | 1 | | 1 | | Waterside |
| Subtotal |  | 1 |  |  |  | 9 | 0 | 1 | 1 | | 1 | |  |
| **Total effective capacity** | | | | | | | | | | 1.0 | |  | |

###### Facility Use

Boat launching facility usage statistics

| Facility ID | Facility name | Total reports | Weipa | Cairns | Napranum | Brisbane | Townsville | Cook | Mareeba | Gold Coast | Northern Peninsula Area | Mackay | Other LGAs |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Total |  | 169 | 88 | 15 | 13 | 6 | 4 | 4 | 4 | 3 | 3 | 3 | 26 |
| Total % |  | 100% | 52.1% | 8.9% | 7.7% | 3.6% | 2.4% | 2.4% | 2.4% | 1.8% | 1.8% | 1.8% | 15.4% |
| NA10 | Napranum, Ooningan Street | 169 | 52.1% | 8.9% | 7.7% | 3.6% | 2.4% | 2.4% | 2.4% | 1.8% | 1.8% | 1.8% | 15.4% |

|  |  |  |
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