

Abrolhos Islands

Moorings Review and Analysis Project



Prepared for



Department of
**Primary Industries and
Regional Development**

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1 Introduction

The Abrolhos is a group of over 200 islands located 60-80 km west of Geraldton on Western Australia's mid-west coast. The surrounding waters are one of the State's unique marine areas and form part of the Abrolhos Fish Habitat Protection Area (FHPA) managed by Department of Primary Industries and Regional Development (DPIRD) (refer to Figure 1).

The islands are growing in popularity, with an expansion in users from the traditional commercial fishing and aquaculture industries to recreational and tourist visitors. In response to the increased demand for moorings, and in acknowledgement of the need for improved mooring management, DPIRD commissioned Wavelength to review and prepare a mooring management plan focussing on:

- current mooring arrangements (private and public)
- issues and challenges associated with the current model
- mooring needs analysis including alignment with national park visitor nodes
- options for future management of moorings including costs and financial analysis

The recommendations contained within this report will be considered by DPIRD in the preparation of a Marine Infrastructure Management Plan as a sub-document to the Abrolhos Fish Habitat Protection Area Management Plan.

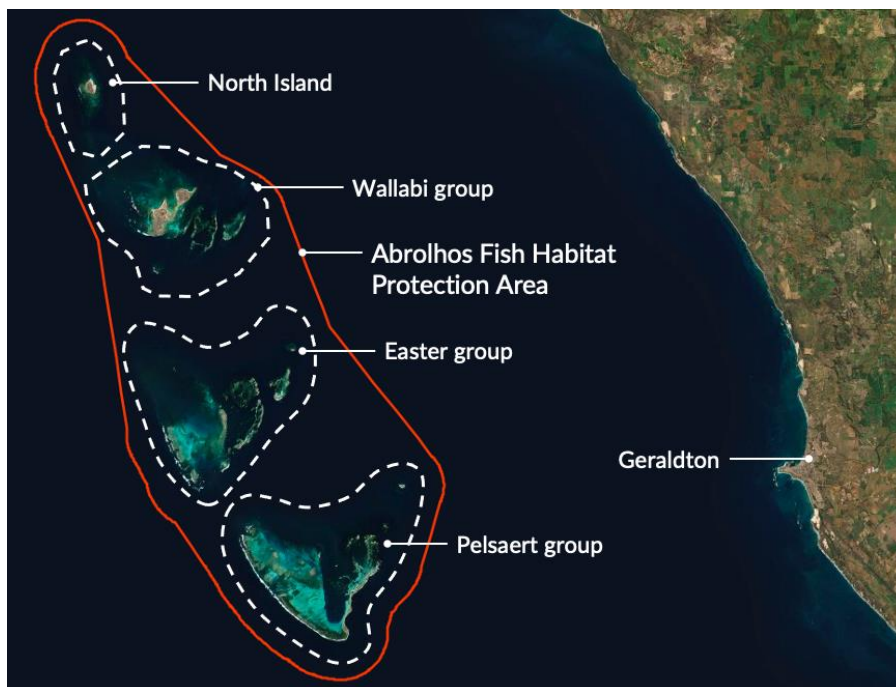


Figure 1. Abrolhos Fish Habitat Protection Area

1.1. Island groups

The islands extend more than 100 km from north to south and comprise of the following four spatial island groups (refer to Figure 1):

- North Island,
- Wallabi group,
- Easter group,
- Pelsaert (Southern) group.

North Island is often considered part of the Wallabi group, however for this study it has been considered separately due to its location further north and different usage patterns.

1.2. Report structure

This report is based around the following sections:

- **Introduction** (this section) – project introduction
- **Current status** – review of existing moorings, usage and a summary of current issues
- **Benchmarking** – comparison of mooring regulations and management in other jurisdictions
- **Future demand** – review of future tourism planning and expected growth areas, and focus areas for the sighting of new moorings
- **Recommendations** – summary of recommendations.

2 Current status

2.1. Management responsibilities

The management responsibilities for the Abrolhos Islands and nearshore waters are shared primarily between DPIRD and the Department of Biodiversity, Conservation and Attractions (DBCA).

The waters surrounding the islands extend to a distance of three nautical miles to form the Abrolhos Fish Habitat Protection Area (FHPA). DPIRD has management responsibility over these waters and moorings within the FHPA and are the focus of this study.

DPIRD also has management responsibility for 22 islands (or parts of islands) that make up the Abrolhos Islands Class A Reserve, which includes occupied island areas. These areas are primarily Body Corporate leased land occupied by commercial fishers and aquaculture operators.

In 2019 the Houtman Abrolhos Islands National Park was created covering all uninhabited island areas to the high-water mark, which includes 189 islands, and managed by DBCA.

Although this study focuses on DPIRD's management of the waters within the FHPA, consideration is given to the land-based resources and expected visitation as a catalyst for water-based demands.

2.2. Existing marine stakeholders

For comparison purposes, the marine stakeholders using moorings within the Abrolhos Islands have been split into the following categories:

- **Commercial fishing/aquaculture operators** – all marine industry users with the exception of tourism operators
- **Commercial tourism operators** – tourism operators covering all aspects of water based recreational activities including fishing, diving, surfing, nature appreciation, heritage interest
- **Recreational** – private recreational boat users accessing the islands for tourism purposes
- **Other** – the small number of 'other' users such as research, training, exploration.

2.3. Existing facilities & marine attractions

There are a variety of natural and historic attractions and uses which draw marine visitors to the islands. There is also existing built infrastructure, both private and public across multiple islands. A summary of the key existing marine attractions and associated infrastructure is as follows:

- **Reef Observation Areas (ROA)** – there are a total of four ROAs, with one in each of North Island, Wallabi Group, Easter Group, Pelsaert Group. The ROAs provide opportunities for visitors to view good quality reef habitats and special reef features with substantial resident fish populations. Fishing is restricted within ROAs.
- **Dive locations** – there are seven recommended dive locations providing the opportunity for visitors to undertake self-guided dive trails.
- **European heritage** – there are twenty known historic shipwrecks scattered across the islands, the most famous being *Batavia* and *Zeewijk*, located within the Wallabi and Pelsaert Groups respectively. There are also significant European heritage attractions across many of the islands.
- **Body Corporate lease areas** – existing facilities, built infrastructure and adjoining jetties exist on a number of islands within Body Corporate lease areas. Many of these islands were originally selected due to their adjoining sheltered waters for mooring and relative ease of access to the islands. (Many of the islands are difficult to access due to shallow rock/reef shelf.)
- **Airstrips** – airstrips are located on North Island, East Wallabi Island, and Rat Island (Easter Group) and form key access points to the Islands.

In addition to these attractions there are a number of natural constraints on the islands, including sea lion and bird breeding locations at particular times of the year and areas of outstanding natural beauty, where visiting is discouraged during certain times.

2.4. Weather conditions

The Abrolhos Islands are a remote offshore location and exposed to all weather conditions, with no protection other than the islands themselves. In common with all offshore locations, conditions can change at short notice and often change during the course of the day.

Wind conditions can be from any direction throughout the year; however, the dominant direction is from the south to southeast. The islands are also exposed to swell waves from distant storms, primarily from the southwest. Although winds and waves are persistent all year round, there is typically some respite from March to May which coincides with the peak usage.

Although the tidal range is very small (considered micro tidal) there are some locations, depending on the bathymetry where strong currents can be experienced.

As a result of the weather conditions, mooring locations are typically favoured where they have natural island shelter from southerly directions, and highly sort after where there is also shelter from northerly directions.

2.5. Current usage

The master of any vessel entering the FHPA is required to notify the DPIRD by completing an online notification form providing details of their intended trip. This provides a record which can be used to provide a current overview of the existing marine visitations.

For comparison purposes the visitors have been broken into the user categories listed in Section 2.2, namely commercial fishing/aquaculture, commercial tourism, recreational and other.

A summary of the usage patterns from vessel notifications for a 1-year period extending from 1/7/2019 to 1/7/2020 is summarised below and also presented in Figure 2 to Figure 5.

The dataset includes a period of regional travel restrictions due to the COVID-19 pandemic that extended from 1 April to 29 May 2020. It is worth noting that whilst these had some influence on visitation numbers during the period of restrictions, overall, the total visitation numbers were only slightly less than the previous year, indicating that COVID-19 had only a limited impact on local visitation to the Abrolhos FHPA.

- The majority of entry notifications were recreational (77%), with recreational vessel numbers totalling 1084 over the year
- Recreational visitor numbers were highest in February to August, with peak numbers from late-March to late-April (Easter school holidays to ANZAC Day long weekend). (N.B. March to May is anecdotally thought of as the peak period.)
- The majority of recreational users visited the Pelsaert group (76%), followed by Easter group (13%) and Wallabi group (9%), very few recreational users listed as visiting North Island
- Recreational vessels are primarily <10m in length (67%) and 21-30m (29%)
- Recreational vessels stayed for an average of 5 nights with 21% visiting for the day with no overnight.

There is currently no booking or recording system for public moorings, so it is not possible to accurately quantify their existing use. The FHPA entry notification only provides the opportunity to undertake a very simplistic assessment of mooring demand vs use.

A summary plot comparing the number of recreational vessels entering FHPA (between (1/7/2019 to 1/7/2020) to the total number of available moorings is provided in Figure 2.

This demonstrates that the total number of available public moorings are exceeded on a number of occasions throughout the year with the most significant peaks occurring between Apr to Jun.

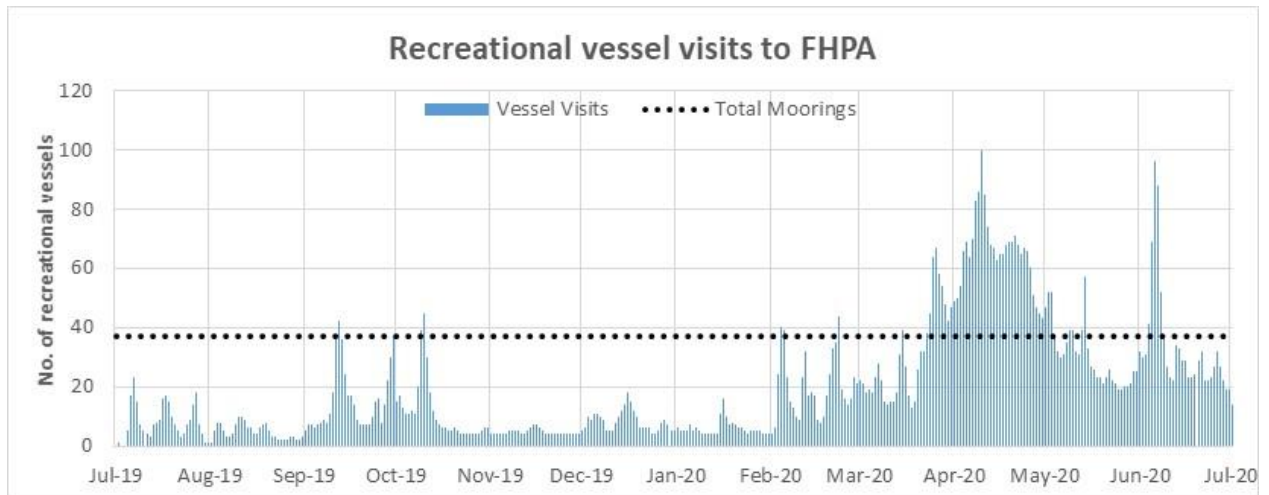


Figure 2. Total number of recreational vessels present within the FHPA from entry notification and stay duration

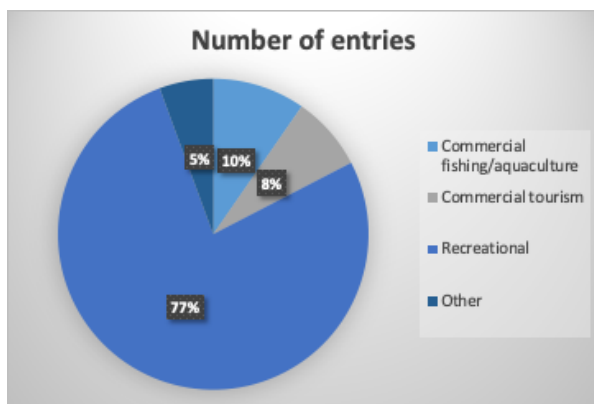


Figure 3. Total number of vessels by entry notifications

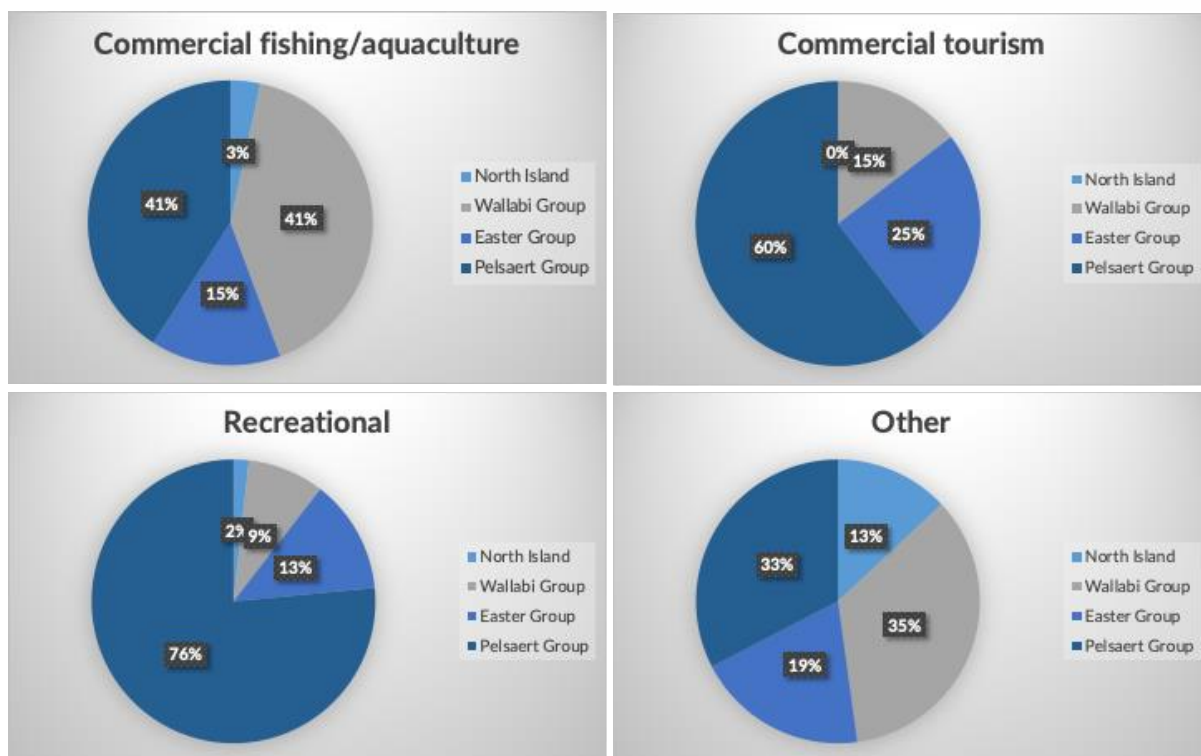


Figure 4. Island distribution of visitors by entry notification

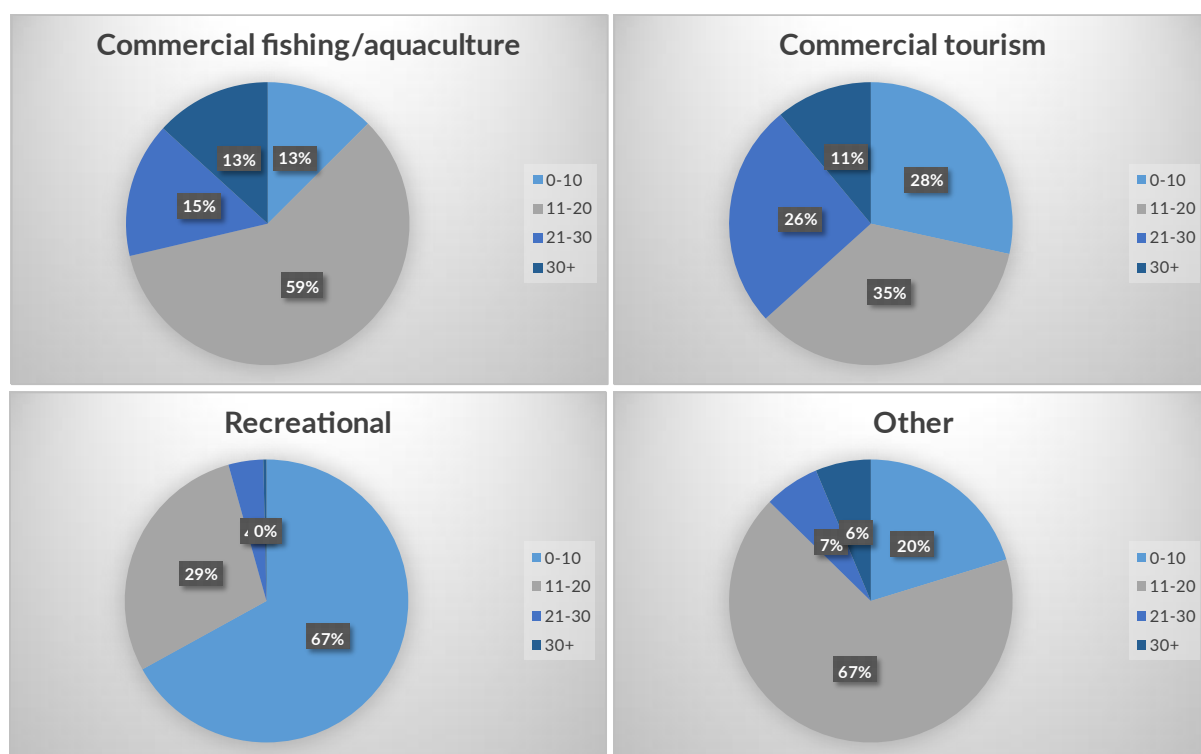


Figure 5. Distribution in vessel length (m) by entry notification

2.6. Legislation

In 2017 the Department of Fisheries was amalgamated to form part of the Department of Primary Industries and Regional Development (DPIRD). The now Minister for Regional Development; Agriculture and Food and the Minister for Fisheries is responsible for administering the existing Acts relevant to DPIRD. The FHPA is declared under the *Fish Resources Management Act 1994* and managed through regulations. The regulations form the basis for the current management of moorings within the FHPA.

2.6.1. Licencing of moorings

Moorings in the FHPA are currently managed under the *Fish Resources Management Act 1994* and through the *Fish Resources Management Regulations 1995* (Regulations). Under the Regulations, a conditional approval for the construction of a mooring may be granted.

The current Regulations are brief in their requirements with regards to moorings. A summary of the current regulations is as follows:

- **No restrictions on applicants** – the Regulations are silent on who can apply and as such there are no restrictions.
- **Shared use** – the Regulations allow for licensees to grant written approval for other parties to use their mooring. A copy of the written approval must be provided to DPIRD.
- **Penalty** – the Regulations specify penalties for use of a moorings without permission, failure to meet requirements of conditions, and failure to undertake any works to maintain the mooring in a safe condition.
- **Conditional** - the Regulations allow for approval to be conditioned by DPIRD.

Unlike other jurisdictions (e.g., DoT, RIA) there is currently no fee mechanisms that can be applied under the Regulations. While the *Fish Resources Management Act 1994* provides the power to prescribe fees or charges, DPIRD does not currently prescribe an application fee or annual fees related to moorings.

2.7. Existing mooring facilities

There are currently 178 registered moorings, comprising:

- 137 private moorings
- 38 DPIRD public moorings
- 6 DPIRD patrol vessel moorings

The locations are summaries in Table 1 and illustrated along with key infrastructure in the following Figure 6 to Figure 9.

Table 1. Summary of existing moorings by location

Location	Moorings
North Island	<ul style="list-style-type: none"> • 40 private moorings • 2 public moorings • 1 patrol vessel mooring
Wallabi Group	<ul style="list-style-type: none"> • 57 private moorings • 14 public moorings • 1 patrol vessel mooring
Easter Group	<ul style="list-style-type: none"> • 32 private moorings • 12 public moorings • 1 patrol vessel mooring
Pelsaert Group	<ul style="list-style-type: none"> • 8 private moorings • 9 public moorings • 1 patrol vessel mooring

Figure 6. Summary of existing moorings North Island

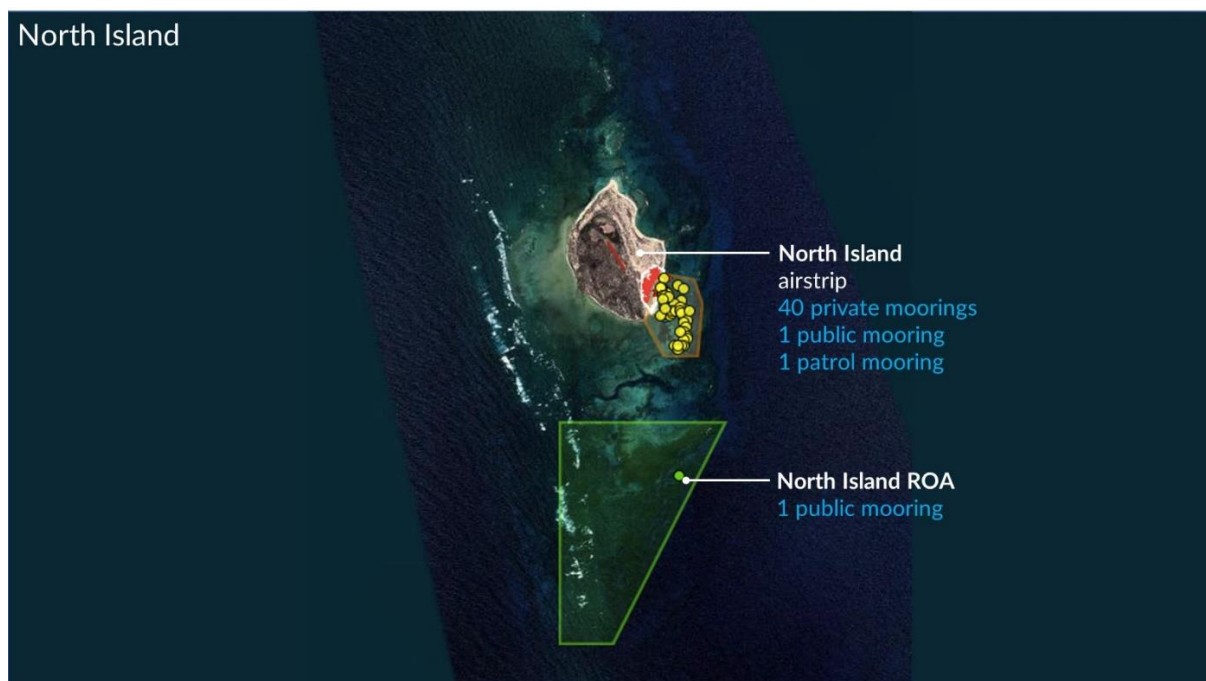


Figure 7. Summary of existing moorings Wallabi Group

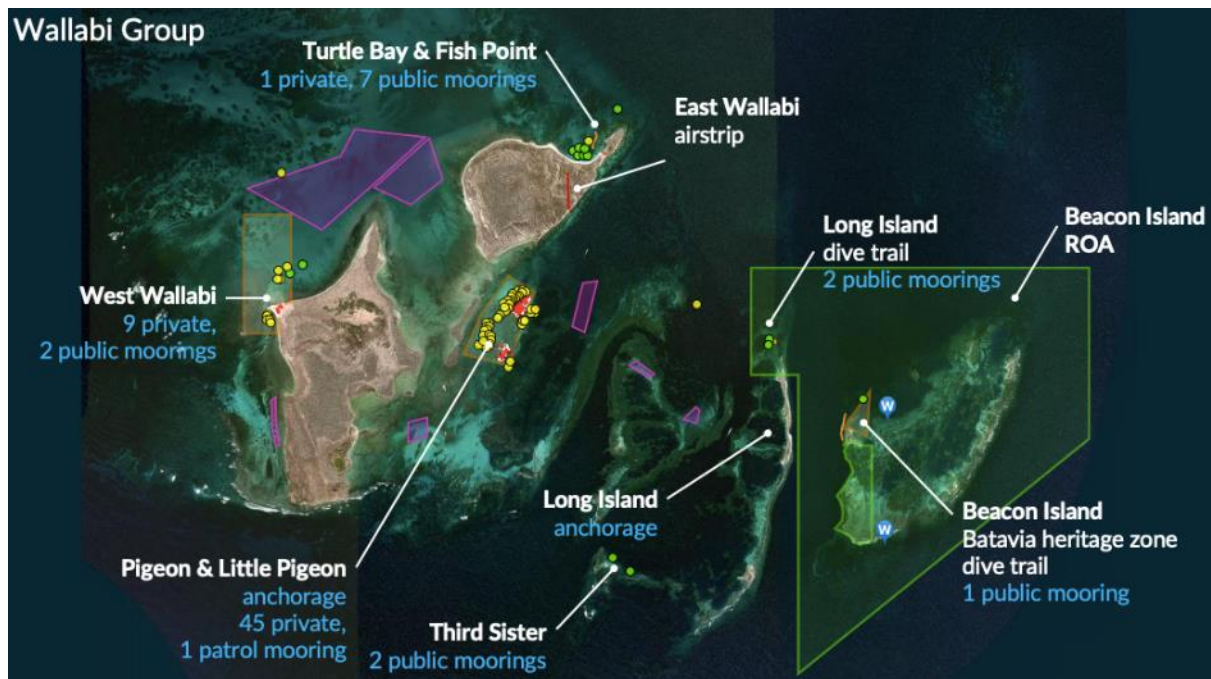


Figure 8. Summary of existing moorings Easter Group

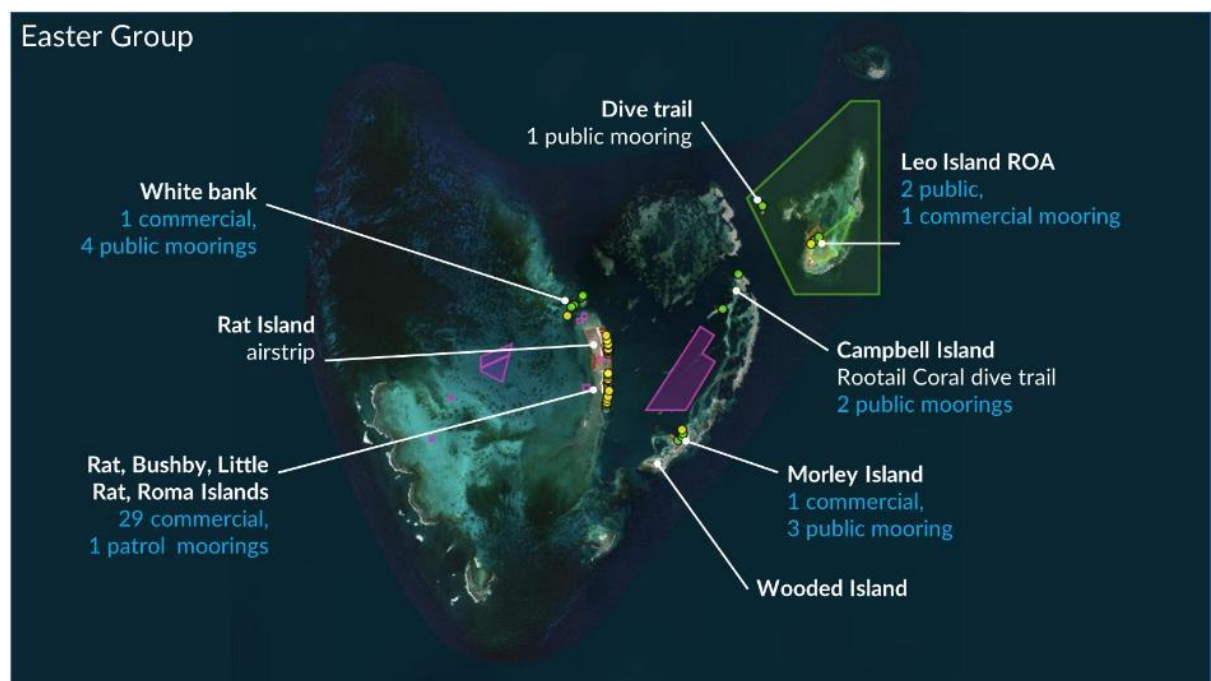
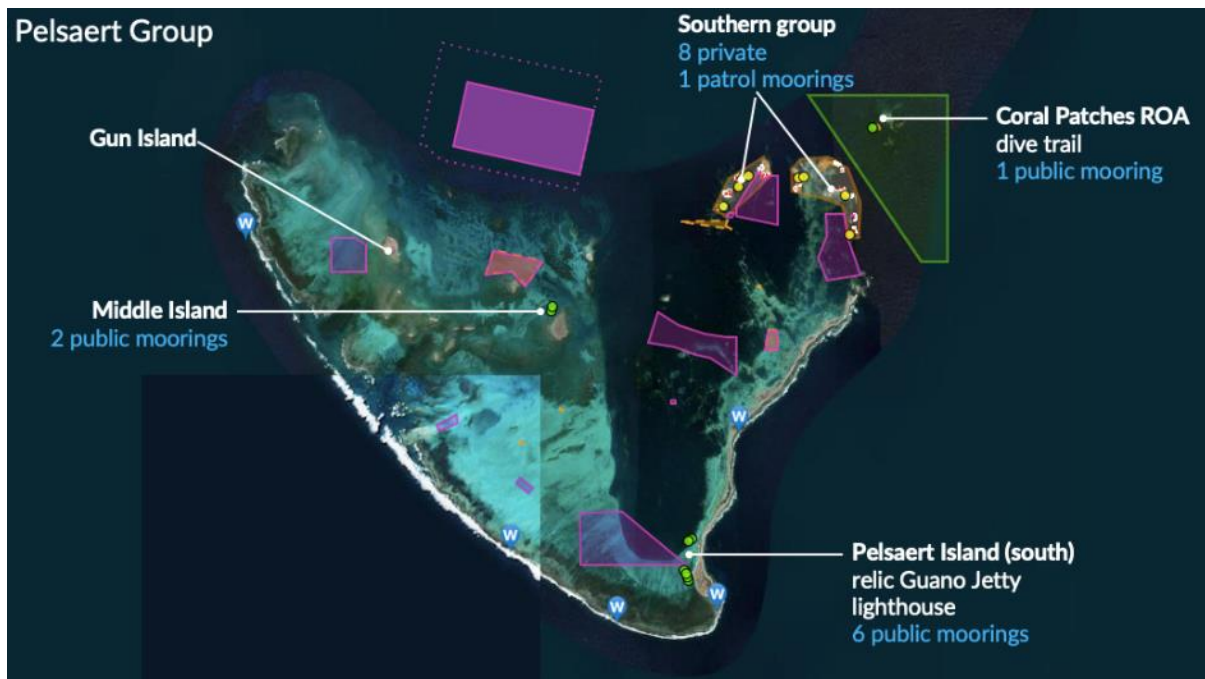


Figure 9. Summary of existing moorings Pelsaert Group



2.8. Private moorings

Private moorings are primarily associated with commercial fishing and aquaculture licence holders, with the majority of moorings located adjacent to Body Corporate leasehold sites.

Many leaseholders also have jetties, and under calm conditions vessels may be berthed against the jetties in preference to moorings. These are primarily located at sheltered locations, e.g., Pigeon and Little Pigeon Islands within the Wallabi Group

In general, with the reduction in commercial fishing over time, there is an overall decline in the number of private commercial moorings, and the location of commercial moorings has evolved overtime to take advantage of sheltered locations and more suitable substrates.

In recent years there has been an increase in the number of non-commercial fishing private moorings. There are a small number of private commercial tourism moorings, with seven (7) moorings recently installed by the commercial tourism operator Eco Abrolhos.

The mooring designs are typically a classic 3-point anchor spread and mooring locations are situated at locations where there is some sand coverage to allow for anchors to take hold. Clump weights are also used on rocky substrates but have limited capacity.

Within the Pelsaert Group, which is mostly hard base, some anchors consist of vertically driven railway lines.

Private moorings are primarily serviced by one contractor (Ledge's Diving Services), and although there is no formal requirement, private moorings are typically inspected and maintained annually.

2.9. Public moorings

DPIRD has installed, and maintains, 37 public moorings located across the island groups. Locations were originally selected with the intent of being sheltered and to support recreational users, while protecting the marine habitat.

There are currently no restrictions on the use of the public moorings, which are provided as courtesy moorings, i.e., free of charge.

2.9.1. Public mooring design

Moorings are currently a combination of single point moorings and 3-point moorings. The single point moorings are constructed as three closely driven railway lines acting as a single anchor point. These moorings currently have a high maintenance requirement due to a fatiguing of a dampening connection.

The remainder of moorings are a conventional 3-point mooring with three anchors. DPIRD is undertaking a program over the next 12 months to upgrade the single point moorings to 3-point moorings where there is sufficient room to place a 3-point mooring spread.

Moorings are typically rated for 20m, 40 tonne vessels under 30knots, however, these conditions are understood to be regularly exceeded, either by use from larger vessels or more extreme wind conditions. The moorings are typically inspected on an annual basis and maintenance works completed as required.

2.10. Anchoring

There are currently no designated anchoring areas and no restrictions on where vessels can anchor. Anchoring is currently undertaken extensively by recreational visitors due to the limited number of public moorings, and recreational and commercial tourist operators have no option but to moor under their own anchor when there are no public moorings available.

It is understood that most anchoring by recreational visitors is undertaken in close proximity to existing public moorings, as they prefer to be close to other recreational vessels and opportunistic in the event a mooring becomes free.

Very large private vessels (>30m) do not tend to use the public moorings and have a preference to moor under their own anchor at sheltered locations. Two popular locations are within the natural lagoon at Long Island and in the sheltered waters near Pigeon Island.

2.11. Summary of current issues

A summary of current issues and concerns impacting on moorings are listed below. This is not expected to be an all-inclusive list, rather highlight key issues which should be taken into consideration in the future planning of moorings at the Abrolhos.

- **Insufficient public moorings**
 - **No mooring certainty** – commercial tourism operators and recreational visitors have raised concerns with uncertainty whether they will be able to access a mooring on reaching the islands. This is expected to be acting as a restriction on the number of recreational and commercial tourism visitors.
 - **Anchoring** – the excess number of visitors in comparison to moorings results in the majority of recreational visitors mooring under their own anchor. Vessel anchors are not to the same standard, size and capacity to a fixed mooring. As such dragging anchors is common. All mooring locations have close proxy to corals and delicate marine habitats. Although unquantified, it is expected that significant cumulative damages is occurring from anchoring.
 - **Hogging of moorings** – anecdotal feedback has indicated that users are staying on some moorings for prolonged periods. Effectively locking the mooring out of general use.

- **Maintenance of public moorings**
 - **Mooring design** – the current single point public mooring design is resulting in higher than expected maintenance requirements.
 - **Header rope** – a number of issues were raised with header ropes including being too large for small vessels and resulting in a high degree of wear where not protected. DPIRD are opting for a shorter header rope with the requirement to bring your own attachment line.
 - **Annual maintenance** – maintenance is typically only undertaken annually, which can result in a mooring being out of use for a prolonged period where damage or failure has occurred.
 - **Mooring misuse** – moorings are reported as being used beyond their intended design conditions.
- **Restricted swing radius** – many public moorings are located where there is a limited swing circle due to the adjacent shallow reef. Consequently, they can only be used under certain weather conditions, or with significant limits on the vessel size.
- **Sea bed damage** – where moorings are located in sensitive habitat areas scouring is occurring due to riser chains rubbing on the seabed.
- **Mooring mapping** – there is limited information on the design, rating, swing radius and current condition of all moorings.

3 Benchmarking

This section provides a benchmark review of the mooring management practices currently implemented by the Department of Transport (DoT) and Rottnest Island Authority (RIA).

3.1. Department of Transport

The DoT is currently the largest administrator of moorings in Western Australia, administering over 2,000 moorings across multiple locations. Currently moorings are primarily for the 'storage' of vessels, in comparison to Rottnest Island (refer to 3.2) which primarily caters for destination or short-stay use.

The moorings are currently administered through regulations and the declaration of mooring control areas (MCA's) under the *Shipping and Pilotage Act 1967* and the *Western Australian Marine Act 1982*. The exception being commercial moorings which are currently administered outside of mooring control areas. A summary is provided in Table 2.

Table 2. Summary of Department of Transport licensed mooring

Act/ Regulations	Mooring control area
Shipping and Pilotage Act 1967 Mooring Regulations 1998	Swan Canning Riverpark Mooring Control Area <ul style="list-style-type: none"> • 15 separate mooring zones • ~1,260 private moorings • 32 public moorings installed by the Swan River Trust
Shipping and Pilotage Act 1967 Shipping & Pilotage (Mooring Control Areas) Regulations 1983	Mangles Bay Mooring Control Area <ul style="list-style-type: none"> • 2 separate mooring zones • 480 registered mooring sites • 15 red public courtesy moorings • 5 white emergency moorings • 460 yellow private moorings
	Peel Mooring Control Area
	Carnarvon Fascine Mooring Control Area
	Oyster Harbour MCA (Albany) Mooring Control Area
Western Australian Marine Act 1982	Commercial licenses <ul style="list-style-type: none"> • No mooring zone • Multiple locations • ~50 commercial mooring primarily servicing the resources industry

3.1.1. Mooring regulation review

In 2014 DoT commenced the Mooring Regulations Review with the intent of establishing a single set of state-wide regulations and a more efficient management system for moorings within waters administered by DoT. The underlying principle to provide fair and equitable access.

The Department's *Mooring Management Position Paper* was endorsed by the Minister for Transport in July 2016. The next step will be to undertake a formal update of the *Mooring Regulations 1998*, which is anticipated to occur in mid-late 2021 depending on government priorities.

Following the update, DoT will seek to transfer moorings managed under *Shipping & Pilotage (Mooring Control Areas) Regulations 1983*, such that all moorings are managed under the *Mooring Regulations 1998*.

DoT are also intending to progressively establish additional mooring control areas (MCA's). These will be prioritised where there are a high number of existing unregulated moorings that are outside of current MCAs but within waters under DoT's jurisdiction.

3.1.2. Current & future management

It is anticipated that the recommendations from the mooring review will be implemented in due course and so this section details the expected future management practices which will be implemented under the revised regulations. The review incorporated a high degree of consultation and as such the outcomes, provide a useful baseline for comparison to the Abrolhos:

- **Single set of regulations** – all MCA's will be transitioned to the *Mooring Regulations 1998*. DoT are focused on maintaining consistency across the state.
- **Mooring control areas** – MCA's will continue to be used and expanded as the primary control mechanism under the regulations.
- **Classification categories** – DoT will amend the *Mooring Regulations 1998* to include the following classes of moorings. Mooring buoys will have different colours based on their classification, these colours are consistent with the colours used by the Rottnest Island Authority and are as follows:

Mooring classification	Buoy Colour
Recreational	green
Commercial	yellow
Commercial resource	yellow
Rental	red
Courtesy	red
Emergency	white

- **Licencing** – recreational and commercial moorings will continue to be licenced for a 12-month period with licensees invited to reapply at the end of each year. The licence enables the holder to install a mooring within a defined area. The design of the mooring and all responsibilities for the mooring apparatus remain with the licensee. Inspection reports will be required every two years.
- **Design** – moorings are required to be designed and installed by an approved mooring contractor. The DoT publishes a list of approved contractors on their website who are recognised as having adequate insurances, and compliant with safety and commercial diving standards.
- **Licences non-assignable** – licenced moorings will not be transferable, for example, with the sale of the vessel. The DoT will apply a waitlist to new mooring requests. In the case of a location where there is a pre-existing mooring, DoT will connect the two private parties to allow for a private negotiation for the sale of the apparatus. If no agreement can be made the out-going licensee will be required to remove their mooring at end of the licence period. Moorings will not be permitted to be sub-let or leased.
- **Waitlist** – the concept of a wait list was introduced as a key mechanism to ensure the equal and fair access to moorings and prevent moorings gaining proprietary value. Moorings cannot be sold or transferred. When a vessel is sold, the purchaser will need to find alternative storage for

the vessel. The mooring cannot be sold with the vessel, instead DoT will then issue the mooring site licence to the next person on the waitlist with some limited exceptions.

- **Short-term casual use of vacant recreational moorings** – similar to Rottnest Island a casual use system will be introduced to allow for the short-term casual use of private recreational moorings. Recreational mooring licensees will have the option to opt-in or opt-out of the short-term casual use system. The use of the system will be by permit only.
 - Recreational mooring licensees who participate in the short-term casual use system will pay a reduced annual licence fee, maintain priority access to the mooring site and receive automatic access to other available moorings within the system.
 - Licensees who opt-out will pay the full annual licence fee, have exclusive use of the mooring site and will not receive automatic access to other available moorings within the short-term casual use system unless they pay for the required permit.
 - Casual use will be for short periods of time <4 hours or overnight. The master will be required to remain on board the vessel at all times to ensure the mooring licensee can access their mooring upon request. Should a licensee return they will be able to request the vessel master immediately move the vessel.
 - Moorings will have a colour disk to identify the size of vessel permitted on the mooring. This is based on the categories and colours used by the RIA, with the addition of a 5m category.

Mooring rating	Mooring disk colour
Not for casual access	red
Vessels < 5m	pink
Vessels < 8m	black
Vessels < 10m	green
Vessels < 12m	grey
Vessels < 14m	purple
Vessels < 16m	blue
Vessels > 16m (max size indicated on the buoy)	white

- **Rental moorings** – DoT currently have a small number of courtesy moorings available for short term casual use. They are intending to expand this to include rental moorings which would be available to be booked, similar to those currently available at Rottnest Island. DoT are in discussion with DBCA over the opportunity to utilise their existing booking system for this purpose.

3.2. Rottnest Island

The RIA manages approximately 900 moorings in the waters surrounding Rottnest Island. Moorings are within the Rottnest Island Marine Reserve and managed under the *Rottnest Island Authority Act 1987* through the application of the *Rottnest Island Regulations 1988*. In comparison to DoT (refer to Section 3.1), moorings are primarily for destination, short stay use as opposed to storage.

Rottneest Island Marine Reserve will remain excluded from the DoT regulations with the RIA having taken the decision to remain independent in their management of moorings. However, RIA and DoT have been working together to seek consistency in the delineation of mooring colours, categories, size classifications, etc.

RIA does not use mooring control areas, and these are not a requirement under their Act. The marine reserve is managed as a whole, with segregation into bays/areas only for the purpose of mooring allocations and waitlists. Higher level approval for changes, such as the approval of fees is through both the RIA board and the Minister.

3.2.1. Moorings

Rottneest Island Authority owns and operates approximately 50 swing moorings comprising hire, one courtesy and a number of emergency moorings. The remaining, and majority of moorings, are privately owned and only accessible through a shared mooring scheme, a breakdown of moorings is provided in Table 3.

Table 3. Summary of Rottneest Island moorings

Moorings classification	Colour	Description
Private	yellow	~900 private moorings accessible only through the shared moorings scheme
Hire moorings	green	41 moorings which are available for hire through their website <ul style="list-style-type: none"> • 33 moorings in Thomson Bay for vessels 8-40m • 4 moorings in Geordie Bay for vessels 8-40m • 4 moorings in Longreach Bay for vessels 12-14m
Courtesy	red	One courtesy mooring provided without charge for up to 4 hours a previous charter mooring
Emergency	white	~10 emergency moorings – for use by the rangers or special permission in the event a vessel is in distress. Also one for ferries when the jetty is full.

3.2.2. Licensing of moorings

Under the Regulations mooring licences are granted for each mooring. The mooring licence is provided for the seabed and the licensee is responsible for the design and installation of the mooring apparatus. This applies to both private moorings and RIA mooring (i.e. for RIA moorings a licence is self-granted).

Moorings are required to be certified annually by an appropriate mooring contractor. The RIA does not have an approved list of contractors but directs licensee to the DoT's list of verified contractors provided on their website (refer to Section 3.1.2). The annual requirement was selected based on observations of mooring equipment wear rates. RIA do not require an annual dive inspection; however, this tends to be stipulated by the mooring contractors as a requirement of certification.

Similar to the proposal by DoT, licences are non-transferable and RIA allocates moorings based on a waitlist. There are a number of restrictions on applications including the need to be a resident of WA, own an appropriate vessel and not currently have a mooring.

3.2.3. Moorings design

The RIA place emphasis on the mooring contractor to take liability and responsibility for the certification of the mooring. The mooring contractor must certificate that:

- the mooring is 'fit for purpose' to hold the vessel of the nominated size under the specified weather conditions (40 knot wind)
- confirm condition of the mooring (anchors, chain, links etc.)
- confirm the mooring centre point, pendant/riser chain length and depth at centre point – allowing for calculation of the swing radius.

In 2000 the RIA introduced the requirement that all moorings be designed to be 'environmentally friendly'. The primary object of the RIA to limit the impact of swing moorings on seagrass meadows due to either anchor dragging or chain scour.

The RIA have identified a preferred mooring design:

- 3-point anchor mooring, where anchors are orientated to the dominant wind conditions
- 'pinned' anchors – railway line (typically 25mm, 2.1m long), jettied vertically into the seabed, suitable for sandy/shelly substrates,
- tight as possible chains from the anchors to the central ring.
- A secondary submersible buoy on the riser, to prevent the riser chain dragging on the seabed.

Stingray anchors may also be permitted where they are buried, however clump anchors are generally avoided due to the increased risk of anchors dragging. Where moorings become overgrown with seagrass, they may be left in place when their removal will likely cause more damage to the seagrass than leaving them in situ. Recent studies have indicated that this has had a positive impact at reducing the extent of seagrass scars relative to mooring numbers (Kempton, 2019).

3.2.4. Selection of mooring locations

The location for new moorings is driven by space constraints and a preference to only install moorings on sandy footprints which are free of seagrass and other benthic habitats. RIA applies a systematic mooring assessment process, whereby the centre point of each mooring is identified and the mooring radius calculated to determine the maximum vessel length permitted at the mooring location. This is based on the following formula:

$$\text{Maximum vessel length} = 0.8 \times ([\text{available swing radius}] - [\text{swing buoy radius}] - [\text{pick up line}] - [2\text{m GPS error allowance}])$$

RIA does not apply exclusive mooring radiuses, due to space constraints and they are allowed to overlap. This means under very clam conditions there is the risk of a vessel colliding. Tenders are required to be moored on portside only with restriction on size.

3.2.5. Shared mooring system

The shared mooring system (SMS) allows licensees and authorised users to access other moorings on a casual basis. All private moorings are part of the SMS, there is no options to 'opt out'.

The system works as follows:

Licensees

- The licensee has priority use of their mooring. Casual users are permitted to leave their vessel unattended but must be contactable by mobile and able to move their vessel within 20 minutes of being requested.
- The licensee can access any other moorings within their vessel size category on a casual basis.

Licensee authorised users

- A mooring licensee can nominate other authorised users to their mooring. There is no limit on the number of additional authorised users they can nominate. The additional users must have a vessel within the mooring size classification.
- The additional user has priority over a casual user for the specific mooring.
- The additional user can access any other moorings within their vessel size category on a casual basis.

RIA authorised users

- In addition to the additional users nominated by the licensee the RIA may nominate an additional 3 users to a mooring. This is via public application for a specific bay and generally does not have a wait list.
- The additional user has priority over a casual user for the specific mooring.
- The additional user can access any other moorings within their vessel size category on a casual basis.

Without being a licensee or authorised user there is no way to access the SMS. RIA will intervene in the case of a dispute over priority between a licensee/authorised user and a casual user. However, they will not in the case of a dispute between two authorised users, which has led to conflicts in the past, dependent on how well the licensee manages the shared use of their mooring.

The SMS uses a colour-coded system to indicate the appropriate vessel size for that mooring (refer to Table 4). Licensees and authorised users can only use moorings that have the same colour disc as that displayed on their licensee or authorised user sticker. The RIA has found this allows for a degree of self-management and general reporting of non-compliance i.e., oversized vessels using moorings. The program is regulated by the rangers with penalties applied for improper use.

Table 4. RIA colour-code mooring rating

Mooring rating	Mooring disk colour
Not for casual access	red
Vessels < 8m	black
Vessels < 10m	green
Vessels < 12m	grey
Vessels < 14m	purple
Vessels < 16m	blue
Vessels > 16m (max size indicated on the buoy)	white

3.2.6. Anchoring Guidelines

Anchoring without a mooring is permitted, provided:

- It is at least 50 metres from a mooring
- does not obstruct or interfere with access to a mooring

- is well clear of reef, seagrass meadows, jetty access and navigation markers
- is outside any boating prohibited areas.

3.2.7. Fees and charges

Mooring licensees are required to pay an annual fee, these are based on a tiered approach dependent on the user type and vessel length. As a contribution to the conservation of Rottne's special marine environment, admission fees apply to all visitors. Boats visiting the Island can choose to pay these per individual visit or apply for a seasonal "annual admission" pass.

Licence fees are determined by the RIA Board and approved by the Minister. Hire fees are reviewed annually against the market rate and approved by the Board.

4 Future demand

4.1. Future tourism focus and new facilities

DBCA is in the process of completing the *Houtman Abrolhos Islands National Park Management Plan*, which will sit under the *Houtman Abrolhos Islands Strategic Direction 2020–24*. The draft management plan outlines the priority areas for encouraging tourism growth and investment in key infrastructure.

The draft management plan provides a review of visitor numbers over the past 10 years from a number of sources. This found that whilst the overall visitor numbers have been low, they have risen at a significant rate over recent years. It is forecast that numbers will continue to increase, boosted by the creation of the National Park and the increased investment in infrastructure and advertising.

Over the short-term it is assumed that Pelsaert Group will remain the most visited due to its shorter voyage distance from Geraldton, together with an increased attraction of visitors to the Wallabi Group driven by East Wallabi and Beacon Islands.

4.2. New mooring considerations

There is a demand for additional moorings (refer to Section 2.5), however, there are a number of conflicting constraints for the selection of mooring locations. compared with many nearshore locations. The Abrolhos is in fact one of the more challenging locations for the design and sighting of moorings, due to the exposed conditions and abundance of reef. As a general rule the selection of a mooring location needs to take into consideration the following:

- **Natural sheltering** – the islands are extremely exposed to wind and wave conditions. Ideal locations are provided with island sheltering from southerly directions (minimum requirement) and northerly directions (ideal).
- **Seabed conditions** – much of the islands are a rocky substrate, with exposed rock rapidly colonised by corals., where sand is present it is often only a thin layer overlaying rock. Sandy locations are ideal for reducing the impacts on benthic habitat from moorings ‘scouring’ the seabed and for ease of anchoring. Sand anchors (e.g., stingray) can achieve a much higher capacity with a lower cost.
- **Benthic habitat** – consideration should be made to the seabed coverage and the mooring design be appropriate to the habitat. For example, areas of high coral coverages should be avoided, however, where this is not possible the mooring design should be such that it minimises scouring of the seabed.
- **Water depth and swing radius** – consideration of the water depth at the location of the mooring on all tides and the proximity to shallow reef to allow for mooring under a full range of wind conditions. Moorings are also limited by the opposite conditions of very deep water in many locations, prohibiting practical mooring arrangements.
- **Access** – consideration needs to be given to the safe access of the mooring location. Many locations are difficult to access without extensive local knowledge due to the complex reef structures. There are also only a small number of locations marked by navigation aids.
- **Access by others** – moorings need to consider any restrictions they may cause to existing navigation access by others. Deeper channels are often also navigation routes and there are numerous small, unmarked, channels and access routes used by commercial fishing vessels.
- **Location demand** – proximity to water and land-based demands and attractions.
- **Location avoidance** – proximity to areas where the preference is to limit or avoid visitation.

4.3. Recommendations for additional moorings

The following recommendations are provided by island group for the sighting of new public moorings. This information is also summarised in the accompanying figures and collectively in Appendix A, Table 5. Recommendations have also been provided for the optimisation of existing moorings at some locations. These recommendations should be read in the context of the broader recommendations provided in Section 5.

4.3.1. Prioritisation

The recommended prioritisation is based on the basic review of the current usage (refer to Section 2.5) and the assumed prioritisation of tourism development in the National Park (refer to Section 4.1). Prioritisation has been considered in the following categories:

- **Priority 1** – highest priority, there is a clear demand and installation is likely to provide immediate benefits
- **Priority 2** – second priority, there is an identified demand and installation is likely to provide a longer-term benefit
- **Opportunity** – opportunities to optimise existing mooring use and do not necessarily require the installation of new moorings

4.3.2. Recommended moorings size/design

Based on the review of existing recreational vessels accessing the FHPA, it is recommended that the majority of moorings should be designed for vessels up to a maximum size of 20m as this will cater for the vast majority of recreational users (up to 95%).

A small number of larger moorings are also recommended to cater for commercial tourism operators and their needs, whereas for larger private vessels (>20m) it is recommended that dedicated anchorages are utilised as these vessels prefer to anchor.

4.3.3. Anchorage

In addition to the recommendations for the sighting of new moorings a number of locations have been identified for the promotion of anchoring locations. These locations could become the site for additional moorings in the future, however, it is expected that the installations of additional moorings will be a stepped process and not all new moorings will be installed immediately.

Given the remote location there are a number of safety advantages of promoting anchoring in set locations. A more detailed review of the benthic habitat in these locations is recommended in order to weigh up the potential damage which will result for anchor placement and the risk of anchor dragging.

4.3.4. North Island

No immediate priorities were identified within North Island.

4.3.5. Wallabi Group

Priority 1

Due to the promotion of the Wallabi Group as the central hub for tourism the number of visitors is expected to increase and additional moorings have been considered a high priority at the following locations:

- **Turtle Bay (East Wallabi)** – extending moorings northward from existing moorings.

Pigeon & Little Pigeon – there are multiple locations close to Pigeon & Little Pigeon Island where additional moorings could be installed (refer to

- Figure 11). The area to the northwest of Pigeon is currently used as an anchorage for larger vessels. The area is well suited to moorings, due to sheltering and water depth and provides a good location for accessing East Wallabi jetty.
- **Beacon Island ROA** – to provide additional public moorings to promote access without the requirement to anchor. The number of moorings and priority will be dependent on the promotion of Beacon as a tourist destination. It is recommended that a dedicated commercial tourist operator mooring be installed. Additional moorings could be located in close proximity to the existing northern mooring.

Priority 2

- **Third Sister** – additional moorings in a similar location to the existing moorings.

Opportunities

- **Fish Point (East Wallabi)** – there is an opportunity to remove this mooring due to low use and its exposed location.
- **Long Island anchorage** – there is an opportunity to promote the use of the natural lagoon as an anchorage in the short-term.
- **Pigeon & Little Pigeon anchorage** – there is an opportunity to promote the area of Pigeon as an anchorage in the short-term. There is also the opportunity to promote the sub-leasing of private moorings to increase the availability of moorings at this location.
- **Shag Rock anchorage** – there is an opportunity to promote the area to the east of Shag Rock as an anchorage for small vessels. This area is not well situated as an anchorage as it requires careful navigation to access.

Figure 10. Wallabi Group Opportunities

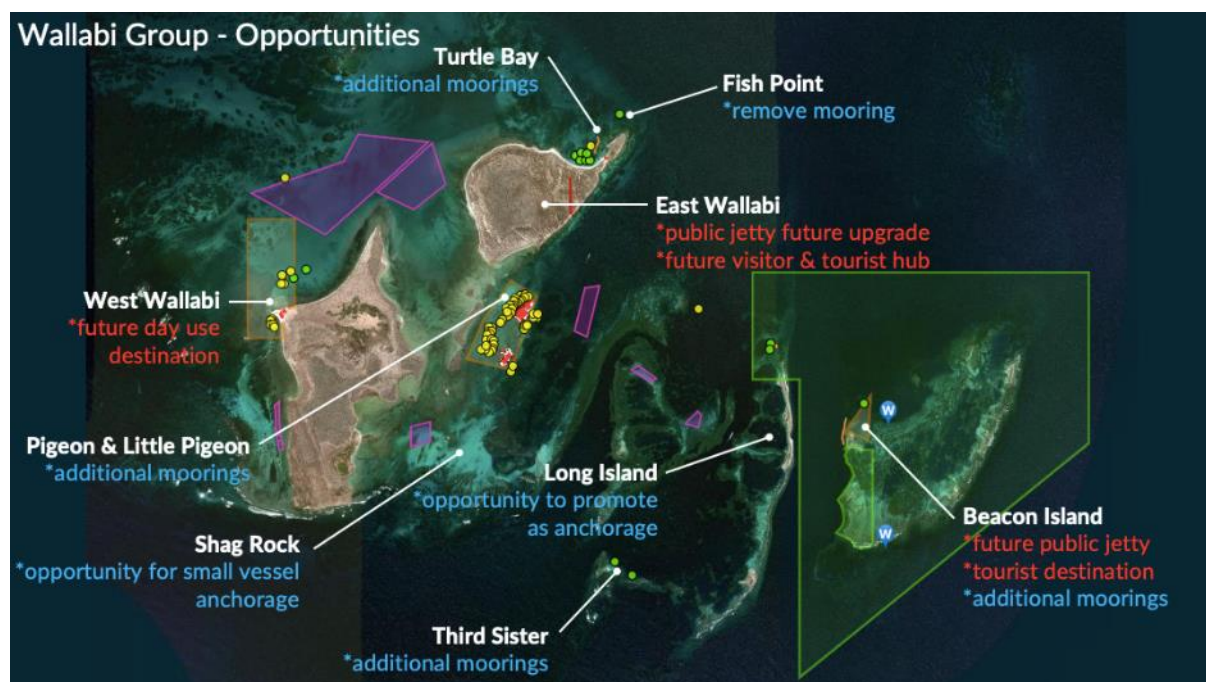
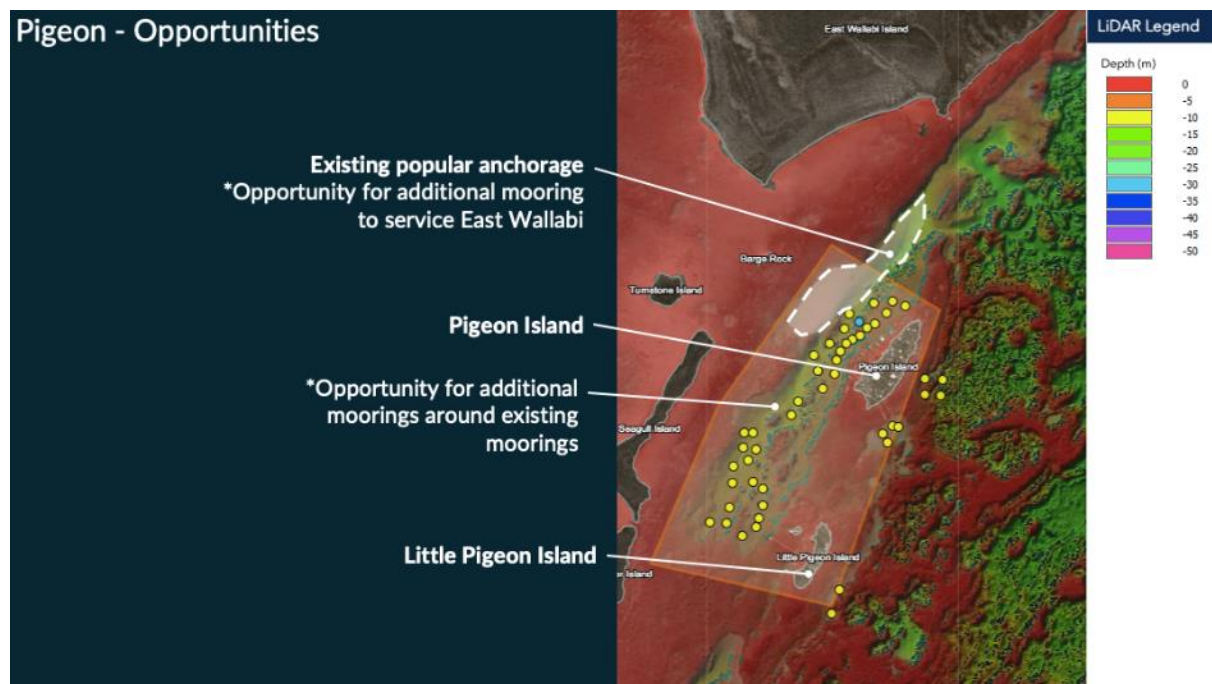


Figure 11. Pigeon Island Opportunities



4.3.6. Easter Group

Priority 2

The installation of additional moorings at Easter Group is considered a lower priority to Wallabi and Pelsaert, due to the lower number of existing visitors and its reduced promotion within the National Park draft management plan. Additional moorings are recommended at the following locations (refer also to Figure 12):

- **White Bank Island** – the channel to the southwest of White Bank Island is well suited for locating additional moorings (refer Figure 13). Consideration needs to be given to maintaining access through the channel, however, there is expected to be sufficient space for a number of additional mooring locations. The location is well suited as it is sheltered and in close proximity to Rat Island. Opportunity to promote as an anchorage in the short-term.
- **Morley Island** – there is the opportunity for additional moorings moving out from the existing moorings. Opportunity to review if existing moorings can be relocated further out (north) to allow for all weather mooring.
- **Rootail** – the existing mooring has a limited swing radius and it is recommended it be retained for smaller vessels only and a larger vessel mooring be installed immediately to the south.
- **Anemone Lump** – to provide additional public moorings to promote access without the requirement to anchor. It is recommended a dedicated commercial tourist operator mooring be installed.

Opportunities

- **Campbell Island** - there is an opportunity to remove this mooring due to low use and exposed location.
- **Rat Islands** – there is an opportunity to promote the shared use of moorings.

Figure 12. Easter Group Opportunities

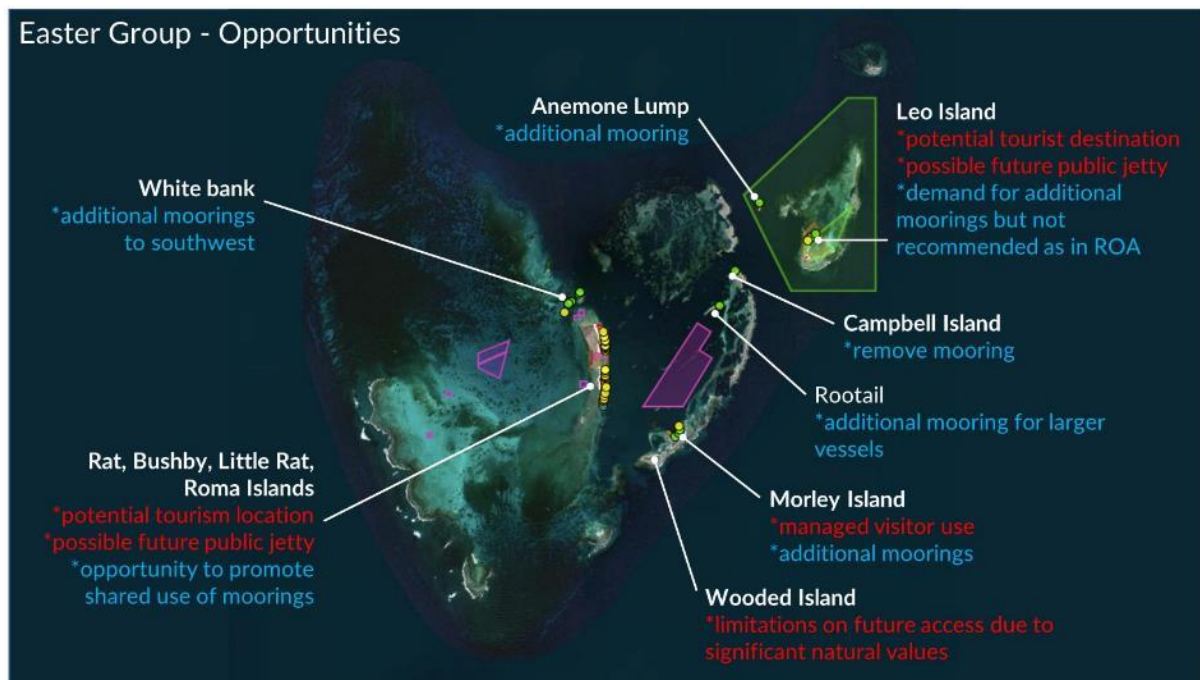
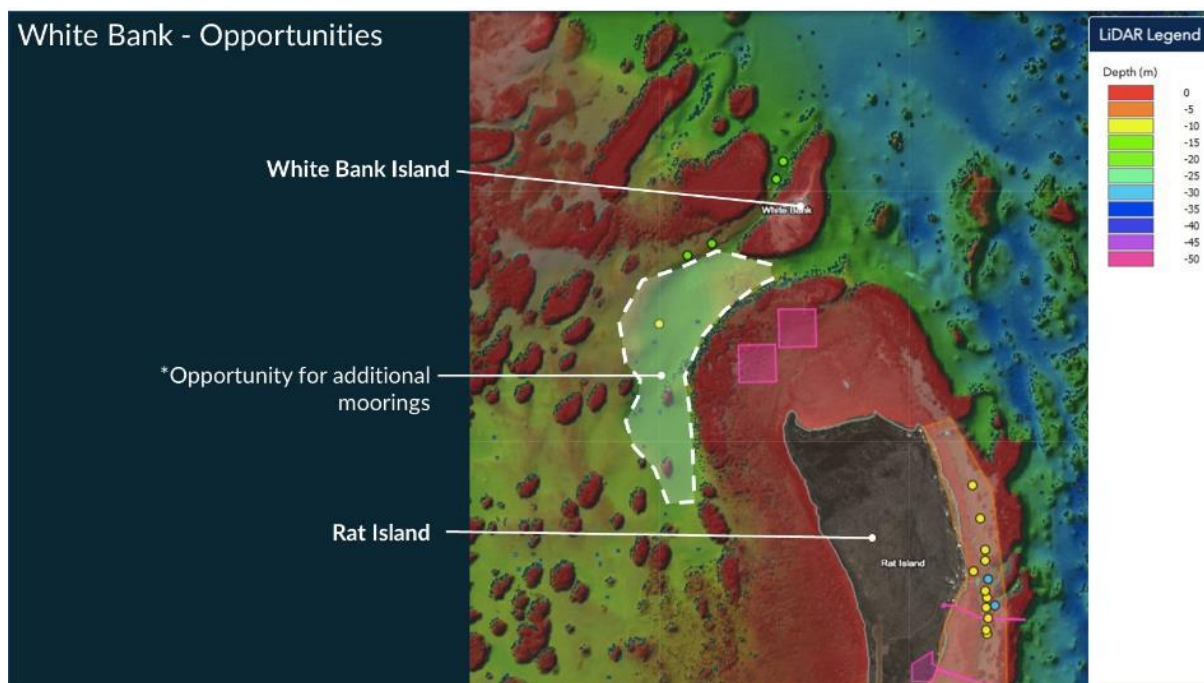


Figure 13. White Bank Opportunities



4.3.7. Pelsaert Group

Priority 1

Due to the high number of recreational vessels visiting the Pelsaert group (refer to Section 2.5), this group is considered the highest priority for increasing public mooring numbers. Additional moorings are recommended at the following locations:

- **Pelsaert Island** – southern end vicinity of the historic Guano Jetty (same location to existing moorings). North of the jetty there is deep water and this location is recommended for both small and large vessel moorings (refer to Figure 15).
- **Middle Island** – north and / or east of the island (refer to Figure 16).

Priority 2

- **ROA** – to provide additional public moorings to promote access without the requirement to anchor.

Opportunities

- **Pelsaert Island Anchorage** – subject to review of the benthic habitat there is an opportunity to promote a large area at the southern end of Pelsaert as a designated anchorage area (refer to Figure 14). The location is well suited to anchoring due to its sheltered location and water depth, however there is currently no benthic habitat information.
- **Southern Group** – review opportunity for additional moorings to support and promote access to the ROA. Potential areas have been identified in proximity to Post Office Island, however require a more detailed review of the local bathymetry.
- **Gun Island** – suitable mooring locations exist in close proximity (north) of Gun Island. However, these are not recommended pending finalisation of the National Park management plan. If Gun Island is promoted for tourism there is the opportunity to install moorings to the north of the island.

Figure 14. Pelsaert Group Opportunities



Figure 15. Pelsaert Island Opportunities

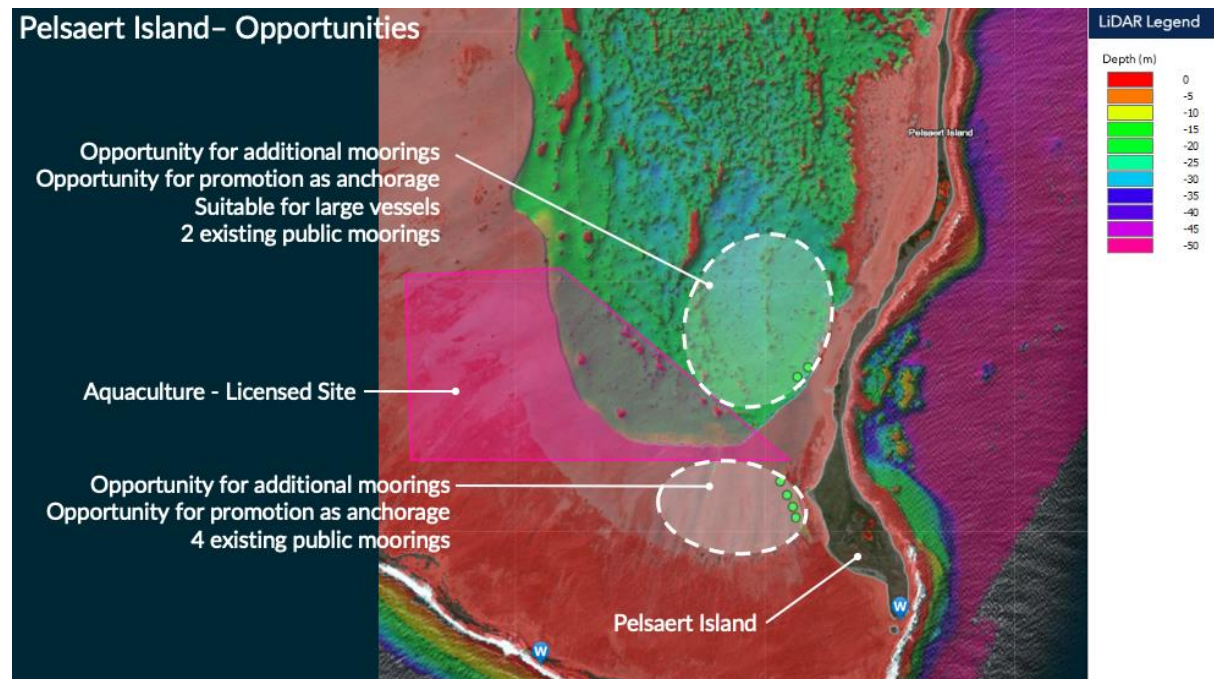
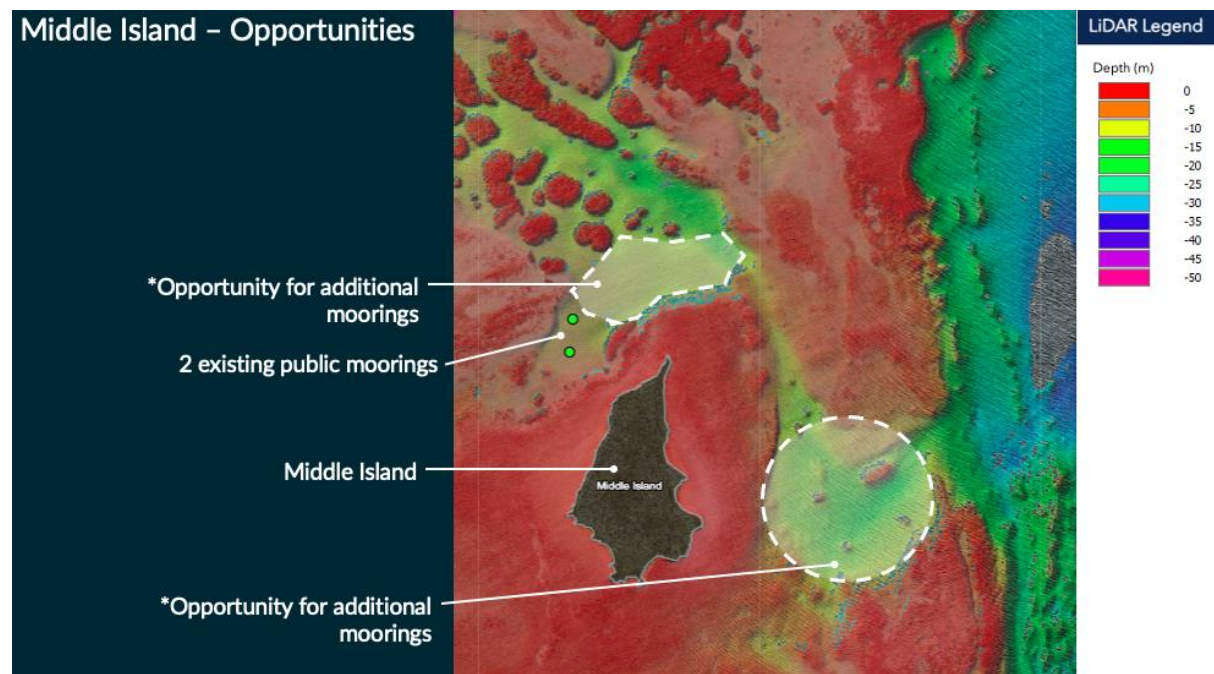


Figure 16. Middle Island Opportunities



5 Recommendations

The Abrolhos Islands are a unique environment, and although lessons can be learnt from other jurisdictions, such as Rottnest Island and DoT waters, its remoteness and exposed location provides unique challenges.

Based on the review of existing information and future demand together with a comparison of other jurisdictions the following recommendations are provided:

Underlying principals

1. **Fair and equitable access** – consistent with the DoT *Mooring Regulations 1998* it is recommended mooring access be based on the same underlying principal of providing '*fair and equitable access*'. It is recommended that this principal underpin decision making and be embedded in any regulations or management controls.
2. **State wide consistence** – as far as practical, regulations, rules and general administration should be consistent state-wide. As far as practical, and where applicable to the Abrolhos, the general administration approaches used by DoT and RIA should be applied to provide state-wide consistency. (A number of individual recommendations are provided below with this intent.)

Administration/Licensing

3. **Management by Regulations** – *Fish Resources Management Regulations 1995* under the *Fish Resources Management Act 1994* are considered an appropriate management mechanism. However, an update to the regulations is required to allow for the recommendations provided in this document. The Regulations should be updated to address the recommendation contained in this review.
4. **Shared administration** – it is recommended to review the opportunity of mooring administration being undertaken by a central government agency. There is an opportunity this could be undertaken through DoT as the largest manager of mooring licenses in WA. DoT have indicated this is a potential option.
5. **Licencing of all mooring** – it is recommended that all moorings be licenced, including those under the ownership / management by DPIRD. This should allow for the same administrative processes to be applied across the board.
6. **Annual mooring licence renewal** – it is recommended that all mooring licenses are required to be renewed annually. The annual renew process should trigger the requirement to confirm the mooring condition, rating, design vessel, location, swing radius. It should also be used as a mechanism for the removal of moorings no longer in active use.
7. **Mooring classification** – it is recommended license categories be introduced consistent with the categories used by DoT (commercial, recreational, hire, courtesy, emergency). The introduction of categories should be such that different regulations and fees can be applied to different categories.
8. **Mooring colour coding** – it is recommended coloured buoys, consistent with DoT, be used as a method for identifying mooring classifications.
9. **Commercial licences** – it is recommended DPIRD consider the introduction of licencing for commercial tourism operators undertaking activities beyond the existing Fish Tour Operator Licence. This is recommended as a mechanism for managing the number of operators in relation to the number of moorings and ensuring compliance with the specific requirements within the FHPA.
10. **User pays** – it is recommended that a mooring license fee be introduced to cover the cost of administering the moorings within the FHPA. Fees should be reviewed on an annual basis.

Mooring design and certification

11. **Mooring vessel rating/size** – it is recommended that the mooring licence record and specify the maximum vessel size taking into consideration the mooring design and available swing radius.
12. **Design certification** – it is recommended that the design of private moorings remain the responsibility of the licensee, with each mooring being certified by a suitably approved mooring contractor as being fit for use for a designated vessel size and metocean conditions (wind, wave, current).
13. **Annual certification** – it is recommended that it become a condition of licence that each mooring be inspected and re-certified by a suitably approved mooring contractor on an annual basis.
14. **Environmentally friendly** – it is recommended that DPIRD investigate alternative designs for use where moorings are required to be installed in highly sensitive benthic habitats. The intent being to identify mooring designs which minimise the scouring of the seabed.
15. **Mooring audit** – it is recommended that a retrospect audit be undertaken of all existing moorings within the FHPA to:
 - confirm all moorings have been mapped and are licensed
 - categorise the mooring (commercial, recreational etc.)
 - confirm the vessel rating for each mooring
 - detailed mapping of the swing radius of each mooring and the proximity of any adjacent shallow water which would restrict the swing radius of the mooring.

Private moorings

16. **Sub-leasing** – use of private moorings by another user is currently permitted with written approval. It is recommended that this be continued and promoted as a mechanism for ‘freeing-up’ private moorings. It is recommended this remain voluntary and to the discretion of licensees. However, licensees be given the option of being included on a public database indicating their willingness to consider shared use and as a mechanism for sharing contact details.
17. **Commercial only** – it is recommended that new private moorings be limited to commercial entities only and for the purpose of undertaking appropriate commercial activities at the Abrolhos. Due to the limited number of locations available for recreational moorings, for equality of use it is recommended these be retained primarily for public use only.
18. **Wait-list** – it is recommended consistent with DoT and RIA a waitlist process be introduced and included as a mechanism for approving new private moorings, to avoid the price inflation of moorings.

Public moorings

19. **Boating guide** – it is recommended that a detailed recreational boating guide be prepared providing advice on the locations available to be visited, promoting use of certain locations, and highlighting constraints.
20. **Classification** – It is recommended that public moorings are designated into two categories:
 - **hire moorings** – it is recommended that the majority of public moorings become ‘hire moorings’ with a designated booking system. These moorings should be located to permit use under all conditions and suitable for overnight stays. A limit should be placed on the number of consecutive days a mooring can be booked for.
 - **courtesy moorings** – it is recommended that moorings which are only suitable to be used for short-term, day use be classified as ‘courtesy moorings’, with use on a first come basis. This should include all moorings within ROAs for which it is recommended overnight use not be permitted. It should also include moorings in locations where there is a limited swing radius preventing the moorings use under all weather conditions. A time limit of nominally 4-6 hours should be placed on the use of these moorings.

- **commercial hire moorings** – it is recommended that hire moorings be installed at key tourist destinations for use by commercial operators. These moorings should be accessible through a separate booking system for commercial tourism operators. As these mooring will cater for larger vessels, consideration should be given to the opportunity for private recreational vessels >20m to also access commercial hire moorings on a secondary preference to commercial operators.
21. **Mooring rating** – all public moorings should be marked with their designated vessel rating. This may be undertaken by the colour tagging, consistent with the method used by DoT and RIA, or by marking on the buoy.
 22. **Booking system** – it is recommended that a booking system be introduced as a mechanism to managing the availability of public moorings. This would be based on two parallel systems for recreational and commercial users.
 23. **Additional moorings** – the installation of additional public moorings is recommended. The prioritisation of locations is detailed in Section 4.3.
 24. **Anchoring locations** – the selection of a number of locations for promotion as anchorages is recommended. This is expected to assist in the short-term while there remains an under supply of moorings. The recommended locations are detailed in Section 4.3.

Reef Observation Areas (ROAs)

25. **Day use only** – it is recommended that moorings within ROAs be conditioned to prevent overnight use, i.e., be restricted to short-term day use only.
26. **No anchoring in ROAs** – it is recommended that ROAs be classified as no anchoring without a designated mooring. This is recommended to preserves the benthic habitat from damage caused by anchor placement and in the event anchors drag.
27. **Public moorings** – it is recommended the number of public moorings within ROAs be increased in-line with the above recommendation.

6 References

- The base information for maps and images has been sourced from the DPIRD online GIS portal <https://wafisheries.maps.arcgis.com/>
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- DPIRD (2020) *Houtman Abrolhos Islands Private Commercial Moorings Interim Guidelines, Procedures And Assessment Criteria* September 2020. Department of Primary Industries and Regional Development, September 2020.
- DoT (2016) *Mooring Regulation Streamline Review 2014-2016*. Department of Transport, August 16
- Kempton (2019) *"Environmentally Friendly" Mooring Design - Impact of moorings on seagrass meadows at Thompson Bay, Rottnest Island*. Amy Kempton, 18 October 2019. <https://storymaps.arcgis.com/stories/ff5fd3b126174f8480c44d5b3bdc4f25>
- WA (2020) *Houtman Abrolhos Islands Strategic Direction 2020-24*. Government of Western Australia May 2020.

Appendix A

Mooring Summary

Table 5. Summary of existing moorings and future recommendations

Island Group	Island/location	Existing commercial use	Existing marine uses	National Park planning	Existing moorings	Mooring notes	Future moorings
North Island	North Island	<ul style="list-style-type: none"> Body Corporate Lease on south corner of island with adjoining commercial anchorage Airstrip 	<ul style="list-style-type: none"> Commercial jetties 	<ul style="list-style-type: none"> Potential future public jetty 	<ul style="list-style-type: none"> Moorings located on eastern side in commercial anchorage: <ul style="list-style-type: none"> 40 private moorings 1 patrol vessel mooring 1 public mooring 	<ul style="list-style-type: none"> Exposed location, moorings required during heavier weather when vessels cannot be left tied the jetty. Current lower tourist use 	<ul style="list-style-type: none"> Lower priority
	South Channel ROA	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Reef Observation Area to the south of North Island 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 1 public mooring located within the Reef Observation Area 	<ul style="list-style-type: none"> Exposed location Current lower recreational use 	<ul style="list-style-type: none"> Lower priority
Wallabi Group	West Wallabi	<ul style="list-style-type: none"> Body Corporate Lease on northwest corner of island with adjoining commercial anchorage 	<ul style="list-style-type: none"> Commercial jetties 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Moorings located on western side close to commercial anchorage: <ul style="list-style-type: none"> 9 private moorings 2 public moorings 1 additional private mooring north of the Island located adjacent to aquaculture licensed site 	<ul style="list-style-type: none"> Relatively exposed location Rocky moorings Current lower demand 	<ul style="list-style-type: none"> Lower priority
	East Wallabi	<ul style="list-style-type: none"> Nil 	<ul style="list-style-type: none"> Air strip Public jetty Fish Point dive trail Turtle Bay 	<ul style="list-style-type: none"> Future visitor & tourist hub Public jetty future upgrade 	<ul style="list-style-type: none"> Moorings primarily located within Turtle Bay: <ul style="list-style-type: none"> 1 private tourism (Eco Abrolhos) 6 public at Turtle Bay planned to be upgrade from single to 3-point. 1 public off northern tip of Fish Point 	<ul style="list-style-type: none"> Turtle Bay is very exposed from the NW and only usable under southerly conditions. Public moorings close in and limited swing radius under NW direction. Popular location recreational & commercial tourism 	<ul style="list-style-type: none"> Additional moorings at Turtle Bay recommended as a priority. Opportunity to review if existing moorings at Turtle Bay can be relocated further out (north) to allow for all weather mooring.
	Pigeon Group (Pigeon & Little Pigeon)	<ul style="list-style-type: none"> Body Corporate Leases with adjoining commercial anchorages 	<ul style="list-style-type: none"> Commercial jetties 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Moorings located on both sides of the islands: <ul style="list-style-type: none"> 45 private moorings, including 1 private tourism (Eco Abrolhos) 1 patrol vessel mooring A number of the private moorings expected to be private recreational moorings for large vessels. 	<ul style="list-style-type: none"> Sheltered location in most weather conditions Adjacent areas used as anchorage due to easy access and sheltered condition Popular location 	<ul style="list-style-type: none"> Opportunity to increase number of moorings Moorings location can be used as an access point to East Wallabi jetty by tender. Opportunity to promote 'subleasing' of private moorings
	Third Sister	<ul style="list-style-type: none"> Nil 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 2 public moorings (3 point) 	<ul style="list-style-type: none"> Sheltered location, well protected from southerlies Popular location 	<ul style="list-style-type: none"> Opportunity for additional moorings at the same location
	Long Island - anchorage	<ul style="list-style-type: none"> Nil 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Natural lagoon used as a sheltered anchorage. 	<ul style="list-style-type: none"> Well protected under all conditions Easy navigation as a marked channel Popular with very large vessels to anchor due to sheltered waters 	<ul style="list-style-type: none"> Opportunity to promote as an anchorage
	Long Island - north	<ul style="list-style-type: none"> Nil 	<ul style="list-style-type: none"> Beacon Island Reef Observation Area Dive trail 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 2 public moorings adjacent to the dive trail (single point) 	<ul style="list-style-type: none"> Existing moorings have to remain single point due to room restrictions Exposed location Relatively low use, used for short-term mooring only. 	<ul style="list-style-type: none"> Existing moorings currently sufficient
	Beacon Island	<ul style="list-style-type: none"> Nil 	<ul style="list-style-type: none"> Beacon Island Reef Observation Area 	<ul style="list-style-type: none"> Tourist destination Future public jetty 	<ul style="list-style-type: none"> 1 public mooring 	<ul style="list-style-type: none"> Exposed location Popular 	<ul style="list-style-type: none"> Opportunity for additional moorings to

Island Group	Island/location	Existing commercial use	Existing marine uses	National Park planning	Existing moorings	Mooring notes	Future moorings
			<ul style="list-style-type: none"> Dive trail 		<ul style="list-style-type: none"> (2 public moorings in close to the reef, scheduled to be removed as too close in to the coral) 1 private tourism (Eco Abrolhos) located to the west outside of the ROA 		<ul style="list-style-type: none"> Opportunity for additional moorings to reduce the need to anchor in the ROA. Recommend this include a commercial tourist operator mooring. Additional space available as same location to existing mooring.
Easter Group	White Bank	<ul style="list-style-type: none"> Nil 			<ul style="list-style-type: none"> 4 public mooring (Southern 2 being upgraded to 3 point, northern 2 have to stay as single point due to room restrictions.) 1 private tourism (Eco Abrolhos) 	<ul style="list-style-type: none"> Sheltered location Close proximity to transfer to Rat airstrip Popular all year round due to shelter 	<ul style="list-style-type: none"> Opportunity for additional moorings. Consideration needs to be given to maintaining access through the channel. Opportunity to promote as an anchorage
	Rat group Rat, Bushby, Little Rat, Roma Island	<ul style="list-style-type: none"> Body Corporate Leases with adjoining commercial anchorages Air strip DPIRD jetty 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Rat identified a future tourism location with potential public jetty 	<ul style="list-style-type: none"> 29 private moorings 1 patrol boat mooring 	<ul style="list-style-type: none"> Relatively sheltered commercial users can be on their jetty under most conditions Narrow access due to reefs – not favoured by bigger recreational vessel, prefer to run out tenders. Southern moorings limited swing room due to reef 	<ul style="list-style-type: none"> Opportunity to promote 'subleasing' of private moorings
	Morley	<ul style="list-style-type: none"> Nil 	<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 3 public mooring 1 private tourism (Eco Abrolhos) 	<ul style="list-style-type: none"> Popular location all year as sheltered Can not use mooring close in in northerly weather as located too close to the reef. Island an important bird habitat (Sept-Jan) 	<ul style="list-style-type: none"> Opportunity for additional moorings. Opportunity to review if existing moorings can be relocated further out (north) to allow for all weather mooring.
	Rootail	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Dive trail 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 1 public mooring 	<ul style="list-style-type: none"> Popular location due to dive trail Mooring very close to reef, limiting use by larger vessels 	<ul style="list-style-type: none"> Opportunity for additional mooring to south for larger vessels
	Campbell	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 1 public mooring 	<ul style="list-style-type: none"> Low use due to exposed location and small swing area Strong currents 	<ul style="list-style-type: none"> Opportunity to remove or relocate mooring
	Anemone Lump	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Reef Observation Area Dive trail 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 1 public mooring 	<ul style="list-style-type: none"> Popular location, close proximity to dive location Strong currents and swell 	<ul style="list-style-type: none"> Opportunity for additional moorings
	Leos Island	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Reef Observation Area Dive trail 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 2 public mooring 1 private tourism (Eco Abrolhos) 	<ul style="list-style-type: none"> Popular Sheltered location Difficult access through reefs 	<ul style="list-style-type: none"> Additional moorings not recommended due to the location with an ROA
Pelsaert Group	Gun Island	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Future campsites 	<ul style="list-style-type: none"> Nil 	<ul style="list-style-type: none"> Popular for small boats to anchor Relatively sheltered location 	<ul style="list-style-type: none"> Opportunity for moorings dependent on National Park planning.
	Middle Island	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 2 public mooring 	<ul style="list-style-type: none"> Popular Sheltered location Central location 	<ul style="list-style-type: none"> Additional moorings recommended as a priority location.
	Pelsaert Island	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> future tourist destination future 5 defined camps sites at northern tip 	<ul style="list-style-type: none"> 6 public mooring at southern end 	<ul style="list-style-type: none"> Popular, year round Sheltered location Good navigation 	<ul style="list-style-type: none"> Additional moorings recommended as a priority location. Deep water to the north of the historic jetty allows for large vessel mooring. Recommend promotion as an anchorage subject to review of benthic habitat.

Island Group	Island/location	Existing commercial use	Existing marine uses	National Park planning	Existing moorings	Moorings notes	Future moorings
	Coral Patches	<ul style="list-style-type: none">•	<ul style="list-style-type: none">• Reef Observation Area• Dive trail	<ul style="list-style-type: none">•	<ul style="list-style-type: none">• 1 public mooring		<ul style="list-style-type: none">• Opportunity for additional moorings to reduce the need to anchor in the ROA
	Southern Group	<ul style="list-style-type: none">• Body Corporate Leases with adjoining commercial anchorages	<ul style="list-style-type: none">•	<ul style="list-style-type: none">•	<ul style="list-style-type: none">• 8 public mooring• 8 private, including 1 private tourism (Eco Abrolhos) located at Post Office Island	<ul style="list-style-type: none">• Sheltered location	<ul style="list-style-type: none">• Review the opportunity for additional moorings to promote access to the ROA.

