Impact of **sea level rise** on **coastal natural values** in **Tasmania**

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This report was compiled by Oberon Carter, Felicity Faulkner, Louise Gilfedder and Peter Voller from the Natural Values Conservation Branch.

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Cover

View to Mount Cameron West by Oberon Carter.

Pied Oystercatcher by Mick Brown.

The Pied Oystercatcher is considered to have a very high exposure to sea level rise under both a national assessment and Tasmanian assessment. Its preferred habitat is mudflats, sandbanks and sandy ocean beaches, all vulnerable to inundation and erosion.

Round-leaved Pigface (*Disphyma australe*) in flower in saltmarsh at Lauderdale by Iona Mitchell.

Three saltmarsh communities are associated with the coastal zone and are considered at risk from sea level rise. Over half of their total extent in Tasmania is projected to be inundated by rising sea levels and increased storm surges.

Contents

Summary

Inundation by rising sea levels and increased storm surges is projected to have a significant impact on habitats and associated biodiversity along Tasmania's coastline (DPIPWE, 2010).

Using GIS-based rules and risk assessment methods, the impacts of projected sea level rise (SLR) on beach-nesting shorebirds, native coastal vegetation and coastal plant species were assessed across all land tenure in Tasmania. In total, 116 coastal areas were identified and mapped as the highest priorities for vegetation and shorebird habitat conservation management.

Three landscape response types are described;

- Refugia sites (coastal sites with predicted low SLR threat to native vegetation or shorebird habitat),
- Retreat Pathway sites (threat avoidance areas), and
- Squeezed-out sites (predicted high SLR threat to native vegetation or shorebird habitat).

Broad options for conservation of beach-nesting shorebirds, coastal native vegetation and plant species in priority locations are provided.

- For refugia sites, it is recommended that land managers minimise activities that may cause disturbance or present threats to natural values.
- For retreat pathway sites, it is recommended that ground-truthing assessment of retreat pathways is undertaken and protection of these pathways occurs through minimising impacts of new developments or infrastructure and by minimising disturbance and physical threats.
- For sites that are to be inundated or squeezed out, it is recommended that management options such as translocation and ongoing monitoring of the site to assess impacts, be considered.

This report is based on detailed business rules prepared by the authors in consultation with key stakeholders and project collaborators. These rules are provided in summary in this report or can be sourced in detail from Natural and Cultural Heritage Division, DPIPWE.

Native coastal grasslands on Moriarty Beach, Clarke Island by Tim Rudman.

*Native coastal grasslands such as this one dominated by the sand- binding coastal spinifex (*Spinifex sericeus*) are highly susceptible to the impacts of increased storm surges, inundation and erosion due to sea level rise.*

Tables and **Figures**

North Patriarch taken from Red Bluff, Flinders Island by Penny Wells.

*Foochow Beach north of Red Bluff is an important retreat pathway and refuge for six species of shorebirds and coastal vegetation at risk from sea level rise. It is also important for the rare Sea Heath (*Frankenia pauciflora *var.* gunnii*).*

A statewide assessment of **sea level rise impacts** to **natural values**

Sea level rise (SLR) has been identified as a threat to coastal systems worldwide, including in Tasmania (DPIPWE 2010). This report uses existing spatial data sets and ecological records combined with expert-panel-generated decision rules to predict the potential direct and indirect impacts of SLR on native coastal vegetation, coastal plant species and beach-nesting shorebirds.

The purposes of the spatial layers produced in this project are to:

1. Provide a spatial representation of the distribution and abundance of coastal-obligate natural values;
2. Map the distribution of expected threat of sea level rise to coastal-obligate natural values; and
3. Spatially prioritise areas for further assessment based on statewide distribution of the intersection of coastal-obligate natural values with sea-level rise threats.

The output spatial layers are intended to inform future fine-scale (and more detailed) analyses of coastal natural values at priority beaches, and sea level rise impacts to them.

Mapping prepared by Sharples (2006) predicted where sea level rise is likely to occur in Tasmania and provides a useful basis to assess impacts to biodiversity. Sharples identified that more than 20% of the Tasmanian coastline is at risk from inundation and erosion as a result of sea level rise and storm surges associated with climate change. Additionally, a Sharples *et al.* (2009) coastal geomorphic analysis provided the capacity for this report to focus attention to areas at risk from sea level rise related impacts.

The focus of this report is on SLR impacts to beach-nesting shorebirds, native coastal vegetation and coastal plant species. The authors acknowledge there is merit in also studying impacts to other fauna, and to near-coastal freshwater ecosystems, however they were beyond the scope of this study.

This study analysed spatial data to identify:

- Which areas of habitat for beach-nesting shorebirds, native coastal vegetation and coastal plant species are not at significant risk of sea level rise (refugia),
- Which areas of habitat have the capacity to persist by retreating landward as sea levels rise (retreat pathways)
- Which places are likely to be inundated and lost (squeezed-out)?
- Where will specific types of conservation effort best be placed for appropriate and strategic efforts?

The results of this assessment are designed to be used to inform land management decision making, such as future conservation reserve selection, development planning, and infrastructure design and placement in coastal areas.

The layers present spatial outputs (100 x 100 m grid cells within 100 m of the High-Water Mark, HWM) indicating the co-incidence of identified coastal-obligate natural values with risks associated with projected sea level rise. Risks of sea level rise include 1) direct inundation, and 2) fragmentation and/or loss of habitat via accelerated erosion processes caused by sea level rise (and associated storm and flooding events).

The authors recognise that whilst this report provides an assessment based on contemporary spatial information, locations identified as priorities for management/adaptation should be assessed in the field to validate specific conservation needs.

Locations are prioritised to help planners and land managers respond to projected sea level rise impacts to coastal-obligate natural values, so that highly vulnerable locations are managed to avoid or minimise barriers for adaptation to higher sea levels.

The preparation of the output spatial layers for this project involved:

A) Identifying the distribution of sea level rise-related threats, and then

B) Intersecting those threats with the distribution of natural values.

This enables categorisation of the consequence of projected sea level rise to different coastal natural values. A composite layer (i.e. a summary output layer) is also produced to quickly and easily display statewide priorities for conservation. In order to bring the disparate input datasets into a common base, a spatial grid-cell data structure of 100 m x 100 m grid cells is used as the basis of the analysis. The 100 m grid cells are labelled using the risk input data layers so that they can be compared with the natural values data.

Response Types

Four threat-based layers have been used to inform the distribution of threats to natural values related to sea level rise and the predicted response type described below.

The four layers generated were:

1. Areas with expected direct exposure to sea level rise (i.e. inundation);
2. Areas with presumed barriers to landward retreat of natural values (particularly vegetation) imposed by underlying bedrock and landforms;
3. Areas bounded by major roads and waterbody barriers; and
4. Areas confined by urban development and infrastructure.

These layers have been used to determine three subsets of sites with one of the following response categories, which are illustrated in Figure 1.

Refuge Site

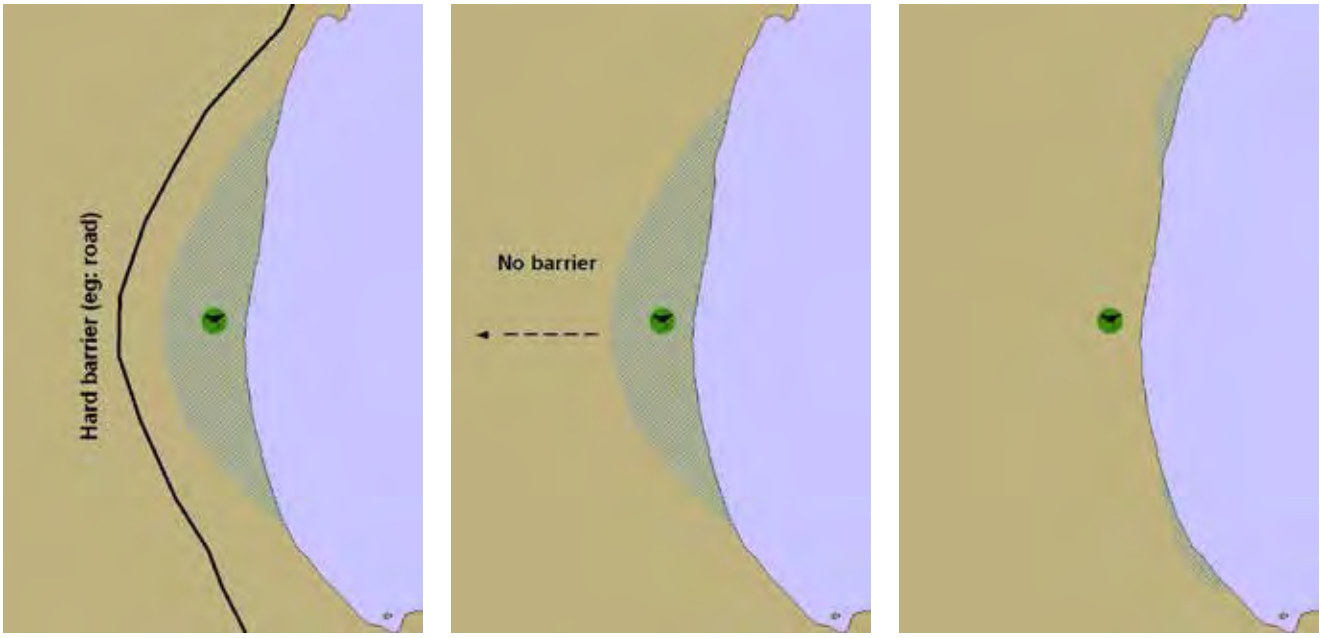
At refuge sites, natural values occur that are projected to be at lower risk of sea level rise impacts than other areas. The assessment indicates that these areas are likely to be relatively unaffected by sea level rise before 2100 and will act as sanctuaries or refuges, providing opportunities for longer-term protection. Additionally, for shorebirds, refuge sites contain areas of high or moderate levels of recorded habitat use.

Retreat Pathway Site

At retreat pathway sites, for the values assessed, evidence existed at the time spatial data was captured, that habitats would be impacted by SLR, but that sufficient area existed landward to allow for habitat migration.

This response category assumes that the vegetation community, shorebird or coastal plant species has the opportunity and capacity to retreat landward. For shorebirds, it is acknowledged that the behaviour of the bird may prompt some to locate a new nesting site elsewhere.

Figure 1. *Response types of natural values to sea level rise. The green circle represents a natural value of interest and the blue diagonal hatching represents inundation by projected sea level rise.*



Squeezed-out Site | Retreat Pathway Site | Refuge Site

For vegetation, the success of landward retreat will depend on the dispersal and regeneration features of the species that comprise the community, and the protection measures to facilitate retreat.

Squeezed-out Site

At squeezed-out sites, sea level rise is projected to impact the recorded natural value and there are hard barriers to landward retreat (see Figure 1). Hard barriers can be one or more of the following:

1) A landform with highly erodible, sandy or muddy coastlines, or cliff faces, based on interpretation of Smartline data by Sharples *et al.* (2009) and detailed in the Business Rules for this project,

2) Nearby presence of a major road or other permanent infrastructure,

3) Nearby land-use that permanently prevents habitat retreat, or

4) The area landward is a water-body.

The authors considered any combination of these hard barriers indicates permanent and high threat to the natural value.

Additionally, for shorebird locations to be labelled as squeezed-out, habitat use by the resident shorebird species is of a High level in the region (as per Table 1).

Adaptation options

The conservation management actions that will best benefit natural values identified in this report will vary based on specific circumstances on the ground and in time. Therefore the authors have not provided advice on management under each response type. Such advice should be informed and verified by field based assessment at specific sites.

Marsupial herbfields on New River by Tim Rudman.

Marsupial lawns are globally-unusual fen communities that result from natural geomorphic processes combined with grazing. They are common in coastal and estuarine environments in Tasmania and are highly susceptible to inundation. Many occur in situations where landward retreat is possible.

Identifying threats to **beach-nesting shorebirds**

Four species of shorebird and two species of small terns are included in this study (see Table 1). These species were selected as they have significant distribution within 100 m of the High Water Mark (HWM) on the Tasmanian coast based on population surveys by Birdlife Tasmania.

Data used to inform decision rules for response type included 14 years of statewide shorebird records gathered by Birdlife Tasmania (2000-2013). This data consists of GPS point locations of sightings of one or more of the identified shorebird species.

Each 'point' location in the shorebird dataset represents a breeding territory that may cover an area of up to a few hundred metres of coastline. The interactions between territories is not well understood but for the purposes of this analysis are assumed to be relatively fixed over time in the absence of threatening processes (such as human disturbance). Many shorebirds remain on, or adjacent to, their territories during the non-breeding season.

Shorebird habitat use

The relative use of different areas of the state by beach-nesting shorebirds is well known based on a long history of direct observations by Dr Eric Woehler of Birdlife Tasmania. Habitat use for each species was summarised according to expert opinion as 'High', 'Moderate' and 'Low' use level (see Table 1). Habitat use is an estimation of the fidelity that each species has to particular regions of Tasmania, with the use-category assigned being relative within each species.

For the purposes of this report, squeezed-out sites for shorebirds were selected only from regions with 'High' habitat use. Retreat pathway and refuge sites were only selected from High or Moderate habitat use regions. Low habitat use regions were not studied within this analysis.

4WD tracks on a Tasmanian beach by Eric Woehler.

Threats to beach-nesting shorebirds include disturbance and physical damage caused by off-road vehicles.

Table 1. Summary of shorebird habitat use by coastal region

Region	Hooded Plover*	Red-capped Plover	Pied Oystercatcher*	Sooty Oystercatcher	Fairy *+ Little Terns*
	Thinornis rubricollis	*Charadrius ruficapillus*	*Haematopus longirostris*	*Haematopus fuliginosus*	*Sternula nereis & Sterna albifrons*
King Island	**High**	Low	**High**	Moderate	**High**
Furneaux Group	**High**	**High**	**High**	Low	**High**
North-west (Arthur Pieman to Rocky Cape NP)	**High**	Moderate	**High**	Moderate	Moderate
North (Port Sorell to East Sandy Cape)	Low	Low	Low	Low	Low
North-east and East (Bridport to Forestier Peninsula)	**High**	**High**	**High**	Moderate	**High**
Tasman Peninsula, South Arm, Pitt Water and Bruny	Moderate	**High**	Moderate	Low	Moderate
South-west and South (Pieman to Southeast Cape)**	No data	No data	No data	No data	No data

*Very high exposure to sea level rise under a national assessment for Australian birds (Garnett *et al.* 2013).

**The south-west region and some off-shore islands of the state are excluded from this dataset due to the absence of comparative contemporary data.

Spatial rules prioritising beaches for conservation management of shorebirds

In a state-wide assessment, the whole of beach-scale is considered to be useful in communicating important places to a range of coastal land managers, particularly when considering shorebird species that may be very mobile. The following beach characteristics were considered for beach level prioritisation among locations:

- The proportion of the mapped locations of shorebirds within a beach that were classified as a given response type, such that **beaches with higher proportions having shorebirds recorded, were afforded higher priority**;
- Estimates of suitable nesting habitat per beach, such that **larger contiguous habitat area was given higher priority**; and
- Exposure to human disturbance based on current (or projected future) human-derived modification to coastal zone. Priority varied depending on response type. **Refuge and squeezed-out sites with low human disturbance were given higher priority. Human disturbance did not influence prioritisation of retreat pathway sites**.

Not all beach extents and contexts were considered to be of equal priority for conservation so spatial rules were derived that are based on the above factors, to score the priority for conservation of each beach as Very High (VH), High (H), Moderate, Low and Very Low.

VH Refuge: The proportion of the beach mapped as 'refuge' is in the top 20% of all beaches assessed and there is low exposure to human disturbance and the area of suitable nesting habitat is in the top 20% of all beaches assessed.

VH Retreat Pathway: The proportion of the beach mapped as 'retreat' is in the top 20% of all beaches assessed and the area of suitable nesting habitat is in the top 20% of all beaches assessed.

VH Squeezed-out: The proportion of the beach mapped as 'squeezed-out' is in the top 20% of all beaches assessed and there is low exposure to human disturbance and the area of suitable nesting habitat is in the top 20% of all beaches assessed.

H Refuge: The proportion of the beach mapped as 'refuge' is in the top 20% of all beaches assessed and there is moderate exposure to human disturbance and the area of suitable nesting habitat is in the top 20% of all beaches assessed; OR

The proportion of the beach mapped as 'refuge' is in the top 20% of all beaches assessed and there is low exposure to human disturbance and the area of suitable nesting habitat is in the top 50% of all beaches assessed; OR

The proportion of the beach mapped as 'refuge' is in the top 50% of all beaches assessed and there is low exposure to human disturbance and the area of suitable nesting habitat is in the top 20% of all beaches assessed.

H Retreat Pathway: The proportion of the beach mapped as 'retreat' is in the top 20% of all beaches assessed and the area of suitable nesting habitat is in the top 50% of all beaches assessed; OR

The proportion of the beach mapped as 'retreat' is in the top 50% of all beaches assessed and the area of suitable nesting habitat is in the top 20% of all beaches assessed.

H Squeezed-out: The proportion of the beach mapped as 'squeezed-out' is in the top 20% of all beaches assessed and there is moderate exposure to human disturbance and the area of suitable nesting habitat is in the top 20% of all beaches assessed; OR

The proportion of the beach mapped as 'squeezed-out' is in the top 20% of all beaches assessed and there is low exposure to human disturbance and the area of suitable nesting habitat is in the top 50% of all beaches assessed; OR

The proportion of the beach mapped as 'squeezed-out' is in the top 50% of all beaches assessed and there is low exposure to human disturbance and the area of suitable nesting habitat is in the top 20% of all beaches assessed.

Note that all shorebird species are treated as 'equal' in relation to this statewide analysis because there is commonality in breeding and feeding habitats required among species.

Priority locations with a score of VH or H as Refuge, Retreat Pathway or Squeezed-out sites are listed below in Table 2.

Table 2. Priority locations for beach-nesting shorebirds.

Beach name* (refer to attached maps)	Response Type (priority)	NRM Region	Reservation Status (NP=National Park, CA=Conservation Area, NR=Nature Reserve)
Red Rocks	Refuge (VH) and Retreat Pathway (VH) and Squeezed-out (H)	North	Mt William NP
North Bay incl. Two Mile Beach	Refuge (VH) and Retreat Pathway (VH)	South	Informal reserve
Break Yoke Beach	Retreat Pathway (VH) and Refuge (H)	North	Bay of Fires CA
Denison Beach	Retreat Pathway (VH)	North	Denison Rivulet CA & unreserved
Foochow Beach to Red Bluff	Retreat Pathway (VH)	North	Foochow CA & North East River Game Reserve
Kenneth Bay	Retreat Pathway (VH)	Cradle Coast	Arthur Pieman CA
Marion Beach	Retreat Pathway (VH)	South	Marion Beach CA & Long Spit NR, Conservation Covenants & Informal reserve & unreserved
Maurouad Beach	Retreat Pathway (VH)	North	St Helens CA
Mawson Bay	Retreat Pathway (VH)	Cradle Coast	West Point SR & Arthur Pieman CA
Seymour Beach	Retreat Pathway (VH)	North	Seymour CA
Templestowe Beach	Retreat Pathway (VH)	North	Informal reserve & Seymour CA
The Friendly Beaches	Retreat Pathway (VH)	South	Freycinet NP
Taylors Beach	Squeezed-out (VH)	North	Bay of Fires CA
Porch Rocks	Refuge (H) and Squeezed-out (H)	North	Denison Rivulet CA
Wrinklers Beach	Refuge (H)	North	Scamander CA
Abbotsbury Beach	Refuge (H) and Retreat Pathway (H)	North	Ansons Bay CA, Bay of Fires CA
Perkins Bay	Refuge (H) and Retreat Pathway (H)	Cradle Coast	Perkins Island CA and Duck Bay CA and unreserved
Mount Cameron Beach	Refuge (H)	Cradle Coast	Preminghana Indigenous Protected Area
Gaffney Point	Refuge (H)	Cradle Coast	Arthur Pieman CA
Beaumaris Beach	Retreat Pathway (H)	North	Scamander CA
Georges Bay	Retreat Pathway (H)	North	Humbug Point NRA, St Helens CA
Sawyer Bay	Retreat Pathway (H)	Cradle Coast	Tatlows Beach CA, Peggs Beach CA, and unreserved
Pollys Bay	Retreat Pathway (H)	Cradle Coast	Arthur Pieman CA
Cape Farewell to Bungaree Creek	Retreat Pathway (H)	Cradle Coast	Porkys Beach CA, informal reserve and unreserved
Red Bluff to Lady Barron	Retreat Pathway (H)	North	Logan Lagoon CA, Sellars Lagoon Game Reserve, Patriarchs CA
Tanners Bay to Marshall Beach and Castle Rock Point	Retreat Pathway (H)	North	Marshall Beach CA
McRaes Isthmus on Maria Island	Retreat Pathway (H)	South	Maria Island NP
Lagoon Bay	Retreat Pathway (H)	South	Informal reserve and unreserved
Kelvedon Beach	Squeezed-out (H)	South	Kelvedon Beach CA and unreserved
Binalong Bay	Squeezed-out (H)	North	Bay of Fires CA, conservation covenant and unreserved.
Unnamed beach south of Bay of Fires	Squeezed-out (H)	North	Bay of Fires CA and unreserved
Gardens Lagoon Beach	Squeezed-out (H)	North	Bay of Fires CA
Pebbly Beach	Squeezed-out (H)	North	Bay of Fires CA
Purdon Bay	Squeezed-out (H)	North	Mount William NP
Smiths Gulch and Ordnance Point	Squeezed-out (H)	Cradle Coast	Arthur Pieman CA
Unnamed beach south of Johnsons Bay	Squeezed-out (H)	Cradle Coast	Arthur Pieman CA
Bates Bay	Squeezed-out (H)	North	Vansittart Island CA
Beerbarrel Beach	Squeezed-out (H)	North	St Helens CA
Christmas Island	Squeezed-out (H)	Cradle Coast	Christmas Island NR

*This is a label used to best describe the location of the site – see attached maps in Appendix 1 for extent of site.

Coastal native vegetation at **risk** from **sea level rise**

Approximately 1% (40,600 hectares based on TASVEG 3.0) of Tasmania's mapped native vegetation occurs within the immediate coastal zone, being within 100 m of the high water mark. Some vegetation types are largely confined to the coast, e.g. saltmarsh, coastal heathlands and scrubs, sprayzone vegetation. Some native vegetation types at the coast can differ compositionally or functionally from other examples of the same TASVEG communities inland because of the influence of coastal processes such as salt spray, winds, and other maritime effects. For the purposes of this project we assume that native vegetation within 100 m of the coast is compositionally or functionally distinct from those communities further inland.

Identification of 'at risk' vegetation communities

'At risk' native vegetation was identified primarily on the basis of the proportion of the extant community projected to be inundated and lost to SLR by 2100. For each native vegetation community mapped in TASVEG 3.0 (DPIPWE 2013) the authors selected those communities with at least 10% of their total extent projected by Sharples (2006) to be inundated by 2100.

Using this process the following communities were identified to be 'at risk' in relation to sea level rise:

Brief description of 'at risk' communities

Three saltmarsh communities associated with the coastal zone and saltmarshes occupy the high tide zone on sheltered soft substrate foreshores and can tolerate high soil salinity and occasional inundation with salt water. These saltmarsh communities have two forms. They may be shrubby occurring as a low-growing community dominated by samphire and glasswort shrubs up to 80 cm high, or can be dominated by sedges and rushes. The sedgy type is restricted to the landwards margins of saltmarsh areas and the lower reaches of estuaries.

Spray zone coastal complex (TASVEG SSZ) occurs in rocky areas along high-energy coastlines where plants are highly exposed to prevailing winds and subject to storm surges and salt spray.

***Eucalyptus morrisbii* forest and woodland** (TASVEG DMO) is an endemic vegetation community dominated by Morrisbys Gum, a white-barked, bluish-leaved tree, with one of two natural populations known from Calverts Hill Nature Reserve and two small nearby remnant coastal stands nearby at Cremorne.

***Allocasuarina littoralis* forest** (TASVEG NAL) is characterised by a very dense bulloak (12–18 m high). It is a community mostly occurring in small patches, and often near the coast. Sea level rise is projected to impact occurrences on Flinders Island, and the east and south east coasts.

Table 3. Coastal vegetation communities 'at risk' from projected sea level rise (Sharples 2006) and the percentage of their total extent in Tasmania projected to be inundated by 2100.

'At risk' vegetation community	TASVEG code	% of total extent projected to be inundated by 2100
Saline sedgeland / rushland	ARS	44
Saltmarsh (undifferentiated)	AUS	59
Succulent saline herbland	ASS	57
Spray zone coastal complex	SSZ	39
Eucalyptus morrisbii forest and woodland	DMO	22
Allocasuarina littoralis forest	NAL	14
Eucalyptus viminalis - Eucalyptus globulus coastal forest and woodland	DVC	11
Melaleuca ericifolia swamp forest	NME	11
Coastal grass and herbfield	GHC	11

Eucalyptus viminalis - Eucalyptus globulus **coastal forest and woodland** (TASVEG DVC) is dominated by either whitegum or bluegum trees that are usually (but not always) small and of open form. This community is generally confined to recently deposited sands (Holocene and Pleistocene) in coastal formations such as back-dunes, sand spits and tombolos.

***Melaleuca ericifolia* swamp forest** (TASVEG NME) occurs as pure or almost pure stands of swamp paperbark forming a dense canopy over a simple sedgy understory. They are largely near coastal but occasionally copses are found inland.

Coastal grass and herbfield (TASVEG GHC) are found on sand dunes, sandy plains and sandy beaches. They include grasslands dominated by a range of sand-binding and tussock grasses, sedges and herbs.

Priority areas for conservation management of 'at risk' vegetation

'At risk' native vegetation was prioritized according to response type and the area of adjoining patches of coastal at risk vegetation (i.e. larger clusters of at risk vegetation were afforded higher priority than smaller clusters, so that management could be implemented to support a larger extent of at risk vegetation across fewer geographic locations). Very High priority areas of at risk vegetation have the following characteristics and are listed in Table 4.

Retreat or Refuge: Clusters of at risk vegetation patches mapped as retreat pathway or refuge that cover more than 20 ha (except for vegetation types that naturally occur in small patches) and are relatively contiguous (i.e. patches must be within 100 m of each other).

Squeezed-out: Clusters of at risk vegetation patches mapped as squeezed-out that cover more than 20 ha (except for vegetation types that naturally occur in small patches) and are relatively contiguous (i.e. within 100 m of each other).

Pittwater estuary by Iona Mitchell.

The Pittwater-Orielton Lagoon is tidal saltwater lagoon fringed by saltmarsh and rocky shores. It is a Ramsar wetland of international importance as a summer-breeding area for migratory shorebirds.

Table 4. Priority locations for 'at risk' coastal native vegetation.

Coastal area name *	Response Type	NRM Region	Reservation Status
Abbotsbury Beach	Refuge or Retreat Pathway	North	Mount William NP
Anderson Bay, Barnbougle Beach to Waterhouse Beach	Refuge or Retreat Pathway	North	Informal Reserve, and Unreserved land
Ann Bay incl Green Point Beach	Refuge or Retreat Pathway	Cradle Coast	Unreserved land
Arthur Beach	Refuge or Retreat Pathway	Cradle Coast	Arthur-Pieman CA and Sundown Point SR
Blackman Rivulet	Refuge or Retreat Pathway	South	Conservation Covenant and Informal Reserve and Unreserved land
Bryans Beach	Refuge or Retreat Pathway	South	Freycinet NP
Burnie, Emu River	Refuge or Retreat Pathway	Cradle Coast	Informal Reserve, and Unreserved land
Cape Barren Island	Refuge or Retreat Pathway	North	Unreserved land
Cape Wickham to Naracoopa	Refuge or Retreat Pathway	Cradle Coast	Lavinia SR, Counsel Hill CA and Unreserved land
Conical Rocks area, King Island	Refuge or Retreat Pathway	Cradle Coast	Seal Rocks SR and Stokes Point CA
Fitzmaurice Bay	Refuge or Retreat Pathway	Cradle Coast	Cataraqui Point CA and Unreserved land
Flat Witch and Maatsuyker Islands	Refuge or Retreat Pathway	South	Southwest NP
Foochow Beach to Red Bluff	Refuge or Retreat Pathway	North	Foochow CA and North East River GR
Forsyth Island	Refuge or Retreat Pathway	North	Forsyth Island CA
Gardiner Point	Refuge or Retreat Pathway	Cradle Coast	Arthur-Pieman CA and Unreserved land
Grindstone Beach	Refuge or Retreat Pathway	South	Unreserved land
Hope Beach, western end	Refuge or Retreat Pathway	South	Unreserved land
Little Henty River	Refuge or Retreat Pathway	Cradle Coast	Mount Heemskirk RR and Informal Reserve
Marion Beach	Refuge or Retreat Pathway	South	Long Spit PNR and Informal Reserve and Unreserved land
Mawson Bay	Refuge or Retreat Pathway	Cradle Coast	Arthur-Pieman CA, West Point SR and Unreserved land
McRaes Isthmus on Maria Island	Refuge or Retreat Pathway	South	Maria Island NP
Moulting Lagoon	Refuge or Retreat Pathway	South	Moulting Lagoon GR, Conservation Covenant, Informal Reserve and Unreserved land
Mount Cameron Beach	Refuge or Retreat Pathway	Cradle Coast	Preminghana IPA
Mutton Bird Island	Refuge or Retreat Pathway	South	Southwest NP
Ocean Beach, Henty River	Refuge or Retreat Pathway	Cradle Coast	Ocean Beach CA and Unreserved land
Pass River Bay to Peerless Point	Refuge or Retreat Pathway	Cradle Coast	Porky Beach CA and Unreserved land
Perkins Bay	Refuge or Retreat Pathway	Cradle Coast	Perkins Island CA and Informal Reserve and Unreserved land
Pitt Water Lagoon	Refuge or Retreat Pathway	South	Pitt Water NR, Conservation Covenant and Unreserved land

Coastal area name *	Response Type	NRM Region	Reservation Status
Red Bluff to Lady Barron	Refuge or Retreat Pathway	North	Logan Lagoon CA, Sellars Lagoon GR and Unreserved land
Ringarooma Bay, Murdochs Beach to Boobyalla Beach	Refuge or Retreat Pathway	North	Boobyalla CA and Unreserved land
Robbins Island	Refuge or Retreat Pathway	Cradle Coast	Unreserved land
Sawyer Bay	Refuge or Retreat Pathway	Cradle Coast	Peggs Beach CA and Unreserved land
Tasman Island	Refuge or Retreat Pathway	South	Tasman NP
Wrinklers Beach	Refuge or Retreat Pathway	North	Scamander CA and Unreserved land
Rheban Beach	Squeezed-out	South	Sandspit River PS and Unnamed CA (Sanspit River)
Sawyer Bay	Squeezed-out	Cradle Coast	Unreserved land
Perkins Bay	Squeezed-out	Cradle Coast	Informal Reserve, and Unreserved land
Gardiner Point	Squeezed-out	Cradle Coast	Arthur-Pieman CA, Private Nature Reseve and Unreserved land
Cape Farewell to Bungaree Creek	Squeezed-out	Cradle Coast	Porky Beach CA and Informal Reserve and Unreserved land
Cape Wickham to Naracoopa	Squeezed-out	Cradle Coast	Cape Wickham CA
Palana Beach	Squeezed-out	North	Blyth Point CA and Unreserved land
Petrifaction Bay	Squeezed-out	North	Badger Corner PS and Unnamed CA (Badger Corner)
Bates Bay	Squeezed-out	North	Vansittart Island CA
East coast of Vansittart Island	Squeezed-out	North	Vansittart Island CA
Chalky Island	Squeezed-out	North	Chalky Island CA
Christmas Island	Squeezed-out	Cradle Coast	Christmas Island NR
Nine Mile Beach	Squeezed-out	South	Informal Reserve and Unreserved Land
Prime Seal Island	Squeezed-out	North	Prime Seal Island CA
Sewage Mudflat, Georges Bay	Squeezed-out	North	McDonalds Point CA and Informal Reserve and Unreserved land
Egg Islands	Squeezed-out	South	Eggs Islands CA, Huon Estuary Marine CA, Conservation Covenant, Informal Reserve and Unreserved land
Ralphs Bay, northeast	Squeezed-out	South	Ralphs Bay CA and Unreserved land
Pitt Water Lagoon	Squeezed-out	South	Conservation Covenant, Pitt Water NR and Unreserved land
south of Wedge Bay	Squeezed-out	South	Crooked Billet Bay CA and Informal Reserve and Unreserved land
Watch House Bay	Squeezed-out	South	Little Swanport CA and Unreserved land
Moulting Lagoon	Squeezed-out	South	Moulting Lagoon GR, Conservation Covenant, Informal Reserve and Unreserved land

Coastal area name *	Response Type	NRM Region	Reservation Status
Cape Portland	Squeezed-out	North	Cape Portland CA and Cape Portland PS
Pig Island and surrounds	Squeezed-out	Cradle Coast	Unreserved land
Don River	Squeezed-out	Cradle Coast	Unreserved land
Forth River	Squeezed-out	Cradle Coast	Informal Reserve, and Unreserved land
Tamar River, east arm	Squeezed-out	North	Unreserved land
Big Bay	Squeezed-out	Cradle Coast	Big Bay CA and Unreserved land
Robbins Passage and surrounds	Squeezed-out	Cradle Coast	Montagu Beach CA, Montagu Island CA, Welcome River SR, Informal Reserve and Unreserved land
Duck Bay and surrounds	Squeezed-out	Cradle Coast	Duck River CA and Informal Reserve and Unreserved land
Robbins Island	Squeezed-out	Cradle Coast	Wallaby Islands CA and Unreserved land
Conical Rocks area, King Island	Squeezed-out	Cradle Coast	Seal Rocks SR, Stokes Point CA and Unreserved land
Outer Sister Island	Squeezed-out	North	Sister Islands CA
Inner Sister Island	Squeezed-out	North	Sister Islands CA
Little Dog and Great Dog Island	Squeezed-out	North	Great Dog Island IPA, Little Dog Island GR and Unreserved land
Cape Barren Island	Squeezed-out	North	Ram Island CA and Unreserved land
Long Island	Squeezed-out	North	Long Island CA
Badger and Goose Island	Squeezed-out	North	Badger Island IPA and Goose Island CA
Preservation Island	Squeezed-out	North	Unreserved land
Clarke Island	Squeezed-out	North	Iungatalanana IPA
Big Green Island	Squeezed-out	North	Big Green Island NR
Kangaroo Island	Squeezed-out	North	East Kangaroo Island NR
Cape Frankland	Squeezed-out	North	Mount Tanner NRA
North Pasco Island	Squeezed-out	North	Pasco Group CA

* This is a label we have used to best describe the location of the site – see attached maps in Appendix 1 for extent of site.

Native coastal plant species

There are 92 vascular plant species native to Tasmania considered by the authors and the project collaborators to be **obligate coastal species** (Table 5). This term is defined as plant species having more than half their recorded observations in Tasmania within 100 m of the high water mark, and/or known or scientifically documented to be obligate or semi-obligate coastal species.

Many coastal species tolerate (or may require) direct salt spray and high exposure to maritime conditions. Some may occur within 100 m of the high water mark but be situated high on cliffs and slopes and so are generally under low threat from sea level rise. Species that may be common on the coast but also have occurrences inland are generally excluded from this list.

Table 5. Native obligate coastal plant species in Tasmania.

Scientific name	Common name
Acacia longifolia	coast wattle
Acaena pallida	dune buzzy
Actites megalocarpus	dune thistle
Alyxia buxifolia	seabox
Angianthus preissianus	salt angianthus
Apium insulare	sea celery
Apium prostratum subsp. *prostratum*	creeping sea-celery
Apodasmia brownii	cushionbush
Asplenium obtusatum subsp. *northlandicum*	shore spleenwort
Atriplex billardierei	glistening saltbush
Atriplex cinerea	grey saltbush
Atriplex paludosa subsp. *paludosa*	marsh saltbush
Atriplex suberecta	sprawling saltbush
Austrofestuca littoralis	coast fescue
Austrostipa stipoides	coast speargrass
Billardiera ovalis	seaspray appleberry
Brachyscome diversifolia var. *maritima*	coastal tall daisy
Brachyscome parvula	coast daisy
Bulbine crassa	island leeklily
Bulbine semibarbata	smallflower leeklily
Calystegia sepium	swamp bindweed
Calystegia soldanella	sea bindweed
Carex pumila	strand sedge
Carpobrotus rossii	native pigface
Correa alba var. *alba*	white correa
Correa backhouseana var. *backhouseana*	velvet correa
Craspedia cynurica	cliff billybutton
Craspedia preminghana	preminghana billybuttons
Crassula moschata	musky stonecrop
Disphyma crassifolium subsp. *clavellatum*	pigface roundleaf
Distichlis distichophylla	australian saltgrass
Epacris stuartii	southport heath
Euphrasia phragmostoma	hairy cliff-eyebright
Euphrasia sp. *Bivouac Bay*	masked cliff-eyebright

Scientific name	Common name
Frankenia pauciflora var. *gunnii*	southern seaheath
Geococcus pusillus	earth cress
Halophila australis	sea wrack
Hemichroa pentandra	trailing saltstar
Imperata cylindrica var. *major*	blady grass
Juncus kraussii subsp. australiensis	sea rush
Lachnagrostis billardierei subsp. *billardierei*	coast blown grass
Lachnagrostis billardierei subsp. *tenuiseta*	small-awn blowngrass
Lachnagrostis robusta	tall blowngrass
Lasiopetalum baueri	slender velvetbush
Lawrencia spicata	candle saltmallow
Leiocarpa supina	coast ploverdaisy
Lepidium flexicaule	springy peppercress
Lepidosperma gladiatum	coast swordsedge
Leptecophylla abietina	seaspray pinkberry
Leptinella longipes	coast buttons
Limonium australe var. *australe*	yellow sea-lavender
Limonium australe var. *baudinii*	tasmanian sea lavender
Lobelia anceps	angled lobelia
Lotus australis	australian trefoil
Muehlenbeckia adpressa	climbing lignum
Myoporum insulare	common boobialla
Nablonium calyceroides	spiny everlasting
Olearia axillaris	coast daisybush
Olearia glutinosa	sticky daisybush
Olearia lepidophylla	clubmoss daisybush
Ozothamnus bracteolatus	woolly everlastingbush
Ozothamnus reticulatus	veined everlasting bush
Ozothamnus turbinatus	coast everlastingbush
Pimelea serpyllifolia subsp. *serpyllifolia*	thyme riceflower
Plantago bellidioides	herbfield plantain
Plantago triantha	saltspray plantain
Poa poiformis var. *poiformis*	coastal tussockgrass
Poa poiformis var. *ramifer*	island purplegrass
Ranunculus acaulis	dune buttercup
Rhagodia candolleana subsp. *candolleana*	coastal saltbush
Ruppia tuberosa	tuberous seatassel
Rytidosperma remotum	remote wallabygrass
Sarcocornia blackiana	thickhead glasswort
Sarcocornia quinqueflora subsp. *quinqueflora*	beaded glasswort
Sarcocornia quinqueflora subsp. *tasmanica*	tasmanian glasswort
Senecio pinnatifolius var. *capillifolius*	fineleaf coast groundsel
Senecio pinnatifolius var. *maritimus*	western coast groundsel
Senecio spathulatus var. *spathulatus*	dune groundsel
Spinifex sericeus	spinifex
Sporobolus virginicus	salt couch
Stackhousia spathulata	coast candles
Stenopetalum lineare	threadcress
Suaeda australis	southern seablite
Swainsona lessertiifolia	coast poisonpea
Tecticornia arbuscula	shrubby glasswort
Tetragonia implexicoma	bower spinach
Tetragonia tetragonioides	new zealand spinach
Threlkeldia diffusa	coast bonefruit
Veronica novae-hollandiae	coast speedwell
Zygophyllum billardierei	coast twinleaf

‘Highly at risk’ coastal plant species

The method used to determine the coastal plant species highly at risk of sea level rise involved integration of point source species presence records as documented in the Natural Values Atlas (Natural Values Atlas 2013) with projected areas of inundation on a 100 m grid cell format.

Rules used were:

1. For species records that are in the inundated portion of a cell, **Inundation Score** = the number of grid cells in which the species is projected to be inundated divided by total grid cells occupied by that species in Tasmania *100.
2. Attribute each cell with the highest recorded score for any species in that cell.
3. The highest recorded 10 percent of cells by area according to the **Inundation Score** are considered ‘high consequence of inundation’ sites for the purpose of the table below. These are labelled with “Very High Inundation Score”. The next highest 10 percent of cells by area are labelled “High Inundation Score”.
4. Generate a list of the species that triggered a high or very high **Inundation Score** (see Table 6). These are considered highly at risk from inundation from projected sea level rise by 2100 (Sharples 2006).

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Brief description of ‘highly at risk’ plant species

Calystegia sepium (Great Bindweed) has been recorded from riverbanks and the margins of forests in the north of the State around the Tamar region.

Frankenia pauciflora var. *gunnii* (Sea heath) is restricted to mudflats and the sprayzone on Flinders Islands and Short and Harcus Islands located in Robbins Strait on the north-west coast. Key sites include Preservation Island, Cone Island, Clarke Island, Rocky Cape to Black River Road, Rum Island, Spike Island, Little Goose Island, Short Island and Harcus Island.

Limonium australe var. *australe* (Yellow sea-lavender) has been recorded from the north coast (west of and including the Tamar Estuary) and the southeast, where it is restricted to saltmarshes. Key populations are found at Short Island, Harcus Island, Stony Point, Port Sorell, Swan Point, Barilla Bay.

Limonium australe var. *baudinii* (Tasmanian sea-lavender) is endemic to Tasmania. It is known from saltmarsh close to the high watermark, typically near small brackish streams, in the Triabunna area near the mouth of the Saltwater River on the Tasman Peninsula.

Ruppia tuberosa (Tuberous seatassel) is an annual or short-lived perennial aquatic herb growing in holes and channels in saltmarsh at Ralphs Bay and Boomer Marsh at Blackman Bay.

Stenopetalum lineare (narrow threadpetal) is an annual herb that has a highly restricted geographic distribution on the east on low grass-covered dunes and coastal heathy woodland. These sites are subject to erosion as a result of the increase in the frequency and intensity of storm surges associated with climate change.

Table 6. *Coastal plant species assessed as ‘highly at risk’ from inundation from projected sea level rise by 2100 (Sharples 2006).*

Scientific name	Common name
Calystegia sepium	swamp bindweed
Frankenia pauciflora var. *gunnii*	southern seaheath
Limonium australe var. *australe*	yellow sea-lavender
Limonium australe var. *baudinii*	Tasmanian sea lavender
Ruppia tuberosa	tuberous sea-tassel
Stenopetalum lineare	threadcress

Priority areas for 'highly at risk' coastal plant species

Coastal areas with a high frequency of records on the Natural Values Atlas of the 'highly at risk' obligate coastal plant species are listed in Table 7. These areas could be considered to be high priority areas for the conservation management of these species.

Tasmanian sea-lavender (*Limonium australe* var. *baudinii*) by Oberon Carter.

This obligate coastal plant is endemic to Tasmania with only four known populations in saltmarsh on the east coast. A key site at Triabunna is projected to be inundated and active conservation measures such as translocation are recommended.

Table 7. Priority locations for 'highly at risk' obligate coastal plant species.

Coastal area name *	NRM Region	Species	Response Type
Clarke Island	North	*Frankenia pauciflora* var. *gunnii*	Refuge
Tamar River, east arm	North	*Limonium australe* var. *australe*	Refuge
Long Point Beach to Fotheringate Bay	North	*Stenopetalum lineare*	Retreat Pathway
Hope Beach, western end	South	*Stenopetalum lineare*	Retreat Pathway
Kelvedon Beach	South	*Stenopetalum lineare*	Retreat Pathway and Squeezed-out
Ralphs Bay	South	*Ruppia tuberosa*	Retreat Pathway
Ralphs Bay, northeast	South	*Ruppia tuberosa*	Retreat Pathway
Badger and Goose Island	North	*Frankenia pauciflora* var. *gunnii*	Squeezed-out
Beechford	North	*Calystegia sepium*	Squeezed-out
Big Bay	Cradle Coast	*Limonium australe* var. *australe*	Squeezed-out
Cave Beach	North	*Frankenia pauciflora* var. *gunnii*	Squeezed-out
Clarke Island	North	*Frankenia pauciflora* var. *gunnii*	Squeezed-out
Crayfish Creek Beach	Cradle Coast	*Frankenia pauciflora* var. *gunnii*	Squeezed-out
Duck Bay and surrounds	Cradle Coast	*Limonium australe* var. *australe*	Squeezed-out
Foochow Beach to Red Bluff	North	*Frankenia pauciflora* var. *gunnii*	Squeezed-out
Georges Bay	North	*Stenopetalum lineare*	Squeezed-out
Hidyards Point	South	*Ruppia tuberosa*	Squeezed-out
Launceston	North	*Calystegia sepium*	Squeezed-out
Long Point Beach to Fotheringate Bay	North	*Stenopetalum lineare* and *Frankenia pauciflora* var. *gunnii*	Squeezed-out
Palana Beach	North	*Frankenia pauciflora* var. *gunnii*	Squeezed-out
Pittwater Lagoon	South	*Limonium australe* var. *australe*	Squeezed-out
Port Sorell	Cradle Coast	*Limonium australe* var. *australe*	Squeezed-out
Preservation Island	North	*Frankenia pauciflora* var. *gunnii*	Squeezed-out
Ralphs Bay, northeast	South	*Limonium australe* var. *australe*	Squeezed-out
Robbins Passage and surrounds	Cradle Coast	*Limonium australe* var. *australe*	Squeezed-out
Sawyer Bay	Cradle Coast	*Limonium australe* var. *australe*	Squeezed-out
Tamar River, islets near Tamar Island	North	*Calystegia sepium*	Squeezed-out
Tamar River, near Middle Point	North	*Limonium australe* var. *australe*	Squeezed-out
Tamar River, near Swan Bay	North	*Limonium australe* var. *australe*	Squeezed-out
Tamar River, Swan Point	North	*Limonium australe* var. *australe*	Squeezed-out
Triabunna	South	*Limonium australe* var. *baudinii*	Squeezed-out
Ulverstone	Cradle Coast	*Limonium australe* var. *australe*	Squeezed-out

* This is a label the authors have used to best describe the location of the site – see attached maps in Appendix 1 for extent of site.

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Coastal grasslands on Southport Island by Oberon Carter.

Rocky coastlines have natural protection from storm surges and inundation and often are important refuges for coastal plant communities.

Appendix 1. Maps of priority coastal areas

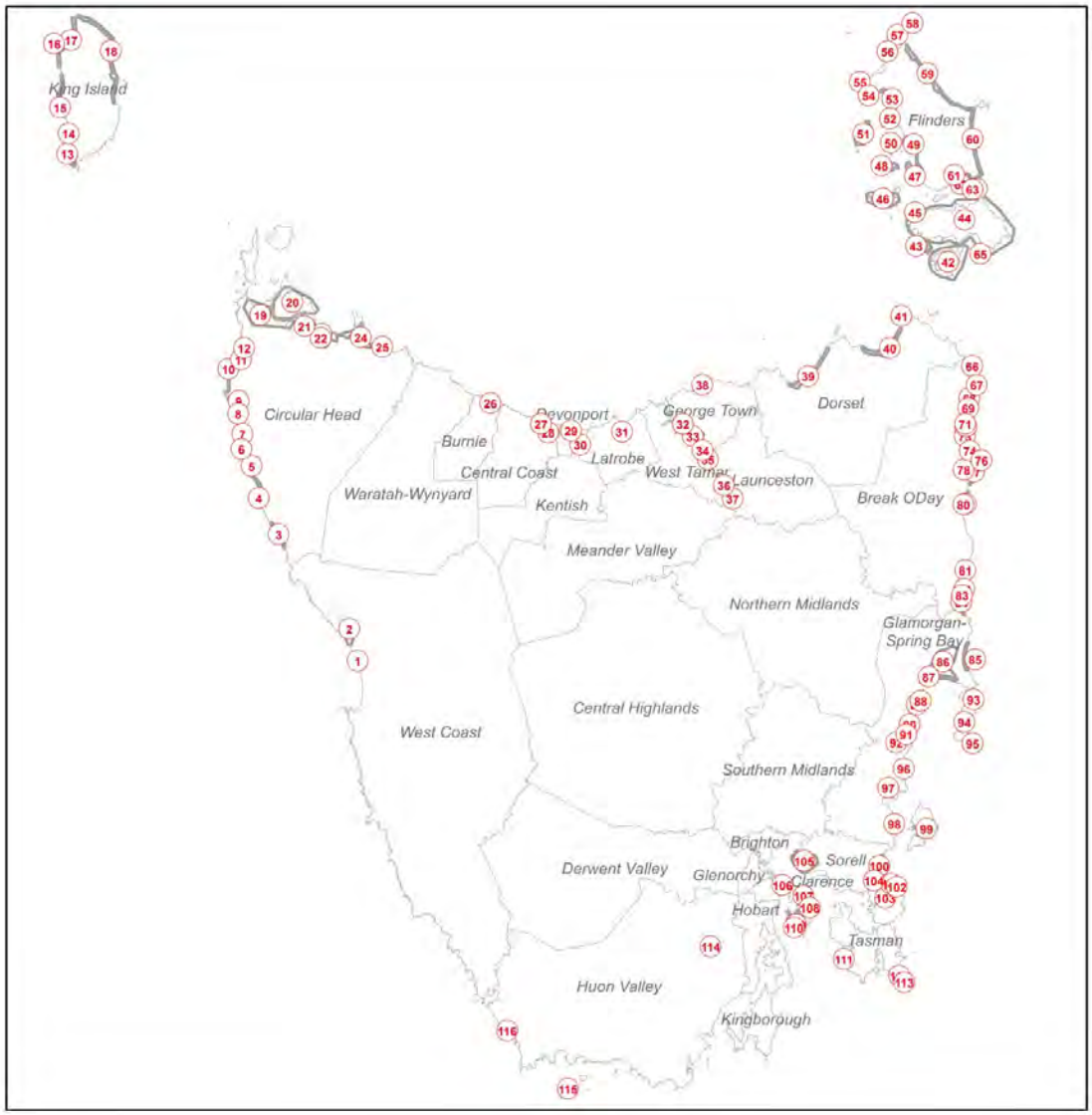
The attached maps provide the following priority locations for natural values conservation management:

Beach-nesting shorebirds: Very High and High priority beaches are mapped. The response type (Refuge, Retreat Pathway or Squeezed-out) is given and the at-risk shorebird species are recorded. The mapped area is outlined in blue and is indicative of the contiguous sandy beach extent for shorebirds that have been recorded on a given beach. Finer resolution mapping is available from DPIPWE on request.

Native vegetation: Very High priority coastal areas for at-risk native vegetation communities are mapped. The extents of Refuge or Retreat Pathway sites are mapped in green and Squeezed-out sites are mapped in orange. Mapping is based on TASVEG 3.0. The applicable at-risk vegetation communities are also listed below the map.

Native plant species: Priority locations for 'highly at risk' obligate coastal plant species are mapped. Red areas represent Squeezed-out sites, dark green areas represent Refuge sites and dark blue areas represent Retreat Pathway sites. The applicable most-at-risk species are listed below the map.

Key to beaches in this report



List of Beaches – sorted by Beach Number

Beach number	Beach name	Natural Values needing management for sea-level rise risk
1	Ocean Beach, Henty River	Vegetation
2	Little Henty River	Vegetation
3	Unnamed beach south of Johnsons Bay	Shorebirds
4	Kenneth Bay	Shorebirds
5	Smiths Gulch and Ordnance Point	Shorebirds
6	Gaffney Point	Shorebirds
7	Pollys Bay	Shorebirds
8	Arthur Beach	Vegetation
9	Gardiner Point	Vegetation

Beach number	Beach name	Natural Values needing management for sea-level rise risk
10	Mawson Bay	Shorebirds, Vegetation
11	Ann Bay incl Green Point Beach	Vegetation
12	Mount Cameron Beach	Shorebirds, Vegetation
13	Conical Rocks area, King Island	Vegetation
14	Fitzmaurice Bay	Vegetation
15	Pass River Bay to Peerless Point	Vegetation
16	Christmas Island	Shorebirds, Vegetation
17	Cape Farewell to Bungaree Creek	Shorebirds, Vegetation
18	Cape Wickham to Naracoopa	Vegetation
19	Robbins Passage and surrounds	Plants, Vegetation
20	Robbins Island	Vegetation
21	Big Bay	Plants, Vegetation
22	Duck Bay and surrounds	Plants, Vegetation
23	Perkins Bay	Shorebirds, Vegetation
24	Sawyer Bay	Shorebirds, Plants, Vegetation
25	Crayfish Creek Beach	Plants
26	Burnie, Emu River	Vegetation
27	Ulverstone	Plants
28	Forth River	Vegetation
29	Don River	Vegetation
30	Pig Island and surrounds	Vegetation
31	Port Sorell	Plants
32	Tamar River, near Middle Point	Plants
33	Tamar River, east arm	Plants, Vegetation
34	Tamar River, Swan Point	Plants
35	Tamar River, near Swan Bay	Plants
36	Tamar River, islets near Tamar Island	Plants
37	Launceston	Plants
38	Beechford	Plants
39	Anderson Bay, Barnbougle Beach to Waterhouse	Vegetation
40	Ringarooma Bay, Murdochs Beach to Boobyalla	Vegetation
41	Cape Portland	Vegetation
42	Clarke Island	Plants, Vegetation
43	Preservation Island	Plants, Vegetation
44	Cape Barren Island	Vegetation
45	Long Island	Vegetation
46	Badger and Goose Island	Plants, Vegetation
47	Big Green Island	Vegetation
48	Kangaroo Island	Vegetation
49	Long Point Beach to Fotheringate Bay	Plants
50	Chalky Island	Vegetation
51	Prime Seal Island	Vegetation
52	Cave Beach	Plants
53	Tanners Bay to Marshall Beach and Castle Rock Point	Shorebirds, Vegetation
54	North Pasco Island	Vegetation
55	Cape Frankland	Vegetation

Beach number	Beach name	Natural Values needing management for sea-level rise risk
56	Palana Beach	Plants, Vegetation
57	Inner Sister Island	Vegetation
58	Outer Sister Island	Vegetation
59	Foochow Beach to Red Bluff	Shorebirds, Plants, Vegetation
60	Red Bluff to Lady Barron	Shorebirds, Vegetation
61	Petrifaction Bay	Vegetation
62	Little Dog and Great Dog Island	Vegetation
63	Bates Bay	Shorebirds, Vegetation
64	East coast of Vansittart Island	Vegetation
65	Forsyth Island	Vegetation
66	Purdon Bay	Shorebirds
67	Red Rocks	Shorebirds
68	Abbotsbury Beach	Shorebirds, Vegetation
69	Pebbly Beach	Shorebirds
70	Break Yoke Beach	Shorebirds
71	Gardens Lagoon Beach	Shorebirds
72	unnamed beach south of Bay of Fires	Shorebirds
73	Taylors Beach	Shorebirds
74	Binalong Bay	Shorebirds
75	Georges Bay	Shorebirds, Plants
76	Beerbarrel Beach	Shorebirds
77	Maurouad Beach	Shorebirds
78	Sewage Mudflat, Georges Bay	Vegetation
79	Beaumaris Beach	Shorebirds
80	Wrinklers Beach	Shorebirds, Vegetation
81	Templestowe Beach	Shorebirds
82	Seymour Beach	Shorebirds
83	Porch Rocks	Shorebirds
84	Denison Beach	Shorebirds
85	The Friendly Beaches	Shorebirds, Vegetation
86	Moulting Lagoon	Vegetation
87	Nine Mile Beach	Vegetation
88	Spiky Beach	Vegetation
89	Kelvedon Beach	Shorebirds, Plants
90	Lisdillon	Vegetation
91	Little Swanport Mouth	Vegetation
92	Watch House Bay	Vegetation
93	Lemon Bight	Vegetation
94	Bryans Beach	Vegetation
95	Schouten Island, southern section	Vegetation
96	Grindstone Beach	Vegetation
97	Triabunna	Plants
98	Rheban Beach	Vegetation
99	McRaes Isthmus on Maria Island	Shorebirds, Vegetation
100	Marion Beach	Shorebirds, Vegetation
101	North Bay incl Two Mile Beach	Shorebirds
102	Lagoon Bay	Shorebirds

Beach number	Beach name	Natural Values needing management for sea-level rise risk
103	Blackman Rivulet	Vegetation
104	Hildyards Point	Plants
105	Pittwater Lagoon	Plants, Vegetation
106	Bellerive Beach	Plants
107	Ralphs Bay, northeast	Plants, Vegetation
108	Lumeah Point	Vegetation
109	Ralphs Bay	Plants
110	Hope Beach, western end	Plants, Vegetation
111	south of Wedge Bay	Vegetation
112	Cape Pillar surrounds	Vegetation
113	Tasman Island	Vegetation
114	Egg Islands	Vegetation
115	Flat Witch and Maatsuyker Islands	Vegetation
116	Mutton Bird Island	Vegetation

List of Beaches – sorted by Beach Name

Beach number	Beach name	Natural Values needing management for sea-level rise risk
68	Abbotsbury Beach	Shorebirds, Vegetation
39	Anderson Bay, Barnbougle Beach to Waterhouse	Vegetation
11	Ann Bay incl Green Point Beach	Vegetation
8	Arthur Beach	Vegetation
46	Badger and Goose Island	Plants, Vegetation
63	Bates Bay	Shorebirds, Vegetation
79	Beaumaris Beach	Shorebirds
38	Beechford	Plants
76	Beerbarrel Beach	Shorebirds
106	Bellerive Beach	Plants
21	Big Bay	Plants, Vegetation
47	Big Green Island	Vegetation
74	Binalong Bay	Shorebirds
103	Blackman Rivulet	Vegetation
70	Break Yoke Beach	Shorebirds
94	Bryans Beach	Vegetation
26	Burnie, Emu River	Vegetation
44	Cape Barren Island	Vegetation
17	Cape Farewell to Bungaree Creek	Shorebirds, Vegetation
55	Cape Frankland	Vegetation
112	Cape Pillar surrounds	Vegetation
41	Cape Portland	Vegetation
18	Cape Wickham to Naracoopa	Vegetation
52	Cave Beach	Plants
50	Chalky Island	Vegetation
16	Christmas Island	Shorebirds, Vegetation
42	Clarke Island	Plants, Vegetation

Beach number	Beach name	Natural Values needing management for sea-level rise risk
13	Conical Rocks area, King Island	Vegetation
25	Crayfish Creek Beach	Plants
84	Denison Beach	Shorebirds
29	Don River	Vegetation
22	Duck Bay and surrounds	Plants, Vegetation
64	East coast of Vansittart Island	Vegetation
114	Egg Islands	Vegetation
14	Fitzmaurice Bay	Vegetation
115	Flat Witch and Maatsuyker Islands	Vegetation
59	Foochow Beach to Red Bluff	Shorebirds, Plants, Vegetation
65	Forsyth Island	Vegetation
28	Forth River	Vegetation
6	Gaffney Point	Shorebirds
71	Gardens Lagoon Beach	Shorebirds
9	Gardiner Point	Vegetation
75	Georges Bay	Shorebirds, Plants
96	Grindstone Beach	Vegetation
104	Hildyards Point	Plants
110	Hope Beach, western end	Plants, Vegetation
57	Inner Sister Island	Vegetation
48	Kangaroo Island	Vegetation
89	Kelvedon Beach	Shorebirds, Plants
4	Kenneth Bay	Shorebirds
102	Lagoon Bay	Shorebirds
37	Launceston	Plants
93	Lemon Bight	Vegetation
90	Lisdillon	Vegetation
62	Little Dog and Great Dog Island	Vegetation
2	Little Henty River	Vegetation
91	Little Swanport Mouth	Vegetation
45	Long Island	Vegetation
49	Long Point Beach to Fotheringate Bay	Plants
108	Lumeah Point	Vegetation
100	Marion Beach	Shorebirds, Vegetation
77	Maurouad Beach	Shorebirds
10	Mawson Bay	Shorebirds, Vegetation
99	McRaes Isthmus on Maria Island	Shorebirds, Vegetation
86	Moulting Lagoon	Vegetation
12	Mount Cameron Beach	Shorebirds, Vegetation
116	Mutton Bird Island	Vegetation
87	Nine Mile Beach	Vegetation
101	North Bay incl Two Mile Beach	Shorebirds
54	North Pasco Island	Vegetation
1	Ocean Beach, Henty River	Vegetation
58	Outer Sister Island	Vegetation
56	Palana Beach	Plants, Vegetation

Beach number	Beach name	Natural Values needing management for sea-level rise risk
15	Pass River Bay to Peerless Point	Vegetation
69	Pebbly Beach	Shorebirds
23	Perkins Bay	Shorebirds, Vegetation
61	Petrifaction Bay	Vegetation
30	Pig Island and surrounds	Vegetation
105	Pittwater Lagoon	Plants, Vegetation
7	Pollys Bay	Shorebirds
83	Porch Rocks	Shorebirds
31	Port Sorell	Plants
43	Preservation Island	Plants, Vegetation
51	Prime Seal Island	Vegetation
66	Purdon Bay	Shorebirds
109	Ralphs Bay	Plants
107	Ralphs Bay, northeast	Plants, Vegetation
60	Red Bluff to Lady Barron	Shorebirds, Vegetation
67	Red Rocks	Shorebirds
98	Rheban Beach	Vegetation
40	Ringarooma Bay, Murdochs Beach to Boobyalla	Vegetation
20	Robbins Island	Vegetation
19	Robbins Passage and surrounds	Plants, Vegetation
24	Sawyer Bay	Shorebirds, Plants, Vegetation
95	Schouten Island, southern section	Vegetation
78	Sewage Mudflat, Georges Bay	Vegetation
82	Seymour Beach	Shorebirds
5	Smiths Gulch and Ordnance Point	Shorebirds
111	south of Wedge Bay	Vegetation
88	Spiky Beach	Vegetation
33	Tamar River, east arm	Plants, Vegetation
36	Tamar River, islets near Tamar Island	Plants
32	Tamar River, near Middle Point	Plants
35	Tamar River, near Swan Bay	Plants
34	Tamar River, Swan Point	Plants
53	Tanners Bay to Marshall Beach and Castle Rock Point	Shorebirds, Vegetation
113	Tasman Island	Vegetation
73	Taylors Beach	Shorebirds
81	Templestowe Beach	Shorebirds
85	The Friendly Beaches	Shorebirds, Vegetation
97	Triabunna	Plants
27	Ulverstone	Plants
72	unnamed beach south of Bay of Fires	Shorebirds
3	Unnamed beach south of Johnsons Bay	Shorebirds
92	Watch House Bay	Vegetation
80	Wrinklers Beach	Shorebirds, Vegetation

1. Ocean Beach, Henty River

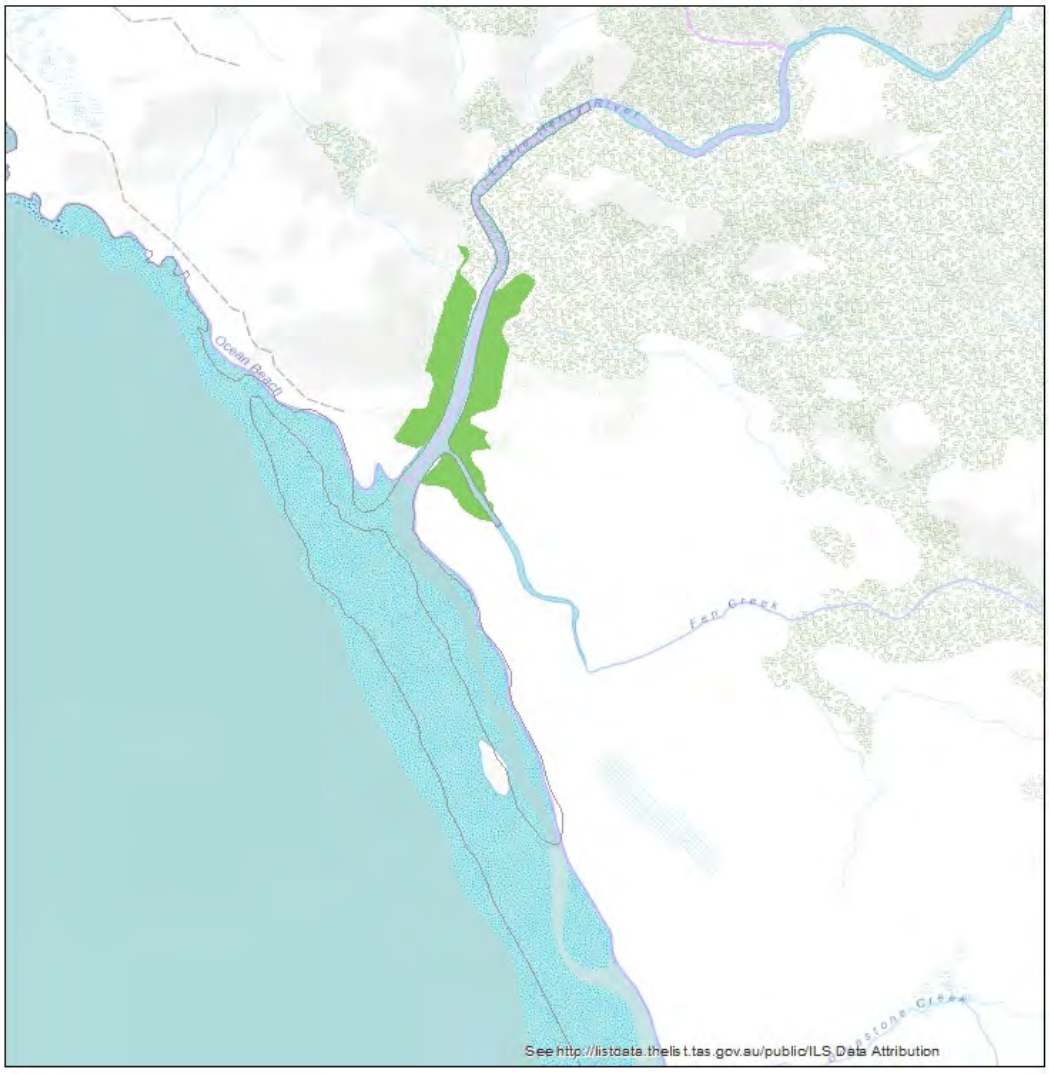
Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield, *Melaleuca ericifolia* swamp forest

2. Little Henty River



Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: *Melaleuca ericifolia* swamp forest

3. Unnamed beach south of Johnsons Bay

Priority beach for shorebirds.

Shorebird Squeezed-out Site - Threat Management

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

4. Kenneth Bay

Priority beach for shorebirds.

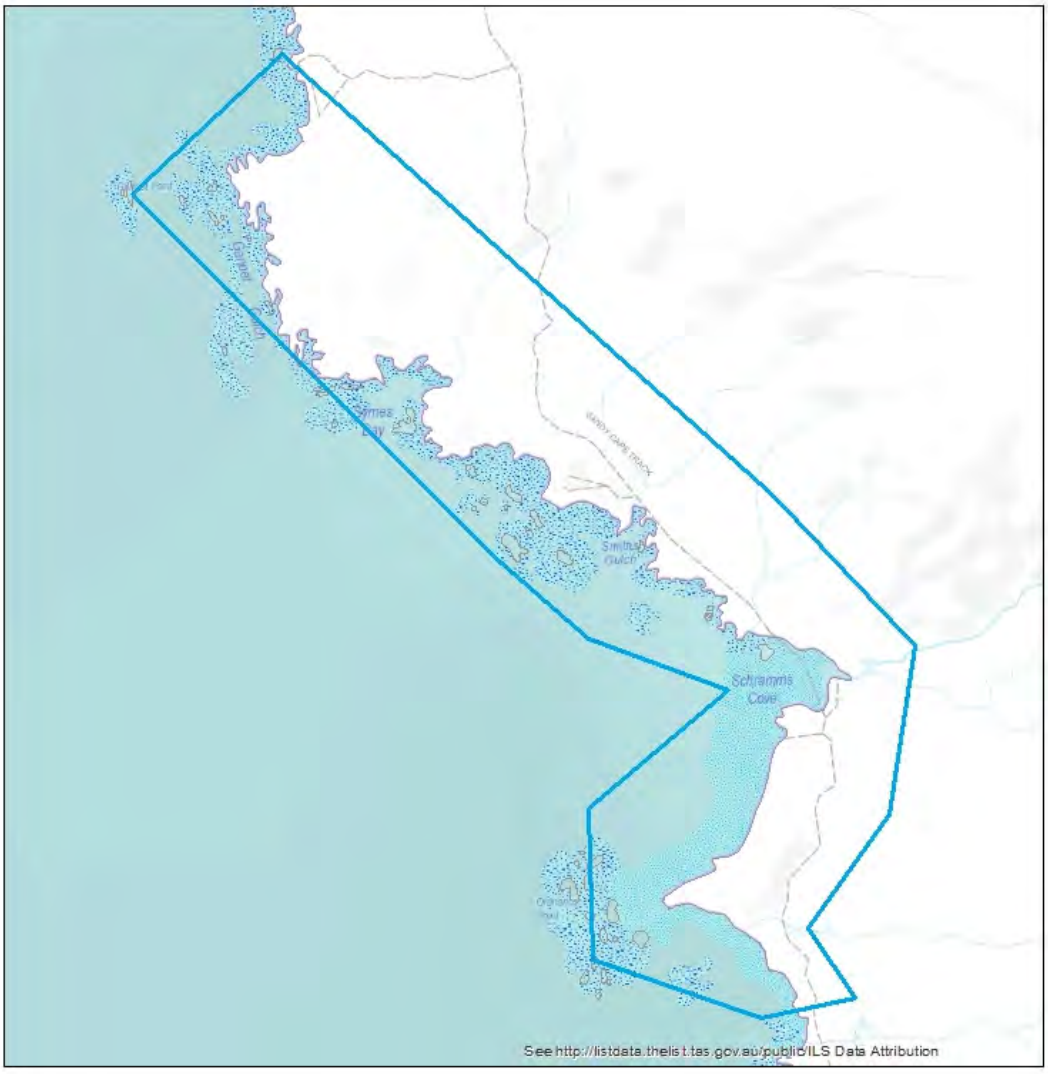
Shorebird Retreat Pathway - Pathway protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

5. Smiths Gulch and Ordnance Point



Priority beach for shorebirds.

Shorebird Squeezed-out Site - Threat Management

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover, Fairy Tern

High consequence beach for shorebirds

6. Gaffney Point

Priority beach for shorebirds.

Shorebird Refuge site - Refuge protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

7. Pollys Bay

Priority beach for shorebirds.

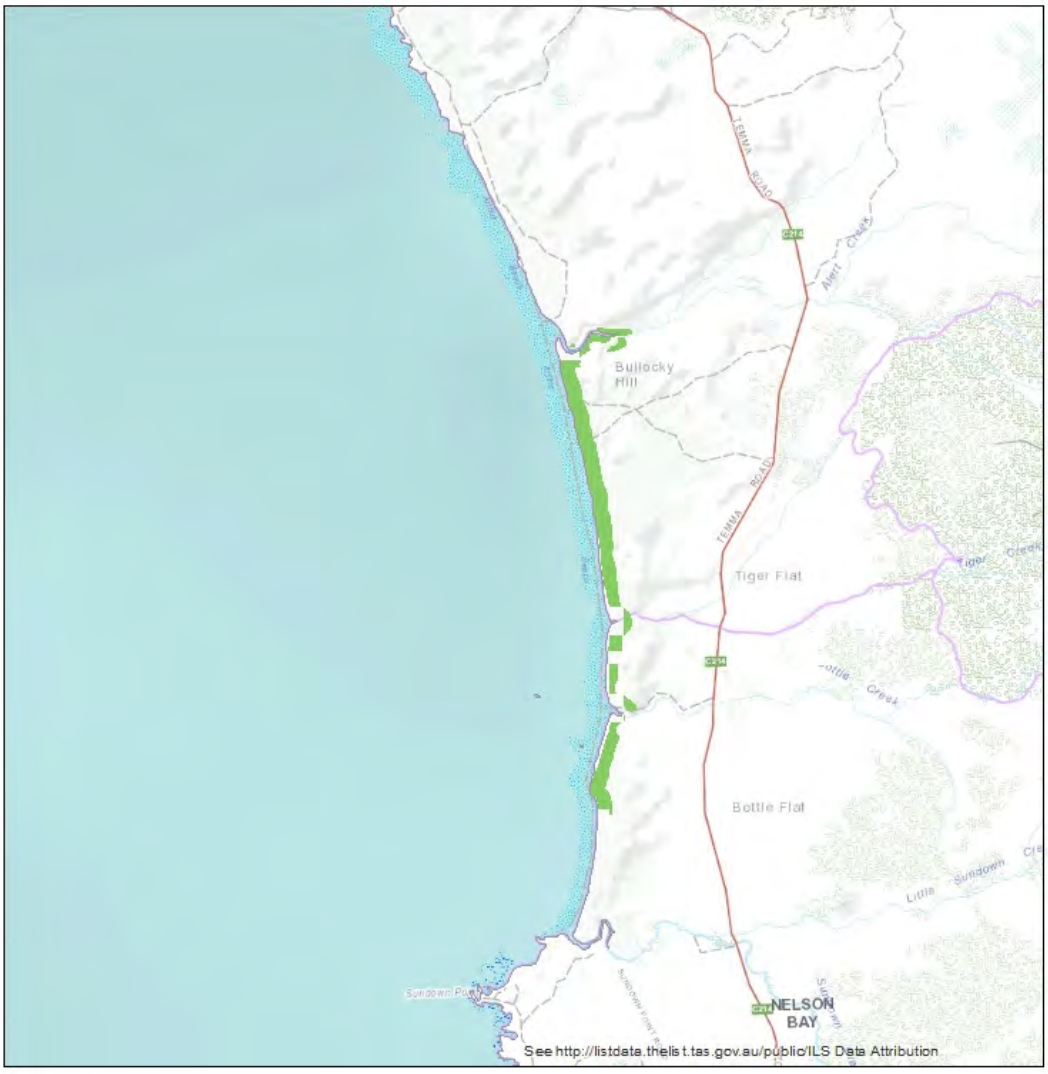
Shorebird Retreat Pathway - Threat Management with pathway protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

8. Arthur Beach



Native Vegetation

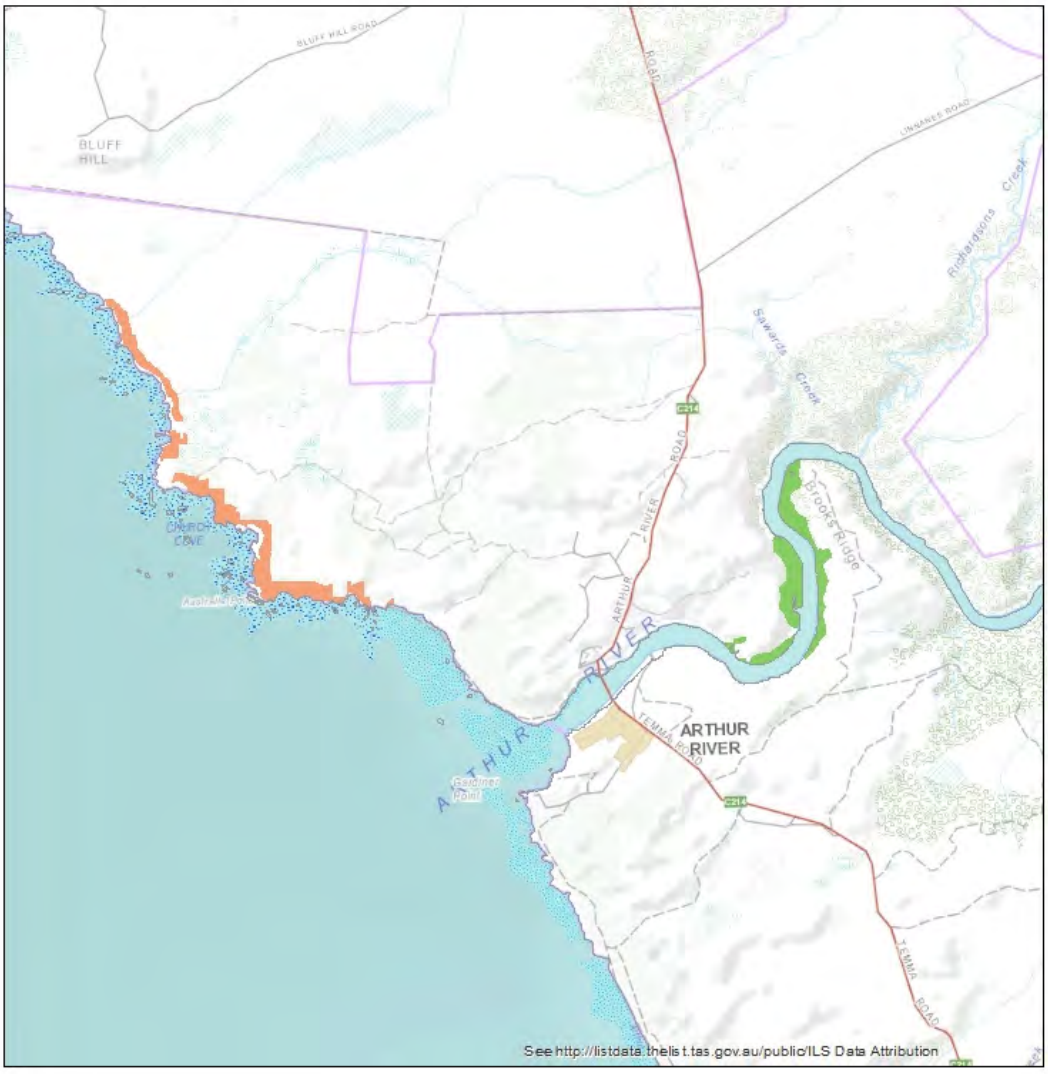
- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield, *Melaleuca ericifolia* swamp forest

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

9. Gardiner Point



Native Vegetation

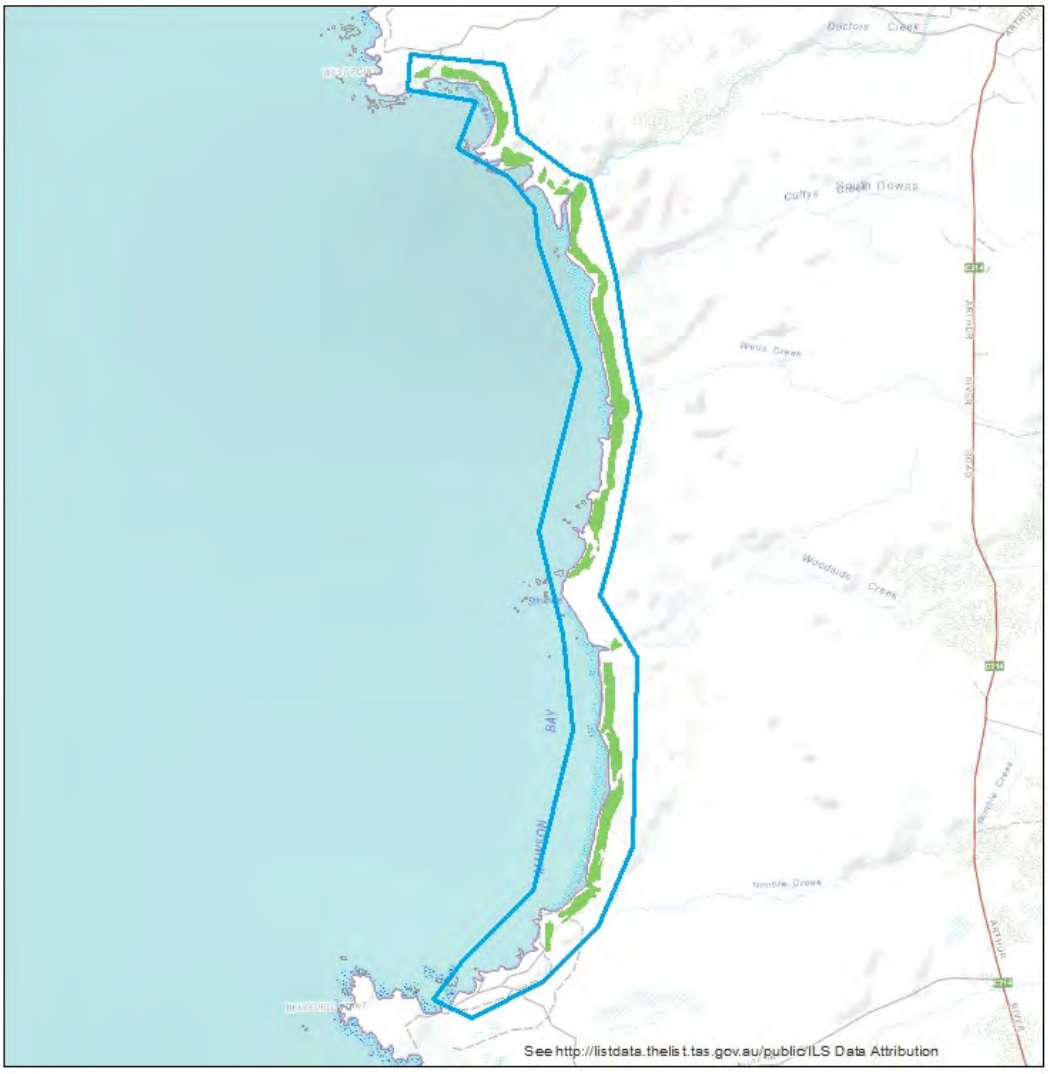
- Retreat or Refuge Site
- Squeezed-out Site

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

At-risk vegetation communities: Coastal grass and herbfield, *Melaleuca ericifolia* swamp forest

10. Mawson Bay



Native Vegetation

Retreat or Refuge Site

Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield

Priority beach for shorebirds.

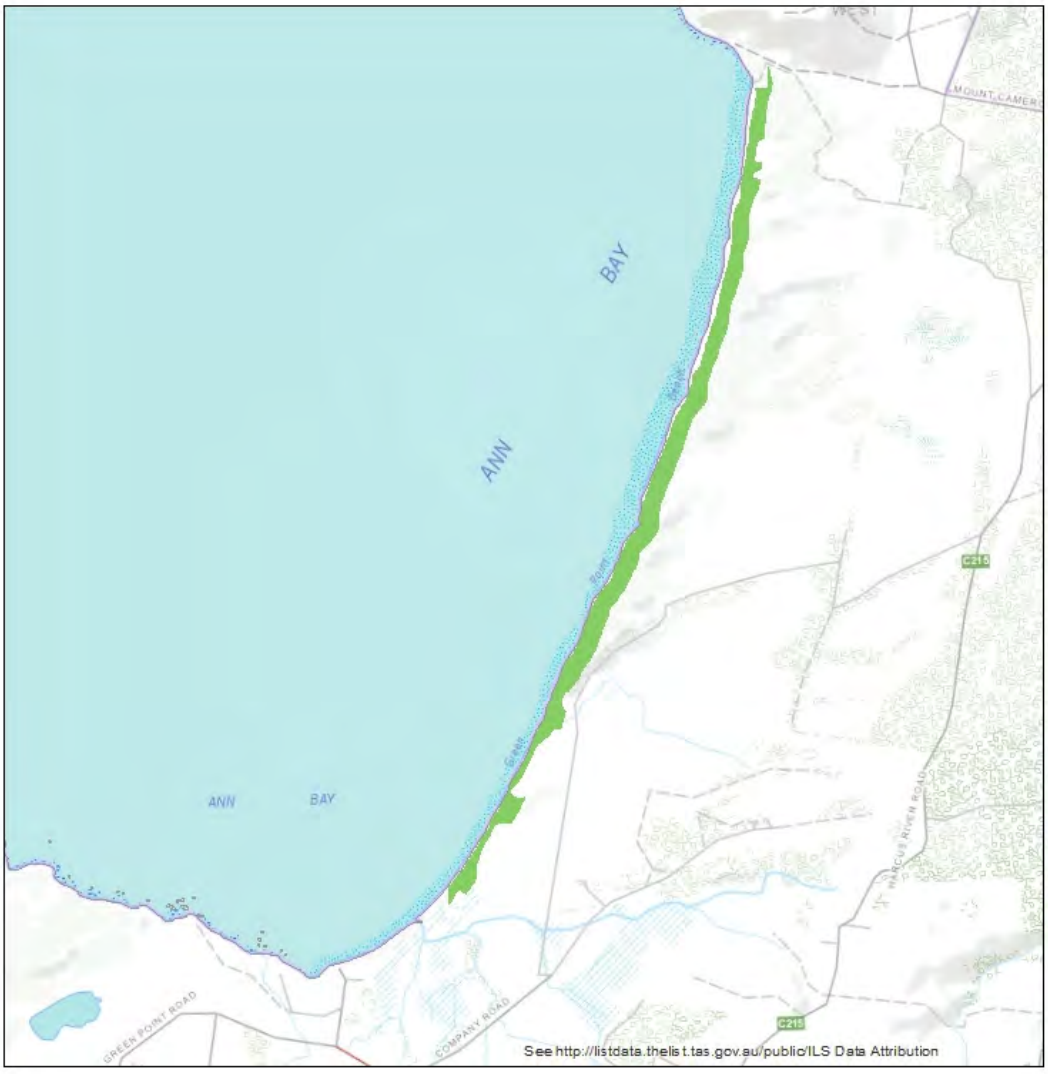
Shorebird Retreat Pathway - Pathway protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

11. Ann Bay incl Green Point Beach



Native Vegetation

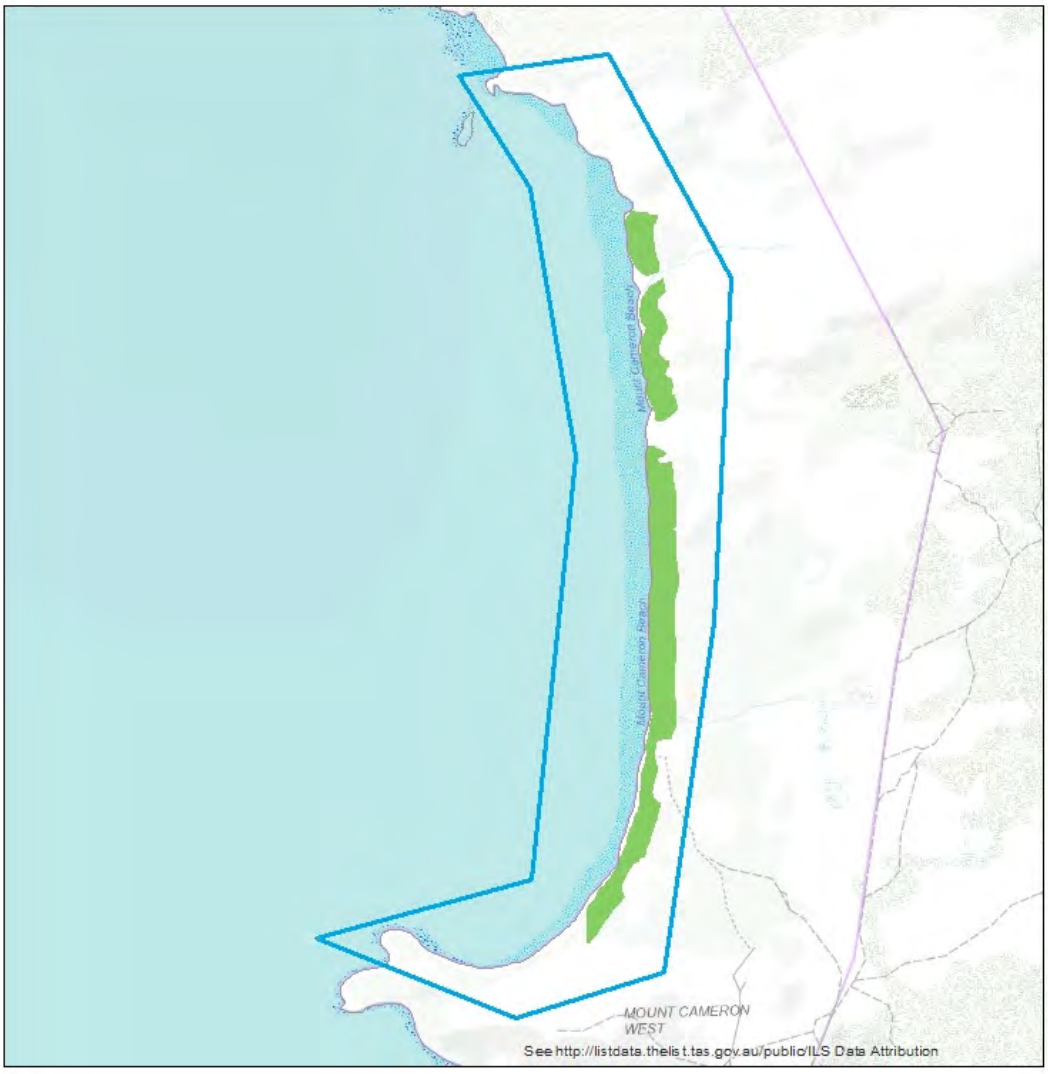
- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

12. Mount Cameron Beach



Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield

Priority beach for shorebirds.

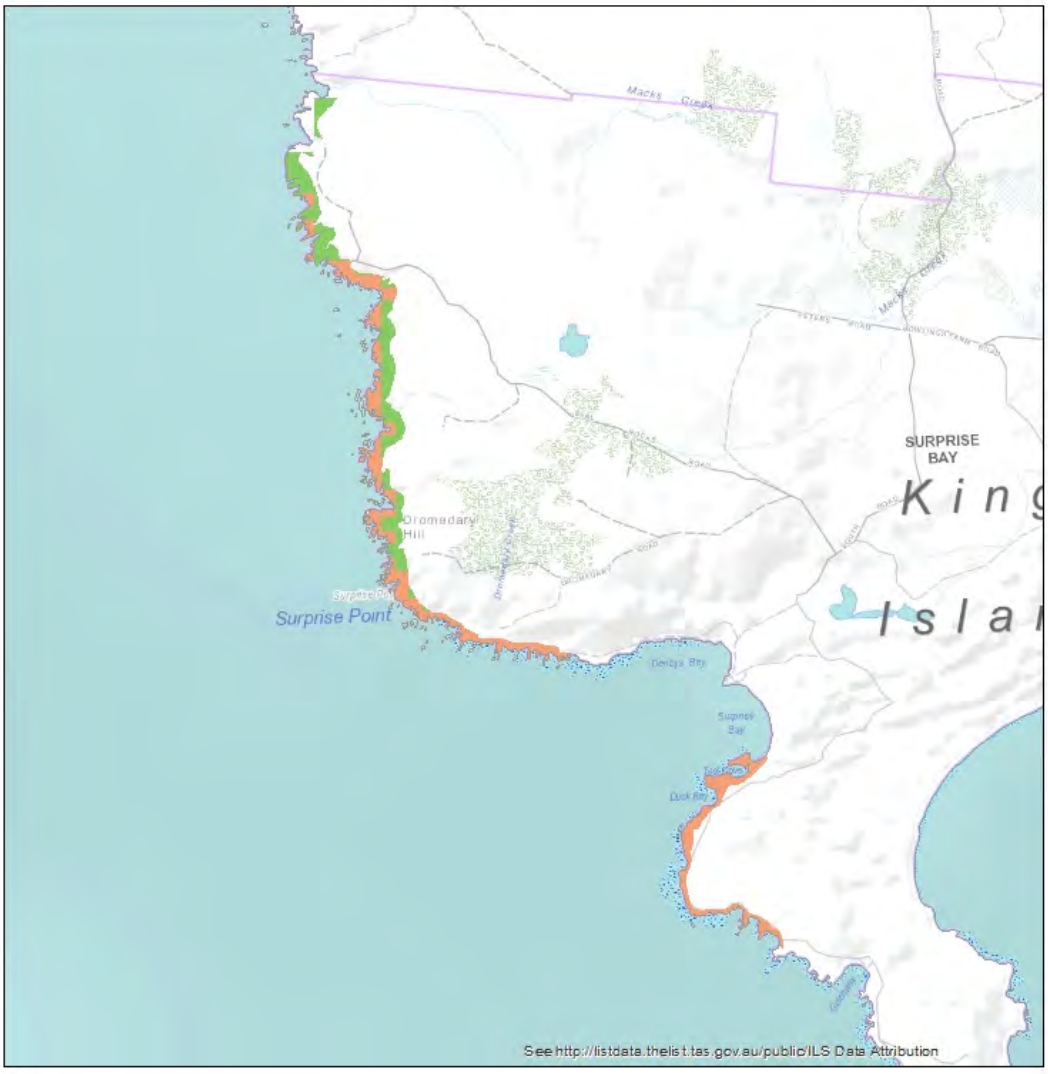
Shorebird Refuge site - Refuge protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

13. Conical Rocks area, King Island



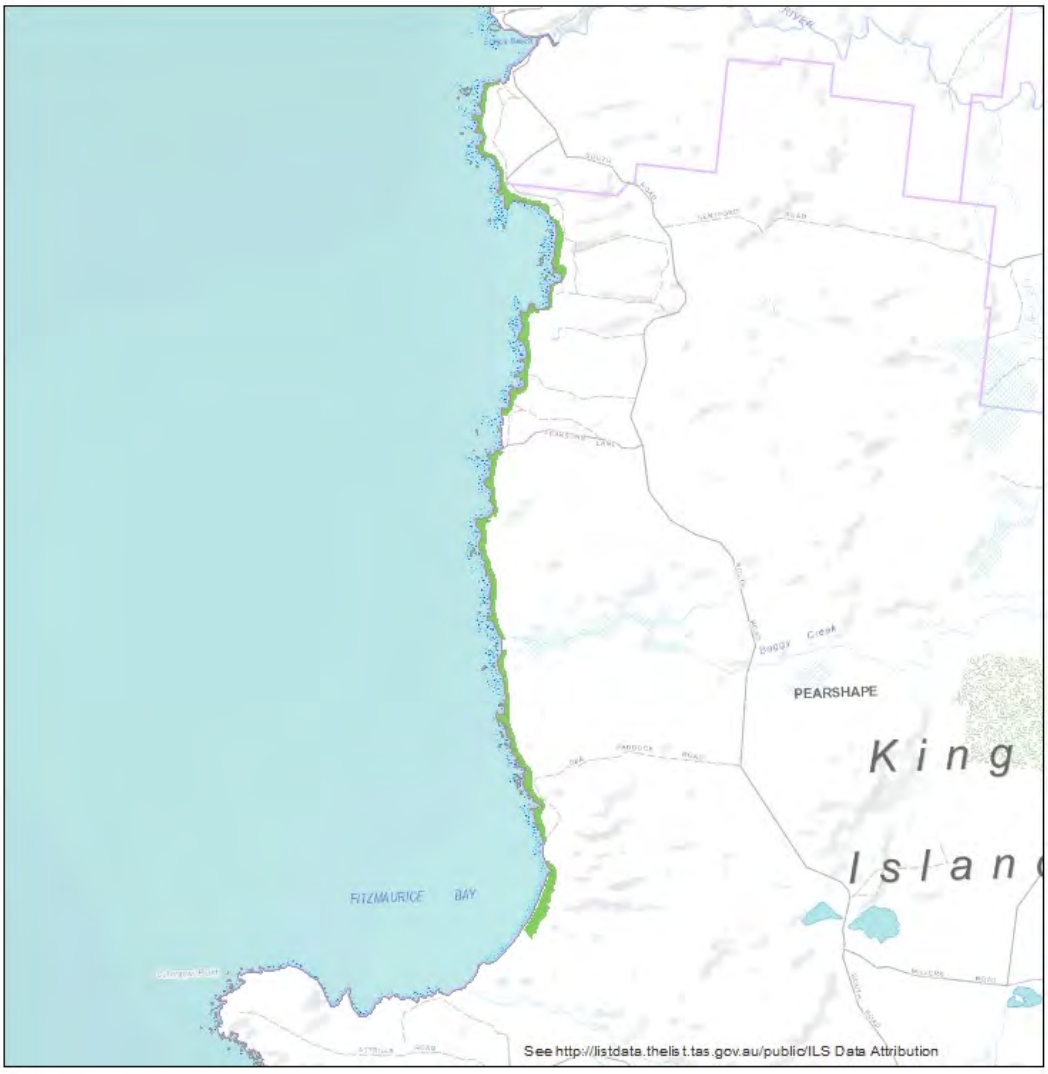
Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield, Spray zone coastal complex

14. Fitzmaurice Bay



Native Vegetation

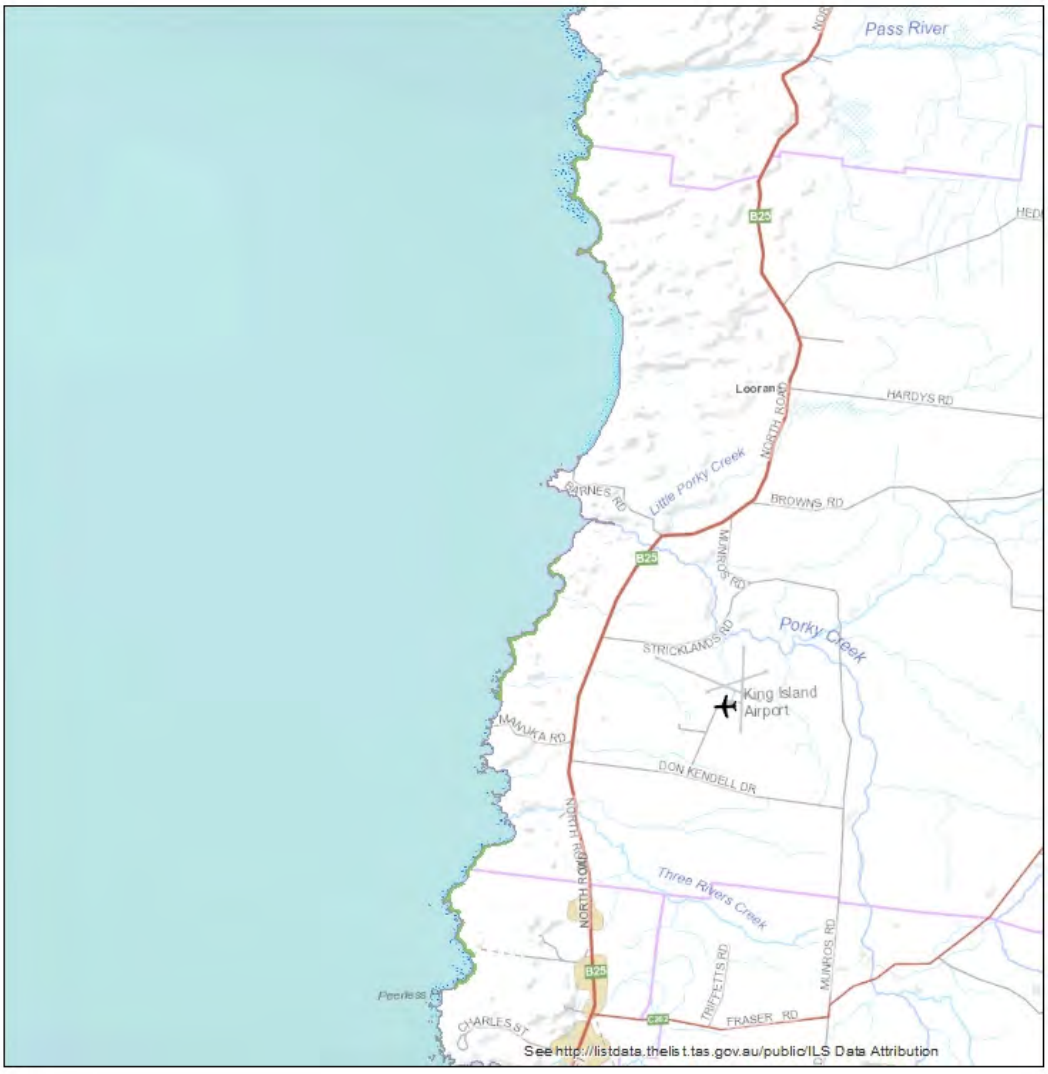
- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield, Spray zone coastal complex

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

15. Pass River Bay to Peerless Point



Native Vegetation

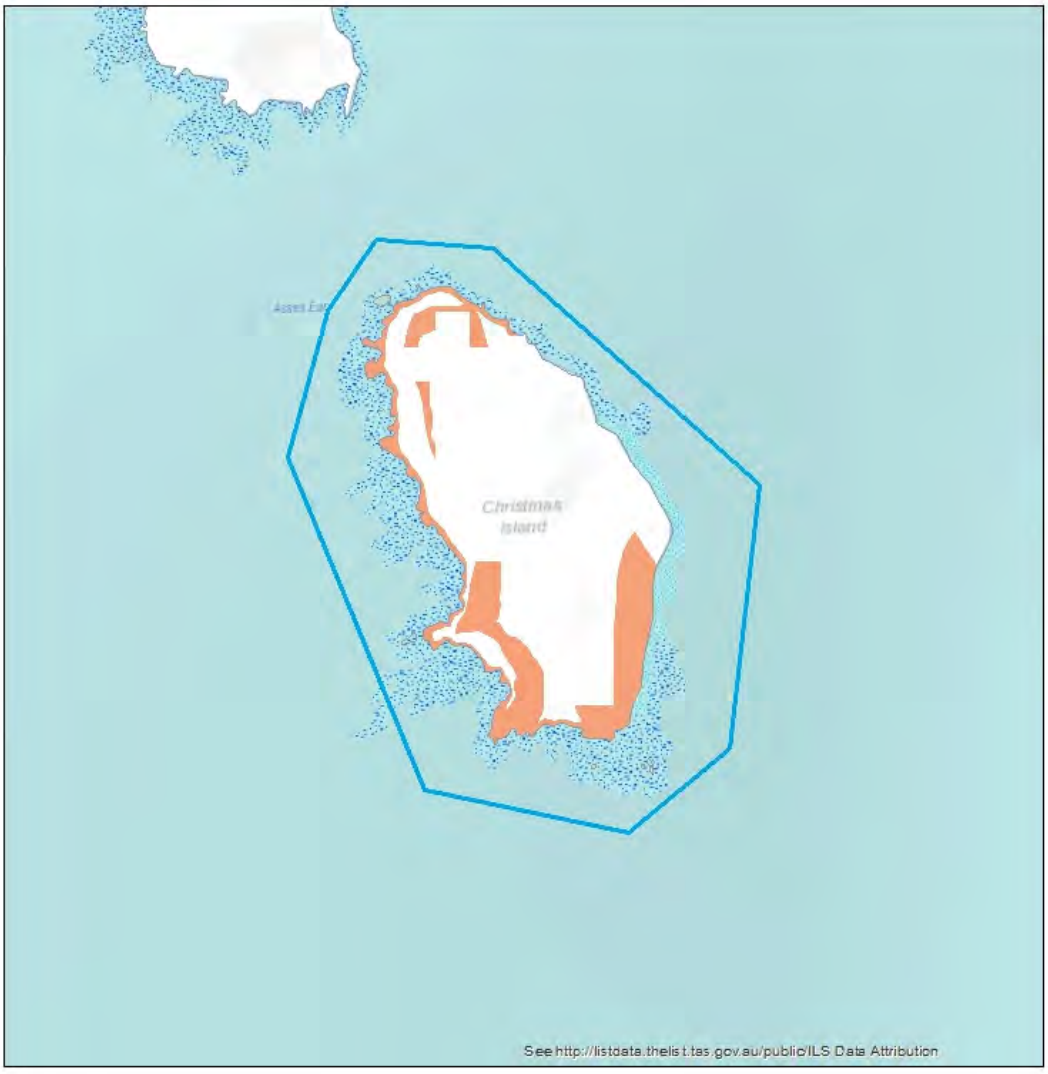
- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield, Spray zone coastal complex

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

16. Christmas Island



Native Vegetation

Retreat or Refuge Site

Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield, Spray zone coastal complex

Priority beach for shorebirds.

Shorebird Squeezed-out Site - Threat Management

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Fairy Tern

High consequence beach for shorebirds

17. Cape Farewell to Bungaree Creek

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: Spray zone coastal complex

Priority beach for shorebirds.

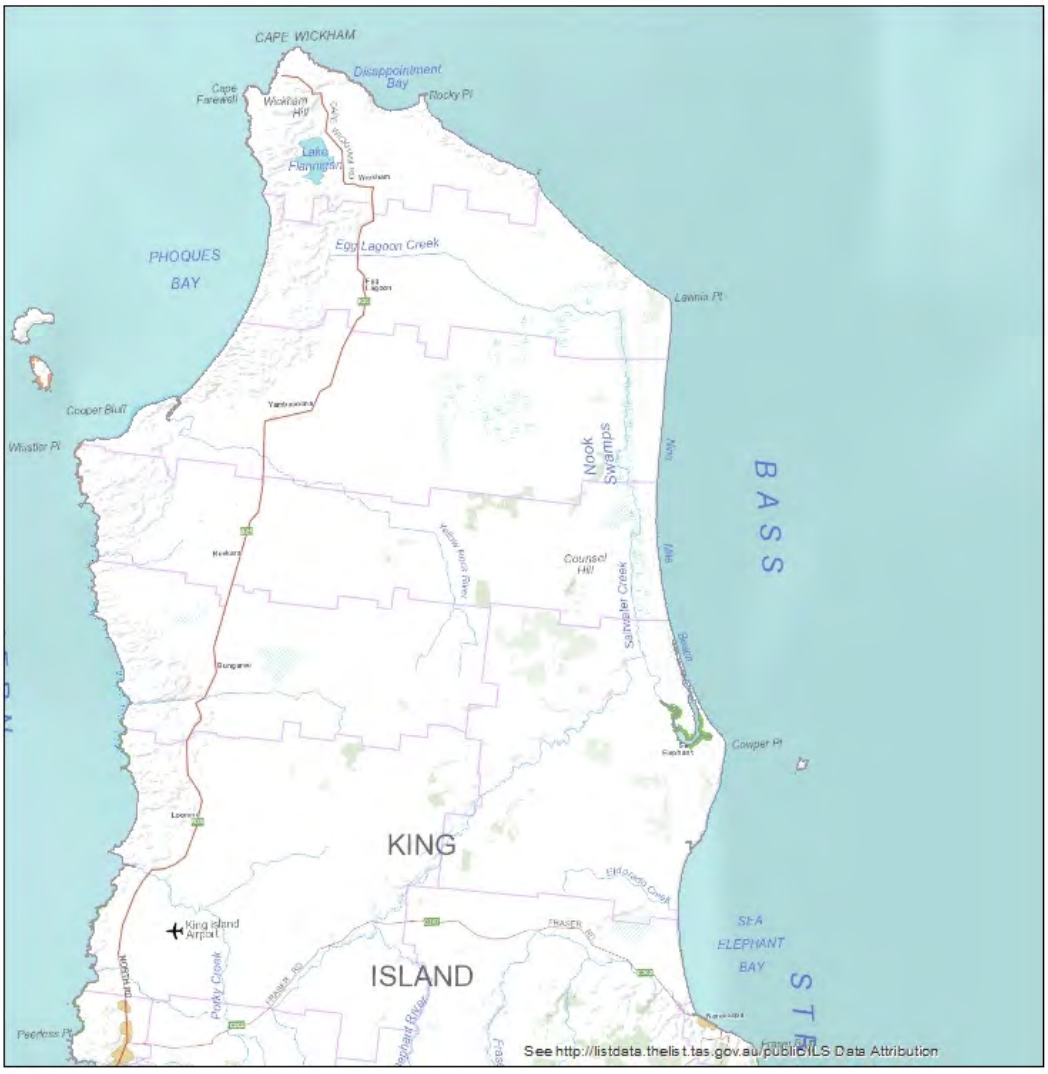
Shorebird Retreat Pathway - Threat Management with pathway protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover, Fairy Tern

- High consequence beach for shorebirds

18. Cape Wickham to Naracoopa



Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield, Succulent saline herbland, Spray zone coastal complex

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

19. Robbins Passage and surrounds

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield, Succulent saline herbland, Saline grassland, Saltmarsh (undifferntiated), *Melaleuca ericifolia* swamp forest

At-risk plant species: *Limonium australe var. australe*

20. Robbins Island

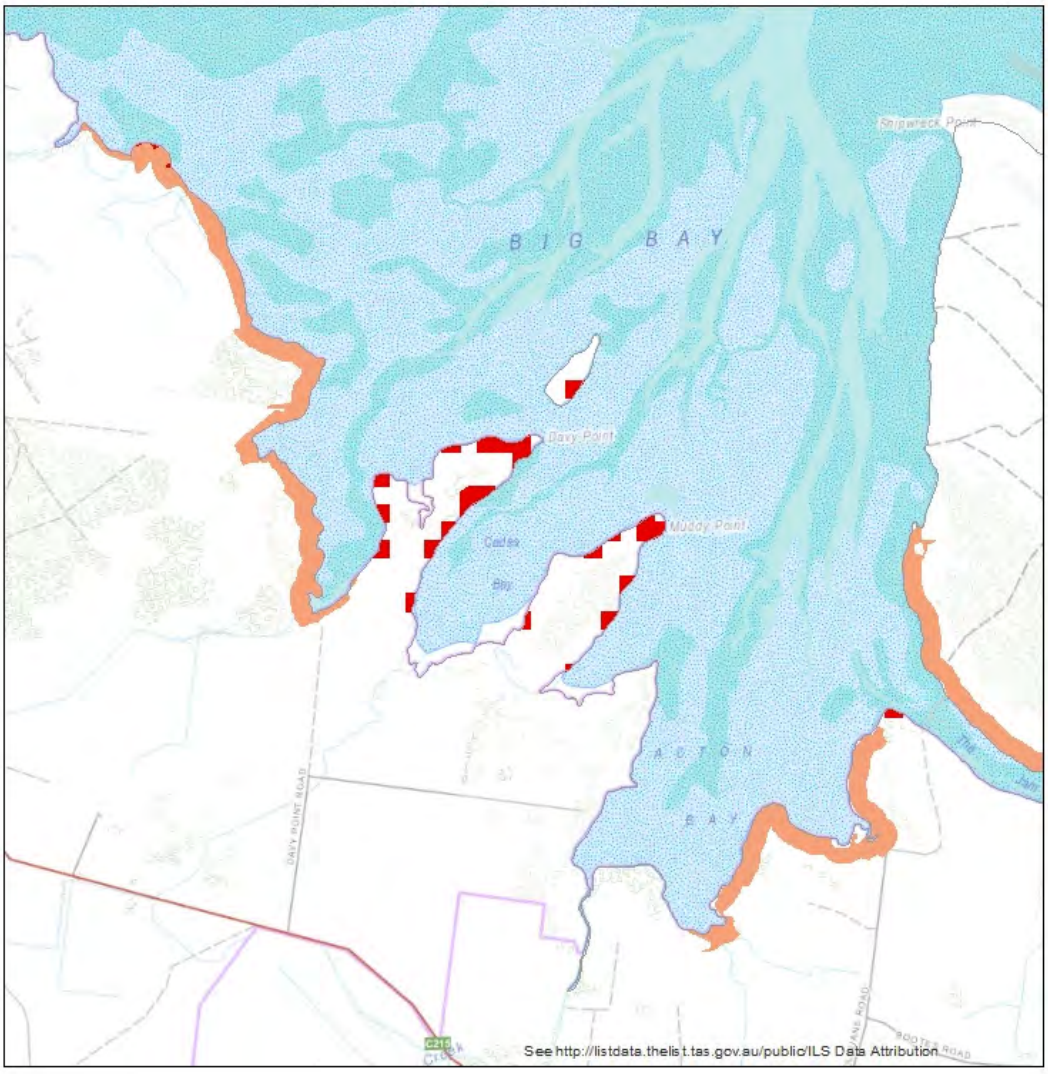
Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield, Succulent saline herbland, Saline grassland, Saltmarsh (undifferntiated), *Melaleuca ericifolia* swamp forest

21. Big Bay



Native Vegetation
- Retreat or Refuge Site
- Squeezed-out Site

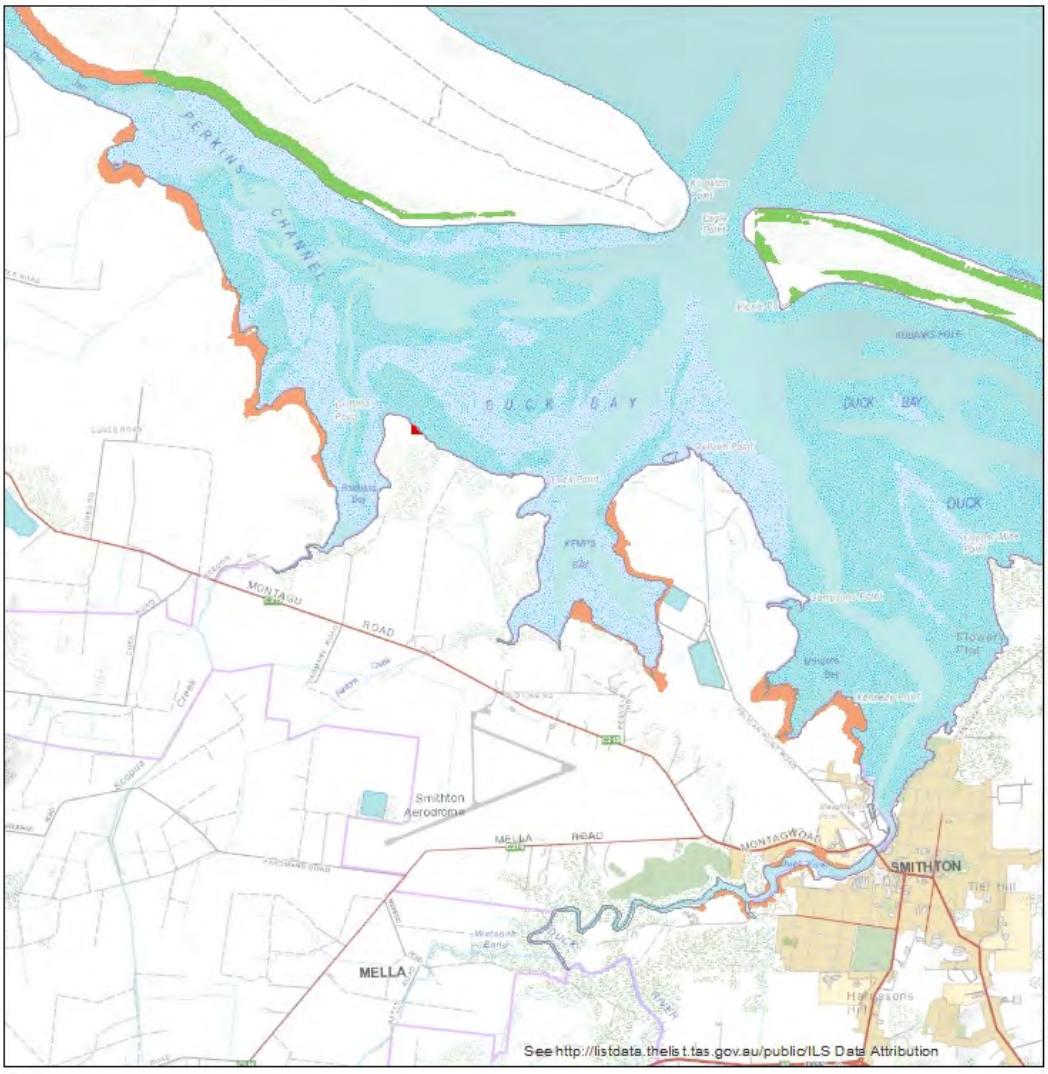
Plant Species
- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Succulent saline herbland, Saline grassland, Saltmarsh (undifferntiated), *Melaleuca ericifolia* swamp forest

At-risk plant species: *Limonium australe var. australe*

22. Duck Bay and surrounds



Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Succulent saline herbland, Saline grassland, Saltmarsh (undifferntiated), *Melaleuca ericifolia* swamp forest

At-risk plant species: *Limonium australe var. australe*

23. Perkins Bay

Native Vegetation

Retreat or Refuge Site

Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield, Succulent saline herbland, Saline grassland, Saltmarsh (undifferntiated), *Melaleuca ericifolia* swamp forest

Priority beach for shorebirds.

Shorebird Retreat Pathway - Threat Management with pathway protection
Shorebird Refuge site - Refuge protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

24. Sawyer Bay

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield, Succulent saline herbland, Saline grassland, Saltmarsh (undifferntiated), *Melaleuca ericifolia* swamp forest

At-risk plant species: *Limonium australe var. australe*

Priority beach for shorebirds.

Shorebird Retreat Pathway - Threat Management with pathway protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

25. Crayfish Creek Beach

Plant Species

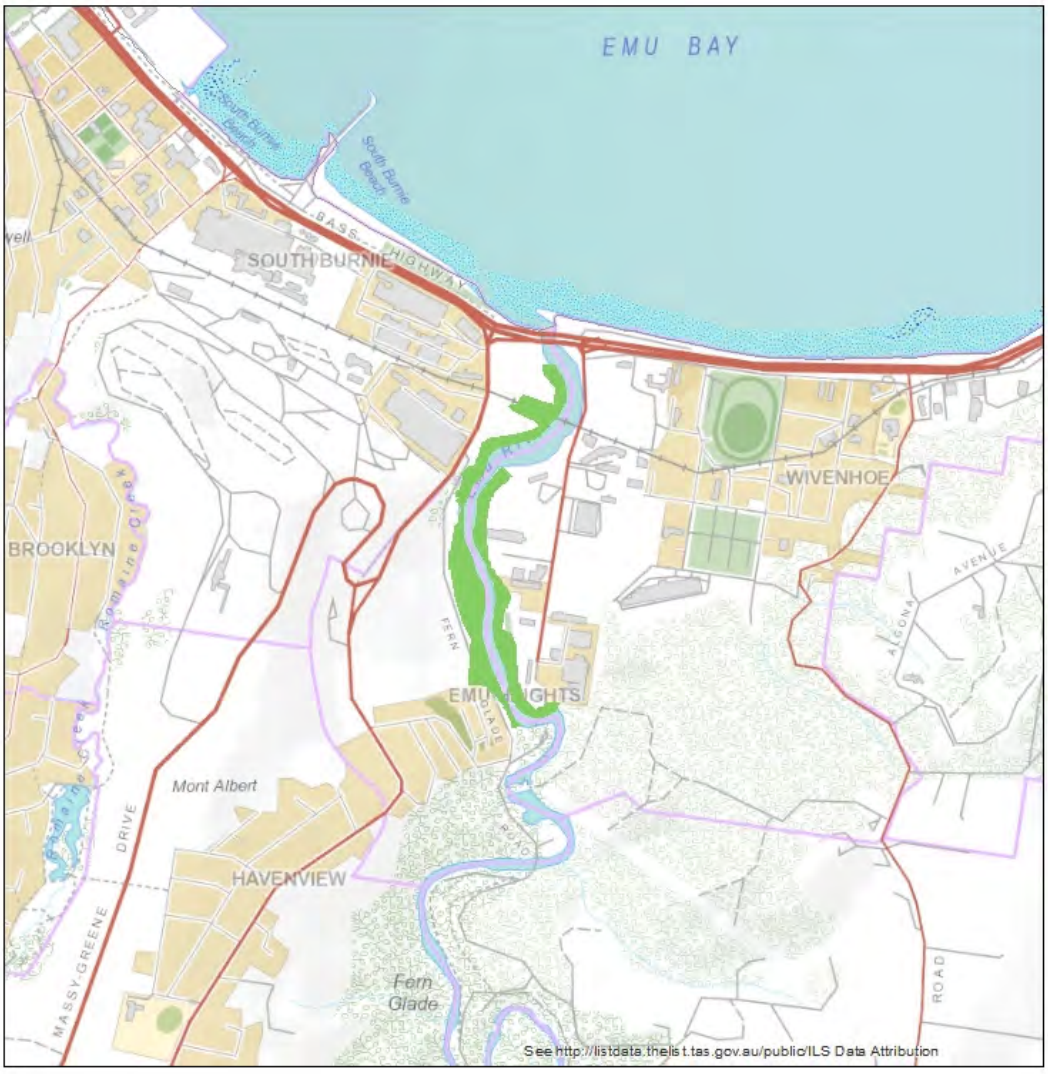
- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

At-risk plant species: *Frankenia pauciflora var. gunnii*

26. Burnie, Emu River



Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: *Melaleuca ericifolia* swamp forest

27. Ulverstone

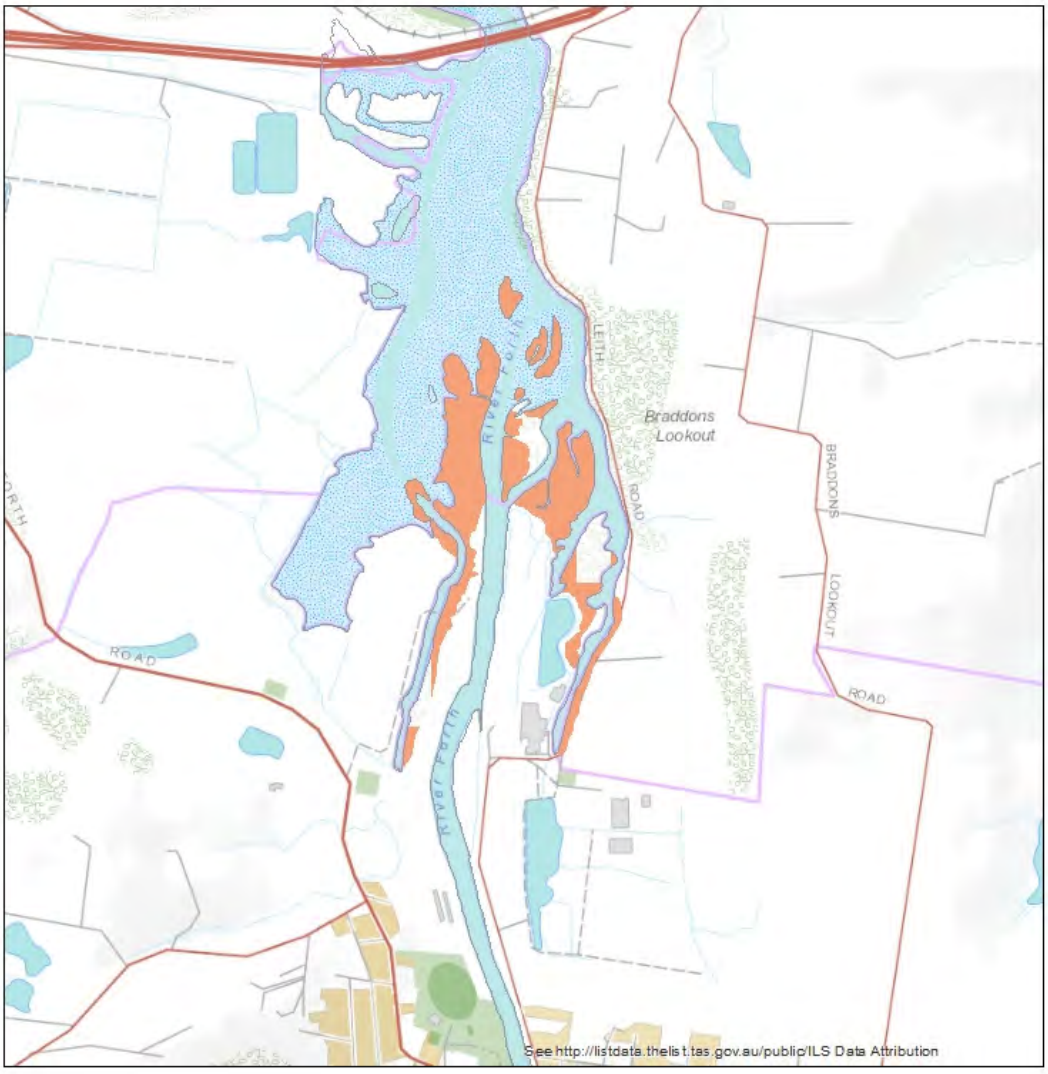
Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk plant species: *Limonium australe var. australe*

28. Forth River



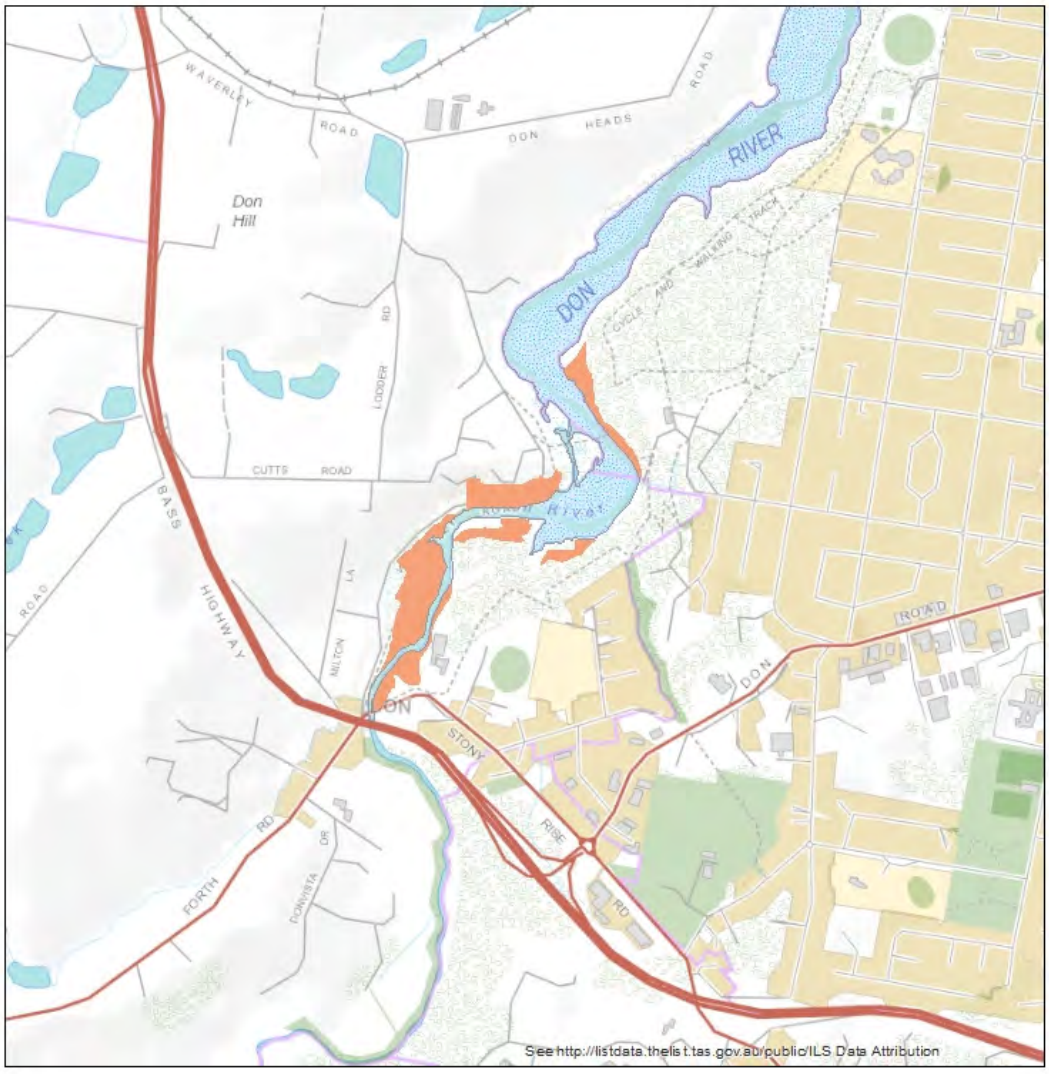
Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: *Melaleuca ericifolia* swamp forest

29. Don River



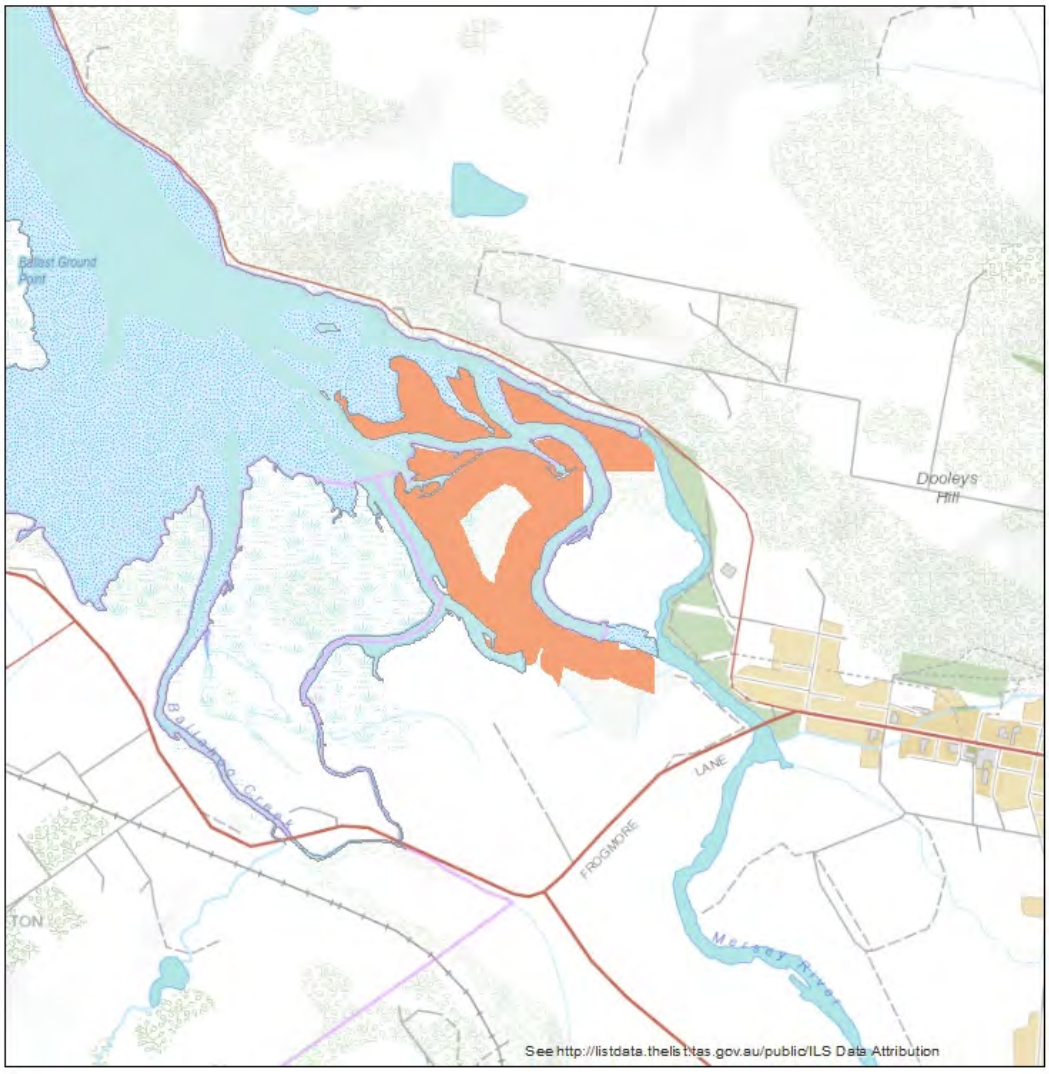
Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: *Melaleuca ericifolia* swamp forest

30. Pig Island and surrounds



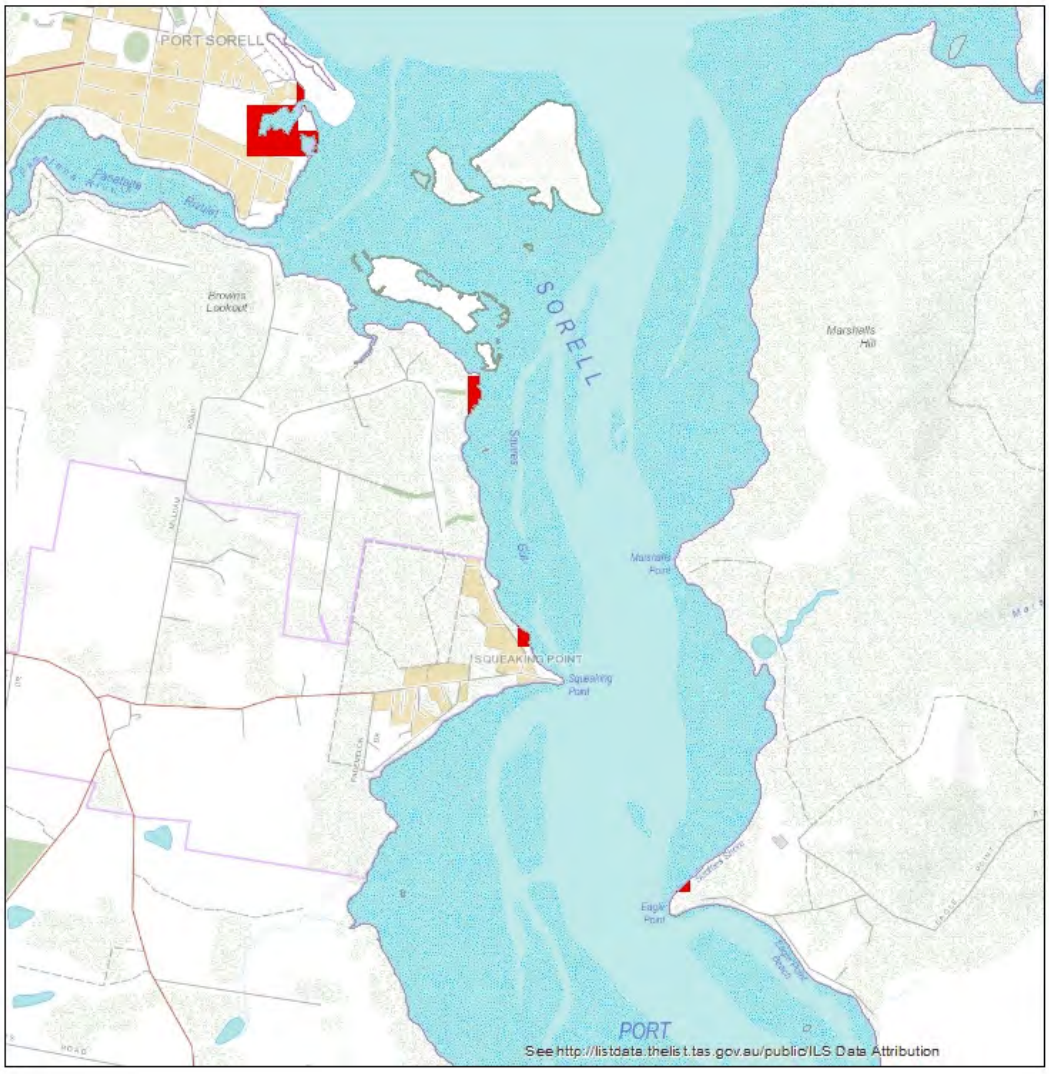
Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield, *Melaleuca ericifolia* swamp forest

31. Port Sorell



Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk plant species: *Limonium australe var. australe*

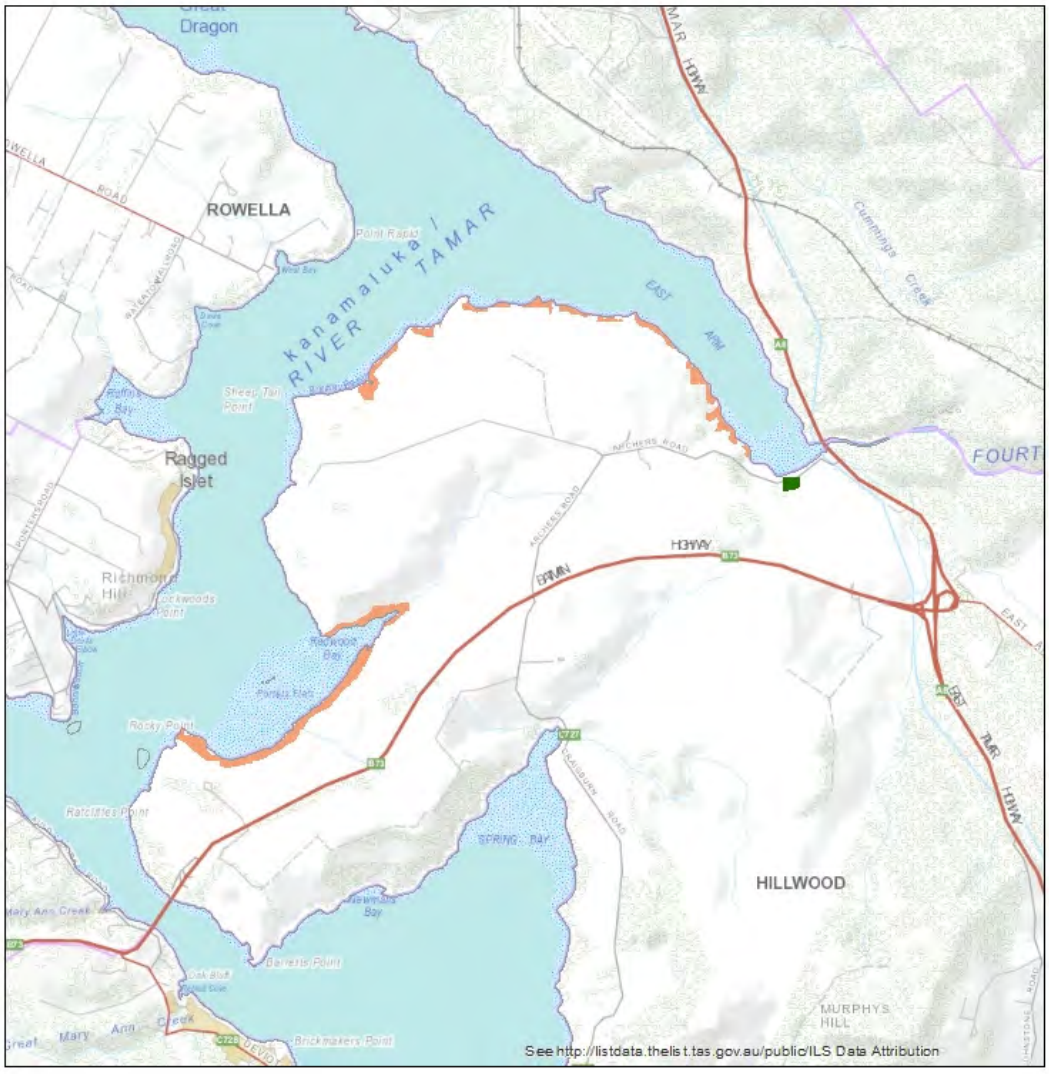
32. Tamar River, near Middle Point

Plant Species
- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk plant species: *Limonium australe var. australe*

33. Tamar River, east arm



Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: *Melaleuca ericifolia* swamp forest

At-risk plant species: *Limonium australe var. australe*

34. Tamar River, Swan Point

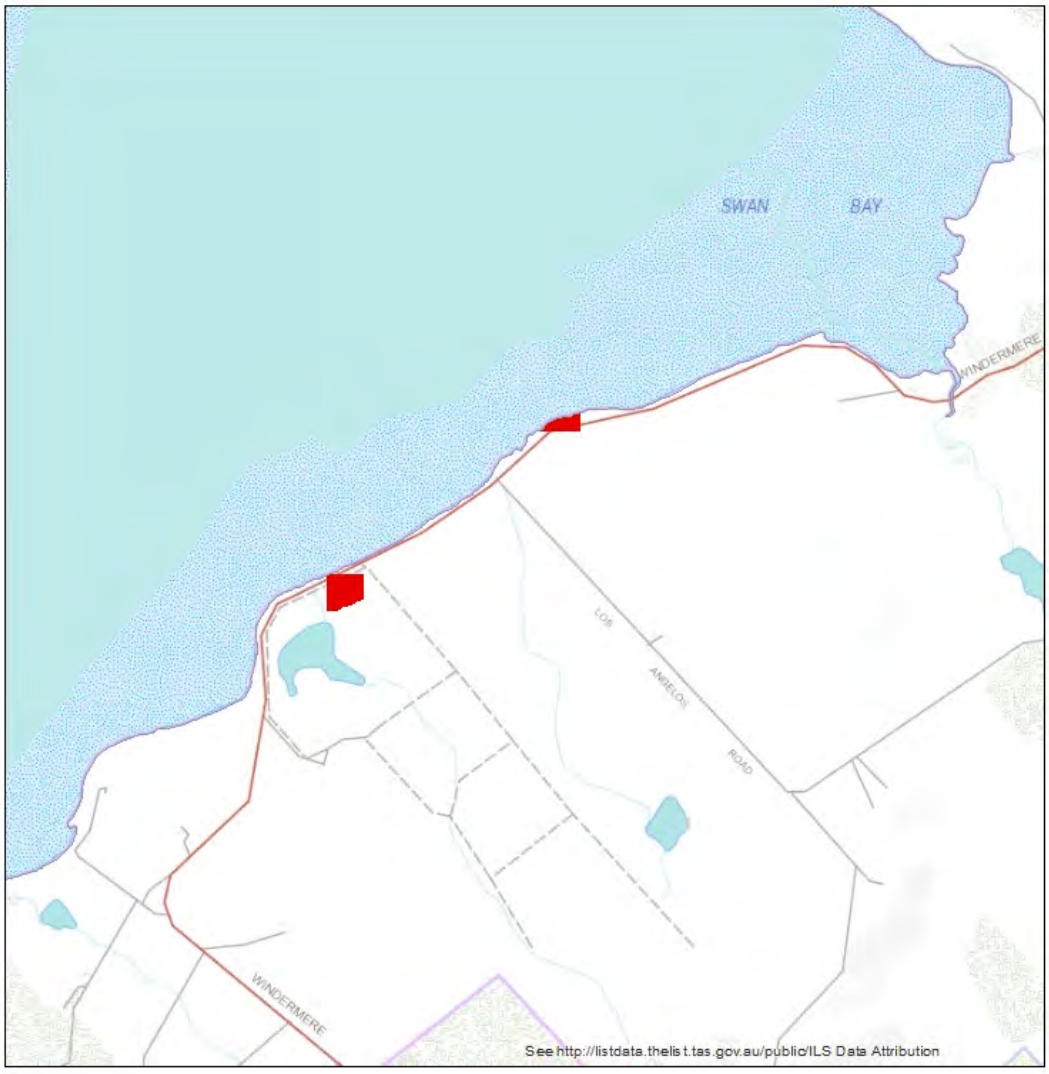
Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk plant species: *Limonium australe var. australe*

35. Tamar River, near Swan Bay



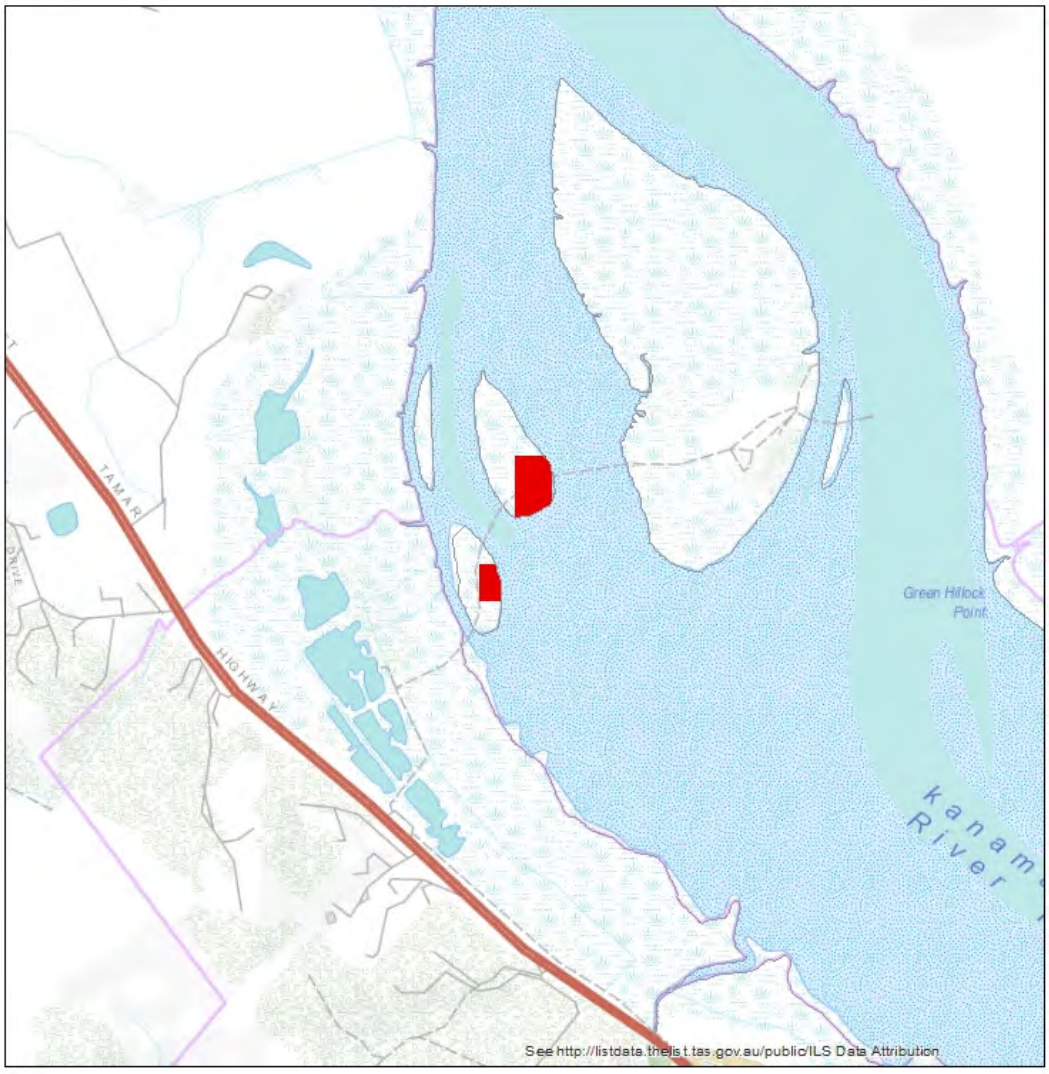
Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk plant species: *Limonium australe var. australe*

36. Tamar River, islets near Tamar Island



Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk plant species: *Calystegia sepium*

37. Launceston

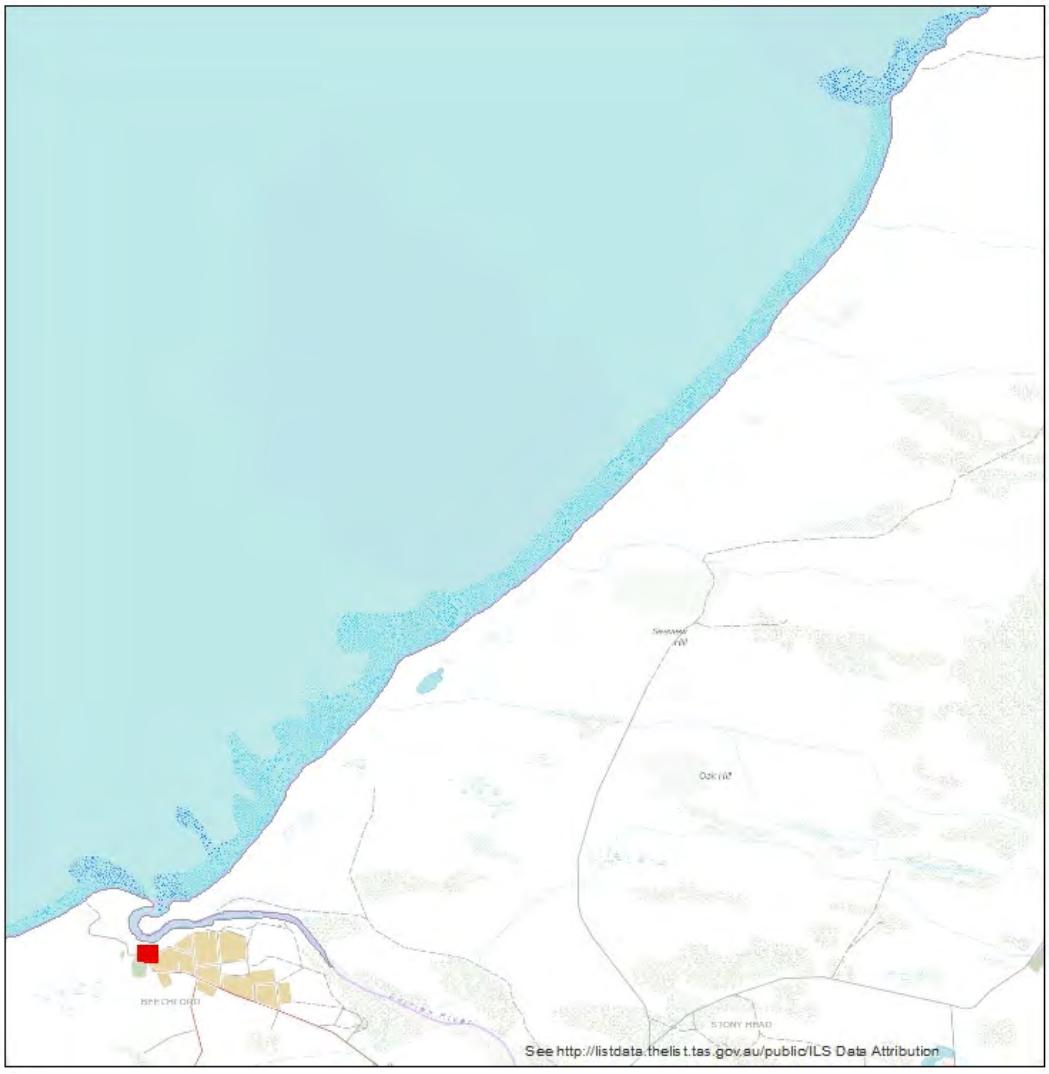
Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk plant species: *Calystegia sepium*

38. Beechford



Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

At-risk plant species: *Calystegia sepium*

39. Anderson Bay, Barnbougle Beach to Waterhouse Beach

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield, *Melaleuca ericifolia* swamp forest

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

40. Ringarooma Bay, Murdochs Beach to Boobyalla Beach

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield, Succulent saline herbland, *Melaleuca ericifolia* swamp forest

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

41. Cape Portland

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield

42. Clarke Island

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield

At-risk plant species: *Frankenia pauciflora var. gunnii*

43. Preservation Island

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield

At-risk plant species: *Frankenia pauciflora var. gunnii*

44. Cape Barren Island

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield

45. Long Island

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield

46. Badger and Goose Island

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Plant Species

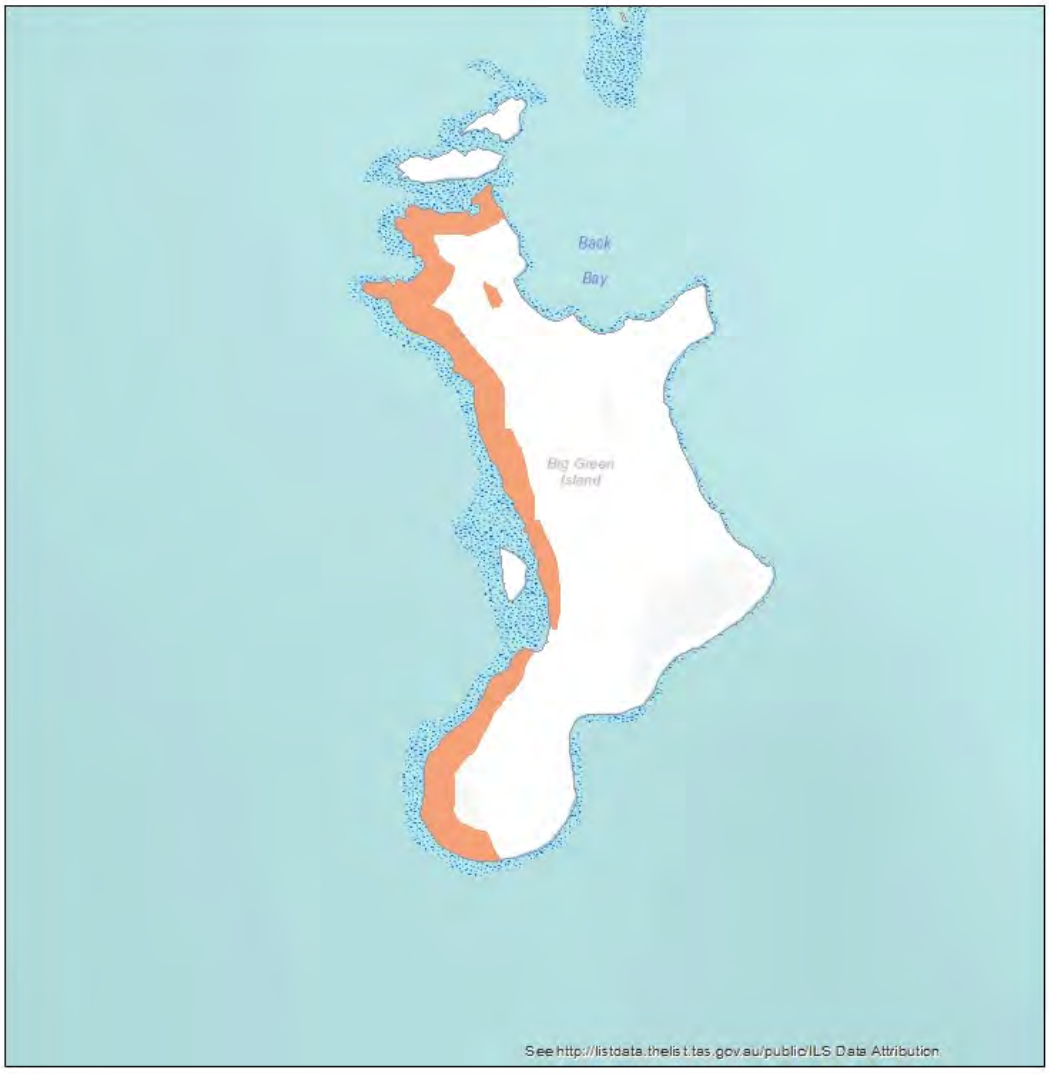
- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield, Succulent saline herbland, *Melaleuca ericifolia* swamp forest

At-risk plant species: *Frankenia pauciflora var. gunnii*

47. Big Green Island



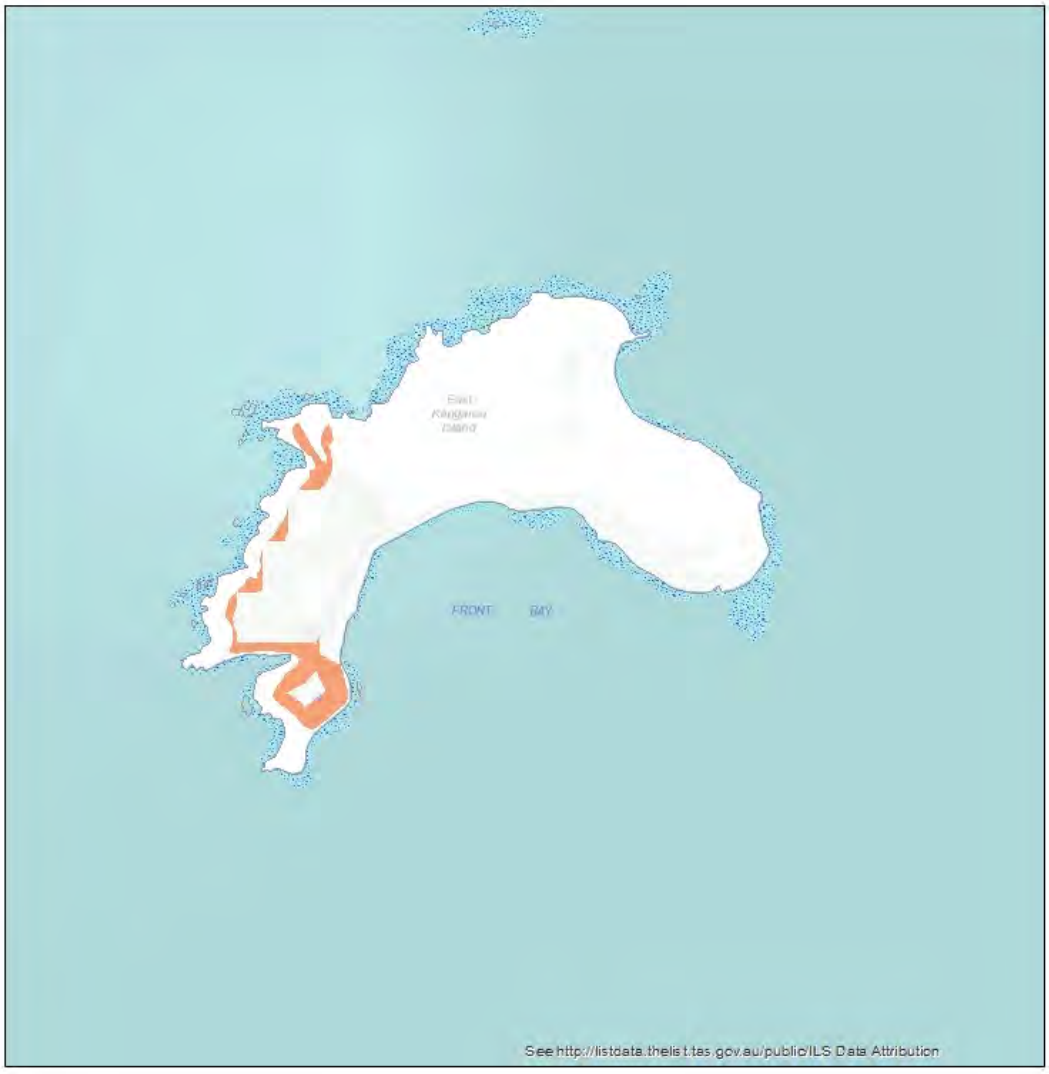
Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield, Succulent saline herbland

48. Kangaroo Island



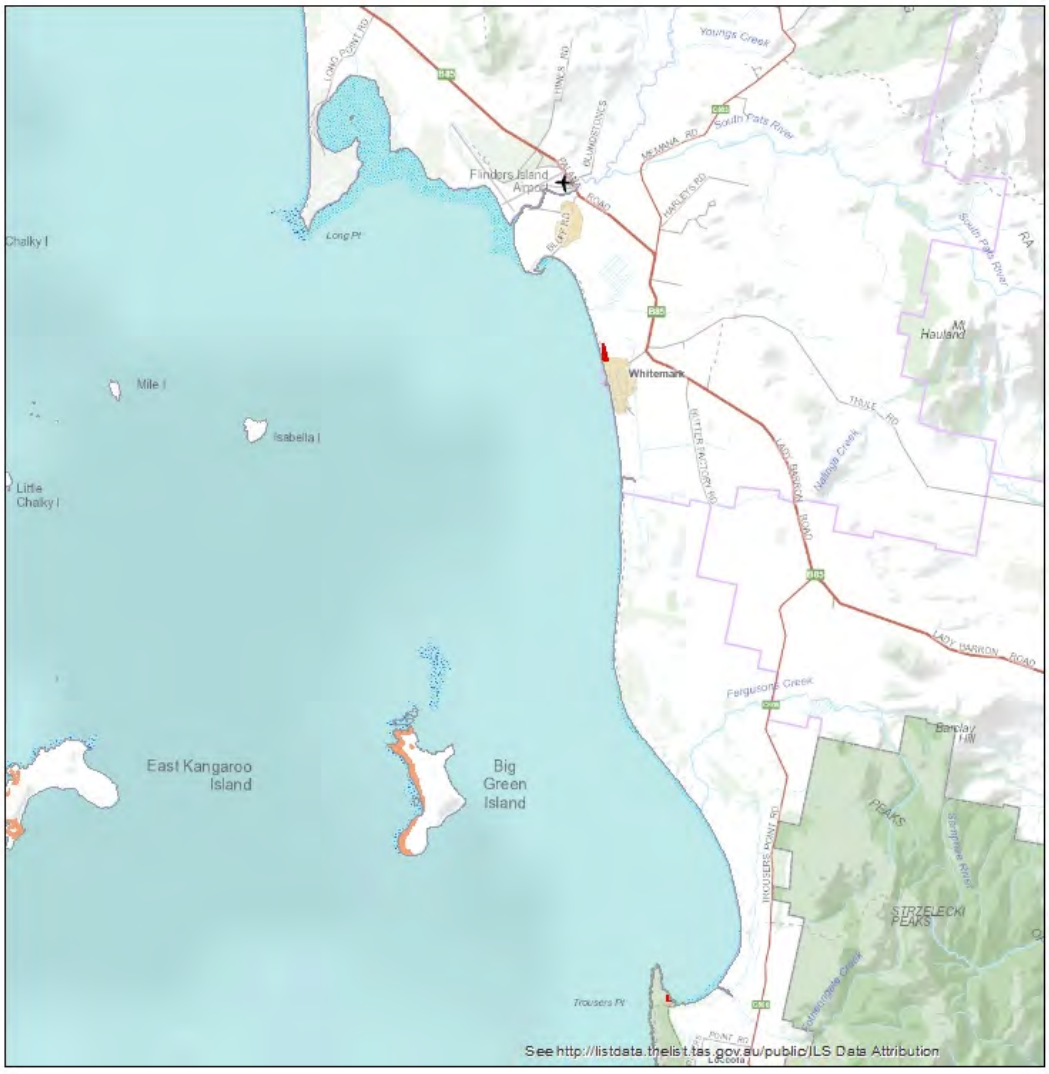
Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield

49. Long Point Beach to Fotheringate Bay



Plant Species

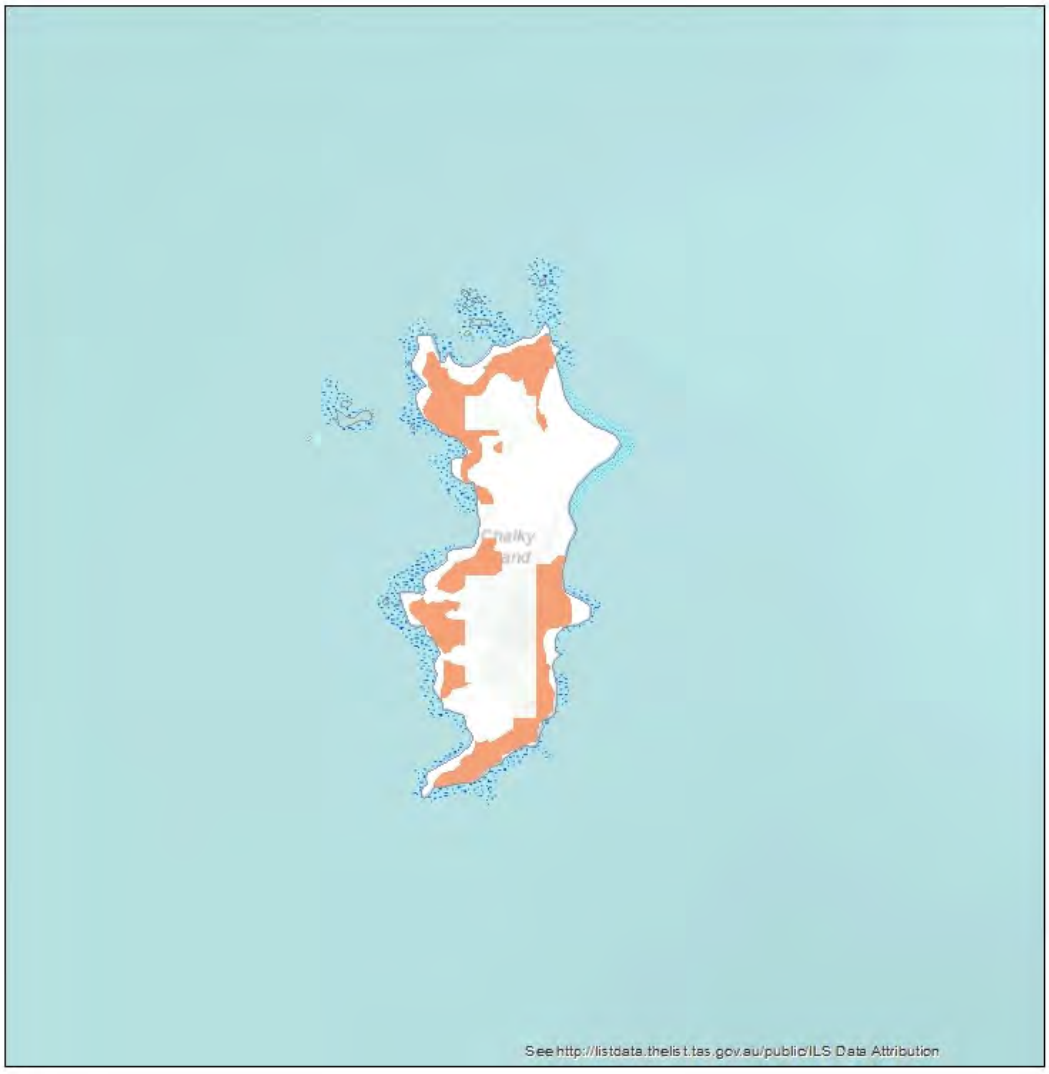
- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

At-risk plant species: *Frankenia pauciflora var. gunnii, Stenopetalum lineare*

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

50. Chalky Island



Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield, Succulent saline herbland

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

51. Prime Seal Island

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

52. Cave Beach

Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

At-risk plant species: *Frankenia pauciflora var. gunnii*

53. Tanners Bay to Marshall Beach and Castle Rock Point

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: *Allocasuarina littoralis* forest

Priority beach for shorebirds.

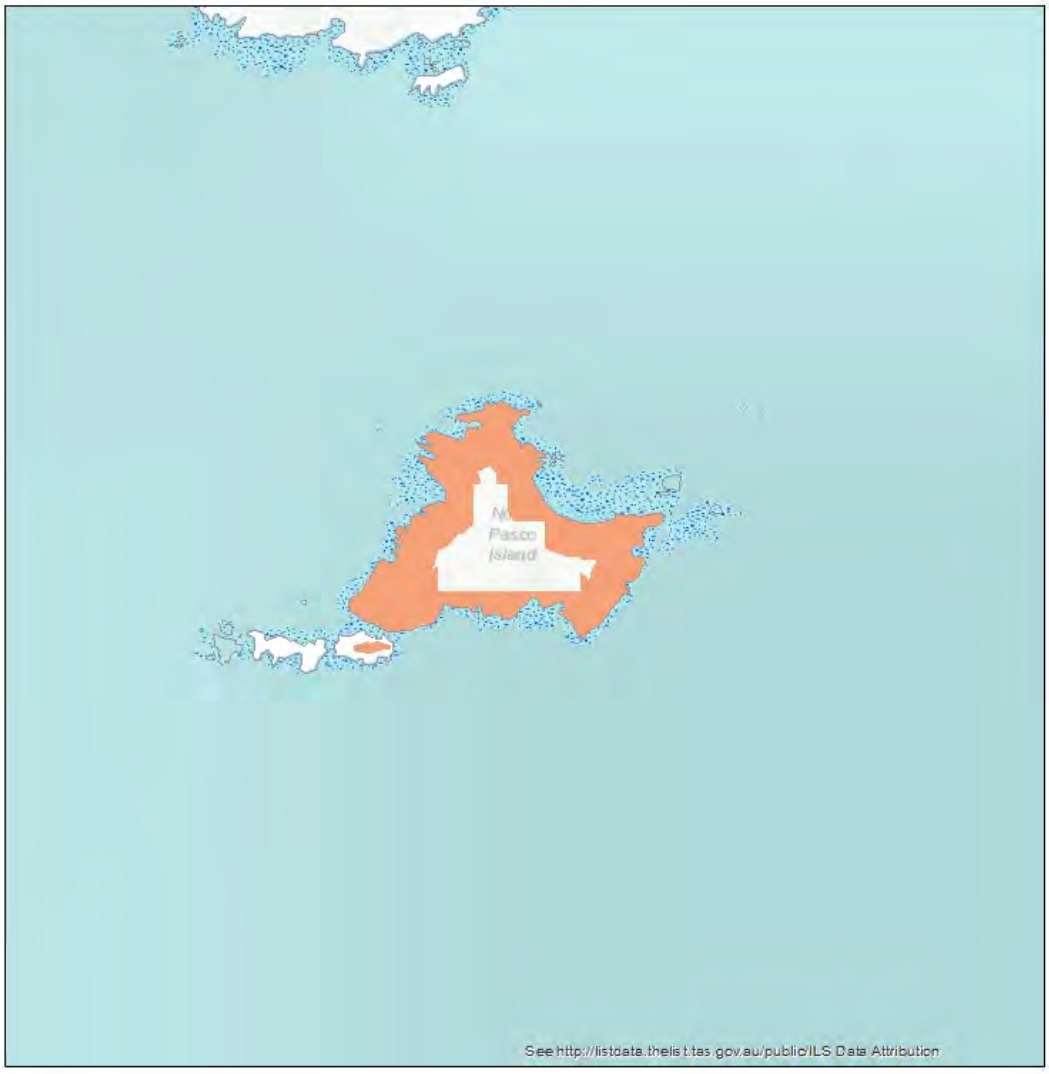
Shorebird Retreat Pathway - Threat Management with pathway protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover, Fairy Tern

- High consequence beach for shorebirds

54. North Pasco Island



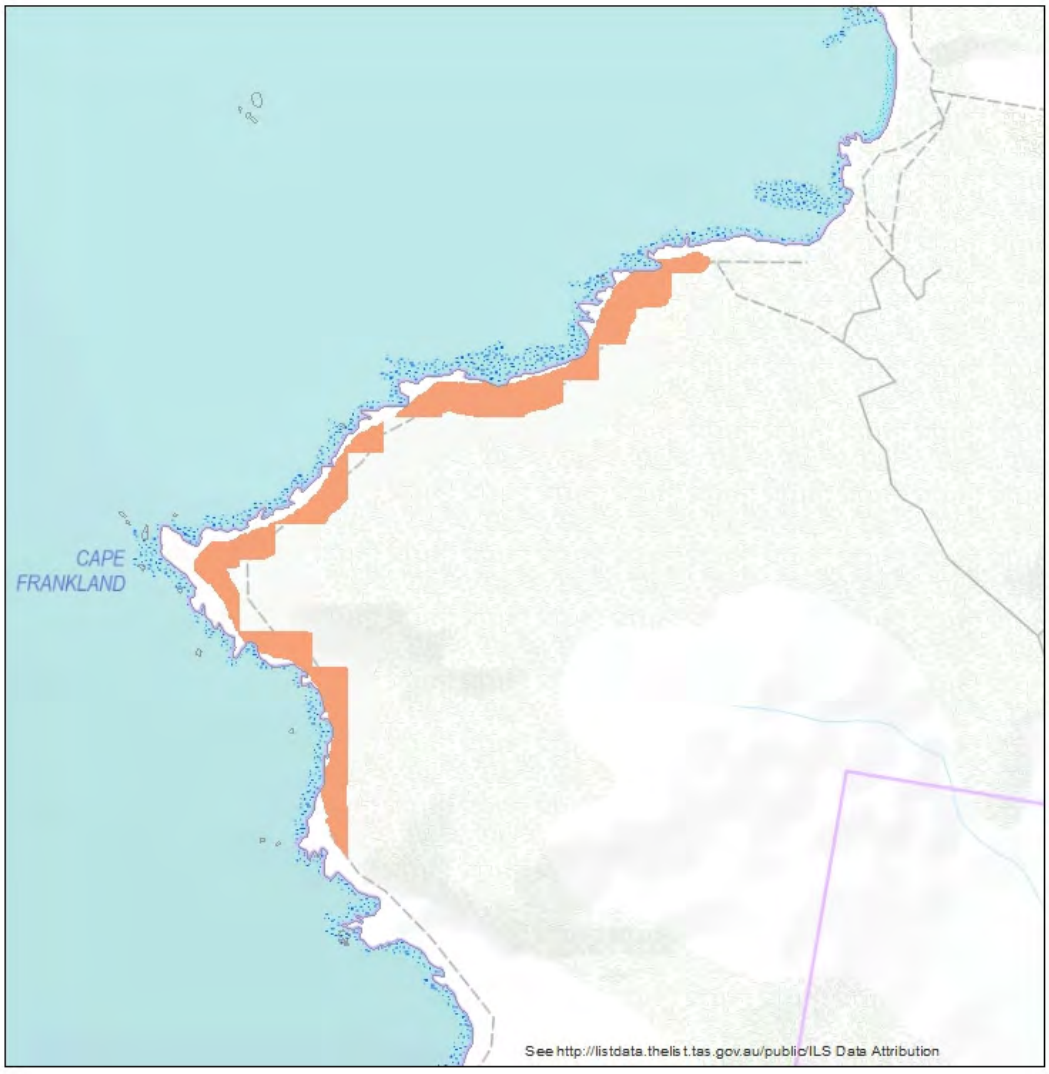
Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield

55. Cape Frankland



Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield

56. Palana Beach

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

At-risk vegetation communities: Coastal grass and herbfield

At-risk plant species: *Frankenia pauciflora var. gunnii*

57. Inner Sister Island

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield

58. Outer Sister Island

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield

59. Foochow Beach to Red Bluff

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

At-risk vegetation communities: *Allocasuarina littoralis* forest, Succulent saline herbland, Saline grassland, Coastal grass and herbfield, *Melaleuca ericifolia* swamp forest

At-risk plant species: *Frankenia pauciflora var. gunnii*

Priority beach for shorebirds.

Shorebird Retreat Pathway - Pathway protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover, Fairy Tern, Little Tern

High consequence beach for shorebirds

60. Red Bluff to Lady Barron

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: *Allocasuarina littoralis* forest, Succulent saline herbland, Coastal grass and herbfield

Priority beach for shorebirds.

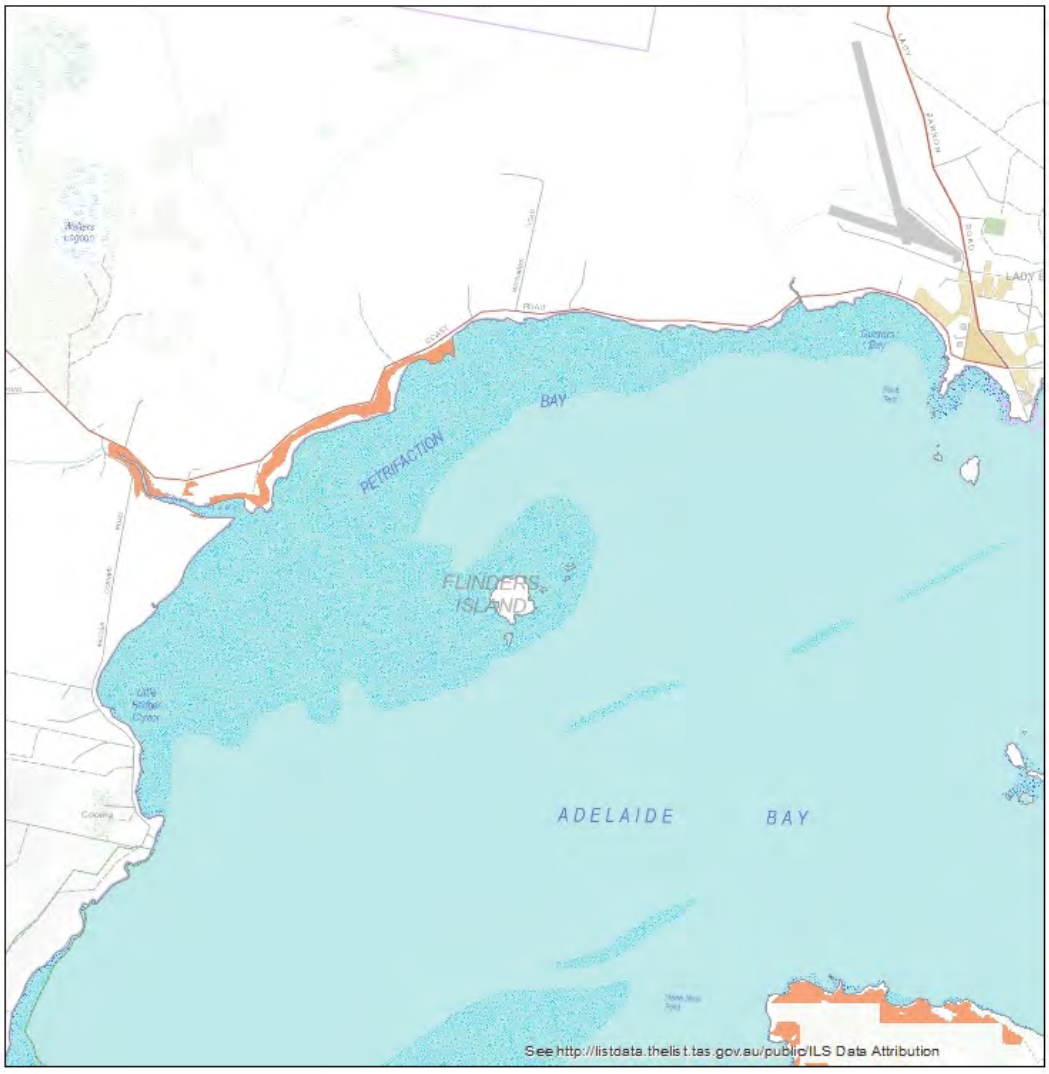
Shorebird Retreat Pathway - Threat Management with pathway protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover

- High consequence beach for shorebirds

61. Petrifaction Bay



Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: Saline grassland, *Melaleuca ericifolia* swamp forest

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

62. Little Dog and Great Dog Island

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield, Saltmarsh (undifferntiated)

63. Bates Bay

Native Vegetation

Retreat or Refuge Site

Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield

Priority beach for shorebirds.

Shorebird Squeezed-out Site - Threat Management

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher

High consequence beach for shorebirds

64. East coast of Vansittart Island

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

65. Forsyth Island

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield

66. Purdon Bay

Priority beach for shorebirds.

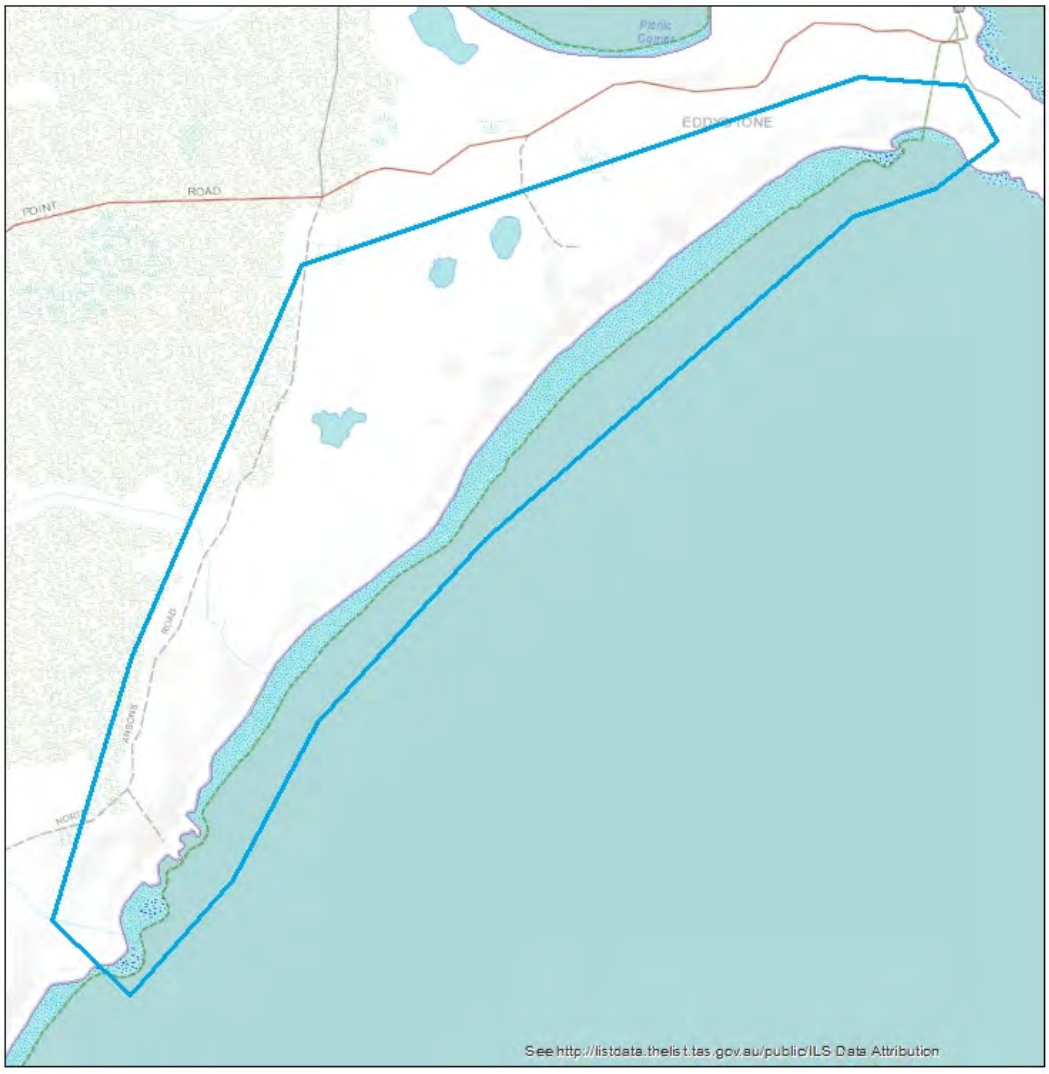
Shorebird Squeezed-out Site - Threat Management

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

67. Red Rocks



Priority beach for shorebirds.

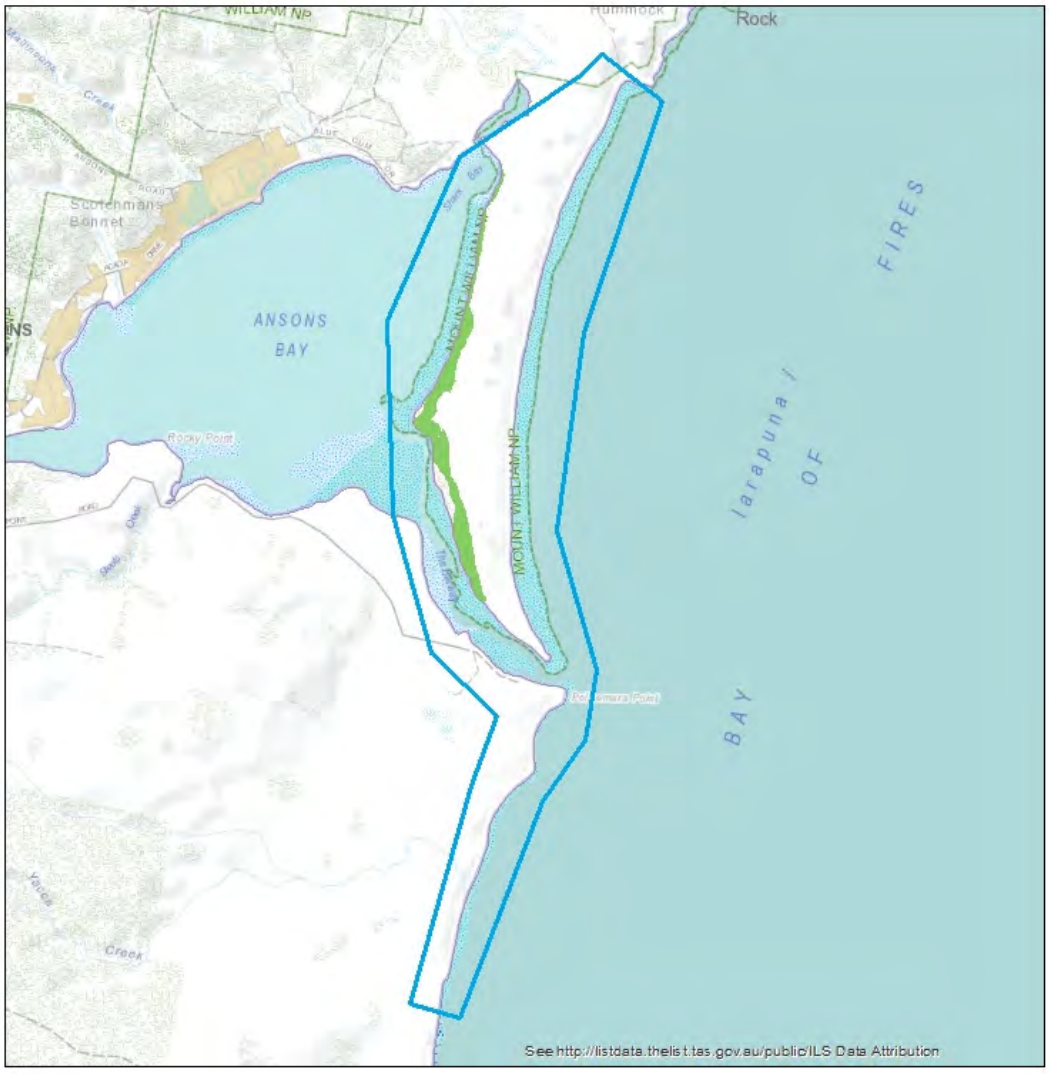
Shorebird Retreat Pathway - Pathway protection
Shorebird Squeezed-out Site - Threat Management
Shorebird Refuge site - Refuge protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

68. Abbotsbury Beach



Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: *Melaleuca ericifolia* swamp forest

Priority beach for shorebirds.

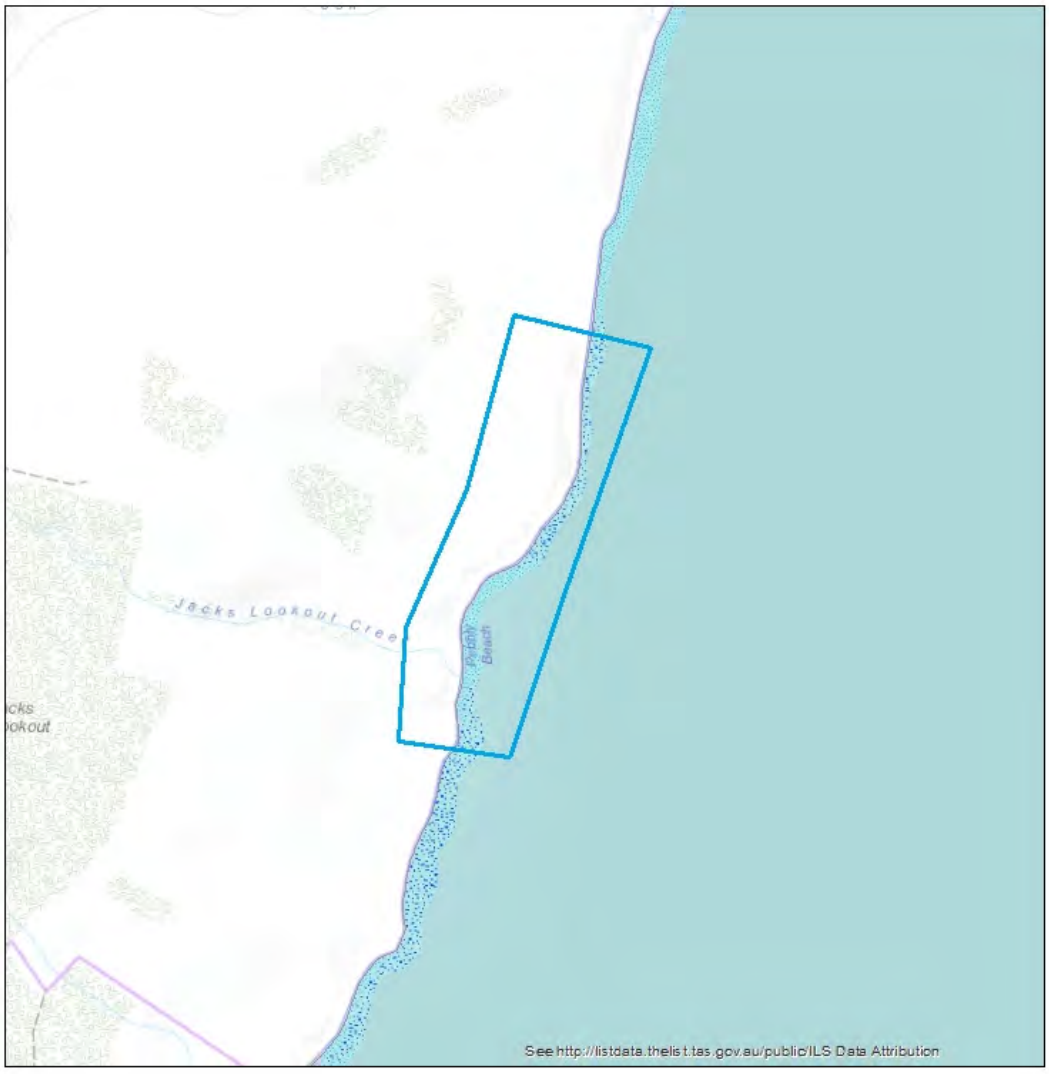
Shorebird Retreat Pathway - Threat Management with pathway protection
Shorebird Refuge site - Refuge protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover, Fairy Tern

- High consequence beach for shorebirds

69. Pebbly Beach



Priority beach for shorebirds.

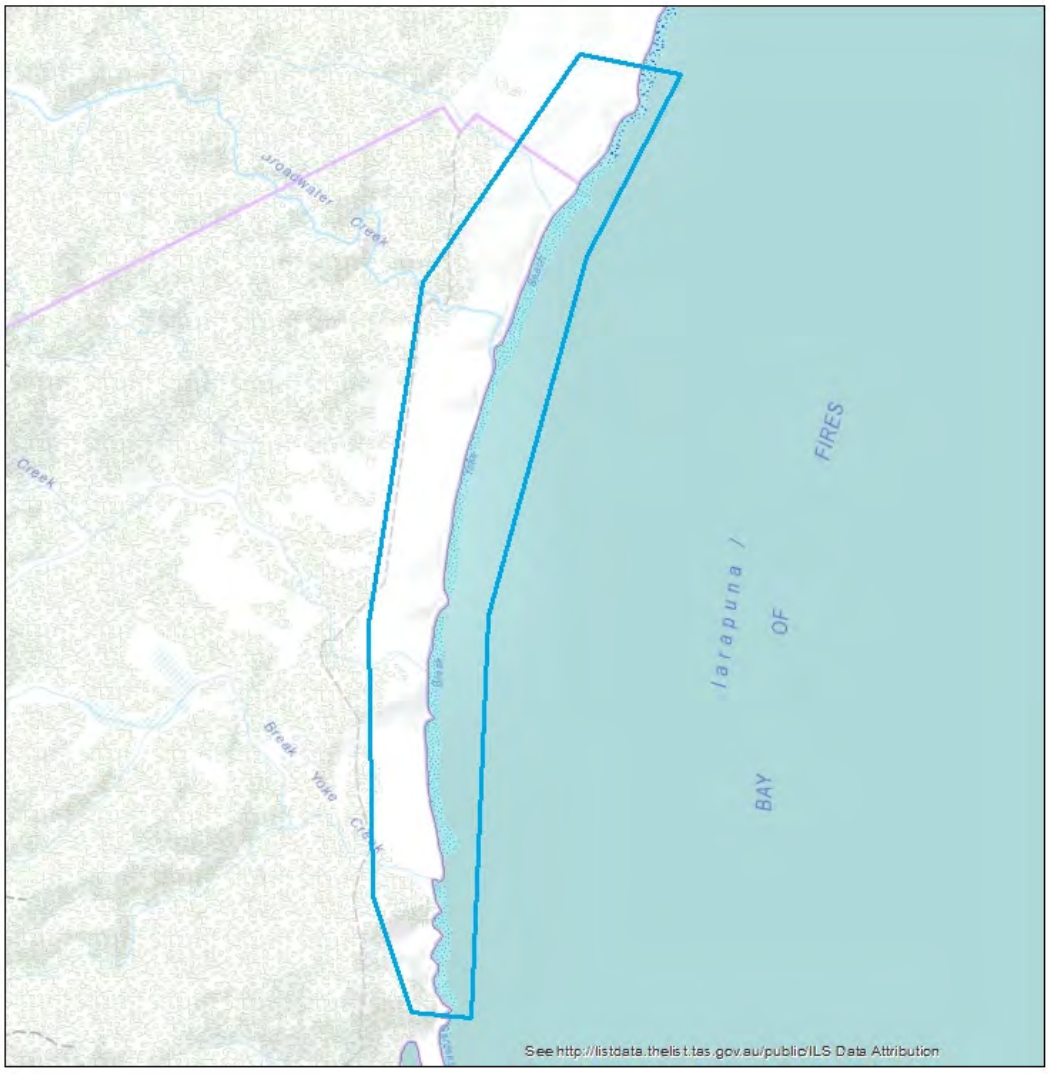
Shorebird Squeezed-out Site - Threat Management

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

70. Break Yoke Beach



Priority beach for shorebirds.

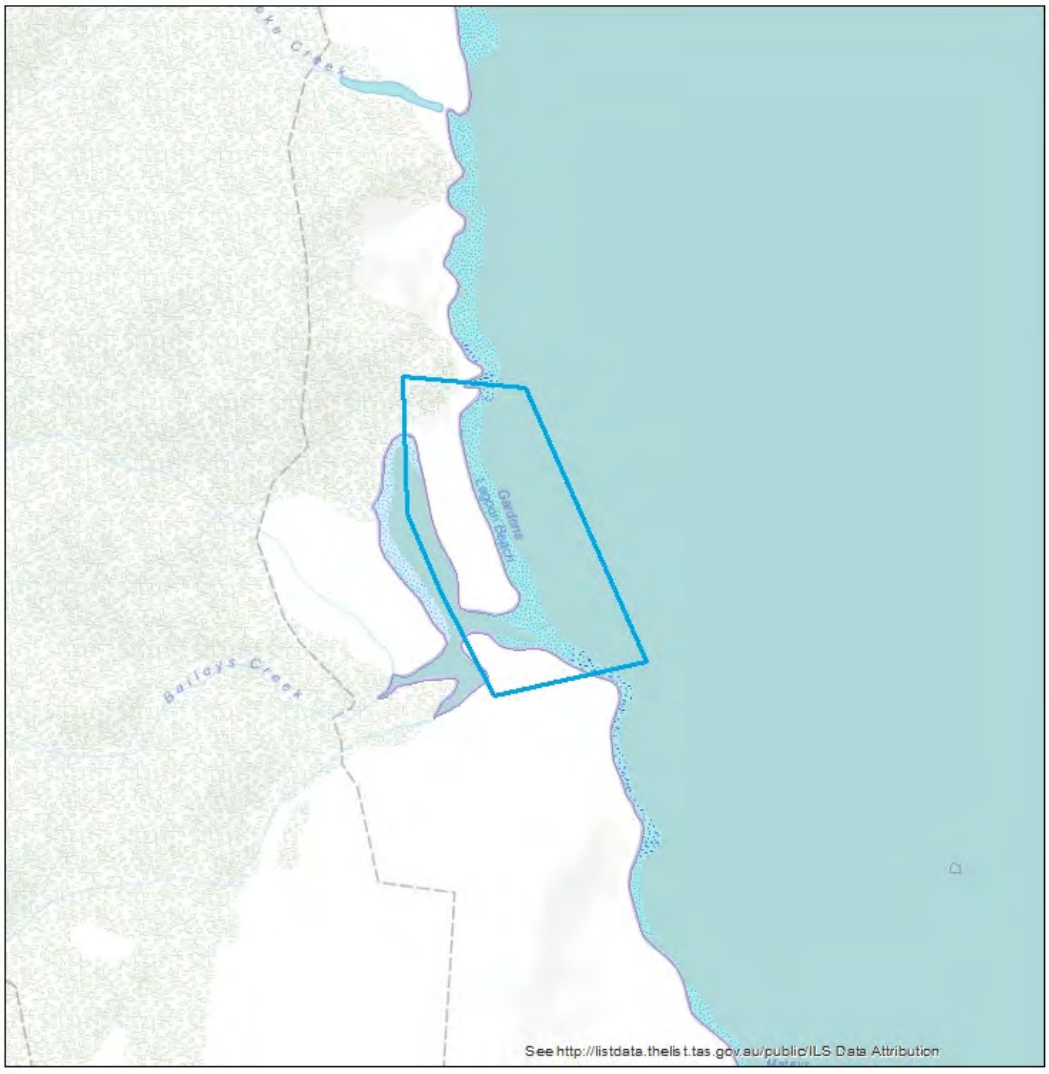
Shorebird Retreat Pathway - Pathway protection
Shorebird Refuge site - Refuge protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

71. Gardens Lagoon Beach



Priority beach for shorebirds.

Shorebird Squeezed-out Site - Threat Management

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

72. unnamed beach south of Bay of Fires

Priority beach for shorebirds.

Shorebird Squeezed-out Site - Threat Management

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher

High consequence beach for shorebirds

73. Taylors Beach

Priority beach for shorebirds.

Shorebird Squeezed-out Site - Threat Management

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

74. Binalong Bay

Priority beach for shorebirds.

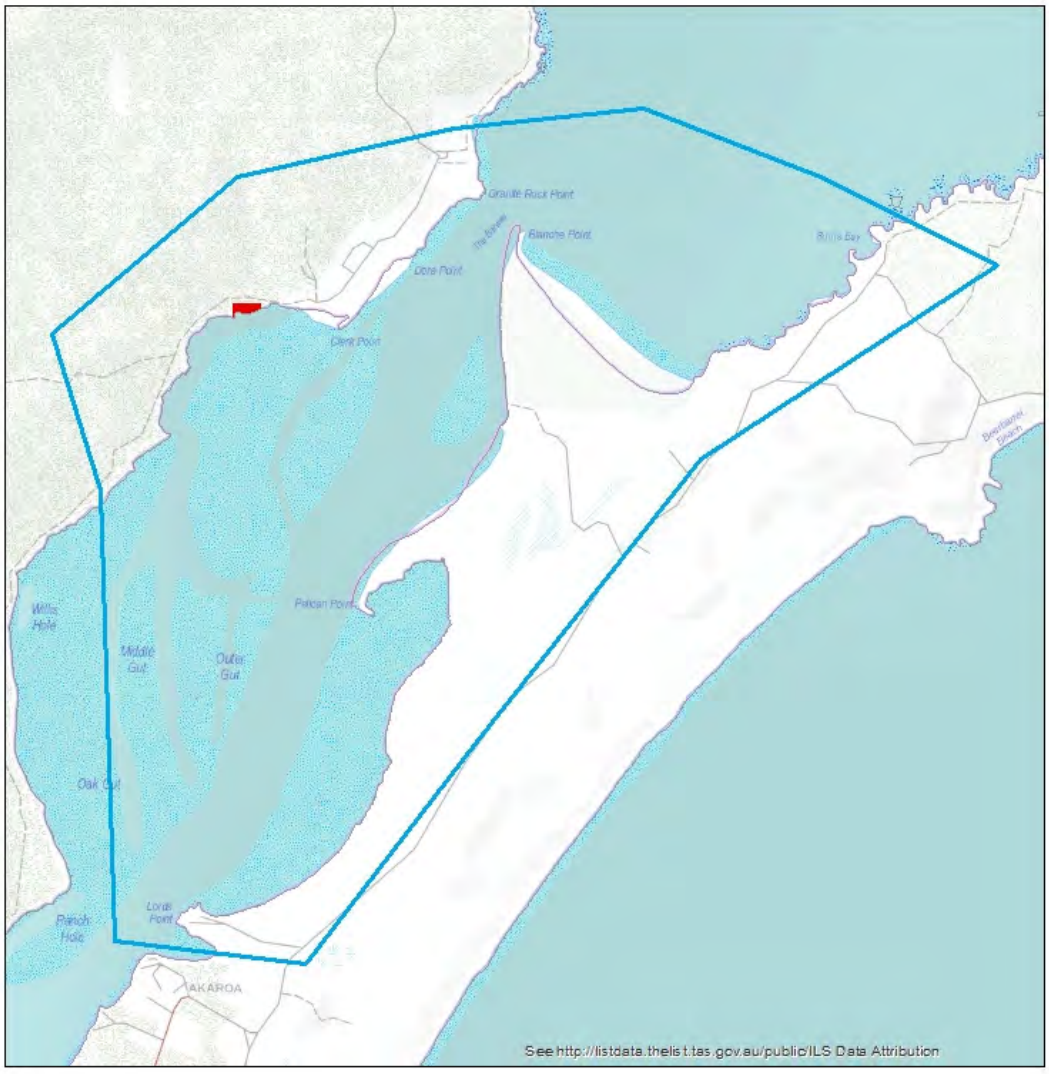
Shorebird Squeezed-out Site - Threat Management

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher

High consequence beach for shorebirds

75. Georges Bay



Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

At-risk plant species: *Stenopetalum lineare*

Priority beach for shorebirds.

Shorebird Retreat Pathway - Threat Management with pathway protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

76. Beerbarrel Beach

Priority beach for shorebirds.

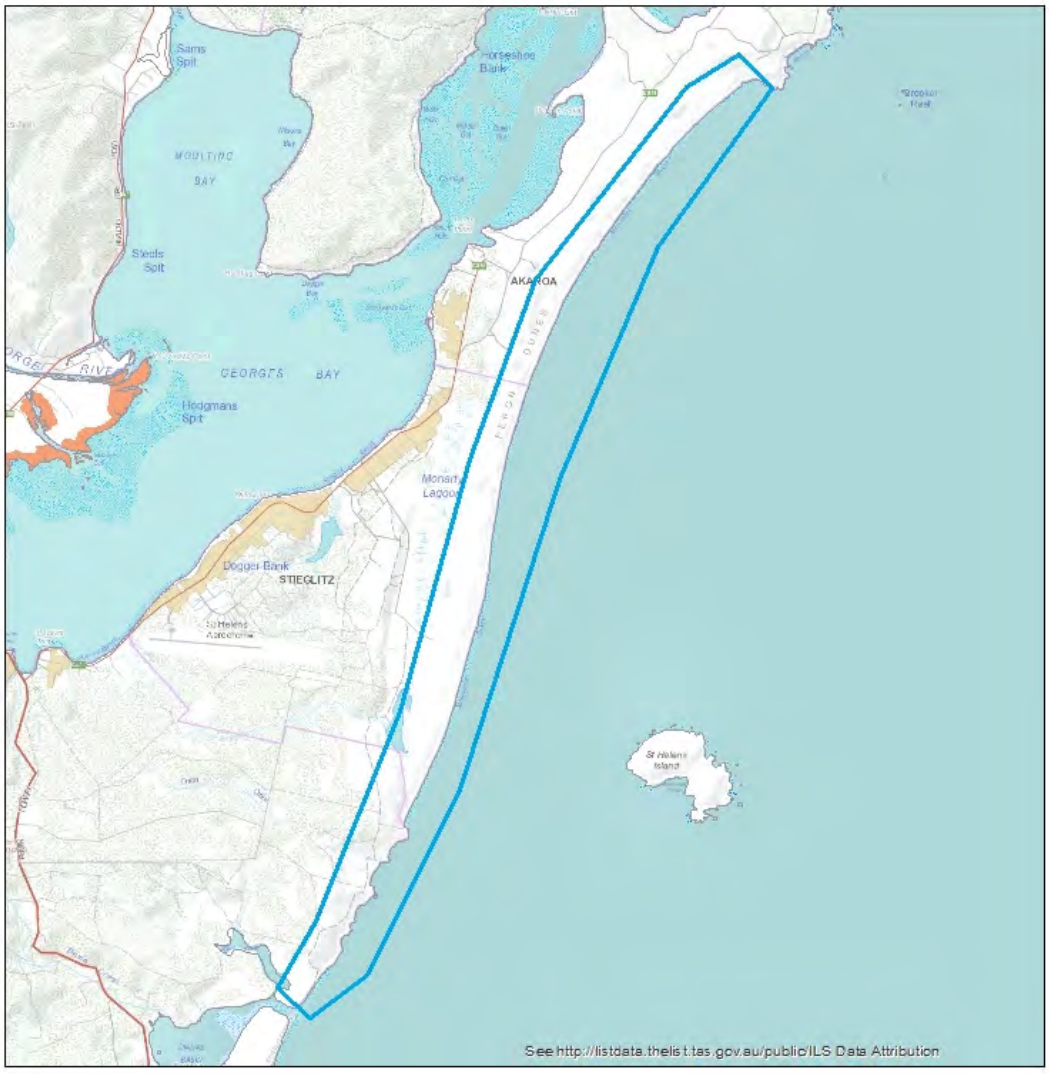
Shorebird Squeezed-out Site - Threat Management

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher

High consequence beach for shorebirds

77. Maurouad Beach



Priority beach for shorebirds.

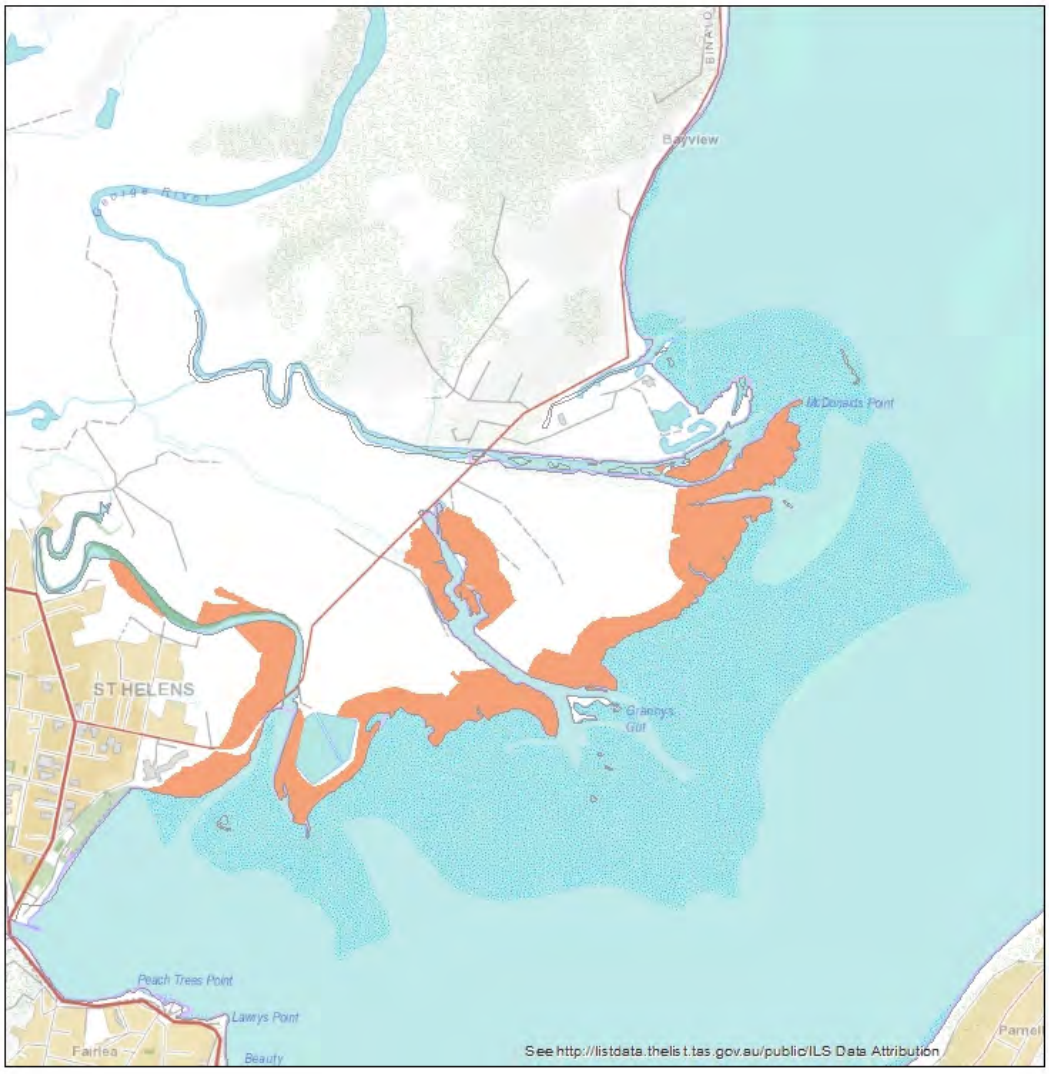
Shorebird Retreat Pathway - Pathway protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover, Fairy Tern

High consequence beach for shorebirds

78. Sewage Mudflat, Georges Bay



Native Vegetation

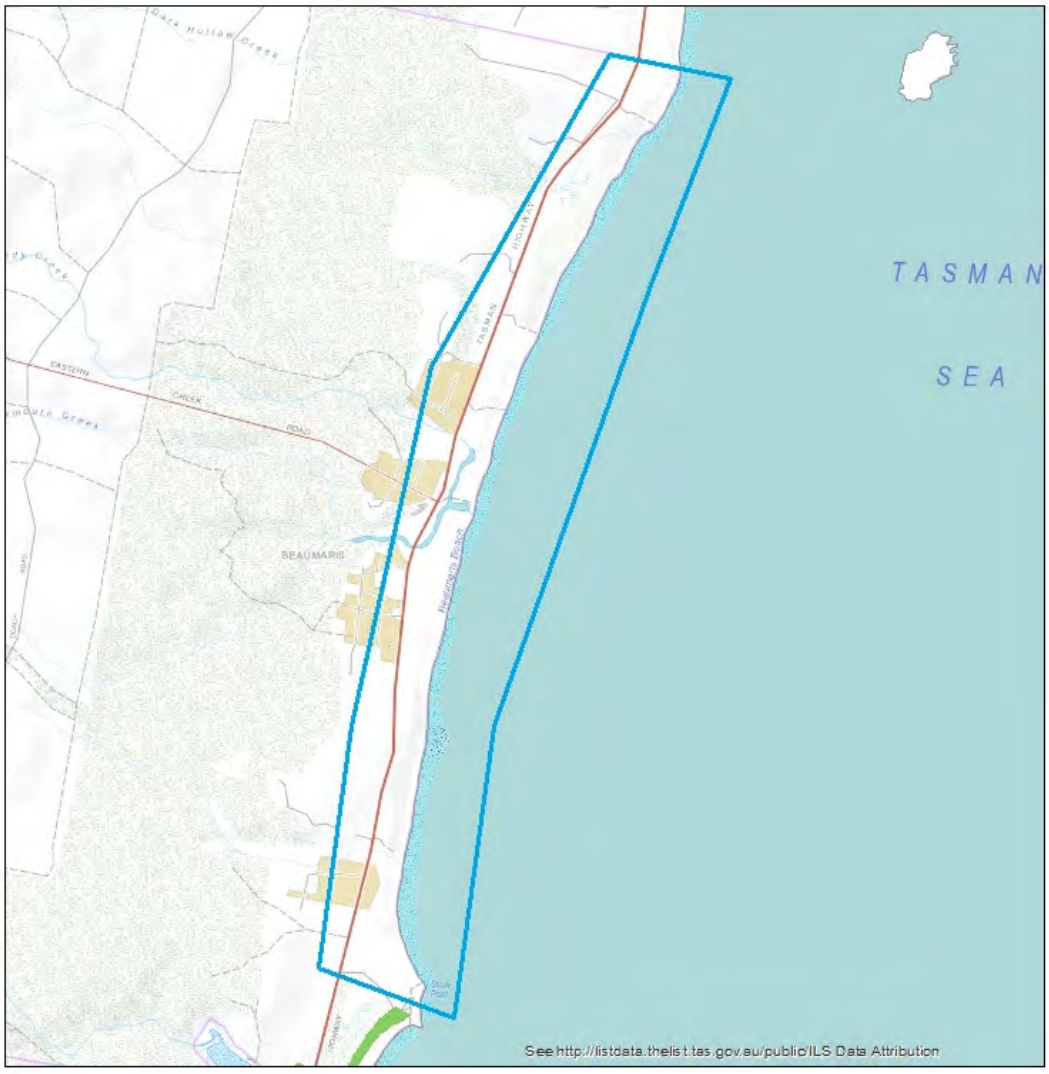
- Retreat or Refuge Site
- Squeezed-out Site

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

At-risk vegetation communities: Coastal grass and herbfield, Succulent saline herbland, Saline grassland, Saltmarsh (undifferntiated), *Melaleuca ericifolia* swamp forest

79. Beaumaris Beach



Priority beach for shorebirds.

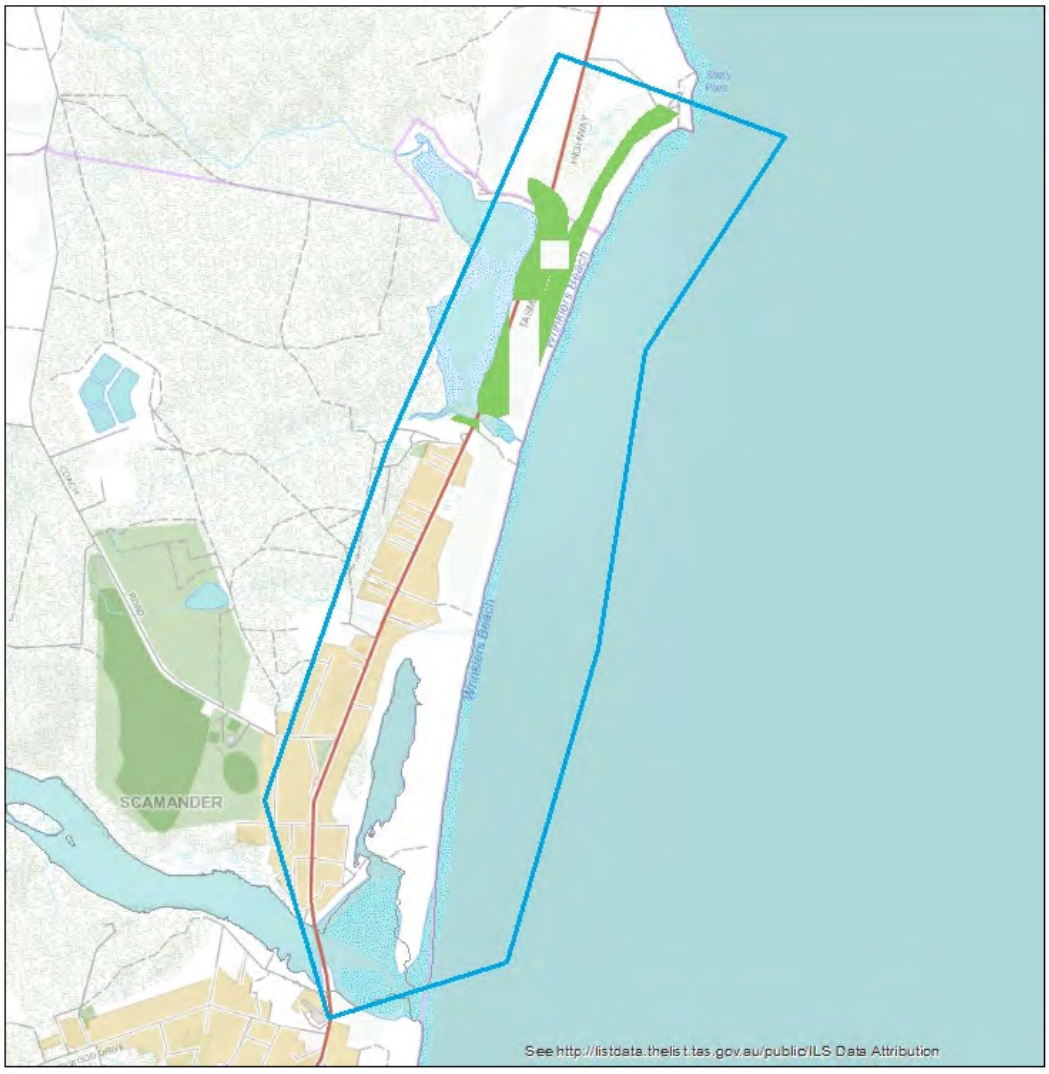
Shorebird Retreat Pathway - Pathway protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

80. Wrinklers Beach



Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield

Priority beach for shorebirds.

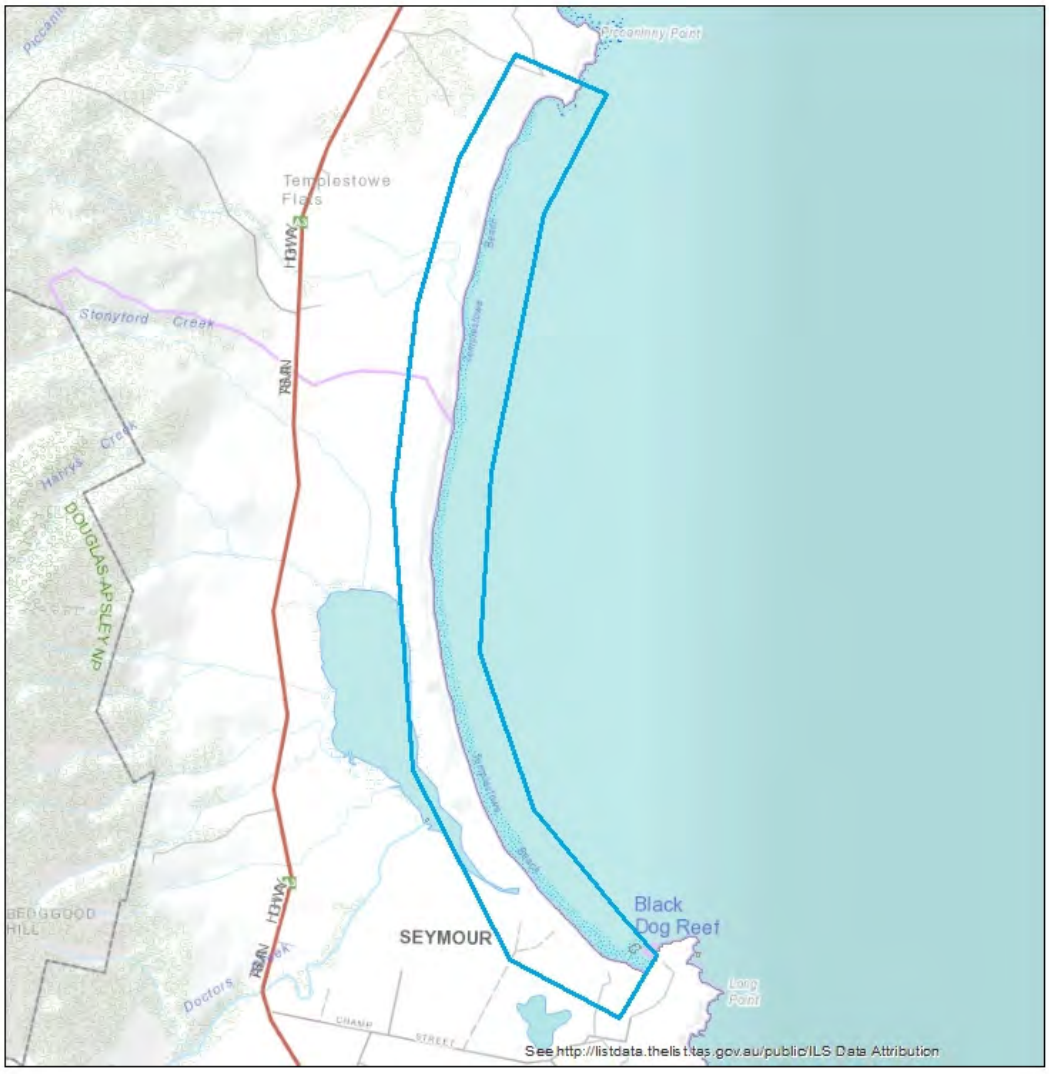
Shorebird Refuge site - Refuge protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Red-capped Plover, Fairy Tern, Little Tern

High consequence beach for shorebirds

81. Templestowe Beach



Priority beach for shorebirds.

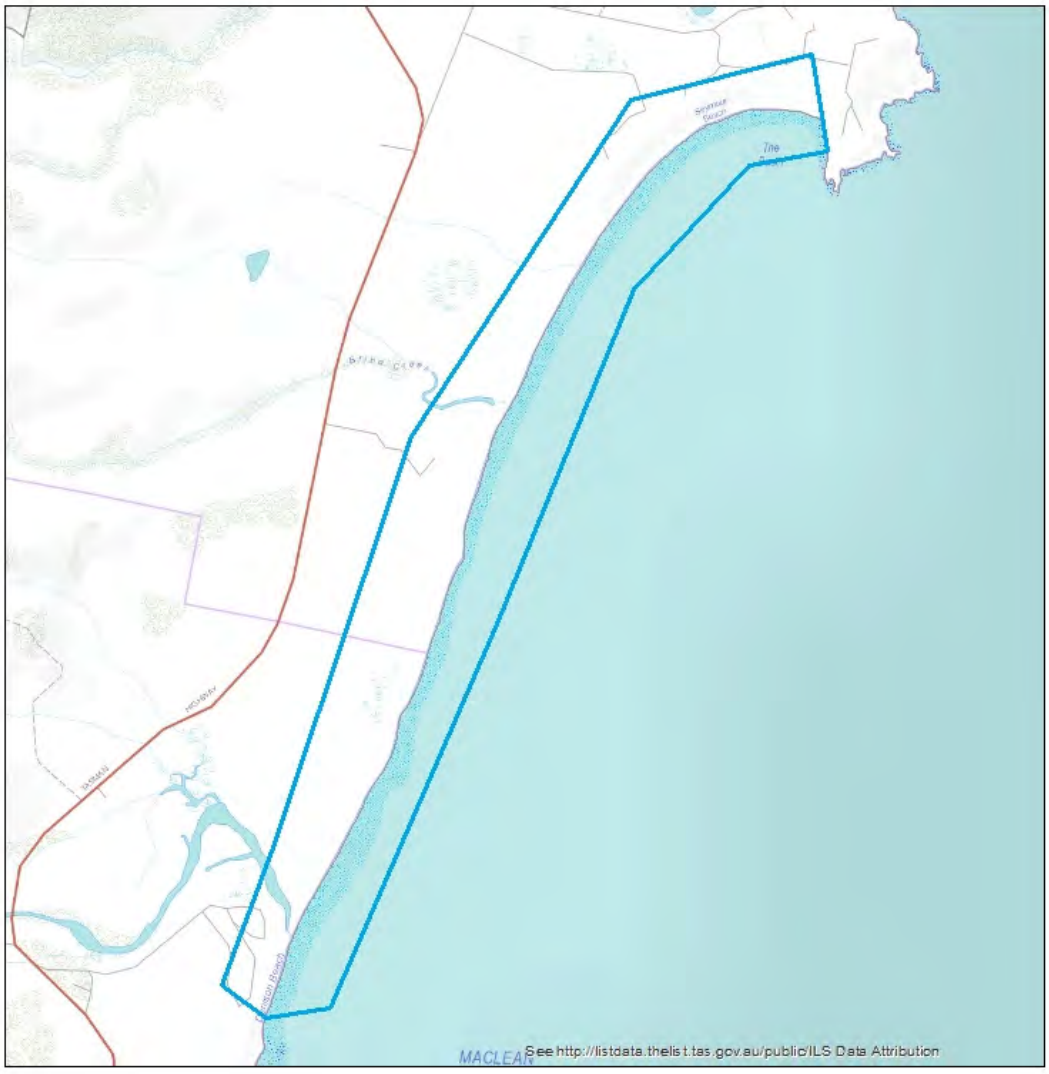
Shorebird Retreat Pathway - Pathway protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Red-capped Plover, Fairy Tern, Little Tern

High consequence beach for shorebirds

82. Seymour Beach



Priority beach for shorebirds.

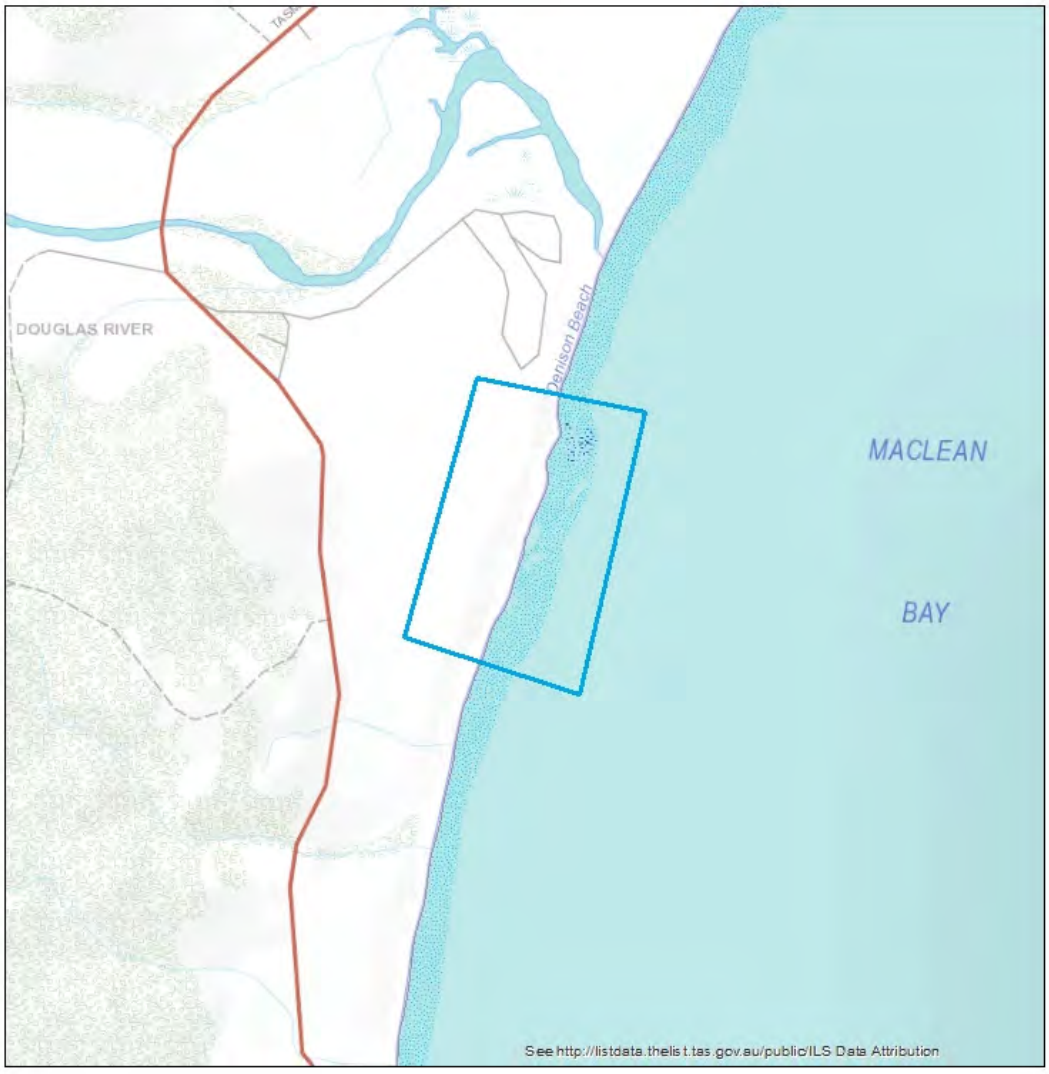
Shorebird Retreat Pathway - Pathway protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

83. Porch Rocks



Priority beach for shorebirds.

Shorebird Squeezed-out Site - Threat Management
Shorebird Refuge site - Refuge protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher

High consequence beach for shorebirds

84. Denison Beach

Priority beach for shorebirds.

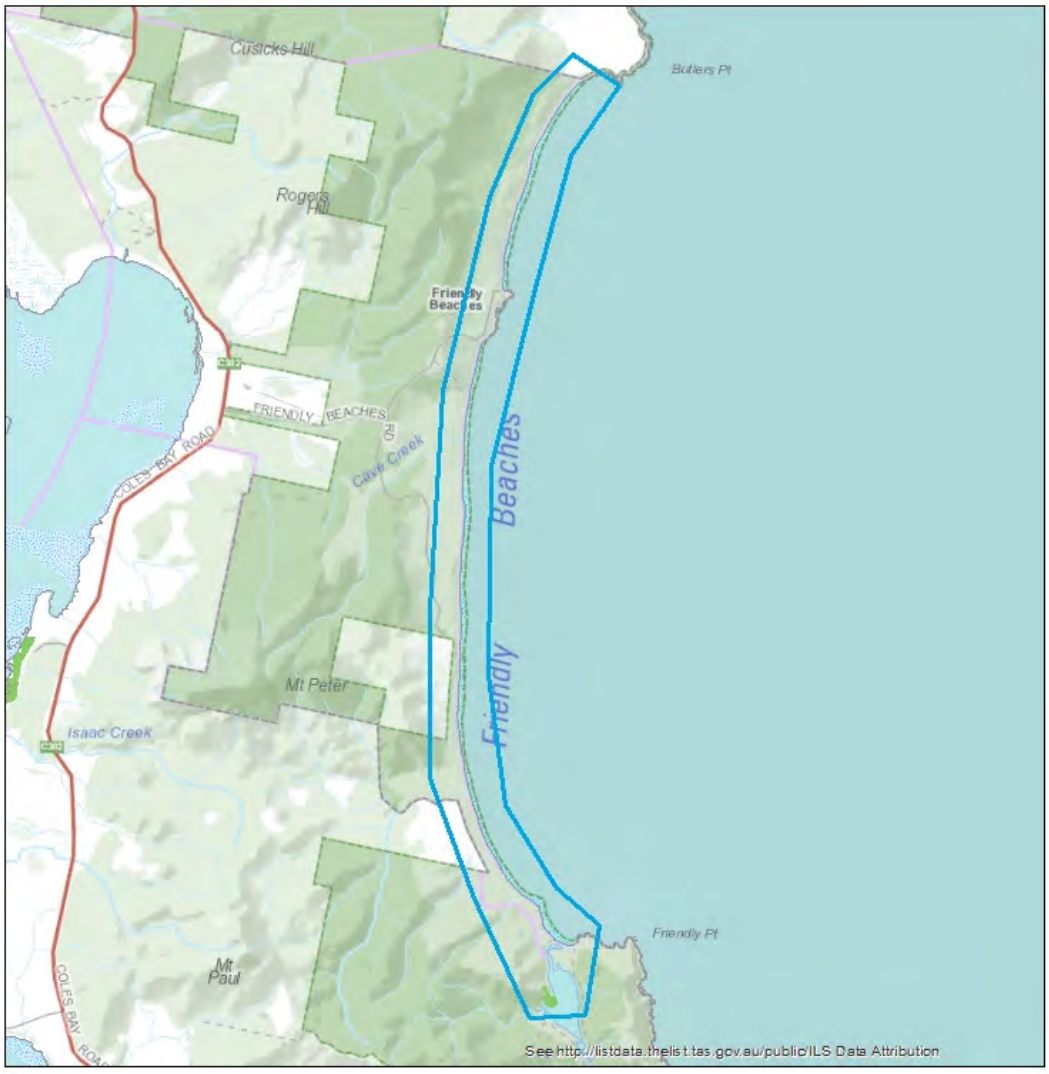
Shorebird Retreat Pathway - Threat Management with pathway protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Red-capped Plover, Fairy Tern, Little Tern

High consequence beach for shorebirds

85. The Friendly Beaches



Native Vegetation

Retreat or Refuge Site

Squeezed-out Site

At-risk vegetation communities: *Allocasuarina littoralis* forest

Priority beach for shorebirds.

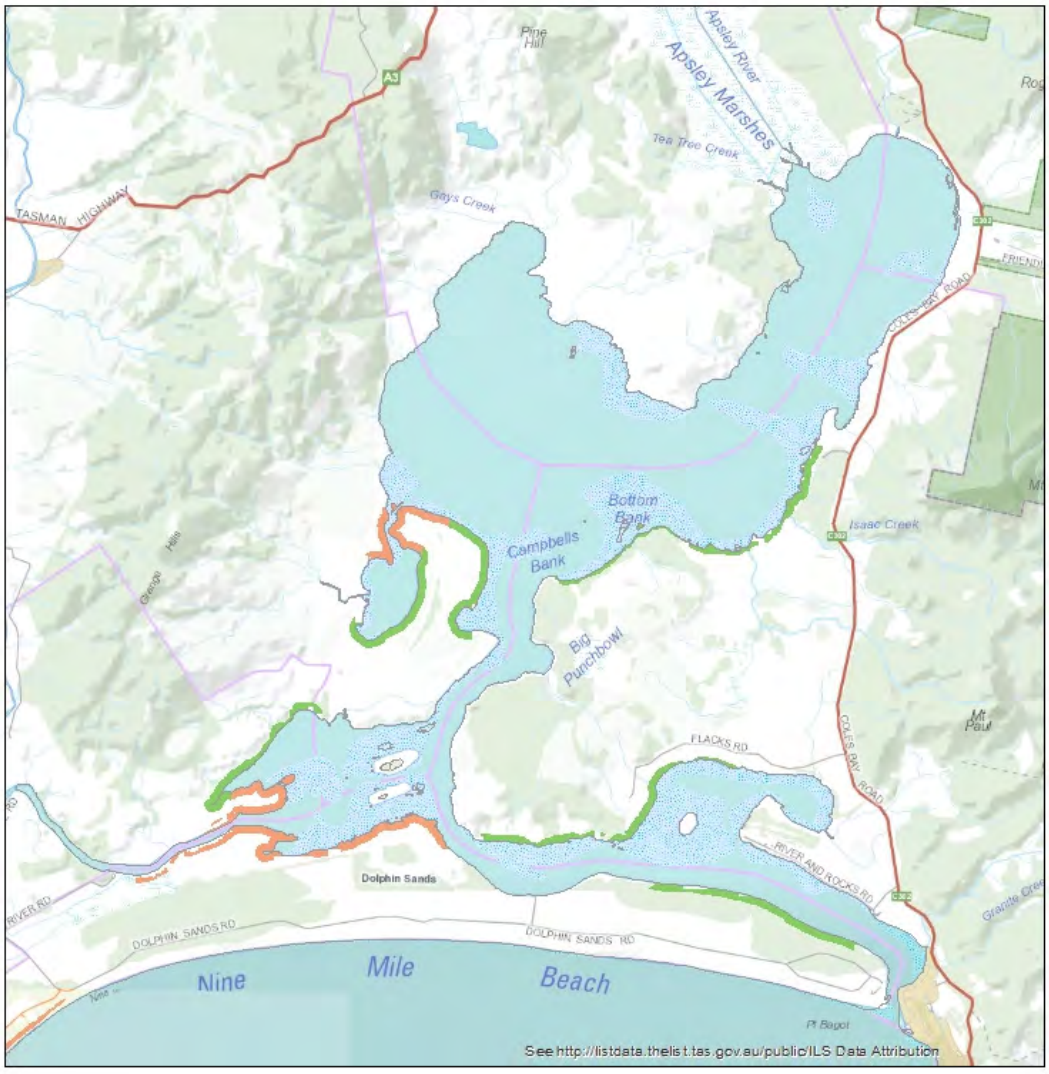
Shorebird Retreat Pathway - Threat Management with pathway protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

86. Moulting Lagoon



Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Succulent saline herbland, Saline grassland, Saltmarsh (undifferntiated), *Eucalyptus viminalis* - *Eucalyptus globulus* coastal forest and woodland

87. Nine Mile Beach

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

At-risk vegetation communities: Saline grassland, *Eucalyptus viminalis* - *Eucalyptus globulus* coastal forest and woodland

88. Spiky Beach

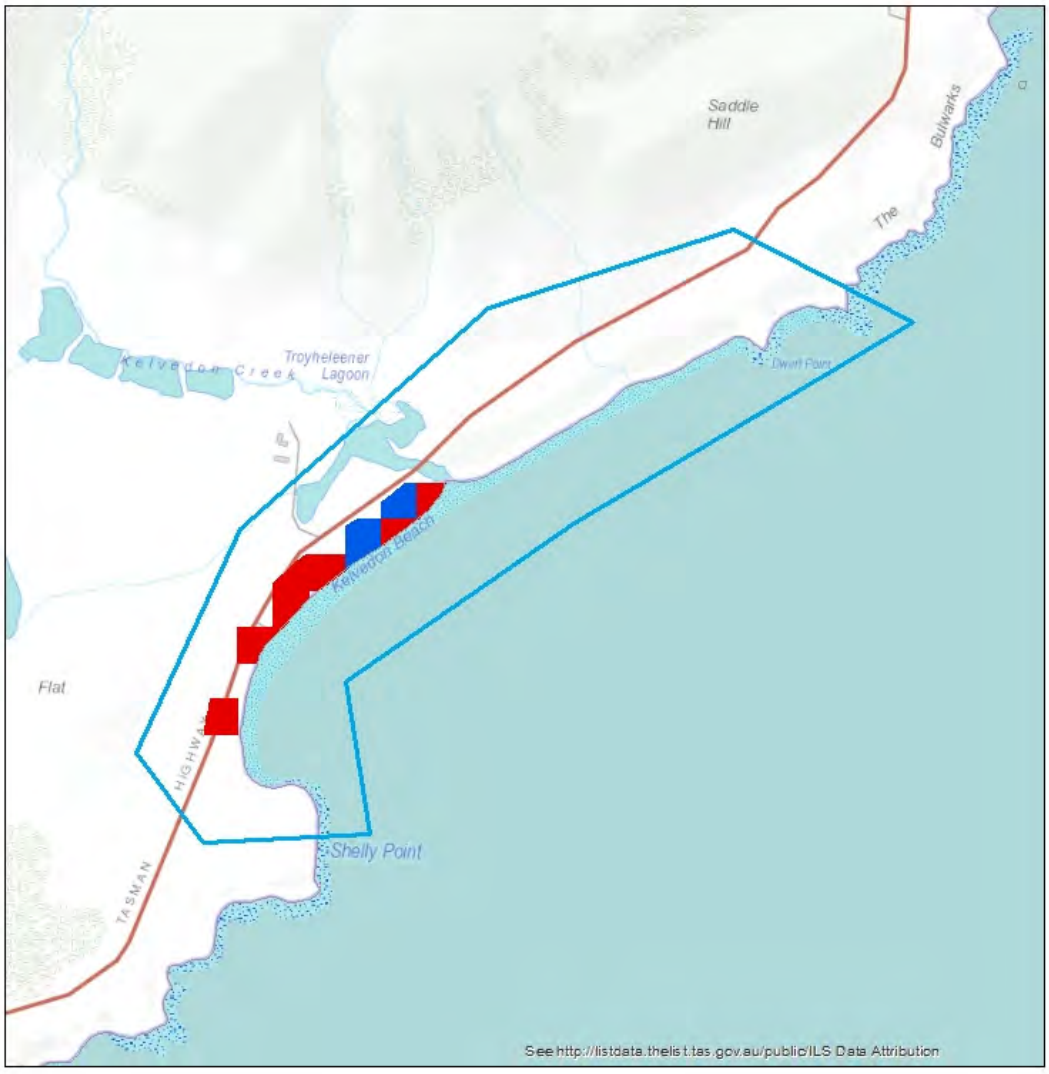
Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: *Allocasuarina littoralis* forest

89. Kelvedon Beach



Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

At-risk plant species: *Stenopetalum lineare*

Priority beach for shorebirds.

Shorebird Squeezed-out Site - Threat Management

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Red-capped Plover, Fairy Tern, Little Tern

High consequence beach for shorebirds

90. Lisdillon

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

At-risk vegetation communities: *Allocasuarina littoralis* forest

91. Little Swanport Mouth

Native Vegetation

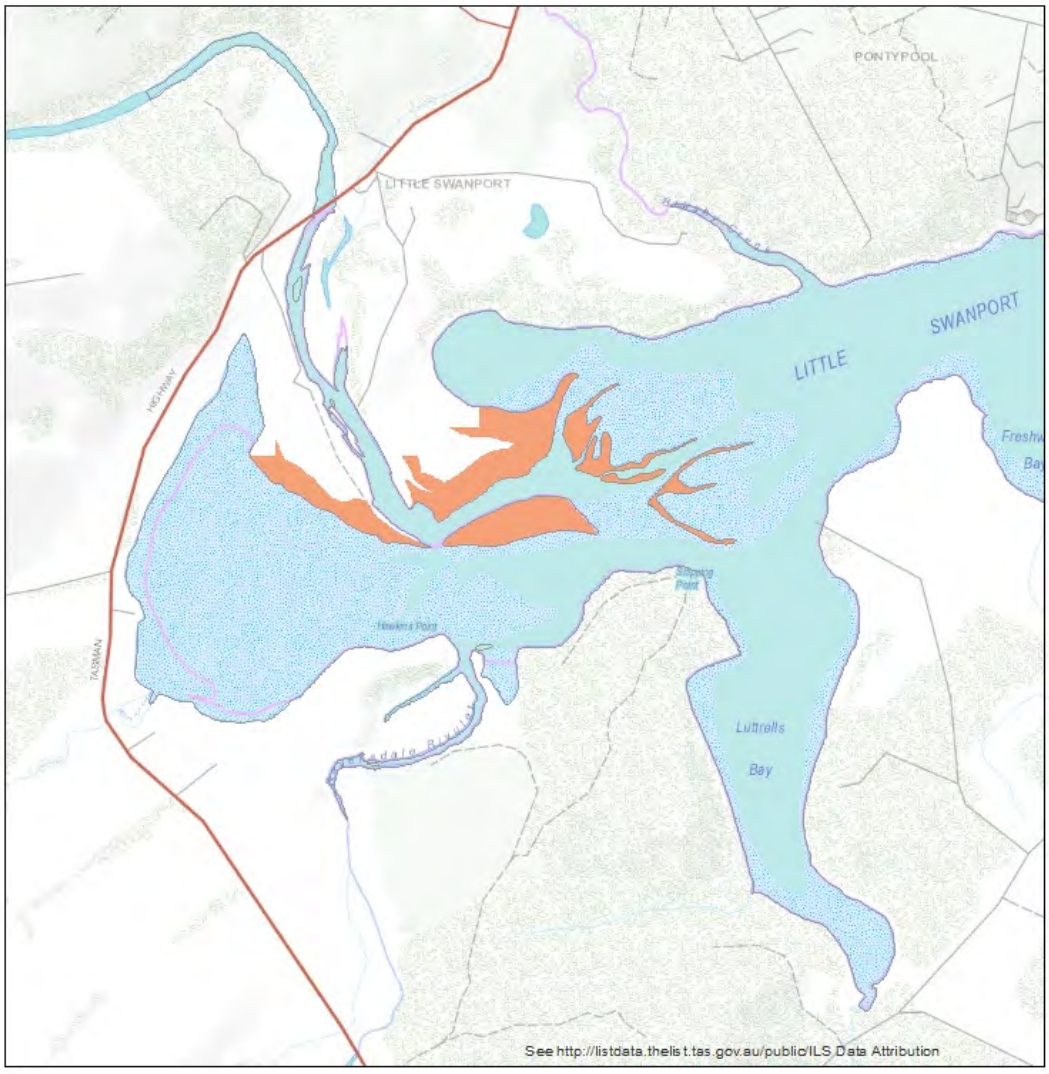
- Retreat or Refuge Site
- Squeezed-out Site

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

At-risk vegetation communities: *Allocasuarina littoralis* forest

92. Watch House Bay



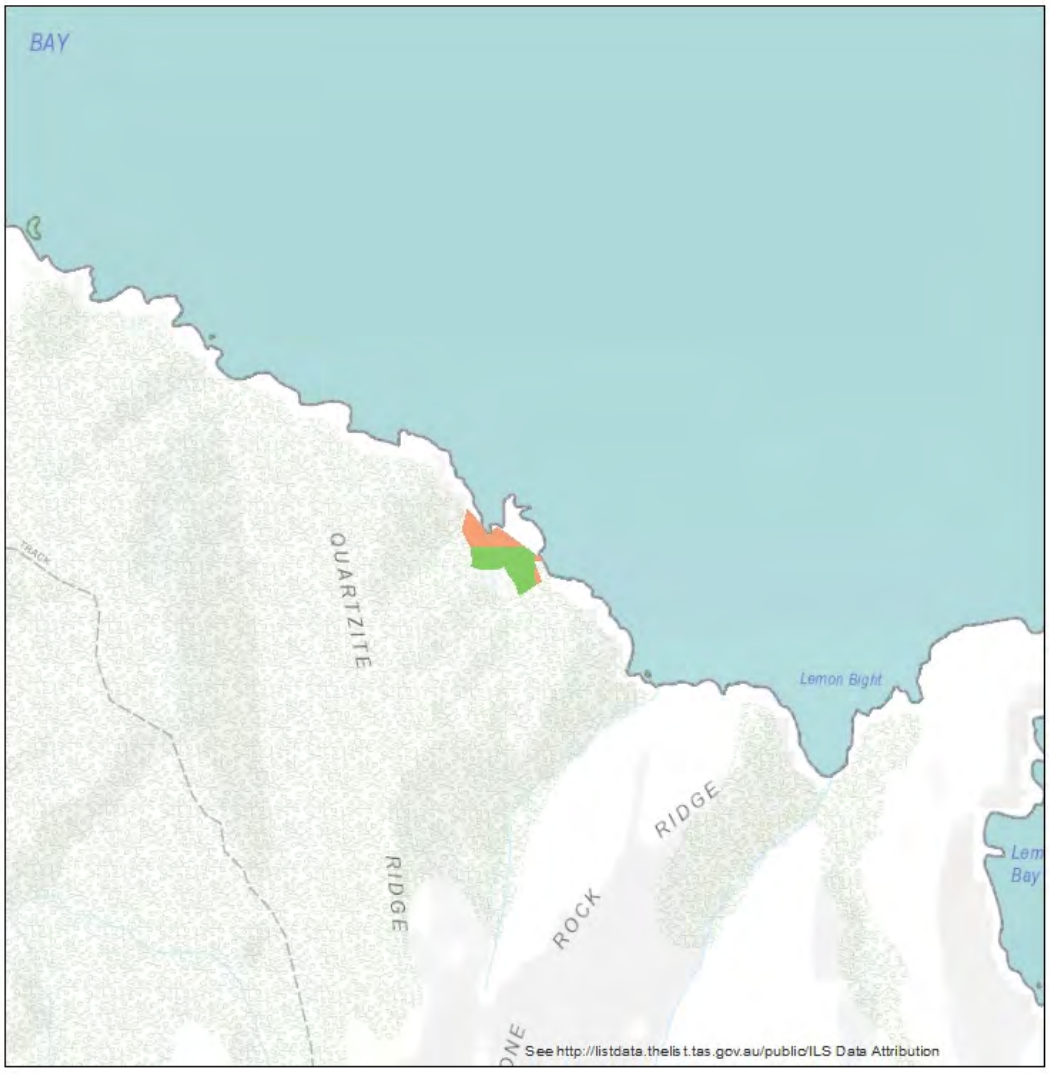
Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Succulent saline herbland, Saline grassland

93. Lemon Bight



Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: *Allocasuarina littoralis* forest

94. Bryans Beach

Native Vegetation

Retreat or Refuge Site

Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: *Allocasuarina littoralis* forest, Succulent saline herbland

95. Schouten Island, southern section

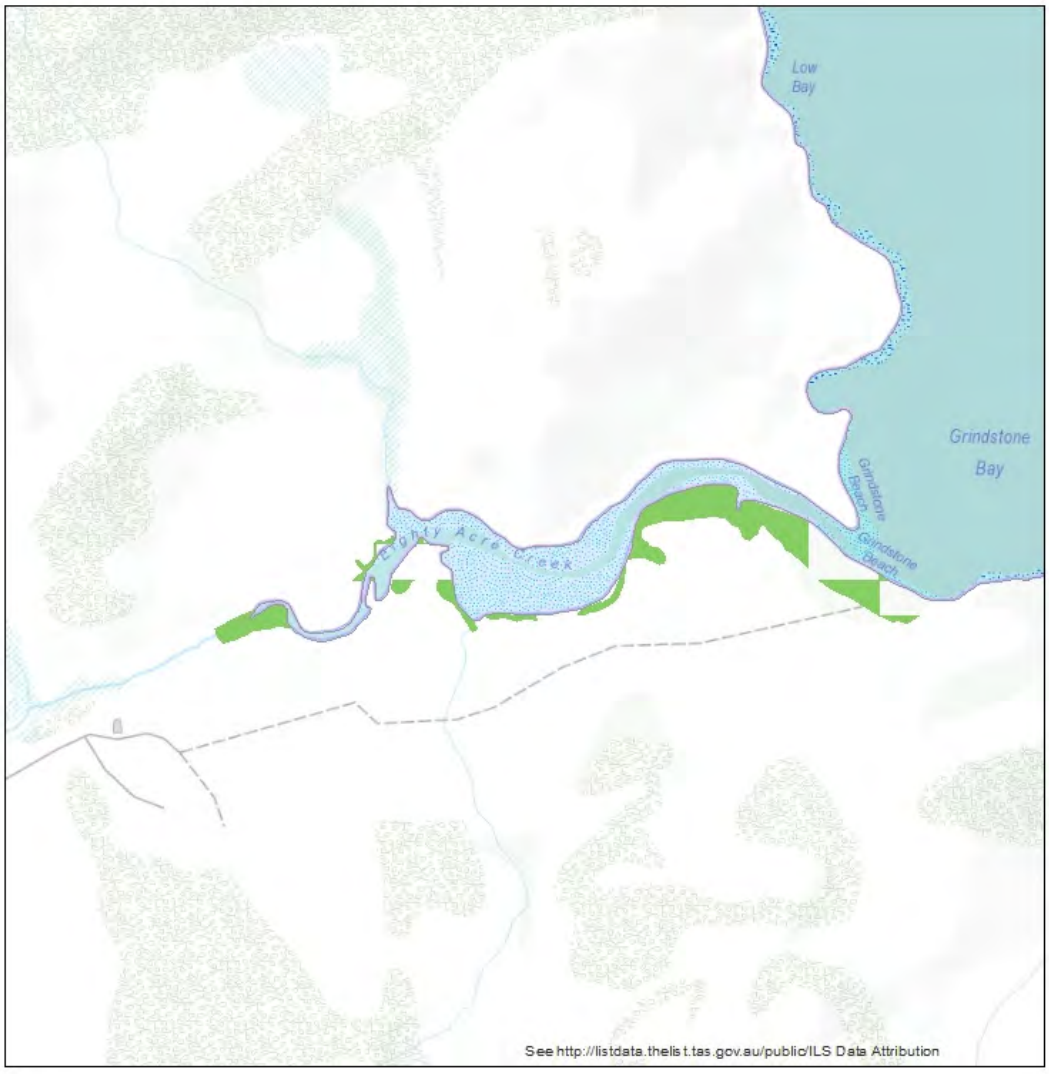
Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: *Allocasuarina littoralis* forest

96. Grindstone Beach



Native Vegetation

Retreat or Refuge Site

Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield, Saline grassland, Saltmarsh (undifferntiated)

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

97. Triabunna

Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk plant species: *Limonium australe var. baudinii*

98. Rheban Beach

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield, Saline grassland, Saltmarsh (undifferntiated), *Eucalyptus viminalis* - *Eucalyptus globulus* coastal forest and woodland

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

99. McRaes Isthmus on Maria Island

Native Vegetation

Retreat or Refuge Site

Squeezed-out Site

At-risk vegetation communities: Saltmarsh (undifferntiated), *Eucalyptus viminalis - Eucalyptus globulus* coastal forest and woodland

Priority beach for shorebirds.

Shorebird Retreat Pathway - Threat Management with pathway protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher

High consequence beach for shorebirds

100. Marion Beach

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

At-risk vegetation communities: Coastal grass and herbfield, Succulent saline herbland, Saline grassland, *Eucalyptus viminalis* - *Eucalyptus globulus* coastal forest and woodland

Priority beach for shorebirds.

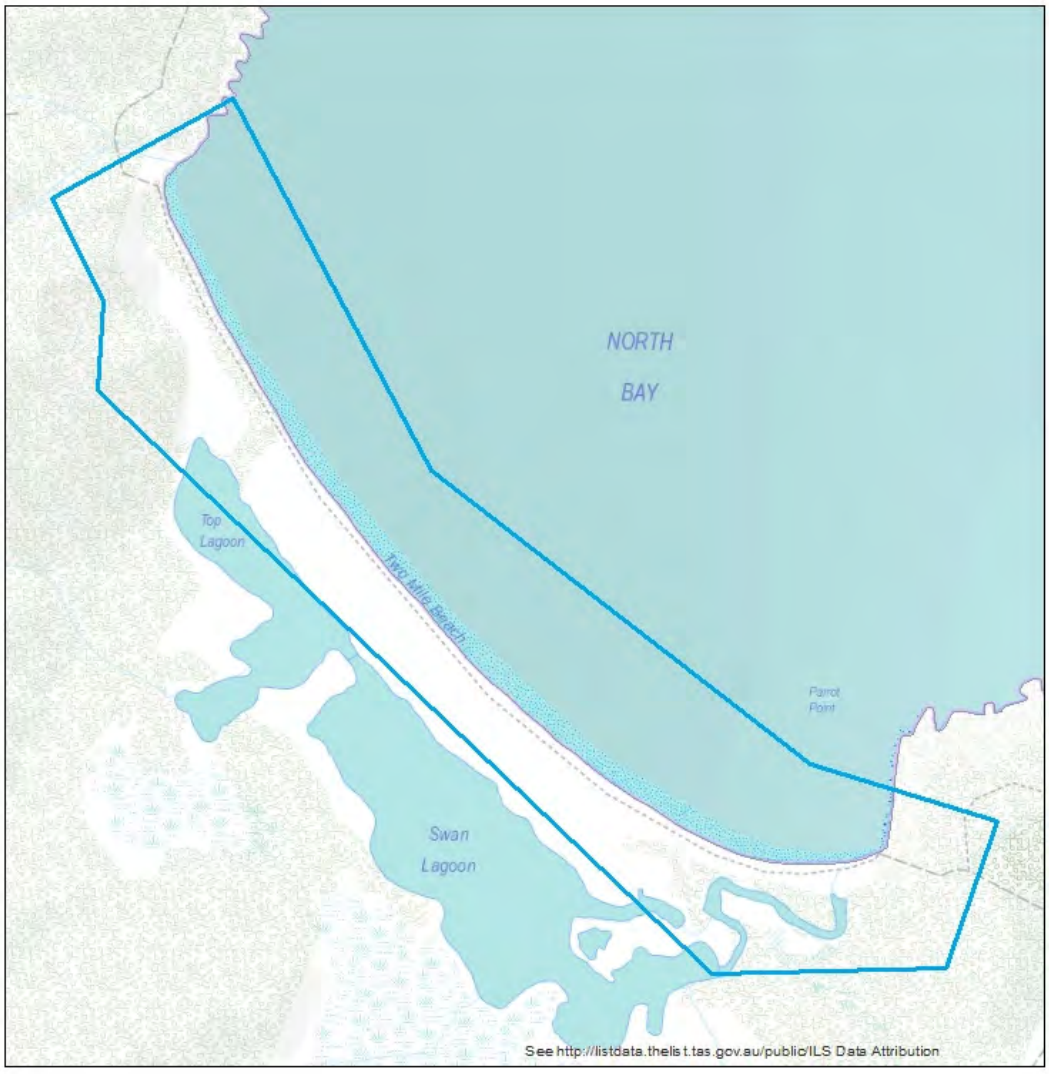
Shorebird Retreat Pathway - Threat Management with pathway protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover, Fairy Tern, Little Tern

High consequence beach for shorebirds

101. North Bay incl Two Mile Beach



Priority beach for shorebirds.

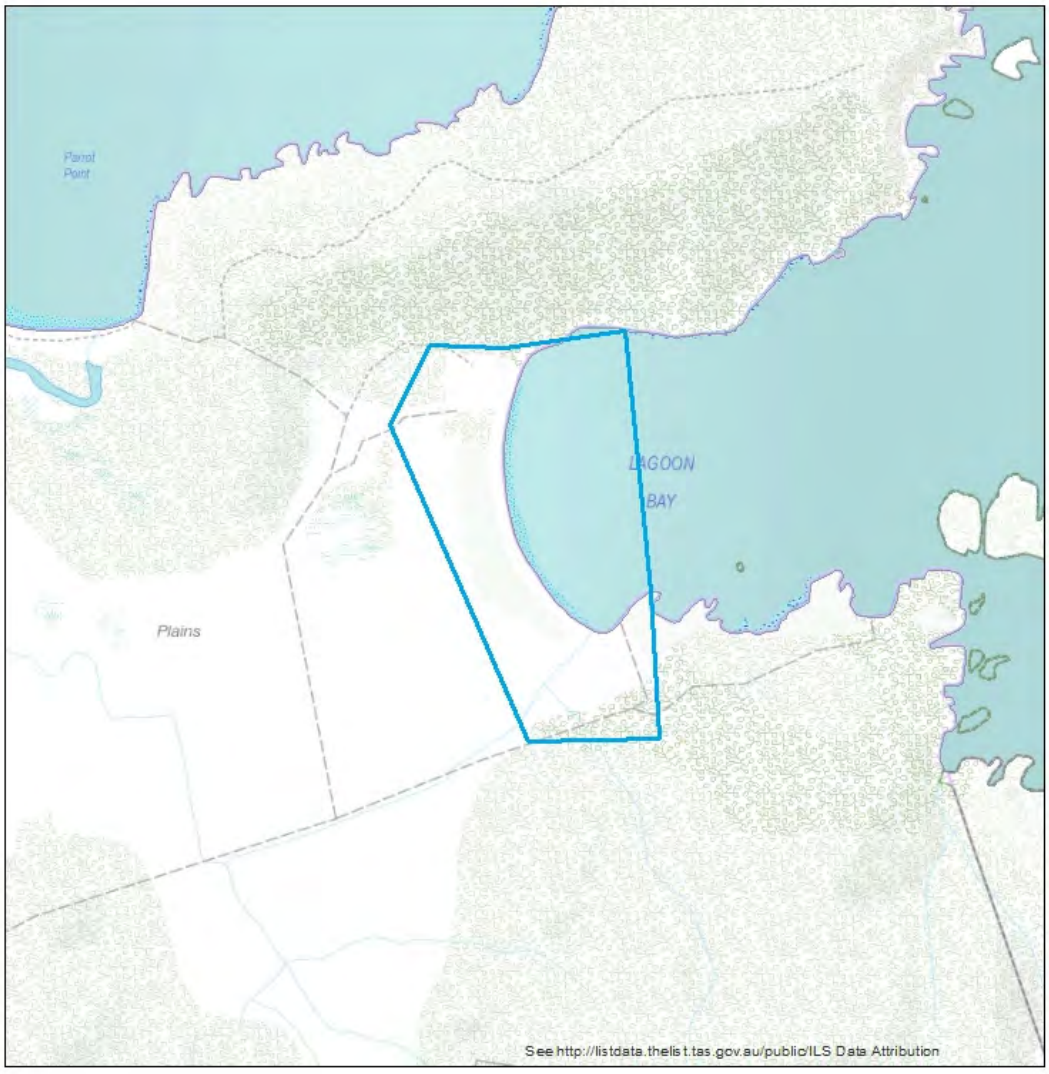
Shorebird Retreat Pathway - Pathway protection
Shorebird Refuge site - Refuge protection

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher, Sooty Oystercatcher, Red-capped Plover

High consequence beach for shorebirds

102. Lagoon Bay



Priority beach for shorebirds.

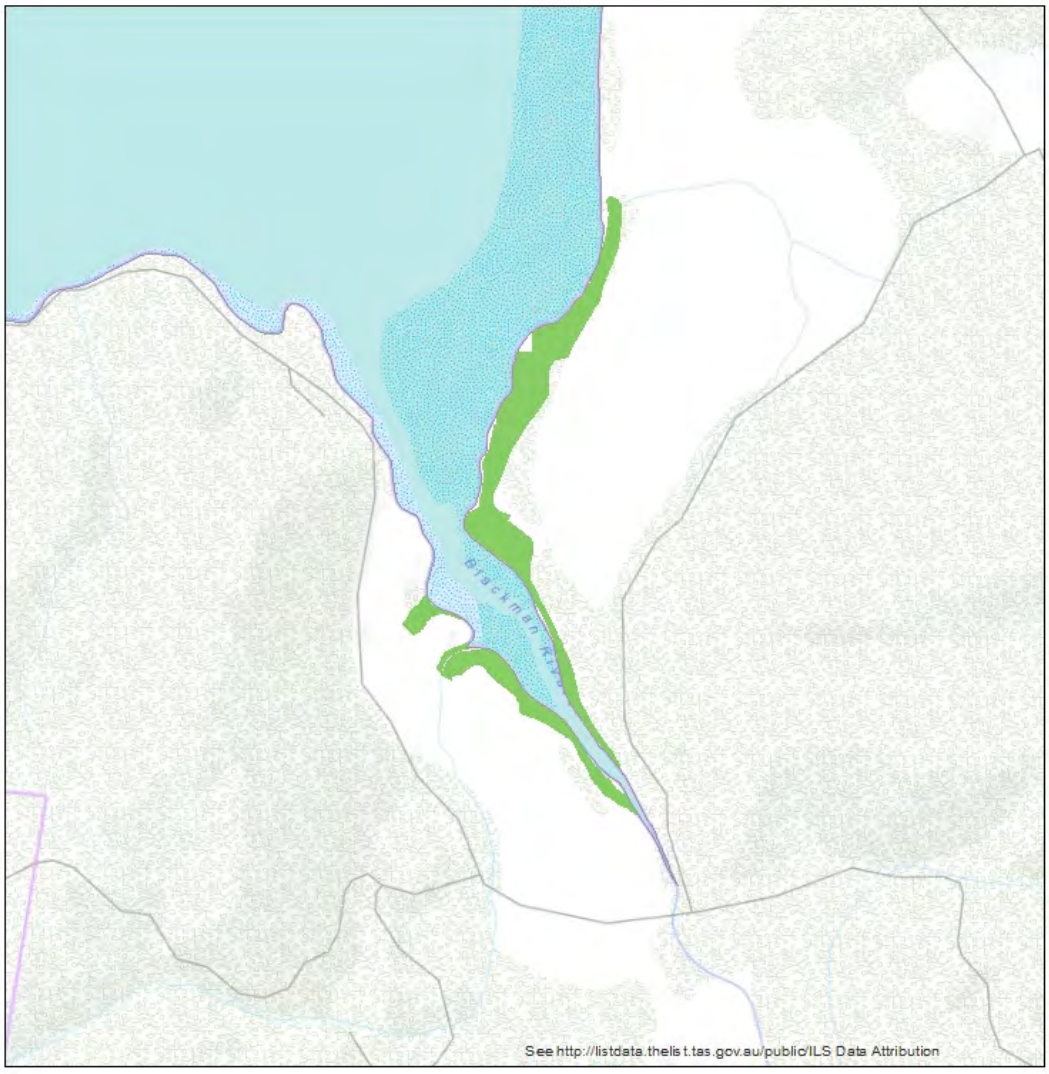
Shorebird Retreat Pathway - Threat Management

Based on contemporary resident shorebird data available as of November 2011.

At-risk shorebirds: Hooded Plover, Pied Oystercatcher

High consequence beach for shorebirds

103. Blackman Rivulet



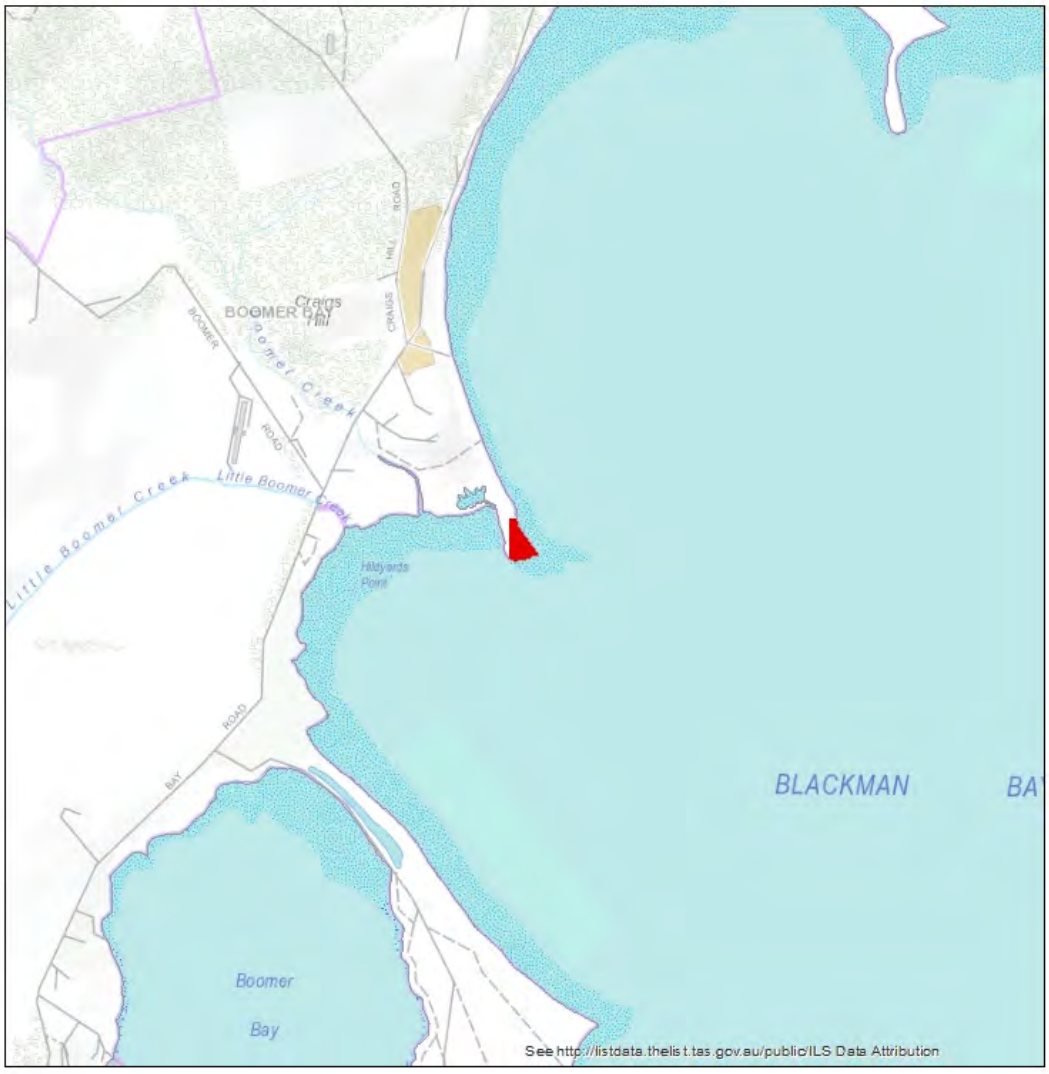
Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Succulent saline herbland

104. Hildyards Point



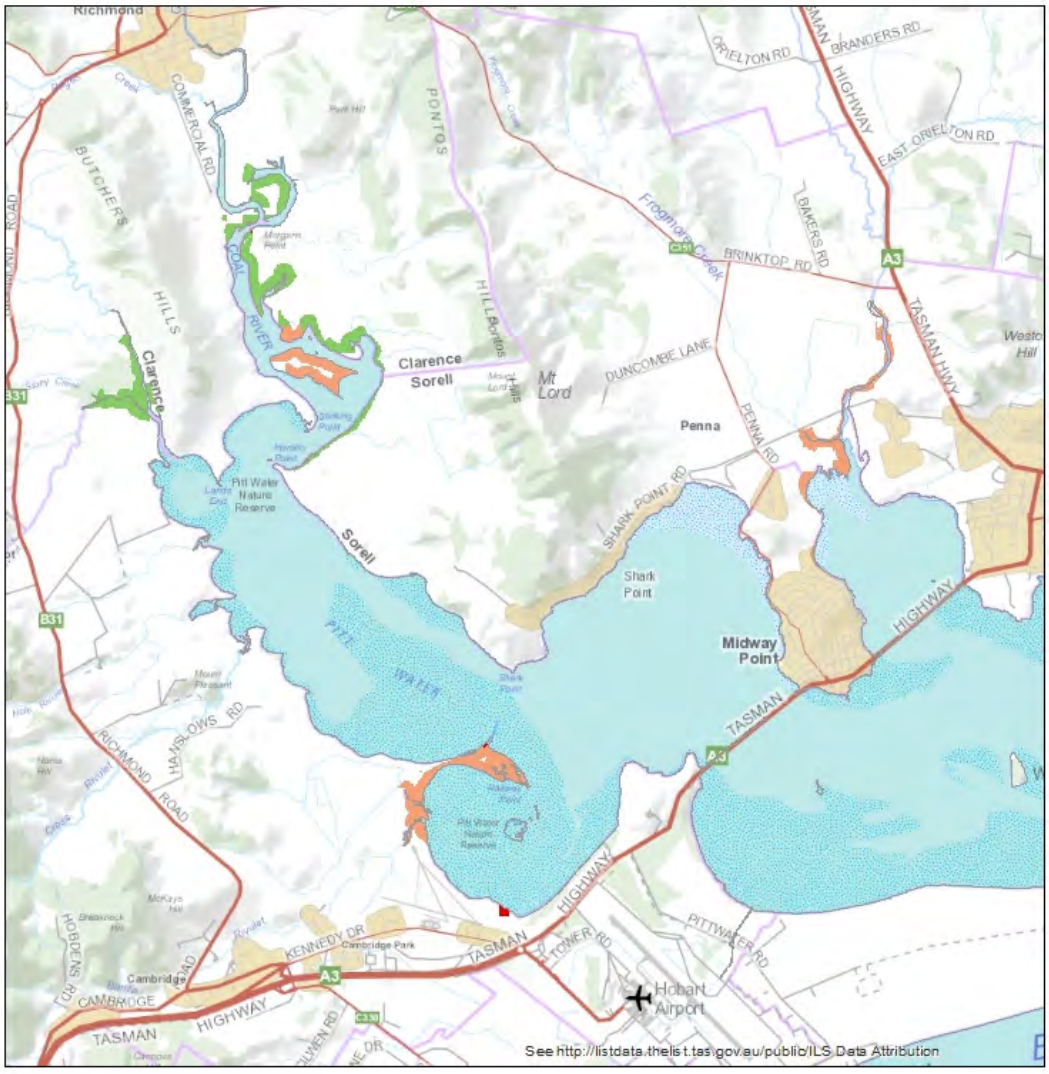
Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk plant species: *Ruppia tuberosa*

105. Pittwater Lagoon



Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Succulent saline herbland, Saltmarsh (undifferntiated)

At-risk plant species: *Limonium australe var. australe*

106. Bellerive Beach

Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk plant species: *Stenopetalum lineare*

107. Ralphs Bay, northeast

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Plant Species

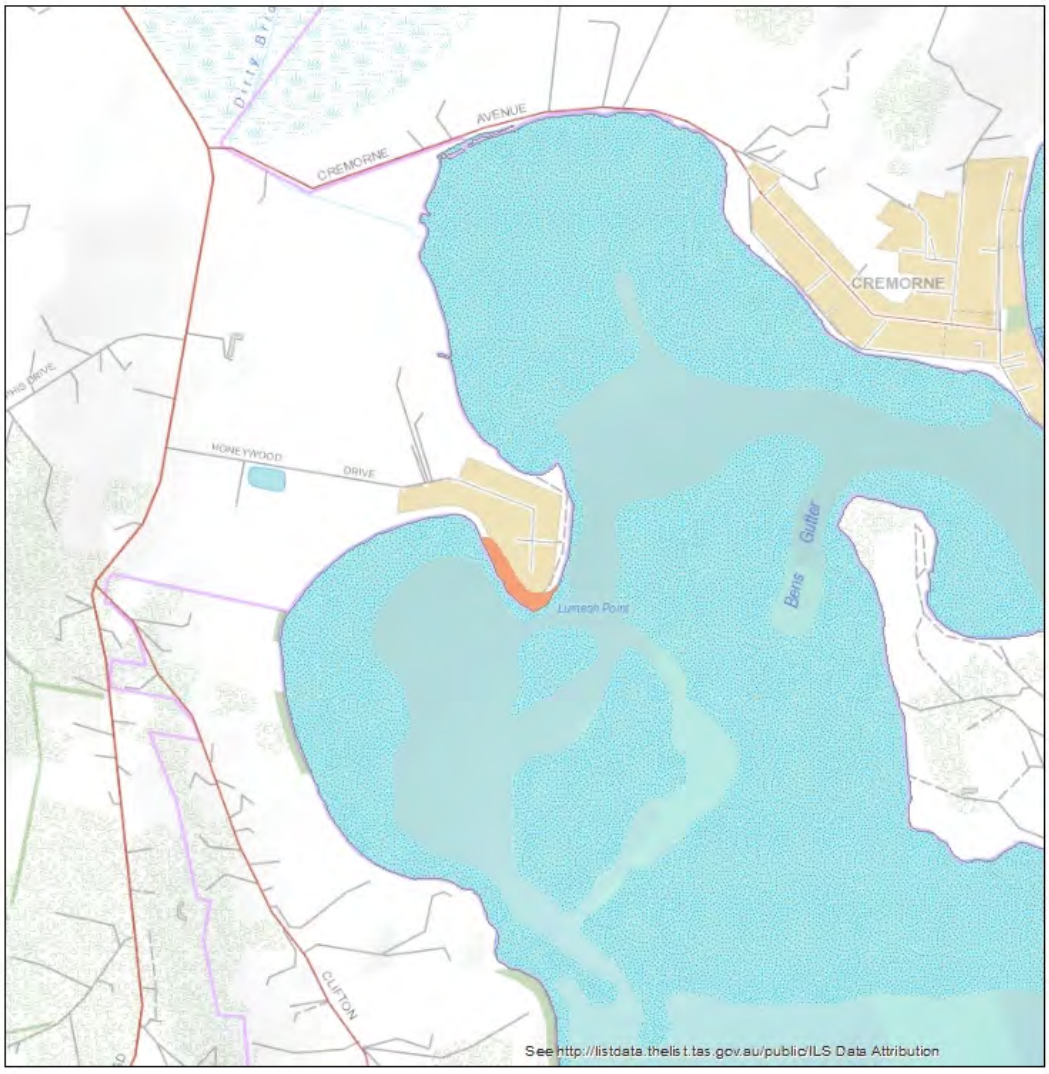
- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Succulent saline herbland, Saline grassland, Saltmarsh (undifferntiated)

At-risk plant species: *Ruppia tuberosa, Limonium australe var. australe*

108. Lumeah Point



Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: *Eucalyptus morrisbyi* forest and woodland

109. Ralphs Bay

Plant Species

- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Assessed for risk to shorebirds - of lower priority for action.

Based on contemporary resident shorebird data available as of November 2011.

At-risk plant species: *Ruppia tuberosa*

110. Hope Beach, western end

Native Vegetation
- Retreat or Refuge Site
- Squeezed-out Site

Plant Species
- Coastal Refuge Site
- Retreat Pathway Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield

At-risk plant species: *Stenopetalum lineare*

111. south of Wedge Bay

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield

112. Cape Pillar surrounds

Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: *Allocasuarina littoralis* forest

113. Tasman Island

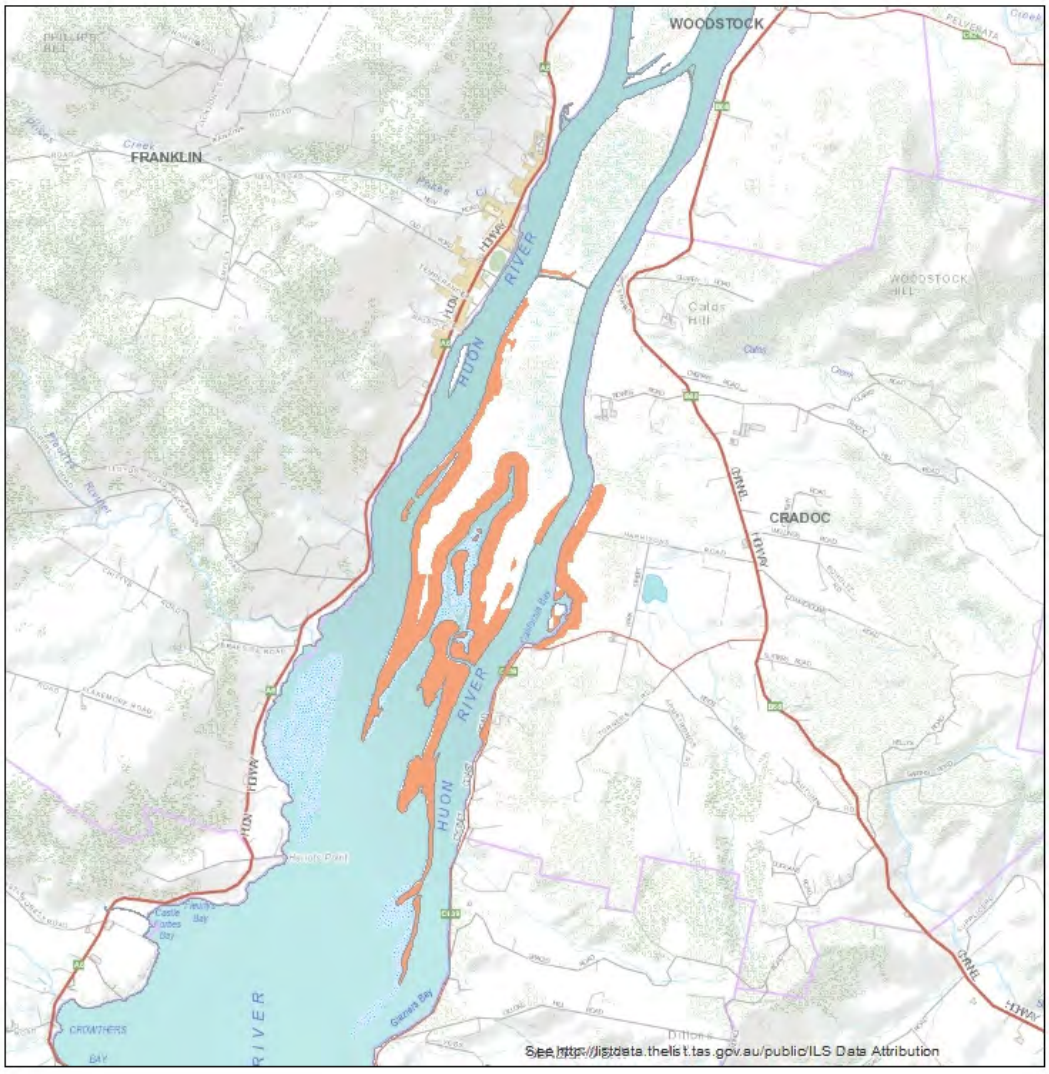
Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield

114. Egg Islands



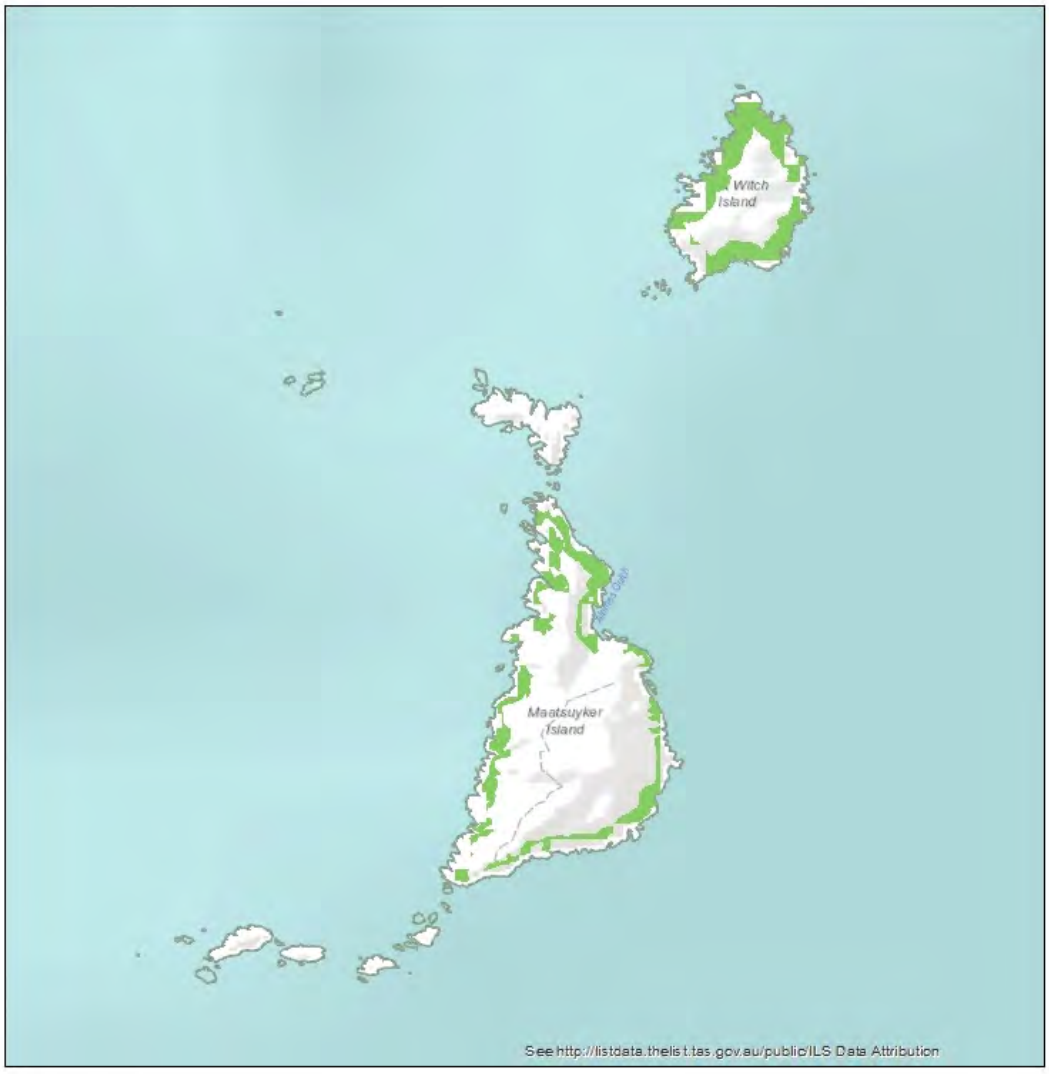
Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Saline grassland

115. Flat Witch and Maatsuyker Islands



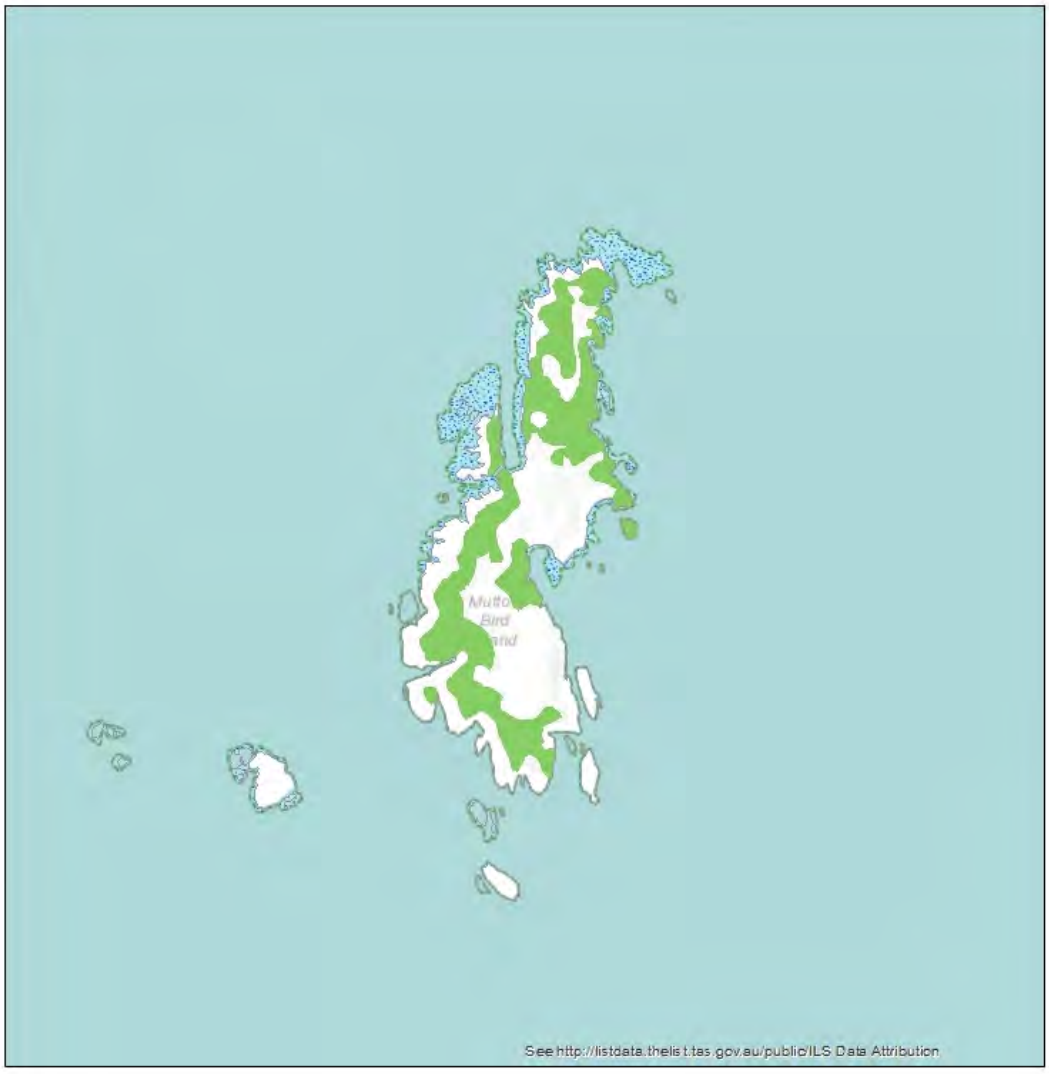
Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield

116. Mutton Bird Island



Native Vegetation

- Retreat or Refuge Site
- Squeezed-out Site

Contemporary resident shorebird data absent as of November 2011

At-risk vegetation communities: Coastal grass and herbfield