

10 Wildlife and pest management



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This chapter deals with the special considerations required for wildlife management on or near the shoreline and in marine environments, with special reference to threatened species, particularly sensitive wildlife values and the significant threats posed by feral animals and marine pests.

Tasmania's diverse coastal, estuarine and marine ecosystems support a rich variety of coastal and marine life including shorebirds and seabirds, seals, whales and globally significant marine assemblages. This includes a number of threatened species, such as the spotted handfish (endemic to Tasmania), fairy tern and southern right whale. Many of these animals are highly adapted to and dependent on the coastal environment, whilst some species are found in other habitats too.

Native wildlife is important in environmental terms and is highly valued as part of the richness of Tasmania's coastline. The protection of wildlife and marine species is an essential component of any coastal works activity. Sometimes the purpose of coastal works is to assist in the protection of wildlife species from threats and human disturbance.

Many aspects of wildlife management away from the immediate shoreline are the same as further inland. More care, however, is necessary in the immediate coastal zone and intertidal area, as many species are highly adapted and cannot survive anywhere else. Increasing human use of coastal areas in most parts of Tasmania, and climate change impacts such as sea level rise and changes in ocean currents, make it more important than ever to protect coastal wildlife and habitat.

*Tab photo: Pelicans at Musselroe Bay, northern Tasmania.
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10.1 Conservation of coastal wildlife and marine animals

This section provides information on the spectrum of wildlife values in the coastal and marine environment, with particular attention to threatened species. Tasmania has vast areas of natural coastline that provide habitat for many diverse and specialised coastal animals.

Many birds frequent our coastlines. Little penguins nest in sand dunes, on rocky shores, under dense

vegetation and on offshore islands; migratory shearwaters nest in soft soils on the steeper headlands. Hooded plovers and other shorebirds breed along many of the more remote beaches, while terns, shy albatross, gannets and many other seabirds breed on offshore rocks and islands.

New Zealand and Australian fur seals haul out on offshore islands. Humpback and southern right whales migrate along Tasmania's east coast. Pilot whales, dolphins, sperm whales and killer whales are all visitors to our coastal waters and, sadly, some species sometimes strand on the Tasmanian coast.

Figure 10.1 Humpback whales are frequent visitors to Tasmanian waters on their annual migration along the east coast.
© Biodiversity Conservation Branch DPIWWE





Many terrestrial mammals also inhabit coastal areas: echidnas, wallabies, bettongs, bandicoots and eastern quolls are common, even in more urban environments. Reptiles, skinks and snakes live throughout Tasmania's coastal areas, with some species unique to offshore islands, and frogs inhabit coastal wetlands.

Tasmania's marine environments contain some of the most distinctive flora and fauna (marine assemblages) in the world. Many of these species are endemic to Tasmanian waters (i.e. not found anywhere else in the world). In fact, Tasmanian temperate waters have globally significant levels of endemism (DPIWE 2000b). A number of marine protected areas around Tasmania have been established to help protect these unique temperate species. These reserves are managed under the *Living Marine Resources Management Act 1995*. Some reserves are subject to 'no take' fishing restrictions, defined by the *Fisheries Rules 1999*.

In many coastal areas, increased pressure from development and human use of coastal resources results in permanent destruction and loss of habitat, which threatens coastal and marine wildlife. Other pressures include wandering cats and dogs, feral animals, marine pests, litter, pollution, sea level rise and other climate change impacts that may see changes in marine assemblages, vegetation communities and wildlife habitat.

10.1.1 Legislation

All Tasmanian species are protected under the *Nature Conservation Act 2002*; marine species are protected under the *Living Marine Resources Management Act 1995*.

Legislation that specifically relates to threatened species protection is listed here. **See also Chapter 1 Working on the Coast and Appendices 1 and 2 for more detailed legislative information.**

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* lists threatened species and ecological communities; migratory species and threatening processes; and prepares recovery plans, wildlife conservation plans and threat abatement plans (TAPs).

The *Threatened Species Protection Act 1995* provides for the protection and management of threatened native flora and fauna and promotes the conservation of native flora and fauna.

10.1.2 Tasmanian threatened species on the coast

'Threatened species' refers to those species listed under the *Threatened Species Protection Act 1995*. Some listed species have recovery plans and there are also threat abatement plans that cover threats common to a number of species.

Tasmania's coastline is home to more than 35 threatened fauna species including the white-bellied sea eagle (*Haliaeetus leucogaster*), shorebirds and seabirds such as the little tern (*Sterna albifrons sinensis*) and fairy tern (*Sterna nereis*), and mammals such as the New Holland mouse (*Pseudomys novaehollandiae*), New Zealand fur seal (*Arctocephalus forsteri*) and many whale species, including the southern right whale (*Eubalaena australis*). Threatened invertebrates include the live-bearing seastar (*Parvulastra vivipara*) and the chequered blue butterfly (*Theclinesthes serpentata lavara*).

Many species declared as threatened in Tasmania are also protected under Commonwealth legislation. Table 10.1 lists a number of threatened fauna species that live on the coast and their key threats (but this is not a comprehensive list).

Table 10.1 Examples of threatened coastal fauna in Tasmania, their current status and key threats. (Not a comprehensive list.)

Common Name	Scientific name	Habitat	Status Tasmania	Status Commonwealth	Threats
Mammals					
New Zealand fur seal	<i>Arctocephalus forsteri</i>	Haul-outs around the coast	rare		Fishing entanglements, fisheries interactions (including aquaculture)
New Holland mouse	<i>Pseudomys novaehollandiae</i>	Prefers coastal heath vegetation (predominantly NE Tas)	endangered		Habitat loss and destruction, inappropriate fire regimes, predation by feral pests
Southern right whale	<i>Eubalaena australis</i>	Migrates annually through east coast waters	endangered	endangered	Habitat or resource destruction
humpback whale	<i>Megaptera novaeangliae</i>	Migrates annually through east coast waters	endangered	vulnerable	Habitat or resource destruction
Birds					
white-bellied sea eagle	<i>Haliaeetus leucogaster</i>	Nests on offshore islands and rocky headlands	vulnerable		Habitat destruction
little tern	<i>Sterna albifrons sinensis</i>	Breeding colonies on beaches under threat	endangered		Habitat loss and destruction, predation by feral pests, human impacts
fairy tern	<i>Sterna nereis</i>	Breeding colonies on beaches under threat	vulnerable		Habitat loss and destruction, predation by feral pests, human impacts
shy albatross	<i>Thalassarche cauta</i>	Offshore species	vulnerable	vulnerable	Long-line fishing
Fish					
spotted handfish	<i>Brachionichthys hirsutus</i>	Declining isolated colonies in Derwent Estuary and adjoining bays	endangered	endangered	Disturbance to seabed through dredging, pumping and marine development
Invertebrates					
chevron looper moth	<i>Amelora acontistica</i>	Saltmarsh in Cremorne and Lauderdale area	vulnerable		Habitat destruction: driving off-road vehicles on saltmarsh; stock grazing leading to displacement of native plants, weed invasion and soil compaction; changes to drainage pattern
chequered blue butterfly	<i>Theclinessthes serpentata lavara</i>	Saltmarsh in Pitt Water and Lauderdale area	rare		As per looper moth
live-bearing seastar	<i>Parvulastra vivipara</i>	Small number of locations on rocky intertidal in SE Tas	vulnerable	vulnerable	Loss of habitat due to development, collection



Everyone undertaking works on the coast has a responsibility to protect threatened species. Coastal land management activities must identify the presence of threatened species as part of planning and risk assessments and put in place measures to manage impacts from work activities on threatened species.

Conservation categories of threatened species

The following definitions apply under Tasmania's *Threatened Species Protection Act 1995*

Endangered: a species that is either:

- in danger of extinction because long-term survival is unlikely while the factors causing the species to be endangered continue operating

or

- presumed extinct on the grounds that no occurrence of the species in the wild can be confirmed during the past 50 years.

Vulnerable: a species that is likely to become endangered while the factors causing it to be vulnerable continue operating.

Rare: a species that has a small population in Tasmania which is not endangered or vulnerable but is at risk.

Figure 10.2 Fairy terns are listed under the *Threatened Species Protection Act 1995*. © Birds Tasmania





Nomination of a new threatened species

Threatened species status is under ongoing review. Anyone can nominate a species for consideration through an official nomination process. If a species recovers, the committee can remove it from the threatened species list.

The Tasmanian Scientific Advisory Committee (SAC) has produced a set of guidelines (or rule sets) based on scientific information which determines whether a species qualifies as being threatened (extinct, endangered, vulnerable or rare) in Tasmania. The criteria are based on internationally accepted definitions but are modified to suit the Tasmanian regional context.

10.1.3 Guidelines for protecting wildlife during coastal management works

Specific information for the protection of threatened species and significant species such as shorebirds and penguins is provided in other sections of this chapter.

Management and conservation of wildlife needs to be taken into account in development proposals and in all aspects of planning for works in coastal and marine environments in Tasmania. Consider the potential impacts of work activities on wildlife and marine species.

Coastal works that create disturbance to marine areas can have a devastating impact on the unique temperate marine assemblages. Localised sediment disturbance, pollution, and increases in nutrient levels can all have an impact on marine species.

Identify any marine habitats or values that might be affected by the works. Seek specialist advice and assessments and approvals where required. More complex coastal works such as shoreline protection structures will require a comprehensive assessment of

the marine values of the site and likely impacts.

Identify any wildlife values and habitats that may be affected by the work activity. Assessments and approvals may be required. Seek specialist advice.

Ensure works are properly supervised by qualified people and that follow-up surveys are done. Ensure all staff and contractors are aware of the operational constraints required to protect wildlife values and habitat.

Minimise damage to wildlife habitat during works and rehabilitate the site soon after works are completed. Ensure follow-up surveys and monitoring are undertaken.

Land management activities in coastal reserves and foreshore areas should promote biodiversity outcomes and reduce the impact of weeds and feral pests.

10.1.4 Special considerations for protecting threatened species

In addition to the guidelines in 10.1.3, the following matters must be considered in areas where threatened species are present.

It is an offence to take a threatened species without a permit. 'Take' includes kill, injure, catch, damage, destroy or collect and can include the destruction of critical habitat for a threatened species.

Consider potential impacts of coastal works on threatened species and critical habitats. Any development-related threats to listed species must be discussed with the Department of Primary Industries, Parks, Water and Environment (DPIPWE) Policy and Conservation Assessment Branch (PCAB), which is responsible for coordinating advice.

Before planning or undertaking works on the coast,



determine whether there are threatened species in the proposed work area.

- Search the EPBC database
- Search lists on the Department of Primary Industries, Parks, Water and the Environment (DPIPWE) website for locations of threatened species.
- Consult specialists in the Threatened Species Section of DPIPWE.
- Check for the existence of recovery plans for species in your work area, which can provide guidelines to ensure your works are complementary to species management work.

Make use of existing recovery and threat abatement plans prepared by specialists. These can provide guidance for protecting particular species such as procedures for vegetation clearance on coastal land.

Develop asset or area management plans, in consultation with specialists, which provide specified objectives and actions in areas known to support threatened species. Identify threatening processes and their impacts.

Monitoring is essential to maintain up-to-date information on threatened species and their habitat and to improve management outcomes. Be sure to incorporate monitoring protocols into any asset or area management plan. Report any occurrences of threatened species in areas outside of their known range to the Threatened Species Section, DPIPWE.

10.1.5 Relocating coastal species

Sometimes it is necessary to relocate coastal species, either for their own protection or for health and safety reasons. Seagulls, for example, can form large breeding colonies during August and September in locations such as ports or along railway lines or causeways.

Pest controllers are sometimes engaged by land management authorities such as Tas Ports to relocate the birds away from areas used for industry or transport. The relocation operations are expensive and are usually only undertaken when the damage caused by large numbers of birds and their excrement is very costly or when human health or safety are at risk.

Seagull faeces can harbour a number of diseases and can be very damaging to freight. Colonies along causeways are a hazard to motorists as fledgling birds fly across the road erratically.



Case Study 10.1: Protecting threatened seastars during construction works in south-east Tasmania

In 2002 the Department of Infrastructure, Energy and Resources (DIER) upgraded McGees Bridge on the Sorell Causeway at the Pitt Water–Orielson Lagoon Ramsar site. DIER worked with the Tasmanian Parks and Wildlife Service and Threatened Species Section of DPIPW to ensure that natural coastal values in the area would be protected.

As part of the assessment process it was confirmed that the sandstone footings of the old bridge were home to a population of the threatened live-bearing seastar, *Parvulastra vivipara* (formerly *Patiriella vivipara*).

The seastar is restricted to discrete locations in south-east Tasmania because it reproduces by bearing live young and therefore does not have a dispersal stage.

To protect this unique and threatened species, teams of volunteers relocated thousands of seastars to a nearby rocky shoreline while construction work was underway.

In addition, the bridge design was modified to ensure that the surface of the new bridge footings would be suitable for the seastars. Once the work was finished, the seastars were collected and moved back to their original location.



Figure 10.3 Threatened live-bearing seastar *Parvulastra vivipara* © Bill Albion



10.2 Seabirds

This section provides information for protecting significant seabird species such as penguins and shearwaters. Threatened seabirds such as tern species are covered in **section 10.3** with shorebirds.

Penguins and shearwaters and their burrows are protected under the *Nature Conservation Act 2002*.

Potential impacts of climate change, in particular sea level rise and resulting erosion of coastal margins such as sandy beaches over the next 50 to 100 years, will compound existing conservation issues and will almost certainly have an impact on seabird habitat. Predicted sea level rise may flood the existing nesting, roosting and foraging habitats of many species.

10.2.1 Little penguins

Little penguins (*Eudyptula minor*) are small, flightless birds standing about 30cm tall, ranging in length from about 40cm to 45cm and weighing around 1kg. Their average life expectancy is approximately seven years, although there are records of some reaching over 20 years.

Little penguins come ashore after dark and return to the sea before first light to reduce exposure to predators.

Penguins colonise coastal areas that have suitable habitat and few predators. They can occupy coastal areas up to 500m from the shore and nest in a wide variety of habitats including both shallow and deep burrows, rock crevices and beneath dense

Figure 10.4 Moulting penguins are easily identified due to the amount of feathers around them and should be left alone.

© Perviz Marker





vegetation canopies, which shelter them from the sun and predators. A typical burrow consists of a tunnel 60–80cm long with a nest bowl at one end, large enough for a little penguin to stand in, even though the entrance may often be much smaller. Little penguins are opportunistic birds, nesting where they can achieve maximum shelter (Pryor & Wells 2009).

They breed between August and February, coinciding with an annual upsurge in marine productivity. The nesting period (around six to eight weeks), followed by the moult period (usually February to April) are particularly vulnerable times in the lives of little penguins, when they are most at risk of starvation or predation.

Understanding and considering the life cycle and habits of the little penguin when planning coastal management works will minimise any impacts on the species.

Moulting penguins

It is easy to mistake a moulting penguin for a sick or injured bird. In late summer and autumn 'scruffy-looking' penguins come ashore to moult. Usually these birds stand or rest by themselves in a sheltered area and are surrounded by freshly moulted feathers. Penguins at the start of moult are usually plump, with dull feathers sticking out from the body. They often appear hunched and 'miserable'. Birds well into moult have large patches of old feathers missing, with clean new feathers emerging.

A moulting penguin is best left alone. If it is threatened by dogs or people, contact the nearest Parks and Wildlife Service (PWS) office or the DPIPW Wildlife Hotline. If you must move the penguin, take care because they can bite when threatened. Keep it in a cool, secure, quiet place and do not handle or feed it.

Many species of sub-Antarctic penguins come ashore to moult on Tasmania's beaches. Report all instances of such events to DPIPW on the 24-hour Wildlife Hotline.

10.2.2 Threats to little penguins

Foxes and domestic and feral cats and dogs are highly destructive predators. Controlling them is essential for the survival of little penguins.

Marine debris and other forms of litter can be lethal to penguins. Discarded fishing nets, line and tackle and other plastic rubbish can entangle penguins and either choke or starve them to death. Oil and chemical spills also have a devastating effect on them.

Habitat loss to development and disturbance by removing shelter and nesting material, threaten the survival of little penguin colonies. Dumping of garden waste and other material can block access to burrows. Every year, many little penguins are killed on coastal roads adjacent to colonies.

Localised overfishing is a significant threat to little penguins, disrupting their feeding habits and making them go further offshore to get enough food to feed themselves and their young and prepare for their fast during the moult.

Grab-all nets (gillnets) are extremely destructive in two ways: they catch and kill all wildlife caught in them, which includes a large number of little penguins; and they disrupt the food chain on which seals, sharks and the little penguin rely, affecting breeding success. Gillnets are a threat especially when set near colonies.

Sea level rise will have an impact on available nesting sites, and increased frequency of extreme storm events and storm surges may result in destruction of existing rookeries, forcing penguins to relocate.



10.2.3 Protecting little penguins

Coastal land managers have a key role to play in the conservation of little penguin habitat, particularly around built-up areas. This role extends to training of planners, maintenance crews and natural resource managers and education of coastal user groups.

New development applications must consider potential impacts on little penguins and their habitat.

In areas with little penguin colonies, it is critical to protect birds when they are moving to or from the sea, by prohibiting dogs for at least one hour before and after sunrise and sunset from July to April.

Consider signage, fencing and other management approaches to educate residents and minimise impacts of dogs and cats on little penguins. Take into consideration the fact that it is preferable not to promote the location of some penguin colonies. Consult specialists at DPIPWVE.

Figure 10.5 Little penguin on eggs in burrow.
© Perviz Marker



If penguins need to cross a road to access their colony and nests, consider management actions to keep them off the road, and educate residents and road users. Consider fencing to keep penguins off the road or tunnels under the road so that penguins can safely access their burrows. A penguin tunnel has been installed at Eaglehawk Neck in collaboration with the local Coastcare group and has reduced the number of penguins being killed on the road.

10.2.4 Guidelines for working in little penguin habitat

Do not work in and around a penguin colony during breeding and moulting times, as the birds can be stressed and may abandon their nests if disturbed. The best months for works are usually from May to July, provided the birds have finished raising chicks and have completed their moult. Avoid works if any birds are present at the site.

Consider the impact of lighting, noise and intense vibration on the penguins and minimise these impacts wherever possible.

Weed removal must be gradual, and combined with revegetation work, to ensure sufficient nesting habitat is always available. Prickly weeds are the only safe habitat for small marsupials and birds in many areas. Nesting penguins often shelter under African boxthorn, an invasive weed species.

Spraying of herbicides is not recommended in penguin colonies and should not be conducted in sites with sandy soils. Herbicides may persist within the soil, as the low organic content inhibits the breakdown of herbicides and may be harmful to nesting penguins. If herbicide needs to be used, the cut-and-paste, scrape-and-paint or drill-and-fill methods are recommended, where appropriate (Pryor & Wells 2009).



The preferred species for revegetation in and around little penguin colonies generally include *Tetragonia implexicoma*, *Rhagodia candolleana* and *Poa* spp., but this depends on the site. *Acacia sophorae* is generally not suitable as its lower branches become rooted in the ground and are too entangled for penguins to negotiate (Pryor & Wells 2009). Information on appropriate species can be obtained from the Understorey Network.

Avoid leaving rock or gravel on the roadside during road work or other infrastructure activities as these obstacles can impede little penguins trying to cross the road.

Ensure that any rubbish from work activities is removed from the site at the completion of works. Provide adequate and appropriate rubbish facilities at boat ramps and other coastal facilities and ensure that they are serviced regularly.

Include local residents and community groups in planning for management actions to protect little penguins. Local residents can make a big difference to improving outcomes for little penguins by making changes in their behaviour, such as keeping dogs locked up and not modifying the foreshore environment.

10.2.5 Short-tailed shearwaters

Short-tailed shearwaters (*Puffinus tenuirostris*) are migratory birds that breed on Tasmanian headlands from September to April. They travel approximately 30 000km on their annual round trip from the Arctic region to south-east Australia.

Approximately 23 million short-tailed shearwaters breed in about 280 colonies across south-eastern Australia with 18 million of these arriving in Tasmania each year. Adult birds will return to the same burrow throughout their lifetime.

Colonies are usually found on headlands and islands, covered with tussocks and succulent vegetation such as pigface and ice plant or sea spinach. Headlands allow for easy take-off and landing. The largest colony is on Babel Island (part of the Furneaux Group in Bass Strait), which has around 3 million burrows.

Other colonies are less remote and are often associated with penguin colonies. Birds in their burrows are vulnerable to attack from feral animals and dogs that are allowed to roam free.

Short-tailed shearwaters are a very significant part of contemporary Aboriginal culture. Chicks (Tasmanian muttonbirds or yolla) are harvested annually from their burrows for their prized meat and oil. The chicks are taken under strict controls and the commercial season is limited to the period 27 March to 30 April. Many colonies are managed by the Aboriginal community in collaboration with DPIPWVE.

Outside of these areas, protection of shearwater colonies and habitat can be achieved by following the guidelines for penguin habitat protection. It is important to keep machinery out of colonies as the burrows can be easily destabilised. Even walking

Figure 10.6 Short-tailed shearwater. © Steve Johnson





around in colonies can be destructive: specialist advice and great care are needed for any access.

Shearwaters washed up on beaches

Short-tailed shearwaters are the most numerous bird found washed up on beaches from February to May each year, typically after a storm or a period of poor weather. At this time, chicks have fledged and are getting ready to migrate but cannot fly very well, so can fall and get washed onto beaches. Often they are starving, exhausted or even hypothermic.

Shearwaters should be placed in a box (*do not attempt to feed them*) and released at night on a beach (preferably from an elevated site) or taken into the nearest PWS office, or the Wildlife Management Branch of DPIPW at 134 Macquarie Street, Hobart (during office hours). Call the Wildlife Emergencies 24-hour Hotline for advice if necessary. **Refer to section 10.7 Tools and resources.**

10.2.6 Threats to shearwaters

Although there appear to be huge numbers of short-tailed shearwaters, they are still vulnerable to over-harvesting and habitat destruction. In places, pigs, cattle and sheep have destroyed whole colonies. Soil erosion after fire can destroy suitable sites for burrowing.

Gillnet fisheries in the North Pacific accidentally drown up to 50 000 birds annually.

Currently, approximately 200 000 chicks are harvested and sold annually in Tasmania by commercial operators. Birds also ingest small plastic particles while at sea, which may limit their ability to maintain condition and will contribute to deaths during migration.

Feral cats and roaming dogs (and now foxes) are also

a problem, as they find shearwater chicks easy prey.

Trampling of burrows by humans can also cause the death of birds. Similarly, erosion caused by recreational vehicles can destroy suitable sites for burrowing. It is important to keep off colonies.

Natural mortality occurs mainly during the first migration due to exhaustion and starvation. The average lifespan is 15–19 years but birds can live for up to 38 years (Parks and Wildlife Service website accessed 15th Sept 2010).

10.2.7 Protecting shearwaters

Because of the shearwater's international migratory habitats, the species has become the subject of a joint protection project between Japan and Australia – the Japan Australia Migratory Bird Agreement (JAMBA). Both countries monitor the shearwater population while the birds are in their area.

In Tasmania, limits are imposed to prevent over-harvesting and a number of wildlife sanctuaries protect shearwater colonies. Japan and other countries are attempting to minimise the number of birds drowned by their fishing operations. It is hoped that these conservation methods will ensure the survival of one of the world's most amazing migratory birds (Parks and Wildlife Service website accessed 15th Sept 2010).



10.3 Shorebirds

This section provides information for minimising impacts on migratory and resident shorebirds. Small seabirds such as little and fairy terns are also considered here, due to their nesting behaviour on sandy beaches.

Shorebirds are coastal birds that breed on beaches and forage on the shoreline and in wetland areas, feeding mainly on small crustaceans and invertebrates. Tasmania is home to both migratory and resident shorebirds.

Migratory species breed in the northern hemisphere and migrate vast distances annually to feed and rest along Tasmania's coastlines and wetlands.

Tasmanian shorebirds are present on the coast all year round. Beaches and foreshores provide habitat for their entire life cycle: foraging, roosting and breeding. Tasmania is believed to be a relatively secure refuge for shorebirds compared to mainland Australia.

Figure 10.7 Pied oystercatchers nest on Tasmanian beaches from September to March. © Birds Tasmania



However, decreases in shorebird breeding populations along the Tasmanian coast, particularly on beaches in the south-east and east and at other popular beaches, have been well documented by Birds Tasmania over the past two to three decades.

Many shorebirds and small terns such as the fairy tern and little tern are listed as threatened species in the *Threatened Species Protection Act 1995*. Others, such as hooded plovers (*Thinornis rubricollis*), are rapidly decreasing in breeding numbers through much of Tasmania. Threats are common to all species of shorebird and tern and include destruction/loss of habitat due to coastal development and disturbance (poor breeding success) from recreational activities such as horseriding and vehicles on breeding beaches.

10.3.1 Migratory shorebirds

Migratory shorebirds visit Australia from the Arctic tundra in the northern hemisphere every year from September to March. Migratory birds travel on an established route known as the East Asian – Australasian Flyway. Birds on the flyway make an annual migration of over 25 000km, some flying for more than 10 000km non-stop.

Many coastal areas in Tasmania are important feeding and resting sites, where birds will rest and replenish fat reserves for their long migration back to breeding grounds in the northern hemisphere.

Sites such as Robbins Passage in the north-west, Moulting Lagoon on the east coast and Pitt Water - Orielson Lagoon and Ralphs Bay in the south-east are very important migratory bird habitats.

All migratory shorebirds are listed in the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* and under international migratory bird agreements including the Ramsar



Convention and JAMBA, the China–Australia Migratory Bird Agreement (CAMBA) and the Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA). Refer to Table 10.2

Ramsar Convention

Many important migratory bird habitats are also protected under the *Ramsar Convention on Wetlands* (1971). Australia is a signatory to the intergovernmental treaty that provides the framework for international cooperation for the conservation and wise use of wetlands.

Management of Ramsar wetlands is in accordance with the duties and obligations of signatories to the convention and is presently undertaken through the *Environment Protection and Biodiversity Conservation Act 1999*.

Figure 10.8 Bar-tailed godwits travel over 10 000 km from their breeding grounds in the northern hemisphere to rest here over the northern winter. © Alan Fletcher, Birds Tasmania



National guidelines for Ramsar Wetlands are currently being developed by the Australian Government to provide a framework for Ramsar Convention implementation in Australia and provide jurisdictions and other interested parties with clear guidance on the management of Ramsar sites.

Migratory Bird Agreements

Australia is a signatory to the Japan–Australia Migratory Bird Agreement (JAMBA), the China–Australia Migratory Bird Agreement (CAMBA) and the Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA).

These international bird agreements provide an important mechanism for pursuing conservation outcomes for migratory birds, including migratory shorebirds. They are bilateral agreements between two countries and more work is needed to influence conservation outcomes across their migratory path (flyway) which extends through multiple countries.

In Australia all migratory bird species listed in these bilateral agreements are protected under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*.

10.3.2 Resident shorebirds

Tasmania's resident shorebirds comprise four species: Australian pied oystercatcher (*Haematopus longirostris*), sooty oystercatcher (*Haematopus fuliginosus*), hooded plover (*Thinornis rubricollis*) and red-capped plover (*Charadrius ruficapillus*).

Hooded plover populations have decreased by more than 25% since 1982, (E. Woehler pers. comm. 2010) and monitoring programs by Birds Tasmania indicate that these decreases are continuing. In New South Wales only 10 or so breeding pairs of hooded



plovers remain and numbers of shorebirds in some mainland states are now at critically low levels and in danger of becoming locally extinct.

Due to the ecological similarities regarding nesting habitat and sensitivities to disturbance, little terns and fairy terns, although strictly seabirds, are included in shorebird protection programs. Caspian terns (*Hydroprogne caspia* formerly *Sterna caspia*) also breed on Tasmanian beaches but nests are rarely seen.

Many Tasmanian beaches are important nesting areas for resident shorebirds and seabirds between

1 October and 31 March each summer. Shorebird eggs are laid in shallow scrapes in the sand. They are hard to spot and therefore can be easily squashed by vehicles or trodden on by the unaware.

Young chicks are flightless for up to seven weeks (depending on species) and will run to the dunes, nearest vegetation or water to hide. Nests are small (around 10cm for plovers, smaller for terns) and well camouflaged, typically at the base of foredunes above high water mark and wrack, but also can be in light vegetation.

Table 10.2 Migratory bird species that make the annual migration to Tasmania over the northern hemisphere winter.

Common name	Scientific name	International bird agreements
bar-tailed godwit	<i>Limosa lapponica</i>	JAMBA, CAMBA, ROKAMBA
caspian tern	<i>Hydroprogne caspia</i> formerly <i>Sterna caspia</i>	JAMBA, CAMBA, ROKAMBA
curlew sandpiper	<i>Calidris ferruginea</i>	JAMBA, CAMBA, ROKAMBA
eastern curlew	<i>Numenius madagascariensis</i>	JAMBA, CAMBA, ROKAMBA
fleshy-footed shearwater	<i>Puffinus carneipes</i>	JAMBA, ROKAMBA
great knot	<i>Calidris tenuirostris</i>	JAMBA, CAMBA
greenshank	<i>Tringa nebularia</i>	JAMBA, CAMBA, ROKAMBA
grey plover	<i>Pluvialis squatarola</i>	JAMBA, CAMBA, ROKAMBA
grey-tailed tattler	<i>Tringa brevipes</i>	JAMBA, CAMBA, ROKAMBA
Latham's snipe	<i>Capella hardwickii</i> formerly <i>Gallinago hardwickii</i>	JAMBA, CAMBA, ROKAMBA
lesser golden plover	<i>Pluvialis dominica</i>	JAMBA, CAMBA
lesser sand plover	<i>Charadrius mongolus</i>	JAMBA, CAMBA, ROKAMBA
pectoral sandpiper	<i>Calidris melanotos</i>	JAMBA, ROKAMBA
red-necked stint	<i>Calidris ruficollis</i>	JAMBA, CAMBA, ROKAMBA
ruddy turnstone	<i>Arenaria interpres</i>	JAMBA, CAMBA, ROKAMBA
short-tailed shearwater	<i>Puffinus tenuirostris</i>	JAMBA, CAMBA, ROKAMBA
terek sandpiper	<i>Xenus cinereus</i>	JAMBA, CAMBA, ROKAMBA



Nesting birds will see people approaching from a distance of 100m or more (long before you see them) and will leave their nests, eggs and chicks. Exposed eggs and chicks will cook on hot sunny days, and chill on cool/wet days, both result in breeding failure. Exposed eggs and chicks are also vulnerable to predation by gulls and forest ravens and possibly currawongs. All dogs are predators of both chicks and eggs.

10.3.3 Signs that nesting shorebirds are present

- Nests are (relatively) easily located by behaviour of birds (calls etc.) and their footprints in sand leading to/from the nest.
- Nesting birds may distract you; pied oystercatchers will make alarm calls to their partners and chicks, some will fly at you.
- Terns will 'attack' you, swooping low over your head, calling and appearing very 'excited' – actually very agitated and distressed.

- Terns may abandon the colony if disturbed, so it is critical to avoid disturbing nesting adults.

10.3.4 Threats to shorebirds

The majority of resident shorebirds live on the beaches that are popular for human recreational activities, including (but not limited to) dog-walking, four-wheel-driving, horseriding, driftwood collecting, beachcombing and walking. There have been increases in beach use in more remote locations that were previously never or rarely visited by people (e.g. on the South Coast track, in the Arthur-Pieman, Waterhouse and Southwest Conservation Areas and the Tasmanian Wilderness World Heritage Area).

In recent years, at a number of beaches, breeding has become restricted to the least disturbed areas, or ceased entirely if adult birds have aged and died without successfully reproducing, due to continuous disturbance from human activities during their

Figure 10.9 Shorebird nests are simple scrapes in the sand and difficult to detect. Eggs and chicks are easily trampled by people or horses or crushed by vehicles. Left: fairy tern chick, Right: hooded plover eggs.

© Dr Eric Woehler and Valeria Ruoppolo





summer breeding season. While shorebird numbers may appear to be stable at a particular site, records have shown that breeding has not been successful at some sites for years (E. Woehler pers. comm. 9th August 2010).

Particular human activities such as taking 4WD vehicles and horses onto beaches can be devastating to nesting shorebirds.

Shorebirds also face threats from climate change impacts. Sea level rise, increased storm frequency, coastal erosion and inundation will result in the modification of suitable breeding beaches and wetland areas that are used as feeding and resting sites.

Shorebird eggs and chicks are extremely camouflaged and are easily trampled by walkers, horses and vehicles on beaches. Beach users will disturb the foraging of resident and migratory shorebirds, preventing the adults from incubating or feeding their young for extended periods. Disturbance that makes birds leave their nests during hot days or cold nights will result in thermal stress to the eggs and chicks, and can result in their death.

Disturbance and destruction by feral or uncontrolled animals such as dogs, cats and foxes are key threats to shorebirds and seabirds. Dogs and people frighten birds away from their feeding and nesting sites.

Unsupervised dogs eat eggs and chicks. Domestic and feral cats kill high numbers of birds every year. Even well-behaved dogs, if they are allowed to run off-lead, are a threat. Just the sight of a dog can be enough to frighten and disturb birds.

10.3.5 Protecting shorebirds

Signage and information brochures can help to alert local residents and visitors to the bird values in the area and foster a sense of appreciation for these unique animals.

Consider temporary fencing of shorebird nests on high-use beaches. This needs to be undertaken with caution and to be accompanied by education and awareness-raising. At popular events such as surf carnivals, temporary fencing works best when volunteers or land management staff can be on hand to watch over the sites and inform beach users about shorebird values and threats.

Control access of dogs, horses and vehicles on shorebird beaches during breeding and migratory bird times, from September to March.

Birds Tasmania volunteers undertake annual monitoring of shorebird numbers and breeding success. Land managers could support these activities by undertaking their own monitoring in collaboration with Birds Tasmania.

Consider providing artificial shelters for breeding birds and their young. Techniques can be found in *A practical guide for managing beach-nesting birds in Australia* (Maguire 2008).



10.3.6 Guidelines for working in shorebird habitat

Schedule works to avoid shorebird breeding season if possible (sometimes the best time to manage weeds clashes with the shorebird season).

Minimise time spent working in breeding territory or close to nest, eggs and chicks, to reduce adults' times off nests, eggs and chicks.

Avoid disturbing nesting birds at night, to prevent eggs chilling: beach sands cool rapidly at night and eggs left unattended will fail.

Assume that nests, eggs and chicks are present even if you haven't found them: reduce your time at the top of the beach to the minimum time required to remove weeds or undertake works.

Travel along the tide line, preferably limiting intense activities to low tide to keep people and any vehicles away from nesting birds.

Avoid damage to the dune landscape that may affect the profile of the dunes and make it difficult for young birds to seek shelter.

Include local residents and community groups in planning for management actions to protect shorebirds. Local residents can make a big difference to improving outcomes for little penguins by making changes in their behaviour, such as keeping dogs locked up and not modifying the foreshore environment.

10.3.7 Monitoring shorebirds

Birds Tasmania undertakes annual monitoring of shorebird numbers. Community groups and land managers can assist by providing information to Birds Tasmania when working in shorebird areas.

Useful data includes:

- reports of nesting shorebirds and small terns, including GPS data and estimates of numbers
- reports of migratory shorebirds – estimates of numbers/species
- evidence of entanglement – photographs.

Birds Tasmania can provide data sheets and bird identification guides, and possibly assist in the identification of carcasses.

Remember: do not disturb birds when you are collecting data.



10.4

10.4 Injured and orphaned wildlife

This section provides information on assisting injured and orphaned wildlife and reporting wildlife emergencies.

Wildlife can be injured inadvertently, for instance in road accidents, from entanglement in fishing line, as a result of chemical or oil spills, or through deliberate cruelty. Accidents that kill parent animals may leave their offspring with little chance of survival.

Compassion and care for wildlife is commendable, but keep personal safety in mind. It is best to get appropriate advice before approaching injured or resting wildlife, as some animals can become stressed and will attack if they feel threatened. In the meantime, it is important to protect the animal from people and dogs. Seek advice from the local PWS office, the RSPCA, the Wildlife Management Branch of DPIPW or a veterinarian.

If professional help cannot be obtained within 24 hours, follow the procedures on the DPIPW website. Before attempting capture, observe the animal for any signs of illness or injury to help the vet or officer identify the animal's problem.

10.4.1 Legislation

In addition to the legislation detailed in **section 10.1.1**, the state *Whales Protection Act 1988* provides further protection for whales in Tasmanian waters.

Most Tasmanian wildlife is protected by law and can only be rehabilitated with a permit. The Wildlife Management Branch of DPIPW is responsible for issuing permits and keeps a list of trained wildlife carers who may be able to help.

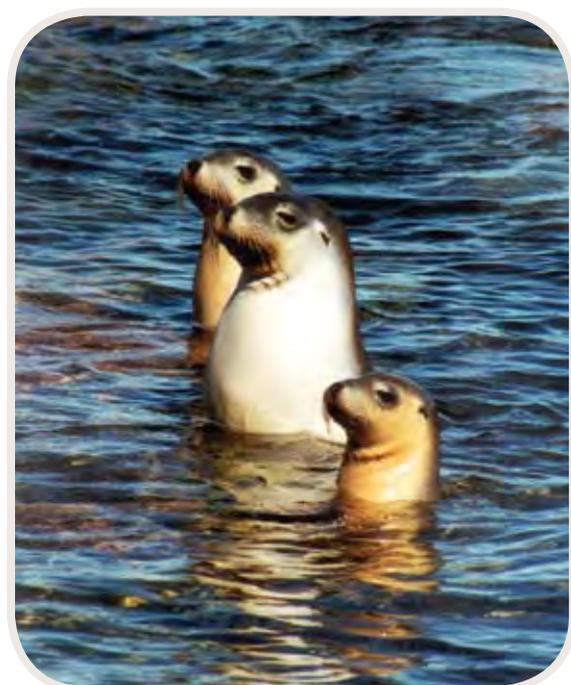
10.4.2 Seals on beaches

Seals regularly come ashore (haul out) for a number of reasons and are not necessarily injured. They may just need time to rest or groom or moult. Keep a safe distance—seals have large teeth and a long, flexible neck which they can whip around with surprising speed. They can inflict painful wounds and carry a number of diseases that may include tuberculosis.

Sick or injured seals may also be found on the beach. Seals are among the most inquisitive of creatures and often end up with rope, fishing net or packaging strap wrapped around their necks. As the seal grows, this material gradually strangles it.

All seals are wholly protected throughout Australian waters.

Figure 10.10 Australian fur seals are curious animals and as such risk becoming entangled in marine debris.
© Biodiversity Conservation Branch DPIPW





Do not approach any seal without advice from the nearest PWS Field Centre or the Wildlife Management Branch at DPIPW. In the meantime, keep dogs away and advise people not to approach the animal. It is important to report all sightings of seals on Tasmanian beaches to DPIPW on the Wildlife Hotline or Whales Hotline. **Refer to section 10.7 Tools and resources.**

10.4.3 Oiled animals

Treating oiled seabirds is highly specialised and should not be attempted without prior training – animals need extensive attention to remove the oil, and intensive after-care.

Contact the Wildlife Hotline if you discover oiled seabirds or mammals.

Wildlife emergency contacts

Wildlife Hotline 6233 6556 (24 hours)

Whale Hotline 0427 WHALES or 0427 942 537

This is a 24 hour monitored telephone service to receive calls of all cetacean sightings and strandings.

RSPCA 6244 3033 or 1300 139 947 (animal cruelty enquiries)

10.4.4 Whale strandings

The information in this section was taken from the *Tasmanian Whale Stranding Handbook and Directory* (DPIWE & DTPHA 2005) and the DPIPW website.

Of all Australian states, whale strandings occur most frequently in Tasmania. A disproportionate number of these strandings have occurred in the Circular Head and Macquarie Harbour – Ocean Beach areas.

Common and bottlenose dolphins, both of which typically strand singularly, are the most commonly reported species. Sperm whales and long-finned pilot whales also are frequently reported, the latter usually in large pods. In 2008 for example, 188 pilot whales were reported as stranded near Sandy Cape. In November 2003 over 100 long-finned pilot whales stranded on a remote stretch of coastline south of Strahan. A detailed record of Tasmanian strandings is available on the DPIPW website.

Most strandings are reported in the summer months, although it is not clear whether this is a consequence of increased human activity along the coast during this time of the year or an increase in the number of whales passing the coast.

Responses to whale and dolphin strandings are managed on a joint basis between the Parks and Wildlife Service and the Biodiversity Conservation Branch, DPIPW.

Successful whale stranding outcomes depend on immediate notification, seeking expert advice and mobilisation of people and equipment.



Why whales strand

The reasons whales strand are not yet fully understood. Some theories include whales following nutrient-rich waters that have been driven closer to southern Australia by climatic conditions. They may be confronted with rough seas or a single individual may stray too close to the shore and become stranded. Toothed whales have very tight family bonds. A stranded animal might continue to call and other members of the pod might follow the call, which can lead to the rest of the pod encountering a similar fate. Occasionally, stranded whales are found to be suffering from infections of the inner ear, which may affect their ability to navigate, using echo-location.

Also, certain topographical features may increase the risk of strandings. Wide, gently sloping beaches are not detected by the reflection of sonar pulses. This may result in the whales approaching too close to the shore. Similarly, bays with narrow mouths flanked by rocky headlands may give the whales the impression that they are trapped with no way out. This can cause panic which may result in beaching. In the case of stranded small whales and dolphins, it is possible that

killer whales (orcas) have panicked the pod, forcing them shoreward.

Helping stranded whales

In the case of single strandings of small whales such as dolphins, it may be possible to successfully return the animal to the sea – but always seek expert advice. A mass stranding is a more formidable problem, and requires a coordinated approach.

The first priority in any attempt to save a stranded pod of whales is to seek help. Contact the Whale Hotline number. Provide details of the exact location of the stranded animals, their numbers, condition, the species (if you know), their size and any other details that may be useful.

Members of the local community and bystanders will be very keen to rescue the whales but, without experienced staff from PWS or DPIPW, this can be very dangerous. It is essential to get assistance immediately to coordinate any response involving the general public.

Figure 10.11 A mass whale stranding, such as this one of long-finned pilot whales on the west coast of Tasmania, attract large numbers of volunteers who want to assist the whales. © Chris Arthur





Before specialist help arrives

Overheating is a big problem for stranded whales. Dig holes for the flippers so that they are hanging free. Allow water to enter these holes to assist in cooling, as the flippers and tail are important areas for heat exchange. Cover the body from the burning and drying effects of sun and wind – towels or seaweed will suffice – but don't cover the blowhole. Wet the animal down, ensuring that water does not enter the blowhole.

Once authorities have arrived, the animals will be assessed and the release coordinated so that the entire surviving pod is released. If released individually the animal will often restrand simply because it does not know where to go or responds to the continued distress calls of the individuals that are still stranded. Whales are highly social creatures. It is important not to underestimate the need to maintain their group structure.

Despite their formidable size, whales appear reluctant to cause any harm to their rescuers. Nonetheless, accidents can happen.

- Don't stand on the shoreward side of a whale, as a wave can easily roll the animal on top of you.
- Beware of sudden movements of the tail.
- Most importantly, beware of hypothermia. Tasmanian waters are cold. Rescuers should be well equipped with thick wetsuits and a change of warm clothes. Be well aware of how long you have spent in the water.

WILDCARE whale rescue volunteers

WILDCARE coordinates a group of first-response whale rescue teams made up of trained volunteers that can be called on to assist in the event of a stranding. The teams are contacted by the Parks and Wildlife Service or the Biodiversity Conservation Branch of DPIPWE.

Members of the public who are interested in assisting with whale rescues can join WILDCARE Inc and register for whale rescue on the membership form. They will receive information about WILDCARE Inc, whale rescue courses, and the formation of First Response Teams.



10.4.5 Animals and road accidents

Remove dead wildlife from the side of the road wherever possible. Carcasses left on the side of the road attract predators such as quolls, devils and birds of prey, which in turn can be killed by traffic.

Check the pouch of marsupials for young that may have survived the impact and could be rehabilitated by wildlife carers.

Your own safety is the priority, so only stop if it is safe to do so.

Reducing roadkill

Refer to the DPIPWE website for guidelines for reducing roadkill, which include the following ideas:

- Provide shelter (e.g. vegetation) on roadsides for animals to hide in.
- Build underpasses with 'funnel fencing' to encourage animals to cross underneath the road. The fences are set at an angle of 45° to the road (like a funnel) to guide animals into the underpass, and extend out into the roadside vegetation.
- Provide escape routes to help animals cross barriers (e.g. building a ramp down a steep roadside bank will enable animals to get off the road when a vehicle approaches).
- Do not create containment walls that prevent animals leaving the road.
- Erect signage to alert drivers to wildlife and use rumble strips to slow cars down in areas where wildlife cross roads.
- Do not leave material piled up on roadsides in areas known to be regularly used as crossings by animals, such as adjacent to penguin colonies.

10.5 Feral animals and introduced pests

Some feral animals (including uncontrolled domestic animals) and introduced species (from outside Tasmania) have a significant impact on our coastal and marine life. Cats and dogs allowed to roam freely in coastal areas can do enormous damage to wildlife. Foxes will increase this predator pressure if the species becomes established in coastal areas.

Introduced species can out-compete native species for resources such as habitat and food. They can change the local environment and landscape, making it less hospitable to native species.

Marine pests can cause dramatic changes to localised marine ecosystems, displace native species and impact on marine resource values.

Knowing how to identify feral animals and marine pests can help to prevent the spread of these pests and a number of identification tools have been developed. **Refer to section 10.7 Tools and resources.**

10.5.1 Legislation

Protection is afforded to Tasmanian wildlife by the *Nature Conservation Act 2002* and the *Threatened Species Protection Act 1995*.

The *Living Marine Resources Management Act 1995* provides for management of marine pests. Some marine pests are listed as noxious species under the Act and a permit is required to possess them.

Obtain a permit or more information from the Water and Marine Resources Division of DPIPWE.



Australian Quarantine Act 1908

Australian Quarantine and Inspection Service (AQIS) is the Australian government agency responsible for enforcing Australian quarantine laws. A permit is required for the importation of specimens into Australia.

10.5.2 Feral animals

It is important to reduce threats from feral animals. Cats and foxes are the greatest threats to coastal wildlife, while dogs are a problem in some areas, especially where penguins or shorebirds are present.

Introduced species, such as rabbits, can cause massive damage by eating native species and/or displacing native fauna, and can cause erosion of coastal landforms such as dunes.

10.5.3 Managing feral animals

The most cost-effective approaches to feral animal management are prevention and early intervention.

Some species, such as the feral cat and rabbit, may have a significant impact on the environment but are widespread, numerous and impossible to eradicate from Tasmania due to social, financial or technological constraints. However, they can be eradicated from offshore islands, and efforts can be made to limit or exclude them around areas of high conservation significance on Tasmania's mainland, such as breeding areas or sites containing threatened plant species.

Figure 10.12 These penguins were killed by dogs (most likely domestic dogs allowed to roam free at night).
© Perviz Marker





Responsible pet ownership

Education of pet owners is extremely important in managing impacts of pets on coastal wildlife.

Local councils can play a role in education of the public about keeping pets such as cats locked up and not taking dogs into wildlife areas. Education about the disposal of unwanted pets, especially exotic species is also highly valuable.

Contact the local Parks and Wildlife Service (PWS) or council office or the Wildlife Management Branch (6233 6556) to report feral cats or dogs in sensitive coastal areas.

Figure 10.13 Northern Pacific seastar collection is an ongoing process. It is possible to maintain some coastal areas free of the seastar pest. © Dr Michael Sierp



10.5.4 Marine pests

There are innumerable non-indigenous species in the Tasmanian marine environment and the vast majority have very little impact on their new environment and local species. Some introduced species, however, do have very serious impacts on the Tasmanian marine environment and are considered marine pests.

Most marine pests are introduced into Australian waters by international vessels exchanging ballast water or as biofouling (i.e attached to the hull or other submerged area). In 2001 mandatory ballast water management requirements for international shipping were introduced. Requirements for managing domestic ballast water and international biofouling are still being developed.

Once a marine pest has been introduced into Australia it can be further spread around our waters by a variety of mechanisms such as recreational and commercial fishing vessels and natural coastal processes.

It is important to report new incursions to make sure that new species are identified before they become established.

There are a number of recognised marine pests in Tasmania, including the northern Pacific seastar (*Asterias amurensis*), and the European green crab (*Carcinus maenas*). These can threaten our marine environment and marine industries.

10.5.5 Impacts of marine pests

Marine pests impact the marine environment in a number of ways, such as out-competing or smothering native species. Some pests, like the northern Pacific seastar, are voracious predators of native species. In some instances this can also have an impact on aquaculture and fisheries operations. Once



a species is introduced in the marine environment, eradication is almost impossible.

The introduced commercial Pacific oyster has settled on shorelines along Tasmania's north-east and south-east coasts. They have sharp-edged shells that can injure humans or pets.

Marine pests can also damage marine infrastructure and encrust or clog components of marine vessels.

10.5.6 Managing marine pests

The most important thing that coastal land managers can do is report any sightings of marine pests, particularly in new areas.

Some community groups are interested in ongoing removal of pests such as feral oysters or northern Pacific seastars. It is possible to locally eliminate these species from an area but it involves ongoing monitoring and follow-up. Expert advice and permits may be required. A permit is only required for listed noxious species.

Noxious species listed under *the Living Marine Resources Management Act 1995*:

Northern Pacific seastar (*Asterias amurensis*)

European carp (*Cyprinus carpio*)

black striped mussel (*Mytilopsis sallei*)

European shore crab (*Carcinus maenas*) – also known as green crab

wakame (*Undaria pinnatifida*), other than in the restricted zone

giant fan worm (*Sabella spallanzanii*)

green algae (*Caulerpa taxifolia*)

In some coastal communities the commercial Pacific oyster (*Crassostrea gigas*) is harming recreational and amenity values as well as competing for space with Tasmanian native oysters (*Ostrea angasi*).

These wild oysters have become known as feral oysters to the local communities and aquaculture industries that are working together to manage the problem. Teams of volunteers collect feral oysters for disposal or use hammers to destroy them. Permits are not required to undertake these eradication activities, but permission from the land manager is required. It is important to ensure that feral oysters are correctly identified and distinguished from native oysters.

Feral oysters should not be eaten

It is not recommended that people eat feral oysters that they have removed from the shore, as oysters are capable of accumulating toxic algae, heavy metals and other toxins from the marine environment at levels dangerous to humans.

In some areas feral oysters are relocated to aquaculture facilities where they can continue to grow and then become part of the commercial stock. Removal of feral oysters for commercial purposes requires a permit as specified by the *Fisheries (Shellfish) Rules 2007*. Oysters can only be harvested from areas that are approved for shellfish harvesting, and must meet the requirements of the Tasmanian Shellfish Quality Assurance Program (TSQAP).



Boat users

Land managers who use boats need to be aware of the potential to spread marine pests and take appropriate measures to minimise the risk.

Introduced marine pests may be spread by ballast water discharge, hull fouling on commercial and recreational vessels, and marine farming operations. The pests can be spread if wash-water and biological material from cleaning boat hulls are not contained at slipways or other boat repair and maintenance facilities.

Introduced marine species spread easily if boats, trailers and fishing equipment are not cleaned after

leaving an infested area. For instance, a piece of wakame left on a net or anchor survives for at least one or two days, and so do microscopic spores floating in water in the bottom of a boat. In mooring areas and marinas, boat hulls without effective antifouling treatment can become infested,

- Follow the guidelines for preventing marine pests, including ballast water management requirements and boat maintenance at the DPIPWE Sea Fishing & Aquaculture website.
- Follow the *Environmental Guidelines for Boat Repair and Maintenance* (Department of Tourism, Parks, Heritage and the Arts 2009).

Figure 10.14 Boat hull cleaning removes marine pests but the wash water needs to be contained and treated at the boat facility, such as here at the Clean Lift facility at Prince of Wales Bay. © Emily Ogier





10.6 Climate change, wildlife management and pests

Climate change will add increased pressure to coastal and marine wildlife and has the potential to exacerbate existing impacts from other factors such as habitat loss and disturbance and feral pests.

Rising sea levels will result in further habitat loss for shorebirds and seabirds. Inundation of wetland areas may result in loss of habitat and foraging sites for shorebirds. Changes to coastal vegetation as a result of increased temperatures and changed rainfall patterns will have an impact on wildlife habitat. Changed rainfall patterns will also result in changes to freshwater flows, which will have implications for estuarine species.

In coastal waters the southern extension of warmer waters will cause a southward shift in species distributions. Warmer ocean temperatures in Tasmania now support species that were not previously viable due to cold water temperatures in winter. Ecosystems usually found in more temperate regions are shifting southward, and many of Tasmania's endemic species have a limited capacity to adapt to such change (DPIPWE 2010).

It is more important than ever to minimise human impacts on native wildlife and marine life, to afford these species the best possible chance of adapting to the effects of climate change.

To mitigate the impact of climate change, it is essential to conserve natural terrestrial, freshwater and marine ecosystems and restore degraded ecosystems, protecting existing ecosystems and a diversity of habitats. In view of uncertainty about the specific impacts of climate change, maintaining diversity of habitats will act as an insurance policy (DPIPWE 2010).



10.7 Tools and resources

Complete details of all printed publications listed here are provided in a reference list at the end of the Manual. Other tools and resources including websites are collated in **Appendix 5**.

Threatened species

Coastal Values data

Vegetation, species habitat and geomorphic values data for a 100m-wide coastal strip of the northern, southern and north-western Tasmania Natural Resource Management Regions. Available on the LIST.

www.thelist.tas.gov.au

Consultant's brief

A consultant's guide providing the minimum requirements for information needed to assess the potential impact/s of proposed activities on biodiversity and geodiversity

<http://www.dpiw.tas.gov.au/inter:nsf/WebPages/SSKA-7UM4AN?open>

Environment Australia Biodiversity website

A range of information on biodiversity, the EPBC Act and lists of species protected under the Act.

<http://www.environment.gov.au/biodiversity/index.html>

Natural Values Atlas

Provides authoritative, comprehensive information on Tasmania's natural values. To access, download a free registration form from the website

<https://www.naturalvaluesatlas.tas.gov.au>

REDmap

A Tasmanian initiative inviting the community to spot, log and map marine species that are uncommon in Tasmania, or along particular parts of our coast. The information collected is mapped and displayed on the REDmap website, demonstrating how species distributions may be changing over time. Report sightings of unusual marine species on the REDmap website

www.redmap.org.au

Threatened species listing statements and recovery plans

More information on threatened species' needs and survey requirements are available within the specific listing statements and recovery plans on the DPIPWE website

<http://www.dpipwe.tas.gov.au/threatenedspecieslists>

Threatened Species Section, DPIPWE

Provides threatened species localities and potential habitat according to site information from a 1:25 000 mapsheet (TASMAP series). Also provides concise information about every Tasmanian threatened animal, including information on the species' conservation status, identifying features, distribution, habitat, biology, important locations, key threats, management recommendations, and other ways to help.

ThreatenedSpecies.Enquiries@dpiwwe.tas.gov.au

<http://www.dpipwe.tas.gov.au>



Threatened Species Strategy (Department of Primary Industries Water and Environment 2000b)

Implementing the *Threatened Species Protection Act 1995*

Outlines the approach to conserving Tasmania's threatened species to ensure: that threatened species can survive and flourish in the wild; that threatened species and their habitats retain their genetic diversity and potential for evolutionary development; and to prevent further species becoming threatened. The Strategy addresses key threatening processes and priority threatened species.

Birds

A practical guide for managing beach nesting birds in Australia (Maguire 2008)

Birds Tasmania

Advice and input in planning for shorebird protection

Co-existing with Little Penguins in the Derwent Estuary - Information and guidelines (Pryor & Wells 2009)

<http://www.derwentestuary.org.au/file.php?id=309>

Guidelines for works in areas of Little Penguin habitat (Marker & Wind 2008)

<http://www.nrmtas.org/projects/cradle/penguinmanagement.htm>

Shorebird information kit

A box of resources for education and display purposes.

Available from the Parks and Wildlife Service, Interpretation Section on request.

Understorey Network

For information on appropriate plant species for revegetation works around little penguin colonies

www.understorey-network.org.au

Wildlife Management Branch

Advice and training for caring for injured and orphaned wildlife

Wildlife emergency contacts

Local Parks and Wildlife Service Field Centre

RSPCA 6244 3033 or 1300 139 947 (animal cruelty enquiries)

Whale Hotline

0427 WHALES or 0427 942 537

A 24-hour monitored telephone service to receive reports of all cetacean sightings and strandings.

Wildlife Management Branch of DPIWWE

6233 6556 (24 hour) – for urgent wildlife problems (other than whales)

An injured animal or orphaned animal may be taken to the Wildlife Management Branch at 134 Macquarie Street in Hobart during office hours (Monday to Friday, 9am to 5pm).



Feral animals and pests

Australian Government: National system for the prevention and management of marine pest incursions.

The Tasmanian Government is a signatory to the National System for the prevention and management of marine pest incursions. The National System aims to prevent new pests arriving, respond when a new pest does arrive and minimise the spread and impact of pests that are already established in Australia.

DPIPWE website

Information about marine pests specific to Tasmania

DPIPWE Sea Fishing & Aquaculture website has guidelines for preventing marine pests, including ballast water management requirements and boat maintenance

www.fishing.tas.gov.au

Environmental guidelines for boat repair and maintenance (Department of Environment, Parks, Heritage and the Arts 2009)

Feral animals in Australia

Federal Government: Department of Environment, Water, Heritage and the Arts, Biodiversity Section website

www.environment.gov.au/biodiversity/invasive/ferals/index.html

Feral card deck

A priority list of terrestrial and freshwater feral animal species for Tasmania, in the form of a handy laminated deck of cards with photos and descriptions of feral animals to assist identification.

Contact the Tasmanian Conservation Trust for more information.

Guide to best practice management of point source pollution at boat repair and maintenance facilities (NRM South 2008b)

National Introduced Marine Pest Information System

Marine pest information sheets available online. Follow links from

www.marinepests.gov.au

National System for the Prevention and Management of Marine Pest Incursions

National best practice guidelines for all pathways at risk of transporting marine pests

http://www.marinepests.gov.au/national_system