

6. MARINE PEST MANAGEMENT STRATEGY

The organisms listed in Table 7 are declared to be pests under the Biosecurity Act, throughout the Northland region. The reason for declaration as a pest, management objectives, rules and obligations for occupiers are defined for each pest in the following sections.

Table 7: Marine pests.

Common Name	Scientific Name	Pest Classification	Page
Asian clam	<i>Potamocorbula amurensis</i>	Exclusion	68
Caulerpa seaweed	<i>Caulerpa taxifolia</i>	Exclusion	68
Chinese mitten crab	<i>Eriocheir sinensis</i>	Exclusion	68
European shore crab	<i>Carcinus maenas</i>	Exclusion	69
Mediterranean fanworm	<i>Sabella spallanzanii</i>	Exclusion	69
Northern pacific seastar	<i>Asterias amurensis</i>	Exclusion	69
Asian paddle crab	<i>Charybdis japonica</i>	Suppression	71
Didemnum sea squirt	<i>Didemnum vexillum</i>	Suppression	71
Eudistoma sea squirt	<i>Eudistoma elongatum</i>	Suppression	72
Styela sea squirt	<i>Styela clava</i>	Suppression	72
Japanese kelp	<i>Undaria pinnatifida</i>	Suppression	72
Risk assessment pests		Risk Assessment	74

The organisms listed in Table 8 are only deemed to be pests under the Biosecurity Act, where they are subject to a NRC approved management plan for a specific pest control area.

Table 8: Species deemed as pests in CPCAs.

Common Name	Scientific Name	Pest Classification	Page
Asian date mussel	<i>Musculista senhousia</i>	Suppression (CPCA)	73
Australian tubeworm	<i>Ficopomatus enigmaticus</i>	Suppression (CPCA)	73
File shell	<i>Limaria orientalis</i>	Suppression (CPCA)	73
Pacific oyster	<i>Crassostrea gigas</i>	Suppression (CPCA)	73

6.1 Exclusion Marine Pests

Exclusion marine pests are potential pests which are not known to have established in Northland. Many of them are also not currently known to be present in New Zealand. These marine pests all have the potential to establish in the region, and are capable of causing significant adverse effects. They are listed as unwanted organisms under the Biosecurity Act. The intention of the Strategy is to prevent these pests from entering and establishing within Northland over the life of the Strategy.

Objectives, Methods and Rules for Exclusion Marine Pests

The objectives, methods and rules for the exclusion marine pests are generic for all species in this category.

Objectives (Five Year)

- To prevent the exclusion marine pests from becoming established in Northland.
- To raise public awareness of the economic, biodiversity, social and cultural impacts of the exclusion marine pests and encourage reports of sightings.

Pest Management Methods

Surveillance:

- NRC will develop and implement a regional surveillance plan in conjunction with MAFBNZ, stakeholders, and other Crown agencies such as DOC, and the Ministry of Fisheries, with a particular focus on pathways, vectors and areas of significance.
- Reported sightings will be investigated and a response implemented.

Incursion Response:

- Eradication of incursions of the exclusion marine pests may be attempted in conjunction with relevant Crown agencies and stakeholders where practicable. Any NRC response would be funded via section 100 of the Biosecurity Act as approved by NRC resolution.

Education:

- NRC will provide training to relevant NRC/stakeholder staff in the identification of marine pests to assist in surveillance.
- NRC will provide advice to NRC consents staff, marine stakeholders/interested parties/occupiers on practices which limit the establishment of marine pests.
- NRC will run publicity campaigns to educate the wider public about marine pests.

Research:

- NRC will work cooperatively with other agencies where further research is needed to identify management measures, potential impacts, pathways and/or behaviours.

Rules

The exclusion marine pests are unwanted and notifiable organisms under the Biosecurity Act. As such the following rules apply under sections 46, 52 and 53 of the Biosecurity Act:

1. No person shall sell, offer for sale, breed or multiply any exclusion marine pest.
2. No person shall knowingly transport or release any exclusion marine pest.
3. Every person who sees any exclusion marine pest, or suspects the presence of any exclusion marine pest shall immediately report the sighting to the NRC or MAFBNZ.

A breach of these rules, without reasonable excuse, is an offence under Section 154(r) of the Act.

ASIAN CLAM

(Potamocorbula amurensis)

Asian clam is not known to be in New Zealand. It is a shellfish with a distinctive uneven overbite and is found in estuaries and brackish waters. The shell is 2-3cm across and is a dirty white, yellow or tan colour. Asian clam can live in fresh and salt water and forms dense mats displacing native species and changing seafloor/riverbed conditions. It consumes large amounts of phyto and zooplankton, so can substantially change any marine community. Asian clam can proliferate rapidly and reach extremely high densities, dominating benthic habitat.

It is native to Japan, Korea and China, though has now invaded parts of the west coast of the United States. Young clams can be caught up in ships' ballast water while adults can attach to fishing equipment. Asian clam is thought to be responsible for the collapse of some commercial fisheries in



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addition to the decline in the diversity and abundance of many benthic species in California.

CAULERPA SEAWEED

(Caulerpa taxifolia)

Caulerpa taxifolia is not known to be in New Zealand, although there are native species that look similar. The aquarium strain of caulerpa is a rapidly growing saltwater weed that can cause major ecological and economic damage. This strain is particularly invasive, and can grow in a wide range of water temperatures, depths and substrates including rock, mud and sand. It is a bright green seaweed with feather-like fronds and has long horizontal runners (up to 9m) supporting many upright fronds. Fronds are flattened-looking with a smooth and distinct midrib.

Caulerpa can form dense fields that can prevent the establishment of native seaweeds and exclude indigenous marine life. It can cause the reduction of fishing catches due to the elimination of fish habitat. The most likely way of Caulerpa arriving into New Zealand is through importation



for use in aquariums and subsequent release into the marine environment.

CHINESE MITTEN CRAB

(Eriocheir sinensis)

Chinese mitten crab is light brown with a body width up to 8cm. Adults have dense patches of hairs on the claws. It has a round body shape and a distinctive notch between the eyes. Its legs are twice as long as its body width. Post-larval stages settle in salt water then migrate to freshwater to grow and develop. Adults migrate to the sea to reproduce and die.

Chinese mitten crab could cause significant damage through burrowing activity, which can undermine the integrity of stream banks. It is an opportunistic feeder with a wide diet and can adversely affect biodiversity (both freshwater and marine) through predation upon and competition with indigenous species. It also has the potential to affect human health as it can carry a parasitic lung fluke which can be passed to humans.

Chinese mitten crab is not known to be in New Zealand. Arrival is possible through ships' ballast water, either salt or



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freshwater, water intakes or among other marine fouling on the outside of ships or yachts. The mitten crab is considered a delicacy in some parts of the world and live crabs have been imported illegally in other countries.

EUROPEAN SHORE CRAB

(Carcinus maenas)

Also known as: European green crab

European shore crab has a broad diet and can survive in a wide range of environments. The crab is medium-sized with a body width up to about 9cm. It has five distinctive spines on either side of the eyes on the front end of the body. The upper body is mottled dark brown to dark green, with small yellow patches. The underside varies in colour from green to orange or red.

It is a voracious predator and can cause the decline of other crab and bivalve species. The crab has the potential to negatively impact shellfish populations important for commercial and recreational fisheries and as a source of kaimoana.

European shore crab is not known to be in New Zealand. Arrival is possible through ships' ballast water, water intakes



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or among other marine fouling on the outside of ships or yachts.

MEDITERRANEAN FANWORM

(Sabella spallanzanii)

The Mediterranean fanworm is a marine bristleworm that is typically found in estuaries or sheltered sites, at depths of anywhere between one to 30m. It consists of a tube, up to 40cm tall, which is always anchored to a hard surface, topped with a single spiral fan (radiole). The tube is tough and flexible and often muddy in appearance. It can often have other organisms growing on the surface.

The Mediterranean fanworm can form dense groups that could affect native species by competing for food and space. Recent studies have indicated some impact on the establishment of new generations of some species, and on nutrient flow. There is potential that dense beds could become a nuisance to recreational and commercial fishers through the clogging of dredges and fouling of other fishing gear.



G. Read, NIWA

The Mediterranean fanworm has been detected in Lyttelton and Auckland. To date, it has not been detected in Northland. Fanworms spread by growing on dirty vessels and equipment and then being relocated. They can also travel growing in enclosed wet areas on ships, or with other marine fouling organisms as larvae in ballast water.

NORTHERN PACIFIC SEASTAR

(Asterias amurensis)

Northern Pacific seastar can reach 40cm in diameter and has distinctive upturned tips to its five pointed arms. The arms join onto a central disc and are covered by numerous small spines with sharp edges. It is mainly yellow in colour and often has purple or red detail on its upper surface. This seastar is normally found in shallow water but can be found as deep as 200m. It is most likely to be found in coastal areas protected from wave action, on soft bottoms, rocks and man-made surfaces.

Northern Pacific seastar is a prolific breeder and voracious feeder preferring mussels, scallops and clams but will also prey upon a wide variety of other marine life. It can survive and breed in a wide range of habitats. It could also adversely affect biodiversity, kaimoana resources and recreational seafood harvest given its predatory behaviour and prolific breeding rate.



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The Northern Pacific seastar is not known to be in New Zealand. Arrival is possible through ships' ballast water, water intakes or among other marine fouling on the outside of ships or yachts.

6.2 Suppression Marine Pests

Objectives, Methods and Rules for Suppression Marine Pests

The objectives, methods and rules for the suppression marine pests are generic for all species in this category.

Objectives (Five Year)

- To minimise the effects of the suppression marine pests on environmental and economic values in Northland.
- To restrict the spread of the suppression marine pests into areas where they are not currently established.
- To raise public awareness of the economic, biodiversity, social and cultural impacts of suppression marine pests and encourage reports of sightings.

Pest Management Methods

Surveillance:

- NRC will include the suppression marine pests in a regional surveillance plan in order to identify the current range and new sites.

Response:

- Responses to the suppression marine pests will be through site-led tactics. These include:
 - **Community Pest Control Areas:** NRC will assist communities and stakeholders to control suppression marine pests where they have impacts upon local values.
 - **High Value Areas:** NRC will include the suppression marine pests in surveillance programmes and where detected at high value areas a response may be developed in conjunction with Crown agencies/stakeholders where appropriate.

Education:

- NRC will provide training to relevant NRC/stakeholder staff in the identification of marine pests to assist in surveillance.
- NRC will provide advice to NRC consents staff, marine stakeholders/interested parties/occupiers on practices which limit the establishment of marine pests.
- NRC will run publicity campaigns to educate the wider public about marine pests.

Research:

- NRC will work cooperatively with other agencies where further research is needed to identify management measures, potential impacts, pathways and/or behaviours.

Rules

1. No person shall knowingly propagate, transport or release suppression marine pests in Northland.
2. Where a management agency has undertaken initial control work and/or supplied resources to reduce pest population densities to a level agreed to in a management plan for the area, the pests shall be maintained at the agreed level by the signatories to the management plan.

A breach of these rules, without reasonable excuse, is an offence under Section 154(r) of the Act.

ASIAN PADDLE CRAB

(Charybdis japonica)

The Asian paddle crab is a swimming crab native to South East Asia. It is typically found in estuaries where there is firm sand or muddy fine sand. It is a relatively large crab with paddle-like hind legs. Adults have a shell width of around 12cm. The adults also have six distinct spines or spikes on each side of the eyes. The crabs range in colour from pale green through olive green, to a deep chestnut brown with purplish markings on the carapace (shell).

Adult paddle crabs can produce hundreds of thousands of offspring. The larvae can float in the water for three to four weeks, during which time they can be moved large distances by tides and currents. Adults are also capable of swimming large distances. These crabs are very aggressive and have the potential to compete with native crabs for space and food, including the commercially fished native paddle crab. These crabs can also impact upon biodiversity, aquaculture and shellfish resources through predation.



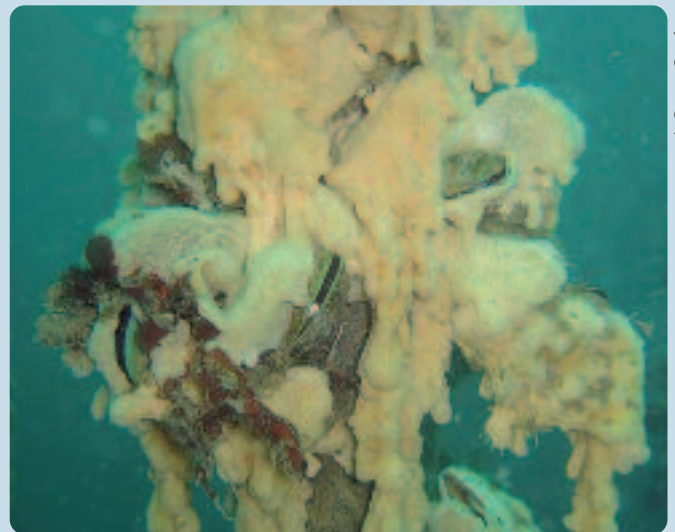
Asian Paddle Crab is in Northland. It is widespread in the Hauraki Gulf and has been detected in small numbers in Whāngārei Harbour.

DIDEMNUM SEA SQUIRT

(Didemnum vexillum)

Didemnum is a leathery or spongy textured, light mustard coloured sea squirt which often looks like a yellowish wax dripping over a structure such as a rope or mussel line. Its surface has raised leaf-like veins without pores. Colonies of didemnum can reproduce sexually by releasing tailed larvae that are carried in water currents. It can also reproduce asexually by budding, hence fragments can break off and grow into new colonies

This sea squirt readily occupies hard surfaces including ship hulls, wharf structures and floats, pilings, moorings and ropes, rock outcrops, and gravel seabed. Didemnum's smothering capabilities choke off bottom dwellers such as shellfish, and may cover grounds needed by fish to lay eggs. Didemnum is not known to be in Northland, but is becoming quite widespread on the east coast of the North Island and the top of the South Island.



A. Courts, Caithron

EUDISTOMA SEA SQUIRT

(Eudistoma elongatum)

Eudistoma is a colonial sea squirt. It forms clusters of white coloured tubes, which contain many small individual organisms. It is generally found in muddy bottomed tidal habitats and on man-made structures such as wharf piles and aquaculture equipment. It is generally submerged just below the waterline, but can often be seen at low tide. Eudistoma reduces in volume during the winter months, but once water temperatures lift it reappears in large volumes, usually over the summer.

Eudistoma is an Australian species and was first reported in New Zealand in 2005. It has been reported on several marine farms on Northland’s east coast, Houhora and Pārengarenga harbours, the Bay of Islands, and Whāngārei Harbour.



H. Blomfield

STYELA SEA SQUIRT

(Styela clava)

Styela is a large, solitary sea squirt that is native to the north-west Pacific. This sea squirt has a long, club-shaped body and each individual has its own stalk and adheres separately to a substrate. The sea squirt is usually brown in colour and underwater often appears fuzzy with secondary growth coating it. It grows attached to hard natural and artificial surfaces and is frequently transported as biofouling on vessels and other mobile marine structures.

Styela poses a threat to biodiversity values through its smothering behaviour. It can multiply rapidly in suitable sites, and competes with other filter feeders for food and space. As a result it can disrupt native ecosystems. It can also add significant maintenance costs to marine structures and vessels through its fouling behaviour. Styela is established in Northland at Marsden Cove and Ōpua marinas.



Matt Connee

UNDARIA SEAWEED

(Undaria pinnatifida)

Undaria is a highly invasive and opportunistic seaweed which spreads mainly by fouling on boat hulls. It is harvested in Japan as a food source. Mature plants (as shown) are a brown/ green/ yellow colour and grow to 1-2m. Juvenile undaria plants have a holdfast and stem and an undivided blade (they appear as a single leaf). The distinctive midrib starts becoming apparent once the plant grows over 5cm.

Undaria is not known to be in Northland, but is present in many harbours and ports around New Zealand. Undaria can form dense stands underwater which may lead to the exclusion or displacement of native plant and animal species, and can change the structure of ecosystems, especially in areas where native seaweeds are absent.



6.3 Community Pest Control Area Marine Pests

The NRC aims to assist communities and stakeholders to control pests where they impact upon local values. Species that are regionally or locally common may be considered for a CPCA or interagency site-led programme where significant environmental, economic or social benefits are likely.

In addition to the suppression pests described above, the following marine species may also be considered for inclusion in a CPCA (Table 9). These species are only deemed to be pests under the Biosecurity Act, where subject to a NRC approved management plan for a specific pest control area.

Table 9: CPCA marine pests.

Common Name	Scientific Name	Group
Asian date mussel	<i>Musculista senhousia</i>	Mollusc
Australian tubeworm	<i>Ficopomatus enigmaticus</i>	Annelid
File shell	<i>Limaria orientalis</i>	Mollusc
Pacific oyster	<i>Crassostrea gigas</i>	Mollusc

These species are widespread throughout the region, but can have adverse impacts on local values, such as recreational use of, or access to beaches and coastal waters. They also have the ability to alter native ecosystems and compete with native species for food and space where present in high numbers.

Pacific oyster is an established commercial species and is subject to Fisheries and Aquaculture Regulations. No CPCA shall be considered for Pacific oyster that contradicts these regulations or proposes to control Pacific Oyster in an Oyster Reserve, authorised marine farm or where it is valued as a food source.

Objectives (Five Year)

- To assist communities and stakeholders to manage local impacts of the CPCA marine pests.

Pest Management Methods

Site-led Programmes:

- NRC will assist communities and stakeholders to control the CPCA marine pests where they impact upon local values.

Education:

- NRC will provide advice to NRC consents staff, marine stakeholders/interested parties/occupiers on practices which limit the establishment of marine pests.

Rules

1. Where a management agency has undertaken initial control work and/or supplied resources to reduce pest population densities to a level agreed to in a management plan for the area, the pests shall be maintained at the agreed level by the signatories to the management plan.

A breach of these rules, without reasonable excuse, is an offence under Section 154(r) of the Act.

6.4 Risk Assessment Marine Pests

Risk assessment pests are those pests which are of potential concern to the region, but little is known about the distribution or the risks posed. The intention is to improve understanding about these pests so that the pest can be classified and managed appropriately when the Strategy is reviewed. Most of these species are not known to be in New Zealand.

There are many potential pests that could arrive here and it is difficult to predict which species will arrive and establish, and which will go on to become pests. The majority of species in the risk assessment list (Table 10) are also recommended for surveillance and monitoring in Australian waters.

Table 10: Risk assessment marine pests.

Common Name	Scientific Name	Group
Asian shore crab	<i>Hemigrapsus sanguineus</i>	Crustacean
Dead man's fingers	<i>Codium fragile ssp. tomentosoides</i>	Macroalgae
Red algae	<i>Grateloupia turuturu</i>	Macroalgae
Wireweed	<i>Sargassum muticum</i>	Macroalgae
Asian green mussel	<i>Perna viridis</i>	Mollusc
Asian rapa whelk	<i>Rapana venosa</i>	Mollusc
Brown mussel	<i>Perna perna</i>	Mollusc
Black-striped mussel	<i>Mytilopsis sallei</i>	Mollusc
European clam	<i>Varicorbula gibba</i>	Mollusc
Golden mussel	<i>Limnoperna fortunei</i>	Mollusc
Didemnum sea squirts (other than <i>D.vexillum</i>)	<i>Non-indigenous Didemnum species</i>	Sea squirt
Pyura sea squirt*	<i>Pyura stolonifera praeputialis</i>	Sea squirt

* Already in Northland and under investigation by MAFBNZ.

Objectives (Five Year)

- To assess the risks, impacts and options for managing the risk assessment marine pests.
- To raise public awareness of the economic, biodiversity, social and cultural impacts of marine pests and encourage reports of sightings.

Pest Management Methods

- The NRC will undertake surveillance, research and raise public awareness of risk assessment marine pests to assist with classifying these pests and managing them appropriately.
- The NRC will provide advice and information to the public, and will support initiatives to minimise any adverse impacts they have.
- If surveillance indicates that a risk assessment marine pest poses a threat to the region, and eradication is achievable, control may be carried out by the NRC and their contractors or, with agreement, by other agencies.

Rules

1. No person shall knowingly propagate, transport or release any risk assessment marine pest in the Northland region.
2. Where a management agency has undertaken initial control work and/or supplied resources to reduce pest population densities to a level agreed to in a management plan for the area, the pests shall be maintained at the agreed level by the signatories to the management plan.
3. Every person who suspects the presence of any risk assessment marine pest shall immediately report the sighting to the NRC or MAFBNZ.

A breach of these rules, without reasonable excuse, is an offence under Section 154(r) of the Act.