

FISH

BLUE COD (*Parapercis colias*)

Blue cod are endemic to New Zealand and are found from the Three Kings Islands in the north to the Snares Islands in the south. They are a common reef fish in Marlborough, Kaikoura, Fiordland, Stewart Island and the Chathams Islands where they can grow up to 66 cm in length. Juveniles have a different colouration to adults being bright white with a black lateral stripe. At 10 - 11 cm length, they change to a drab brown colouration and at 25 to 27 cm they change to adult colouration with a dark green-blue saddle and white belly¹⁴⁰.

They are found throughout Marlborough on rocky habitats and offshore biogenic soft bottom habitats. They are most abundant in the outer Sounds and Cook Strait.

Blue cod mature at 15-25 cm, after 2-4 years⁵⁰. Spawning occurs in coastal and outer continental shelf waters from late winter to early summer¹⁴⁰. Small juveniles appear at about 5 cm length on sandy or shelly bottoms that provide some cover (e.g. dead whole shells or cobbles) in January to February. As they grow, they inhabit a greater range of habitat types. Blue cod may reach an age of 32 years.



Blue cod (Rob Davidson)

Tagging studies suggest that most cod move relatively little; however, some cod have been recorded travelling up to 156 km²⁴⁰. Results from recent studies in the Marlborough Sounds have suggested local depletion of blue cod stocks with less than 1 percent of the blue cod population in the outer Queen Charlotte Sound greater than 330 mm in length⁹¹.

Blue cod are an iconic species in Marlborough as they highly regarded as a recreational fish. In Marlborough they can become very abundant and are a dominant or keystone predator. It is probable that blue cod feeding activity impacts the abundance and distribution of its prey.

ELEPHANT FISH (*Callorhinchus milii*)

Elephant fish belong to an ancient family of fishes related to sharkes and rays. They have a distinctive lobed, trunk-like snout, smooth scaleless skin and swim by sculling with their pectoral fins. They are silver-grey in colour with an overlay of brown markings on the body and fins. They may grow to over 1.2m long. Adults reach sexual maturity at 2-6 years¹⁴². They occur throughout New Zealand coastal waters but are most common around the South Island. They also occur in southern Australia, and closely related species are also found in South Africa and South America.

Adults are most often found on soft bottom habitats, from the surf zone to 227m depth. Historically they were caught in large numbers and used for fish and chips. Numbers appear to be recovering following over fishing in the 1970s and early 1980's.

Adults migrate into inshore waters, including harbours and estuaries, to breed between November to January¹⁴². Spawning grounds have been identified at several locations in the Marlborough Sounds. Observations suggest that highest densities of egg cases occur in Garne Bay, Pelorus Sound, but other important areas include Saville Bay, Kumutoto Bay and Grove Arm.



Elephant fish (Melbourne Aquarium)

Females lay egg cases on substratum composed primarily of fine sand and natural broken shell located in shallow water less than 25 m depth. The incubation period is approximately 5-8 months. Their eggs are vulnerable to disturbance and possibly smothering by sediments.

Elephant fish are a significant species in Marlborough as the accessibility of the spawning areas makes them of importance to scientists studying aspects of their early development and in the study of vertebrate systematics and evolution¹¹⁵.

GROPER, HAPUKU (*Polyprion oxygeneios*)

Groper have a grey back, light grey to white belly and a pointed head with a lower jaw that protrudes well beyond the upper jaw. They are a large fish growing up to 160 cm length. Groper occur throughout New Zealand waters and are widely distributed in the southern Pacific, Atlantic and Indian Oceans. They occur in large schools, small groups or as solitary individuals in a wide range of habitats including rocky reefs, canyons and flat, open sandy and muddy sea floor to depths of at least 400 m.

Before they were heavily fished, groper were commonly found in shallow inshore waters and could be caught from the shore in some parts of their range. Historically they were regularly caught in the deeper parts of Queen Charlotte and Pelorus Sounds but they are now largely restricted to the outer Marlborough Sounds and Cook Strait.

Groper mature over a wide size range (65-100 cm) when they are between 10 and 13 years old. In the Cook Strait region the size at which half the male population is mature is 80–85 cm and 85–90 cm for females. Aging groper has proved difficult but it is thought that maximum age is more than 40 years, and possibly as much as 60 years.

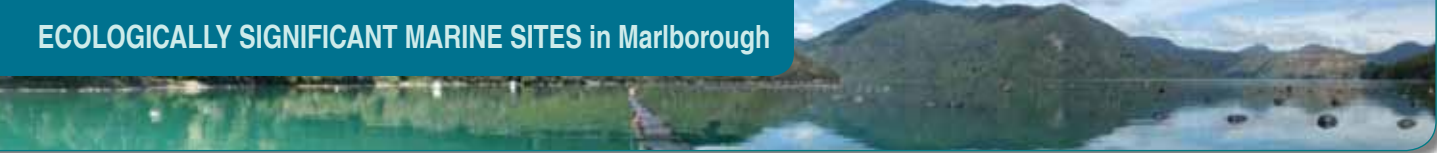
Spawning occurs during winter but few spawning groper have ever been caught and the spawning grounds are unknown. Around the South Island groper used to be most abundant in shallow water from October to May, and moved offshore in June and July. Tagging has shown that groper around South Island tend to migrate north towards Cook Strait from July to September possibly in preparation for spawning, with some moving up to 1389 km from the tagging location¹⁹⁸. The smallest juvenile groper known are 25-50 cm in length and occur near the surface in offshore waters, sometimes associated with flotsam³¹⁵. Groper of this size are caught on tuna longlines all around New Zealand. They appear to settle to the bottom between 50-70 cm length (Paul 2002).



Hapuka (Irene Van de Ven)

Groper feed on a wide size range and variety of fishes, cephalopods (octopus and squid) and crustaceans (including rock lobsters). They also occasionally take small seabirds such as blue penguins.

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Groper are an iconic species. They highly regarded as a recreational fish throughout New Zealand, including Marlborough. Marlborough may be particularly important for this species as it appears they migrate to Cook Strait to breed. Historically, it is possible that their feeding activity played an important role in structuring some marine communities.

LANCELET (*Epigonichthys hectori*)



Lancelet are small, transparent, slender, fish-like animal; approximately 80 mm in length. They belong to a subgroup of vertebrates, but are not “true fish”. Technically, they are invertebrates because they lack bony structures; however, their bodies are supported by a gelatinous rod of tissue, a precursor to a backbone. They have an almost transparent body, no eyes or brain, a permanent notochord extending into the head and a dorsal hollow nerve cord, gill slits, and segmented muscle blocks.

Lancelets spend most of their life buried in sand or coarse gravel in a depth range of 0 to 100 m. Their reproductive organs are present on the right hand side of the body only. They filter feed using whiskery growths around their mouths to trap minute organisms from water²⁹⁷.

This species is mostly found north of Cook Strait. The Marlborough population is significant as it is the only known one in the South Island, and is restricted to sandy areas in the entrance to Croisilles Harbour¹⁰³. Little information is known about the breeding, distribution or abundance of this species.

Lancelet (DOC)

ROUGH SKATE (*Zearaja natuta*)

The rough skate is a thin, diamond-shaped skate with an elongated snout. The tail, which lacks a poisonous spine, is broad and has three rows of thorns down its length. Two small dorsal fins are located near the tip of the tail. The upper body is coloured dark to pale brown with scattered white spots, darker marbling and a more or less prominent eye spot on each wing. It reaches a maximum reported length of 118 cm. Skates feed on benthic invertebrates and small fishes.

The rough skate is an endemic species most common off the South Island in depths to 500m, although it may occur deeper than this.

In Marlborough, spawning occurs in inner Queen Charlotte Sound and Port Underwood with adults most frequently encountered by divers during winter. Females lay pairs of eggs in leathery cases on the seabed in spring to summer¹⁴¹, however, the number of eggs laid annually is unknown. Embryos hatch at about 10 to 15 cm body length. They reach sexual maturity at 4-6 years¹⁴⁴. Maximum age is 9 years.

This species is significant because it breeds in the sheltered bays of the Marlborough Sounds and its egg cases are vulnerable to disturbance and smothering by sediments.

Rough skate (B Wybourne)



Rough skate (DOC)





SNAPPER (*Pagrus auratus*)

Snapper have light copper-pink coloured backs fading to a white belly. Their lower caudal fin rays are white and the upper body covered in numerous electric blue dots (usually fade in larger fish). Snapper can grow to a length of 105 cm and weigh 17 kg or more. Snapper are widely distributed and occur off New Zealand, Australia, Philippines, Indonesia, China, Taiwan and Japan. Populations in the northern and southern hemispheres are isolated from each other but similar enough to be considered the same species.

In New Zealand they are found mainly in warmer coastal waters from Three Kings Islands south to Cook Strait on the east coast; and to Tasman Bay and Westport on the west. Occasional individuals have been recorded from Foveaux Strait and Chatham Islands¹⁴⁰. Snapper are present



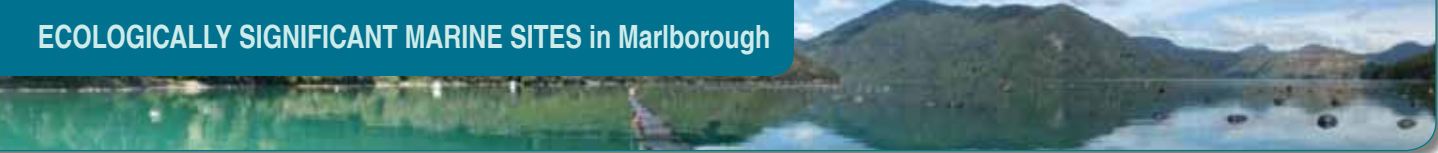
Snapper (MoF)

throughout Marlborough but are more common in the west. They are seldom seen by divers but are regularly captured by fishers particularly in the inner Pelorus and Queen Charlotte Sounds. Their abundance and distribution changes seasonally probably in response to water temperature, spawning and/or changes in prey abundance.

Large schools of snapper congregate before spawning and move on to the spawning grounds, usually in November-December. The spawning season may extend into January-March in some areas and years before. After spawning the fish disperse, often inshore to feeding grounds. Snapper

are serial spawners, releasing many batches of eggs over an extended period. The larvae have a relatively short planktonic phase which results in the spawning grounds corresponding fairly closely with the nursery grounds of young snapper. Young fish school in shallow water and sheltered areas and move out to deeper water in winter. The fish disperse more widely as they grow older. They first reach maturity from 20 to 28 cm fork length at 3 to 4 years of age. The winter grounds are thought to be in deeper waters where the fish are more widespread. Water temperature appears to play an important part in the success of recruitment. Generally strong year classes in the population correspond to warm years, weak year classes correspond to cold years.

This species is significant as an iconic species in Marlborough as they highly regarded as a recreational fish. In Marlborough their abundance has been reduced compared to pre 1970's. Snapper can become a dominant or keystone predator and it is probable that their feeding activity impacts the abundance and distribution of prey for both soft and rocky shores.



● INVERTEBRATES

BLACK FOOT PAUA (*Haliotis iris*)



Paua (MoF)

Black foot paua are a large sea-snail that lives in shallow coastal waters, usually in large groups on rocky reefs. The shell of the paua is oval and the exterior is often encased with coralline algae. In contrast, the interior of a paua is an iridescent swirl of intense green, blue, purple, and sometimes pink colours. Black foot paua can grow up to 188 mm in length^{261,262,263,302,303,304,305,325,326,331,336}.

Black-foot paua are endemic to New Zealand. In Marlborough they have been recorded throughout much of the Marlborough Sounds apart from inner Pelorus Sound. They are most common from exposed outer Sounds locations and areas with macroalgal forest.

This species is significant as an iconic species in Marlborough as they highly regarded as a recreational and commercial catch²⁶². In Marlborough their abundance has been in decline due to legal and illegal fishing. Paua can become a dominant or keystone herbivore and it is probable that their feeding activity impacts on habitat composition on exposed rocky shores.

BRYOZOAN CORAL
(*Galeopsis porcellanicus*)



Galeopsis, Allen Strait (Rob Davidson)

Bryozoans are made up of tiny colonial animals that generally build stony skeletons of calcium carbonate. They appear superficially similar to corals. *Galeopsis porcellanicus* is an endemic species that forms colonies that are white in appearance. Colonies consist of many tiny fingers making a structure up to basketball size. In Marlborough it is known from areas with relatively strong tidal currents^{90,102}.

Bryozoan corals that form mounds are significant in Marlborough as they provide biogenic habitat for a variety of species. Bryozoan mounds can create a nursery habitat for juveniles of commercial fish, particularly snapper, tarakihi, and john dory⁴⁰. Bryozoan reefs have the potential to significantly enhance biodiversity by increasing structural complexity and provide unique habitats for other species. It is also likely that large colonies modify water flow around them potentially affecting sediment composition and other ecological relationships. Colonies are, however, very brittle and vulnerable to damage or removal by dredging and trawling or smothering by excess sedimentation. Anchor damage can also occur.





BURROWING ANEMONE (*Cerianthus sp.*)



Burrowing anemone (DOC)

The burrowing anemone is a solitary tube-dwelling species with an elongated body adapted for burrowing in soft sediments. They can be over 40 cm long but most of the tube is below the sediment surface. Shallow and deepwater species emit bright green fluorescence^{289,195,380}.

Burrowing anemone have been recorded from a variety of locations in Marlborough. They are most common from Oke Rock in the entrance to Pelorus Sound¹⁰¹ but are also known from Port Ligar and East Bay, Arapawa Island. Occasional individuals have been observed elsewhere in Marlborough.

They are found in silty shelly-sand substrata in locations with low to moderate tidal flow.

The burrowing anemone is a significant species in Marlborough as they are relatively uncommon, being found at particular locations usually in low abundance. It is probable that the abundance and distribution of this species has been reduced by increased sedimentation and disturbance.

CHITON (*Notoplax latalamina*)

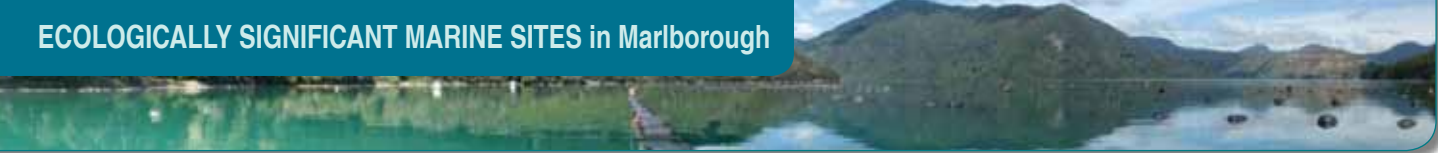
This large chiton has a wide fleshy girdle covered in short spines or spicules. The visible external surface of the shell valves is much reduced. Coloration of the valves is pale fawn and the girdle is brownish-grey to whitish. It is found on rocky reefs between 6 to 200 m depth, associated with large sponges growing in areas of moderate to high current flow.

This species is significant in Marlborough as it is endemic to the outer Marlborough Sounds being recorded nowhere else. The type locality of the species is 200 m depth off Stephen's Island (Takaporewa). It has also been observed by divers from Croisilles Harbour to Sentinel Rock in the outer Marlborough Sounds¹¹⁸. This species appears to be naturally rare, and is sparsely distributed in the outer north-west Marlborough Sounds and Cook Strait.



Notoplax latalamina in *Geodia sp.* sponge (S de C Cook)





GIANT LAMPSHELL (*Neothyris lenticularis*)



Giant lampshell (Rob Davidson)

The giant lampshell is New Zealand's largest brachiopod^{62,63,228,229,230}. Juveniles have a smooth shell that is relatively thin and a translucent light brown, while the adult shell is thicker and an opaque grey-brown. Adult shells are oval compared to a more flattened appearance of juvenile shells³¹².

This species and genus is endemic to New Zealand and sub Antarctic waters¹³⁷. They are known from 200 m depth at Stephens Island and form large beds in Cook and Foveaux Straits²⁸¹. Optimum environmental conditions appear to exist in Foveaux Strait and around Stewart Island, where the largest and most prolific populations are known. In Marlborough it is widespread in deep waters of Cook Strait, but has also been recorded from a variety of shallow locations in East Bay, Arapawa Island and several locations in inner Queen Charlotte Sound.

Brachiopods are suspension feeders and trap microplankton and organic particles, which are then transported to the mouth by cilia.

The giant lampshell is significant in Marlborough due to its scientific and conservation values. At high densities this species can form a biogenic habitat, potentially enhancing benthic biodiversity and productivity. In most areas where it occurs this brachiopod is found in deep water. Shallow beds in East Bay and Queen Charlotte Sound provide a rare opportunity to study this ancient species of shellfish.

HORSE MUSSEL (*Atrina zelandica*)



Horse mussel (B Wybourne)

Horse mussels are New Zealand's largest bivalve, reaching up to 400 mm long and 120 mm wide. They inhabit soft sediments with most of the shell embedded in the sea floor and anchored to sediment by byssus threads. The crinkly posterior edge projects above the seafloor keeping the water intake clear of the bottom. The exposed shells provide attachment for an array of algae and invertebrates such as sponges and sea squirts. Horse mussels are often patchily distributed, but can form very dense beds if conditions suit and damage from dredging is minimal. Patches are often composed exclusively of similar-sized individuals¹⁸⁴.

They are found in muddy to sandy soft-sediment habitats around the coast of New Zealand from extreme low water to 70 m depth. In the Marlborough Sounds they are often found in the soft sediments. Dense beds of greater than 10 per square metre have been recorded from particular areas such as Grove Arm, Wet Inlet and Port Gore.

Spawning mainly occurs during late summer, autumn and early winter¹⁹². The pelagic larva is free swimming for several days or weeks with recruitment being sporadic and short-





lived. Horse mussels grow rapidly for at least the first 2 to 4 years, after which growth slows dramatically¹⁷⁷. Large horse mussel live for at least 5 years and possibly up to 15 years old.

Horse mussels are a significant species in Marlborough because they can form a biogenic habitat in high densities⁹⁰. Studies have shown a strong relationship between biogenic structure, including horse mussels, and the abundance of juvenile snapper in the Hauraki Gulf⁹⁷². The study showed that “complex habitat structure had a positive influence on the abundance of juvenile snapper, suggesting that these areas are preferred by fish”. Similar findings have been made regarding habitat complexity and the survival of juvenile scallops³⁶⁴.

Horse mussels are particularly vulnerable to trawling because of their size, delicate shell and inability to rebury once pulled from the substratum. Large areas of horse mussels appear to have been lost due to these activities in outer Pelorus Sound, Guard’s Bay and Port Gore. Horse mussels are adversely affected by increased suspended sediments and sedimentation rates, and research has also shown that their beneficial influence of macrofaunal diversity and abundance also declines with increasing levels of suspended sediments^{290,291,126}.

ROCK LOBSTER (*Jasus edwardsii*)

New Zealand has two common species of rock lobster: the red or spiny rock lobster, and the green or packhorse rock lobster⁷. Rock lobster reach a maximum length of at least 54 cm for males, and 43 cm for females, and maximum reported weight of more than 13 kg^{259,260}. They are found from Three Kings, North, South, Stewart and Chatham Islands, south to Auckland Islands. Pack horse lobsters are more common in northern New Zealand. Both species also occur in southern Australia.

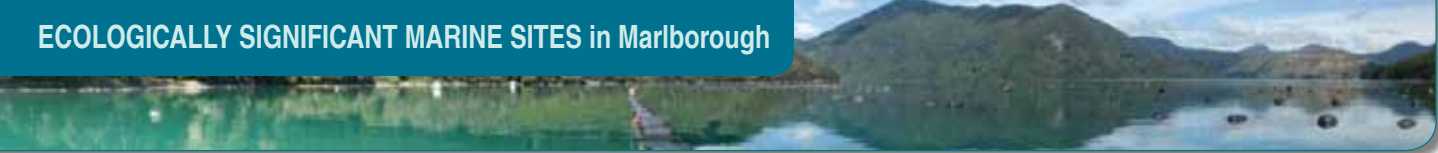


In Marlborough they have been recorded throughout the Sounds where suitable rock habitat exists, except central and inner Pelorus Sound. They are most common from outer Sounds locations and areas swept by moderate to strong tidal currents^{9,10,11,12,36,37,59}. Juvenile settlement appears to be heaviest in eastern areas of Marlborough, particularly Port Underwood where large numbers of juveniles can be observed in the shallows. Largest rock lobsters tend to occur in the western outer Marlborough Sounds.

Crayfish
(Rob Davidson)

Red rock lobsters are found in rocky reef and on occasion, soft sediment habitats^{46,146,208,209,210}. Rock lobsters usually move by night to search for food and return to “shelters” located on rocky reefs during the day³⁴. There is also a seasonal movement into shallow water for moulting and mating, and another when females move to the edges of reefs to spawn^{13,14,241}. Rock lobsters also migrate long distances with movements of up to 460 km having been recorded. They eat a wide variety of bottom life, including shellfish, crabs, seaweeds and sea urchins.

This species is significant as an iconic species in Marlborough as they highly regarded as a recreational and commercial catch. In Marlborough their abundance has been historically reduced but now appears relatively stable. Rock lobster can become very abundant in marine reserves soon becoming a dominant or keystone predator^{98,244}. It is probable that their feeding activity impacts on the abundance and distribution of their prey.



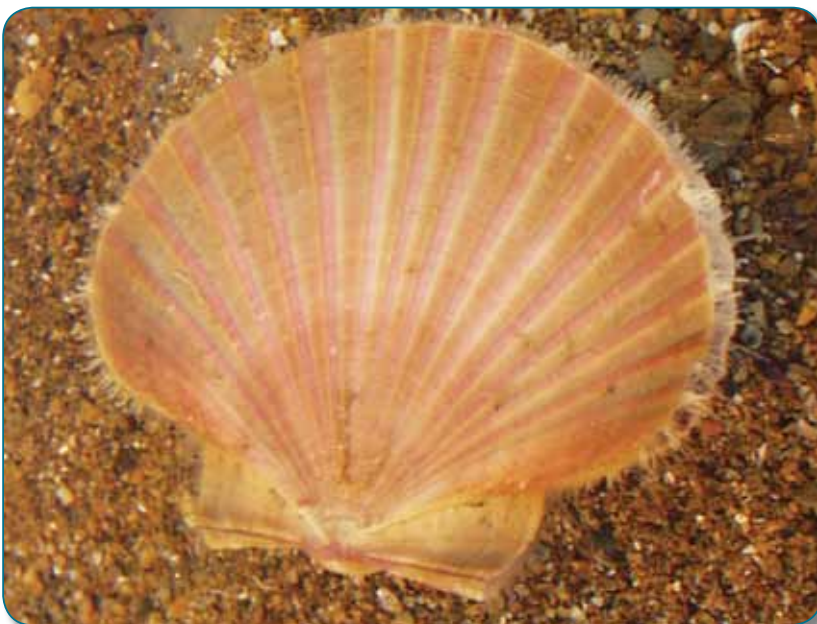
SCALLOP (*Pecten novaezelandiae*)

Scallops are endemic and one of several species of “fan shell” bivalve molluscs found in New Zealand waters. The shell is fan-shaped with the lower valve deeply curved and the upper valve flat. Both valves have conspicuous ridges. They are found throughout the Marlborough Sounds except inner Pelorus Sound (including inner Kenepuru Sound) and Port Underwood¹¹⁸. They are particularly abundant in Croisilles Harbour entrance, the many bays in Queen Charlotte Sound and some outer Sound locations.

They are found on a variety of soft substrata from mud to fine gravels, however adults appear to prefer coarse sediments (e.g. shell gravel and grit)²⁷⁴. They are usually most abundant in areas with some tidal flow. Although free-living and capable of movement, tagging experiments have shown adult movements are limited to a few tens of metres at most.



Scallop (Rob Davidson)



Scallop (MDC)

Scallops are functional hermaphrodites (have both sexes) and become sexually mature at a size of about 60–70 mm shell length³⁸⁶. Each individual may spawn several times each year³⁴⁸. Spawning within populations is synchronised but may vary between populations. Fertilisation is external and larval development takes about three weeks. Young scallop development is highly variable and probably determined by large scale environmental conditions as well as local hydrodynamics²⁷⁴. Young scallops attach to filamentous material or dead shells using a byssus thread. After growth to about 5 mm the byssus is detached and the juvenile drops to the bottom³⁶⁴. Variable recruitment, post-settlement mortality and growth, a short life-span and mass mortality events mean scallop populations, particularly commercially fished ones, often exhibit large year-to-year fluctuations in abundance.

This species is significant as an iconic species in Marlborough as they highly regarded as a recreational and commercial catch. In Marlborough their abundance fluctuates but appears relatively stable. Scallops are often caught using dredges. This activity often results in a negative impact, especially if scallops are growing amongst biogenic habitats. The presence of scallops can therefore have a negative effect on the ecology of an area.



SEPARATION POINT CORAL (*Celleporaria agglutinans*)

The Separation Point coral is a bryozoan that is made up of tiny colonial animals that build stony skeletons of calcium carbonate. Superficially they appear similar to coral. They are orange in appearance and form solid structures that can be up to 0.5 m in height. In New Zealand it is commonly known as Separation Point coral, Tasman Bay coral or 'hard coral' and occurs from the Three Kings Islands to Foveaux Strait at about 3 to 220 m depth¹⁶¹. In Marlborough this species is relatively widespread and grows on rocky and soft sediment substrata, but only tends to form large, conspicuous colonies on soft sediments in high current areas. Particularly large concentrations of colonies are known from Current Basin, Chetwode and Titi Islands.



Celleporaria (Rob Davidson)

Separation Point coral is a significant species in Marlborough colonies because it can form dense beds that provide habitat for a variety of other species⁹⁰. Areas of muddy-sandy bottom off Separation Point historically supported many thousands of large mounds of hard coral intermixed with other bryozoans, creating a nursery habitat for juveniles of commercial fish, particularly snapper, tarakihi, and john dory⁴⁰. Bryozoan reefs have the potential to significantly enhance biodiversity by increasing structural complexity and provide unique habitats for other species. It is also likely that large colonies modify flow around them potentially affecting sediment composition and other ecological relationships. However, colonies are very brittle and vulnerable to damage or removal by dredging and trawling or smothering by excess sedimentation. Anchor damage can also occur.

TUBEWORM (*Galeolaria hystrix*)

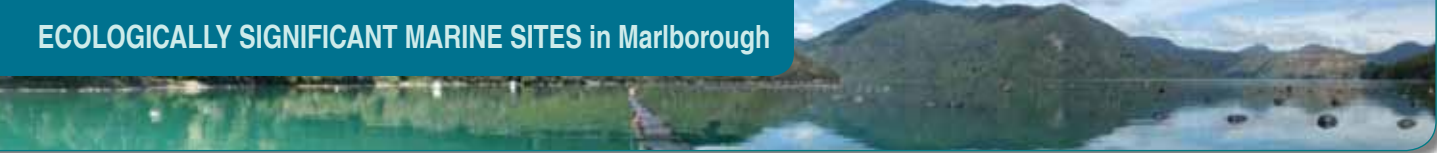
The tubeworm *Galeolaria hystrix* is a large, double-keeled southern tube worm in the serpulid family with a distinctive bright red crown and a light grey to white calcified tube. It can be found as individuals or forming colonies that build up into relatively large mounds. Mound forming is by gregarious behaviour in which attached adults induce adjacent larval settlement by both chemical and physical means²¹⁵.



Tubeworm mound
(Roberta D'Archino)

This tubeworm is found on the rocky shores throughout Marlborough, however mounds are restricted only known to occur in the sheltered waters of the Marlborough Sounds and Port Underwood. Particularly dense growths of these mounds are restricted to locations such as The Knobbies and Perano Shoal⁹⁵. They are most abundant on rocky sheltered shores devoid of macroalgae but swept by tidal currents. Mounds are absent from areas exposed to ocean storms.

Tubeworm mounds represent a significant biogenic habitat in Marlborough as they are utilised by a variety of species enhancing local biodiversity and potentially providing habitat for a variety of juvenile fishes^{90,351}. Dense tubeworm beds are a relatively rare feature in Marlborough partially due to human activities such as dredging and land clearance.



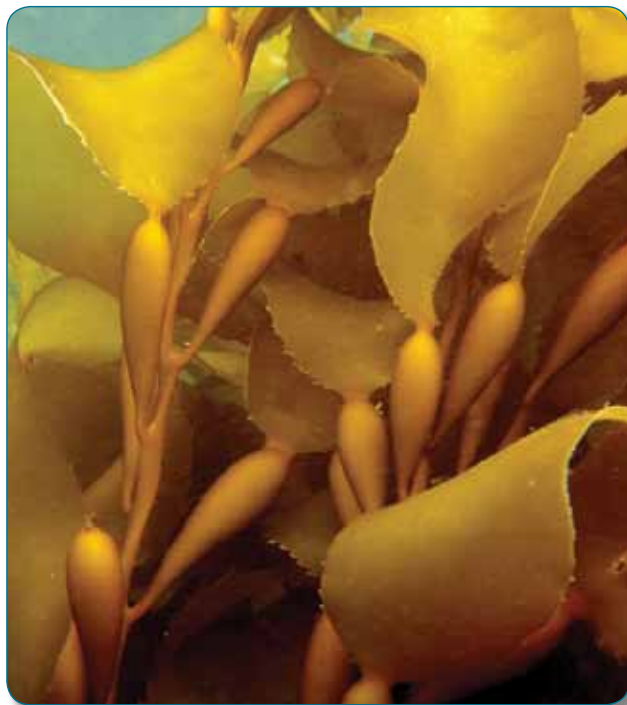
ALGAE

GIANT KELP (*Macrocystis pyrifera*)

Giant kelp may grow to 20 m length with long slender stems reaching the surface where they are buoyed by elongated, pear-shaped air bladders¹. Mature blades have a pronounced, corrugated surface, while fertile leaves are smoother and lack bladders. The alga is a golden brown colour and can grow up to 30 cm per day when conditions are favourable.

The giant kelp is found throughout New Zealand's marine environment and is also widely distributed in temperate regions of the Southern Hemisphere and west coast of North America¹⁶³.

Giant kelp (DOC)



The range and extent of beds in the Marlborough Sounds has declined, with beds now absent from the eastern coast of D'Urville Island¹⁷⁶. Beds in the Marlborough Sounds are largely confined to sheltered eastern outer sound locations. Giant kelp beds are also located north and south of Cape Campbell.

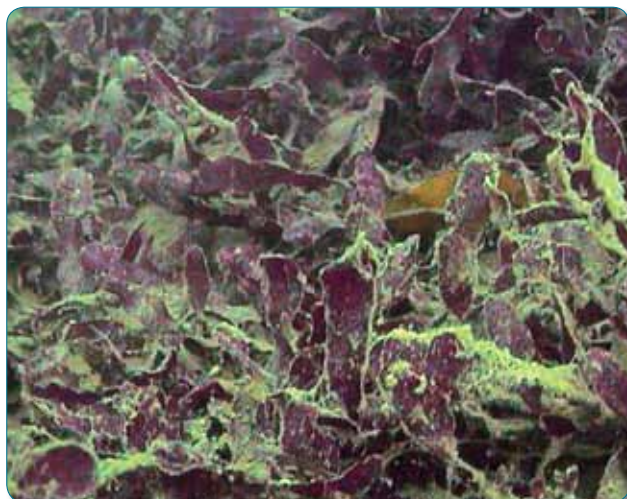
It generally attaches to rock substrata, occasionally horse mussels, from low water to at least 18 m depth. The lower depth limit is determined by light and habitat availability. It is vulnerable to damage by storms, and absent from very exposed localities except where depth provides a refuge.

Macrocystis is regarded as a significant species in Marlborough because in areas where it is dominant it can alter abiotic and biotic conditions by dampening water motion, altering sedimentation, shading the sea floor, scrubbing nutrients from the water column, stabilising substrata, and they can provide physical habitat for organisms both above and below the benthic boundary. This species may also be a useful indicator of global warming as its distributional limit has been moving southward.

RED ALGA (*Adamsiella chauvinii*)

The red alga *Adamsiella chauvinii* can form dense beds of plants up to 15 cm in height. Plants have one or more leafy blades arising from a wiry base. Blades have a midrib and lobes that are marginal or from the midrib. The holdfast is a small disc and the alga is generally dark brown to crimson colour¹.

It is endemic to New Zealand^{298,299}. In Marlborough it often forms dense beds in particular areas of Port Underwood, East Bay, and inner Queen Charlotte Sound (Houhou Point, Hauatehoro Point, Wedge Point, Ngakutu Point). It is found growing on a variety of substrata from rock to sand and mud⁹⁰.



In the Marlborough Sounds dense beds of red algae located on mud are sometimes associated with dense beds of parchment worms. It is not clear if the algae grow on the exposed tubes of these worms or on the surrounding sediment.

Adamsiella is regarded as a significant species in Marlborough because where it forms dense beds it appears to provide habitat for a variety of species including bivalves, holothurians and fishes^{385,172}. Rough skate and Elephant fish are known to lay egg cases on the beds of *Adamsiella* in some parts of Grove Arm, Queen Charlotte Sound.

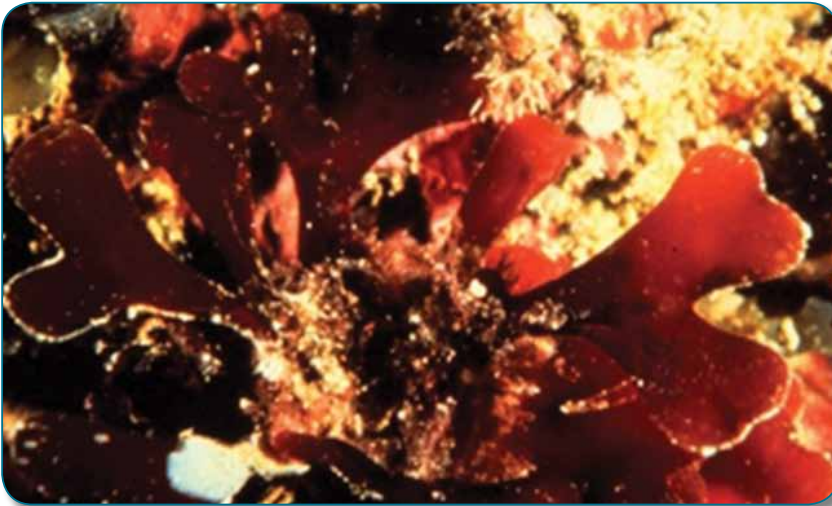
Red algae – Adamsiella (Rob Davidson)



RED ALGAE (*Rhodymenia* spp.)

Red algae in the genus *Rhodymenia* range in size from small low lying algal species to plants up to 20 cm high. The leaf blades are usually fan shape blade arising from a central base with blades usually being forked several times.¹

They occur on a variety of substrata including rock, tube worm colonies and horse mussel shells^{284,344}. They may also be intertidal but most beds are subtidal in harbours and inlets.



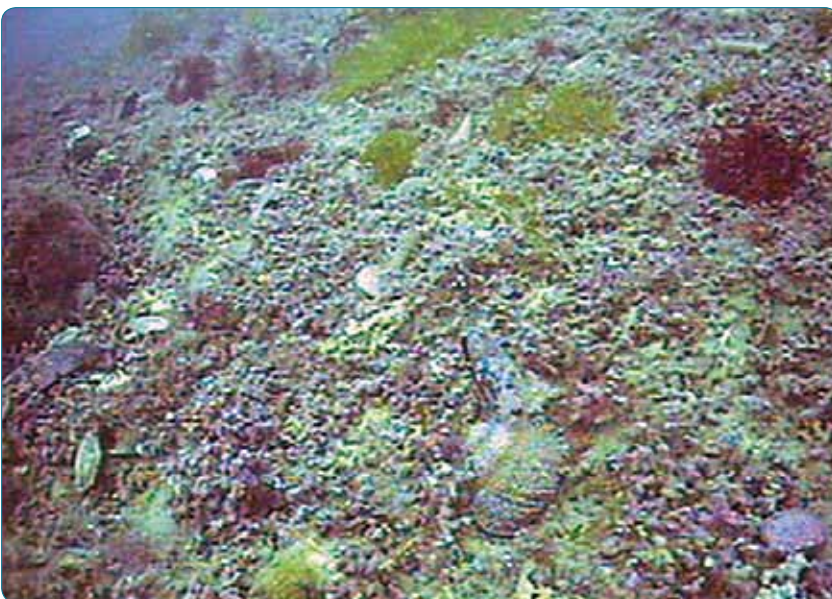
Red algae – *Rhodymenia* (DOC)

Beds of *Rhodymenia* are regarded as significant in Marlborough because they provide an important food source for a variety of species, including urchins and some herbivorous fishes^{322,321}. Extensive beds on soft sediments may provide biogenic habitat, and could potentially affect sediment stability and nutrient processes and thereby benthic-pelagic coupling. It is also possible that they could play a role in the recruitment of species such as scallops that do not settle directly onto the soft sediment.

RHODOLITHS (*Lithothamnion* sp.)

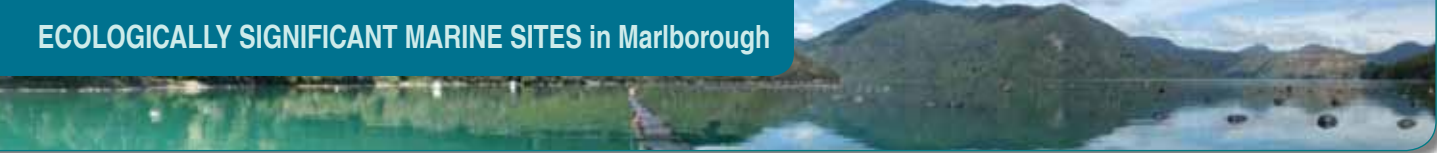
Rhodoliths are free-living encrusting coralline algae. Many species that form rhodoliths may also be found encrusting reefs and other hard substrata. Rhodoliths may form around small particles of rock, shell or coral, or may develop from fragments of coralline algae eroded from reefs. The appearance of rhodoliths is highly variable and is influenced by local environmental conditions, particularly water movement, position in the bed and by the species of algae forming them²⁸³. Lumpy, warty, spherical, shapes usually occur in high energy environments. Whereas open branching forms are more common in sheltered environments. Rhodolith beds may be composed one or several species. Rhodoliths are often sterile and can therefore be difficult to identify to species using morphological characters. Locally rhodoliths are relatively small structures, less than 5 cm in height and form a cluster of small nodules. Rhodoliths from the Marlborough Sounds are morphologically identical to those from the Abel Tasman coast⁸⁹.

Rhodoliths, (Rob Davidson)



Rhodolith beds have been reported from almost all marine environments ranging from polar regions to tropical coral reefs and sea grass beds. In Marlborough rhodoliths they are known from a small number of distinct locations in the Sounds including Picnic Bay in Pelorus Sound, and Ponganui Bay and Catherine Cove, D’Urville Island.

Coralline algae, including rhodoliths, play an important role in the global calcium carbonate budget. Rhodoliths may also enhance local biodiversity by increasing habitat complexity and providing habitat for macroalgae and invertebrates⁹⁰.



● PLANTS

NATIVE MUSK (*Mimulus repens*)

The native musk is a mat-forming, succulent, perennial herb. The stems are dark green to red-green, prostrate, sometimes ascending at apices. Leaves clasp the stem due to the absence of leaf stalks; the upper surfaces are covered in minute pits. The flared flattened-trumpet flowers are large compared to the leaf size, usually purple with yellow throats, but are sometimes close to white.

Native musk is found in North and South Islands of New Zealand and also in Tasmania³⁹⁵. In Marlborough it is known from Wairau Lagoons. It is strictly coastal usually found above salt marsh in brackish estuarine areas, in permanently damp or soggy, saline mud or silt soils in locations that are periodically flooded during high or spring tides or rain events. It is intolerant of competition from taller plants or faster growing mat-forming species.

It flowers in September to February and fruits in November to May. It is easily grown from rooted pieces, stem cuttings and fresh seed and is pollinated by insects³³.

This species is significant in Marlborough on conservation grounds having a “naturally uncommon” status³⁹². The spread of aggressive weeds, such as *Spartina*, *Carex divisa* and *Plantago coronopus* is also a risk in some parts of its range, including Wairau Lagoons.



Mimulus repens (MDC)



Mimulus repens (Rob Davidson)

SEA SEDGE, ESTUARY SEDGE (*Carex litorosa*)

Sea sedge is an upright sedge growing to 80 cm height (but usually smaller), that forms pale green, straw-coloured or reddish dense tussocks with curly leaf tips. Leaves are flat on one side, curved on the other and slightly serrated along the edge. The leaves are 1.5 mm wide and about the same length as the flower stem. Flower stems are cylindrical and upright with light brown spikes.

Sea sedge is endemic to New Zealand and in Marlborough is known from a number of locations in the Marlborough Sounds including Matai and Tawa Bays, Kaituna Estuary, and Port Hardy and Greville Harbour, on D’Urville Island³. It prefers brackish salt marshes, estuary margins and sandy tidal reaches of deltas and river banks. It flowers in October to December with fruit appearing in December to April but seed heads are persistent for long periods.





This species is significant in Marlborough on conservation grounds having a “declining” status³⁹⁵. This decline is primarily due to habitat loss through coastal development, especially by reclamation and river channelisation. Encroachment by estuarine weeds is also a serious problem, especially from by *Spartina*, tall fescue and *Carex divisa*.



Sea sedge (DOC)



Sea sedge (Cathy Jones)