The fragile marine life under boulders

Beneath low tidal boulders the marine life is rich, varied and colourful, but it is also delicate and vulnerable. Examples of most life forms that live in the sea can be found living in these micro-habitats. Many are creatures that are normally found only below low tide but they are able to survive under beach boulders because they are well protected from drying out, ultraviolet burning, wave assault and attack by the larger predators such as fish and birds.

Many are encrusting animals firmly cemented to the rock that feed by straining plankton from the water when the tide is in. Some are deposit feeders processing biological debris, including the faeces of other marine animals, that accumulates in the crevices beneath boulders.

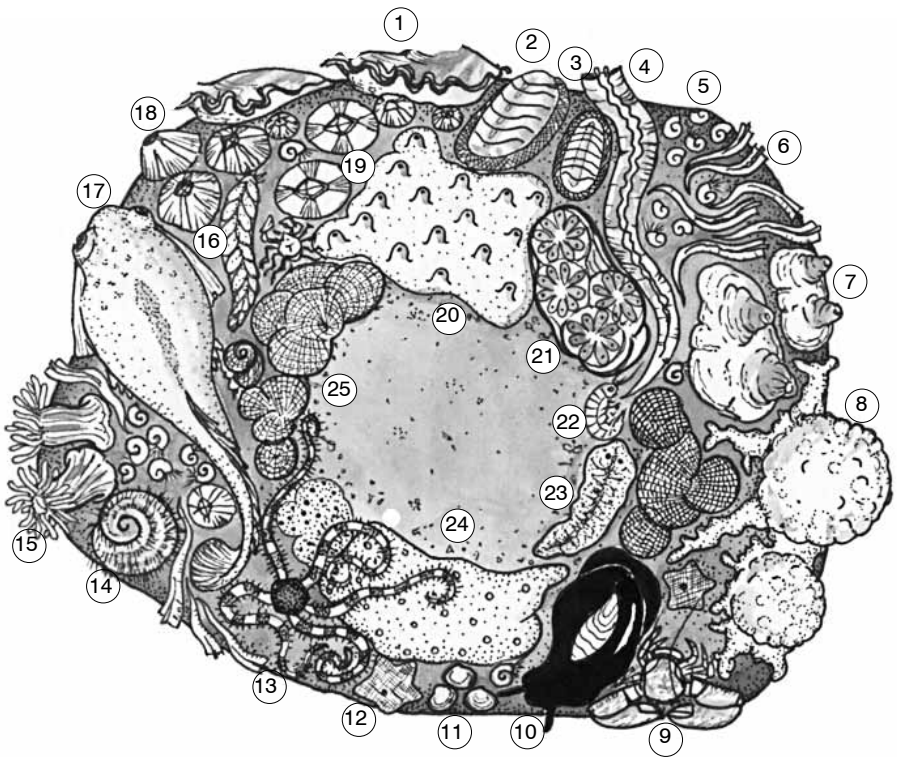
Some of the mobile creatures, like small whelks, crabs, flatworms and slugs are predators of the sedentary filterers but others, especially chitons, limpets and small topshells, are only temporary residents. These are grazers that hide during the day time or while the tide is out to avoid drying out and predation.

Never leave boulders overturned.

It is thrilling to see the great variety of marine life under boulders but critical to the survival of these small creatures is that they are not exposed to the drying wind or the sun's burning rays for more than a couple of minutes. Always turn boulders back after glimpsing the life beneath them for most of the creatures that live there are only adapted to survive in dark, moist

Under Boulder Life

1. Rock oyster
2. Green chiton
3. Narrow chiton
4. Red crowned tubeworm
5. Spiral tubeworm
6. Blue crowned tubeworm
7. Blue siphon sea squirt
8. Golfball sponge
9. Porcelain crab
10. Shield slug
11. Nestling clams
12. Cushion star
13. Brittle star
14. Saucer limpet
15. Striped sea anenome
16. Scaleworm
17. Sucker fish
18. Subtidal barnacle
19. Wafer barnacle
20. Nipple sponge
21. Colonial seasquirt
22. Hopper
23. Flatworm
24. Sponge
25. Polyzoa colonies



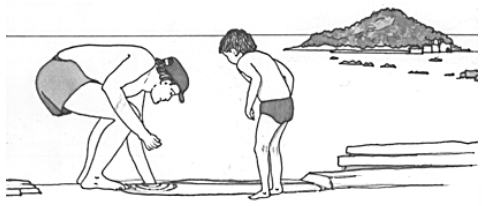
Further reading: companion DOC brochure "The Underwater World". *Drawings & text:John Walsby.Copyright.*

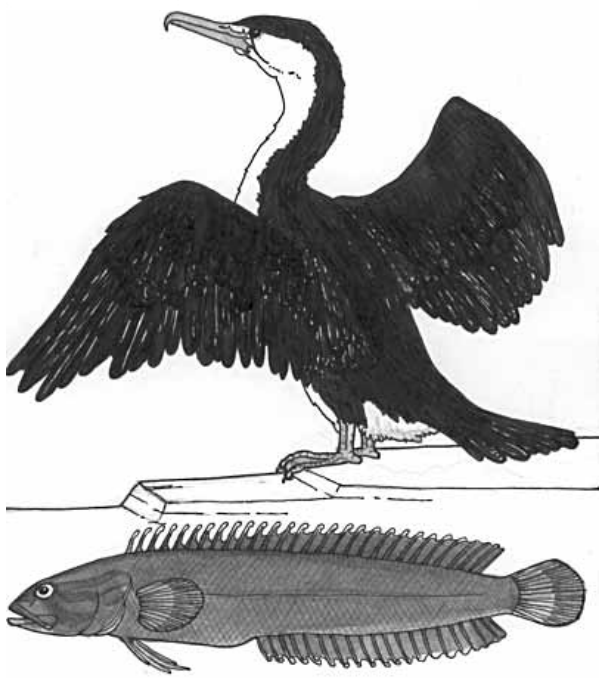
Cape Rodney-Okakari Point Marine Reserve

The Inter-Tidal World

Hauraki Gulf Marine Park

AUCKLAND



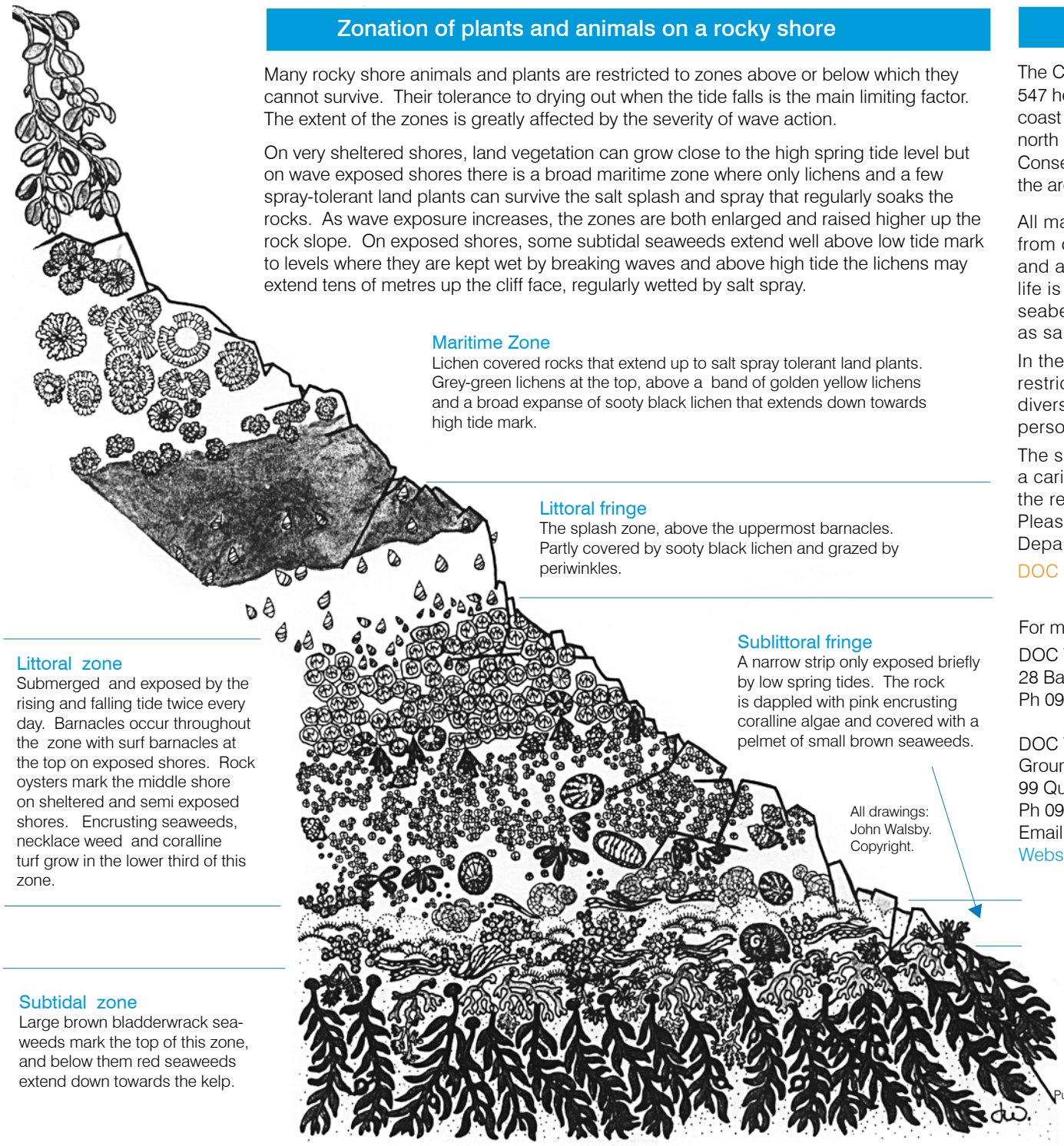


Department of Conservation
Te Papa Atawbai

Zonation of plants and animals on a rocky shore

Many rocky shore animals and plants are restricted to zones above or below which they cannot survive. Their tolerance to drying out when the tide falls is the main limiting factor. The extent of the zones is greatly affected by the severity of wave action.

On very sheltered shores, land vegetation can grow close to the high spring tide level but on wave exposed shores there is a broad maritime zone where only lichens and a few spray-tolerant land plants can survive the salt splash and spray that regularly soaks the rocks. As wave exposure increases, the zones are both enlarged and raised higher up the rock slope. On exposed shores, some subtidal seaweeds extend well above low tide mark to levels where they are kept wet by breaking waves and above high tide the lichens may extend tens of metres up the cliff face, regularly wetted by salt spray.



Maritime Zone
Lichen covered rocks that extend up to salt spray tolerant land plants. Grey-green lichens at the top, above a band of golden yellow lichens and a broad expanse of sooty black lichen that extends down towards high tide mark.

Littoral fringe
The splash zone, above the uppermost barnacles. Partly covered by sooty black lichen and grazed by periwinkles.

Littoral zone
Submerged and exposed by the rising and falling tide twice every day. Barnacles occur throughout the zone with surf barnacles at the top on exposed shores. Rock oysters mark the middle shore on sheltered and semi exposed shores. Encrusting seaweeds, necklace weed and coralline turf grow in the lower third of this zone.

Sublittoral fringe
A narrow strip only exposed briefly by low spring tides. The rock is dappled with pink encrusting coralline algae and covered with a pelmet of small brown seaweeds.

Subtidal zone
Large brown bladderwrack seaweeds mark the top of this zone, and below them red seaweeds extend down towards the kelp.

All drawings: John Walsby. Copyright.

Help take care of this reserve

The Cape Rodney-Okakari Point Marine Reserve protects 547 hectares of shore and sea on the northeastern coast near Leigh, about one and a half hours drive north of Auckland. It is managed by the Department of Conservation Warkworth Area Office. Its rangers watch over the area and enforce the "no take" restrictions.

All marine life within the marine reserve is protected from disturbance or harm, including all plants and animals. No fishing or collecting marine life is allowed or unnecessary disturbance. The seabed, foreshore and all natural material such as sand, rocks and shells are also protected.

In the interests of visitor safety there is a 5 knot restriction on all vessels within 200 metres of a divers flag or the shoreline, or 30 metres from a person in the water or another vessel.

The success of a marine reserve depends on a caring community that supports conserving the reserve in its natural state for all to enjoy. Please report any breaches of these rules to the Department of Conservation on the 24 hour DOC HOTline 0800 362 468.

For more information or to report any offences contact:

DOC Warkworth Area Office
28 Baxter St, Warkworth.
Ph 09-425 7812 (office hours)

DOC Visitor Centre
Ground Floor Ferry Building
99 Quay St Downtown
Ph 09-379 6476, fax 09-379 3609
Email: aucklandvc@doc.govt.nz
Website: www.doc.govt.nz

DOC HOTline
0800 362 468
Report any safety hazards or conservation emergencies
For fire and search and rescue call 111

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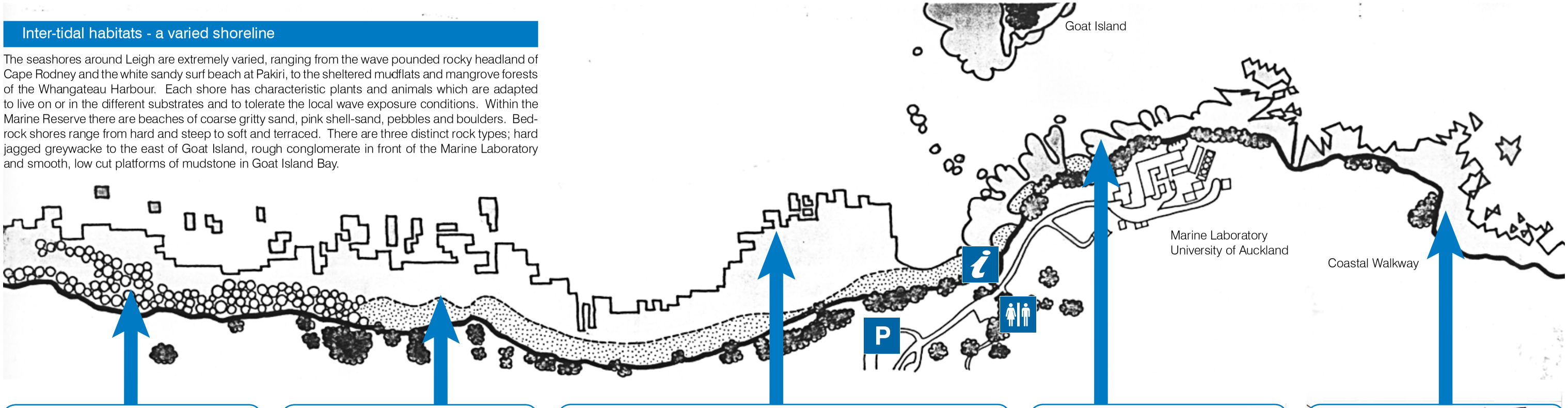
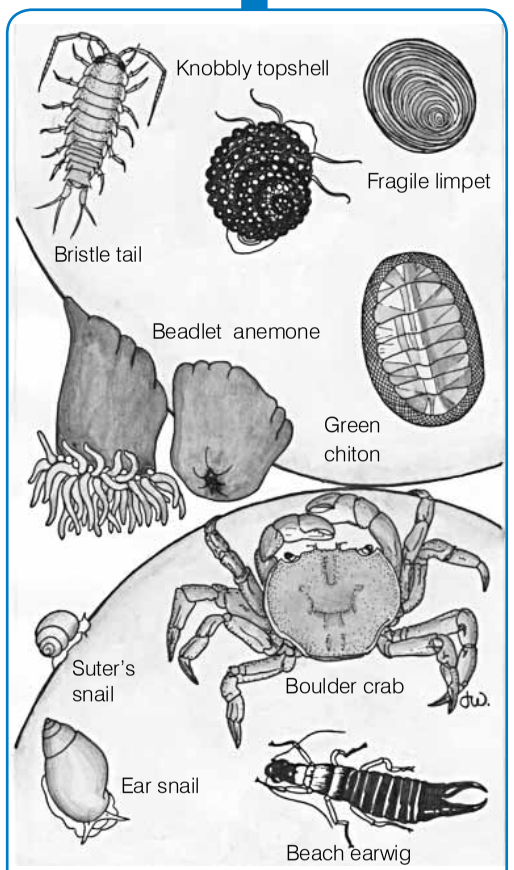
Inter-tidal habitats - a varied shoreline

The seashores around Leigh are extremely varied, ranging from the wave pounded rocky headland of Cape Rodney and the white sandy surf beach at Pakiri, to the sheltered mudflats and mangrove forests of the Whangateau Harbour. Each shore has characteristic plants and animals which are adapted to live on or in the different substrates and to tolerate the local wave exposure conditions. Within the Marine Reserve there are beaches of coarse gritty sand, pink shell-sand, pebbles and boulders. Bed-rock shores range from hard and steep to soft and terraced. There are three distinct rock types; hard jagged greywacke to the east of Goat Island, rough conglomerate in front of the Marine Laboratory and smooth, low cut platforms of mudstone in Goat Island Bay.





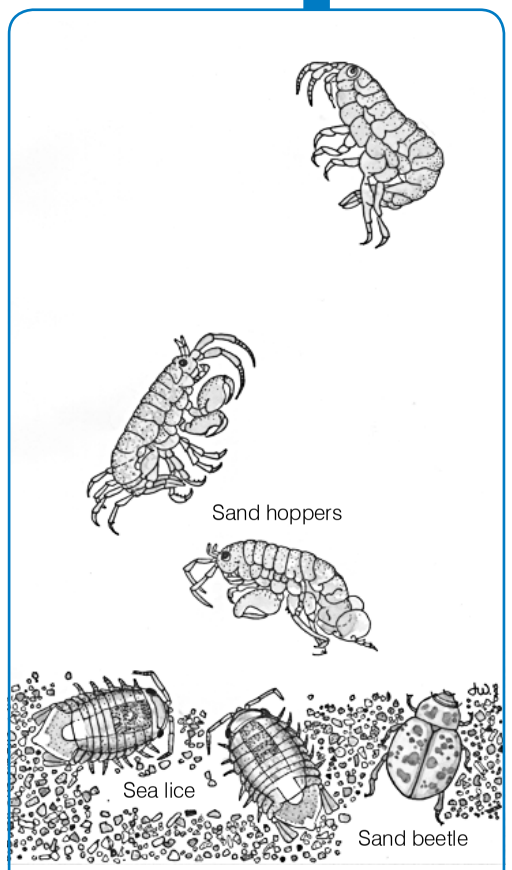
Boulders

Banks of rounded boulders piled up along the top of the shore look quite barren, but beneath them where the air is always cool and damp live many animals that shun the sunlight.

In the spaces below are plump, moist red sea-anemones, fast running boulder crabs and scurrying bristle-tails.

Fragile limpets, knobbly topshells and chitons that all feed by grazing the tops of the boulders, only emerge at night.

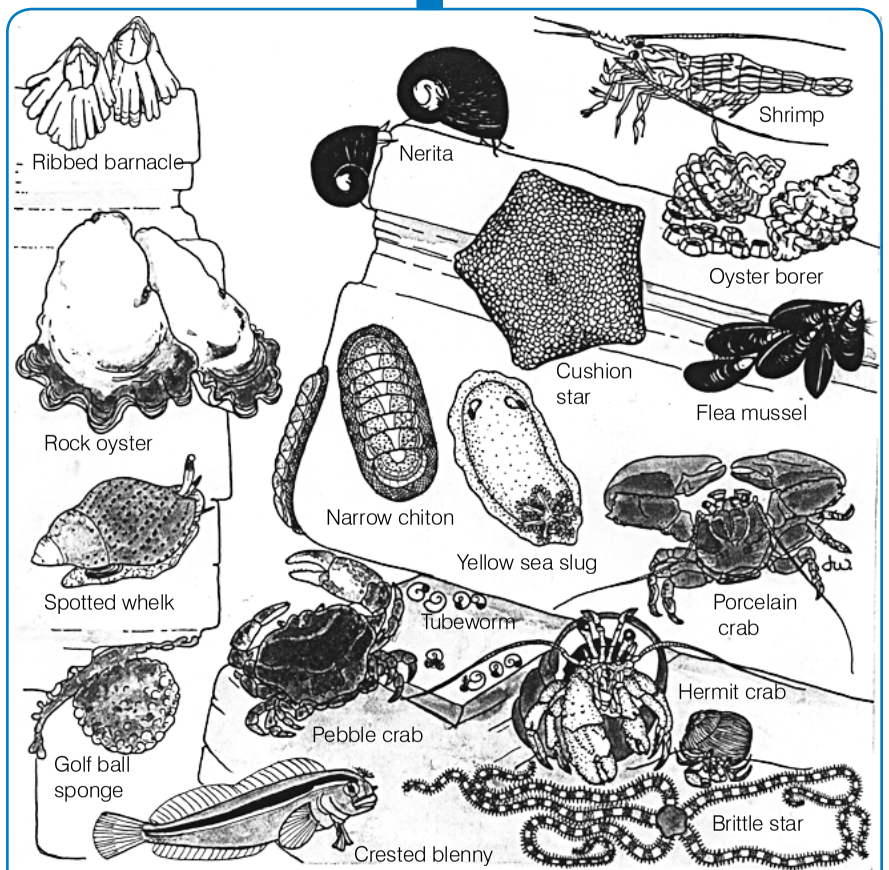
In the lower layers hoppers and small snails feed on the slimy rotting remains of washed up seaweeds and other debris.



Coarse Sand

Apart from microscopic organisms, few animals live in the sand at the top of the beach. It is so coarse and loose that it is churned up by wave action every time the tide rises. Where dead animals and seaweed lie stranded along the drift line, sand hoppers and sea-lice are common.

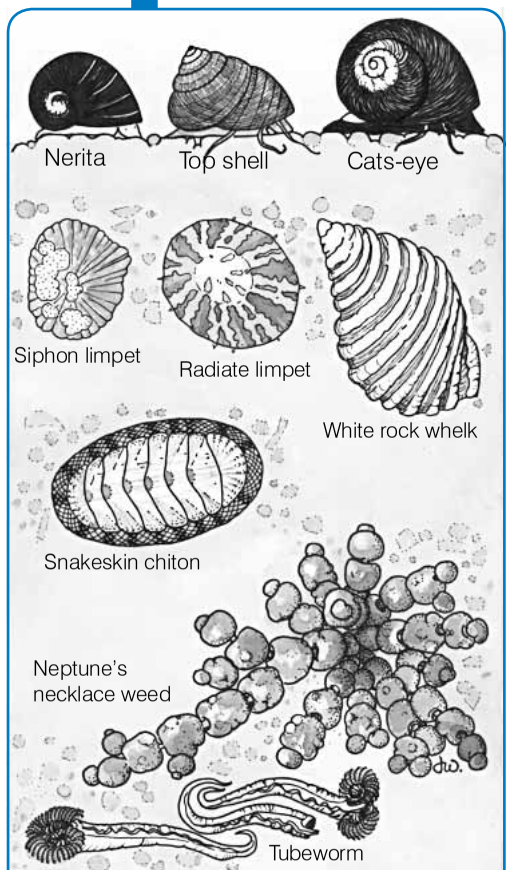
These beach cleaners, assisted by kelp fly maggots and a small sand beetle, speedily dispose of any biological drift line flotsam. During the day they burrow in the sand or hide beneath the drift weed but at night they roam the upper beach in search of food.



Mudstone Terraces

The low-tidal terraces are very rich with marine life. Open surfaces are grazed by many different snails, limpets and chitons, some of which are eaten by brown rock whelks, black fingered crabs and octopus. Packs of small whelks dine on barnacles, oysters and flea mussels and the larger white rock whelks prey on ribbed barnacles and snails. In pools, wary hermit crabs, shrimps and small fish abound. They are only seen by patient observers for they hide as people approach. Sea-eggs are common too, often covering themselves with stones and weed. Cushion stars of varied colours roam the flats, digesting anything they settle on.

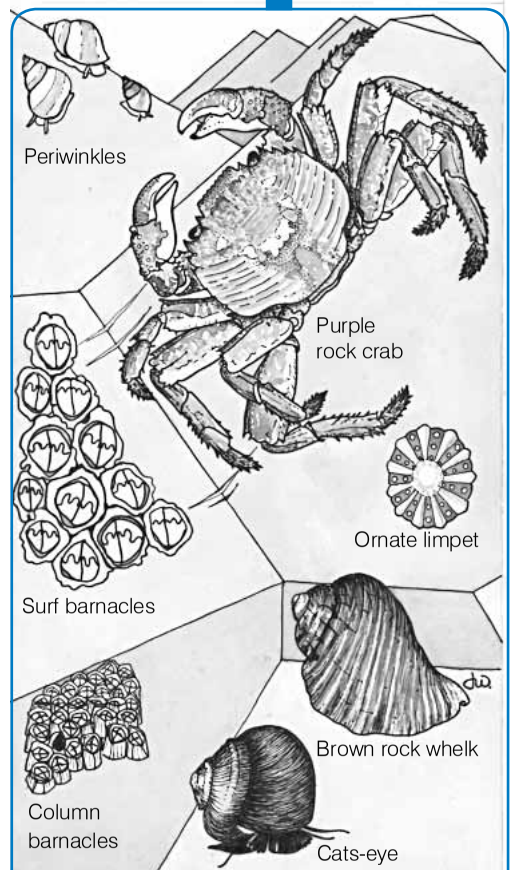
Under the flat boulders are often dozens of filter feeding half-crabs, as well as several species of true crabs, light-shy chitons, colourful worms, polyzoa, brittle stars and many tiny snails and bivalves. Beneath large boulders and overhangs, there are also brightly coloured sponges and seaquirts that are normally only seen below low tide mark.



Conglomerate

The rough surface of this pebblestone rock remains quite wet after the tide falls and this encourages algal films and scabs to grow in pits and clefts. In shallow puddles Neptunes necklace weed, turfing algae and other small seaweeds flourish. These lush growths provide food for all of the common grazers; periwinkles, snakeskin chitons, top shells, radiate and siphon limpets, nerita and cats-eyes.

Filter feeding animals, mainly barnacles, tubeworms and oysters are cemented to open rock surfaces where many fall prey to oyster borers and white rock whelks.



Greywacke

The hard, fractured greywacke rock has steep faces and deep gullies. High on the shore, where purple rock crabs patrol, the slopes are covered by surf barnacles that strain plankton from the breaking waves. Lower down, sheets of column barnacles extend towards the brown bladderwrack seaweeds at low tide. Many thousands of periwinkles and small limpets graze these wave exposed surfaces, sheltering between barnacles when the tide falls.

In wave sheltered crevices rock whelks lie in wait for larger grazers that move up and down the shore with the tide.