

Marine Algae of the West Coast, South Island, New Zealand

Don Neale¹ and Wendy Nelson²

¹Department of Conservation, Private Bag 701, Hokitika

²Museum of New Zealand Te Papa Tongarewa, PO Box 467, Wellington, New Zealand

ABSTRACT: The West Coast of New Zealand's South Island is a windward shore that transects a westerly temperate ocean current system. The coastline structure is very much dominated by its history of glaciation and tectonic uplift, and its high sediment loading, which combine to give this marine region a distinctive ecological character. Within the region, three marine ecological districts (Buller, Westland and South Westland) can be distinguished. Although the biomass of seaweeds on the West Coast's rocky shores and estuaries is often reduced by heavy sediment abrasion and other influences, over 175 taxa are recorded from historic and recent collections in the region. Significant features of the region's algal flora are hard to discern on the basis of existing knowledge, but include the virtual absence of some common New Zealand species, and extensions to the known distributions of others.

KEYWORDS: Marine algae, West Coast South Island New Zealand, biogeography

Marine Environment of the West Coast

The West Coast region, between Kahurangi Point in the north and Awarua in the south, extends for some 600 kilometres along the windward side of the South Island, New Zealand (Figure 1). The geographic coordinates of the West Coast shoreline are between Lat. 40° 47' S Long. 172° 13' E (Kahurangi Point) and Lat. 44° 17' S, Long. 168° 07' E (Awarua Point). The NZMS262 (scale 1:250 000) maps for the area are Sheets 9 (Nelson), 10 (Grey) and 12 (Mt Cook).

The outer continental shelf of the West Coast of the South Island (WCSI) has been the focus of major research over the past 10-20 years (e.g., Bradford 1991), largely on account of its great importance to New Zealand's commercial fisheries. The

hydrography, productivity and fishery resources of the WCSI are, consequently, better known than many other parts of the New Zealand shelf.

In contrast, the inshore marine ecology of the WCSI is much less well studied. Cooperative work between the Department of Conservation, the Museum of New Zealand Te Papa Tongarewa, and other research agencies has recently facilitated the collection and identification of many marine specimens from throughout the region, and is a basis for this report on the region's marine algae. The report complements similar lists that have been prepared for other regions of New Zealand [Kermadec Islands (Nelson & Adams 1984), Three Kings Islands (Adams & Nelson 1985), Bay of Islands (Nelson & Adams 1987), Wellington (Adams 1972), northern South Island (Nelson *et al.* 1992), Chathams (Nelson *et al.*

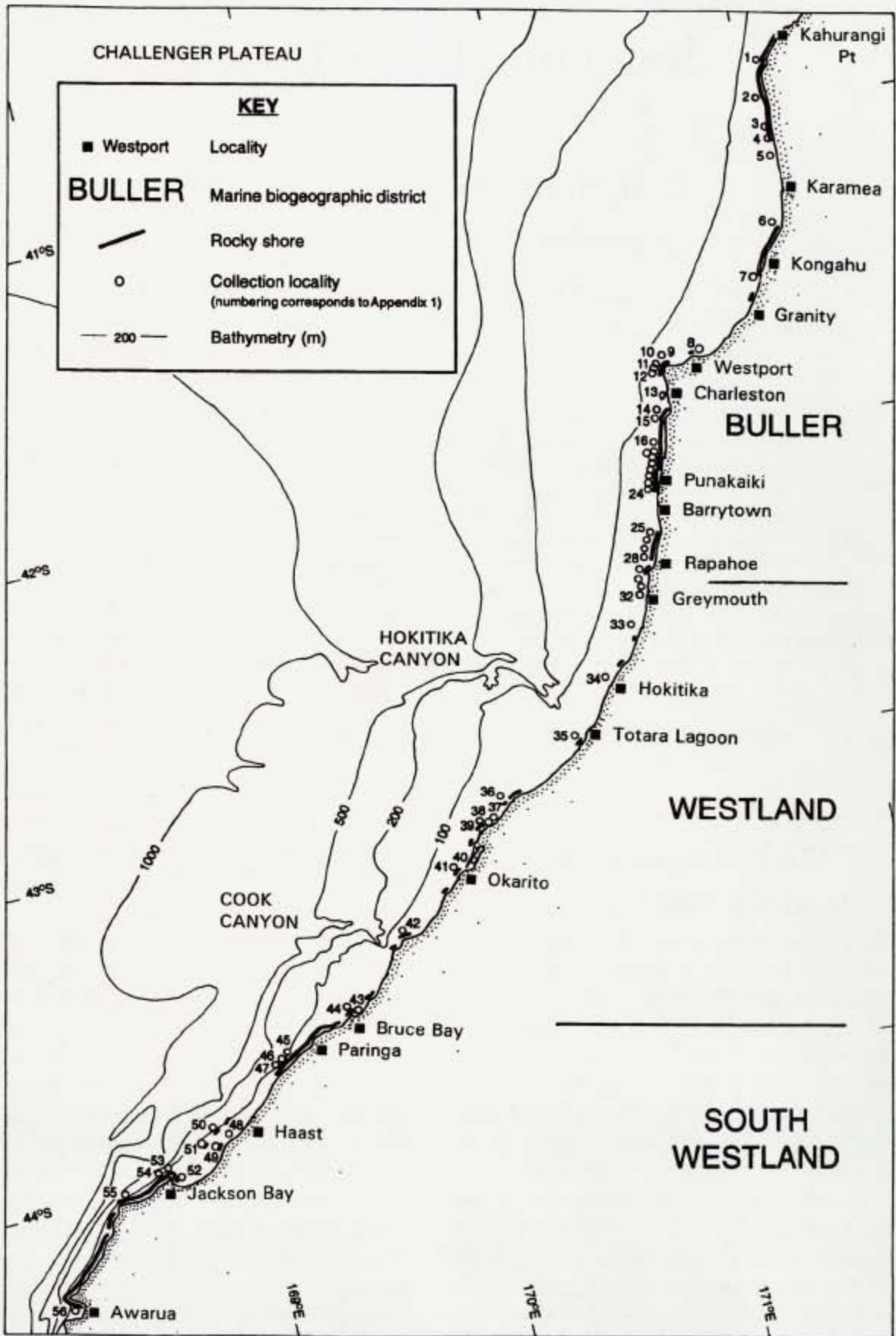


Figure 1. The study area: West Coast of the South Island

1991), Kaikoura (South & Adams 1976), Stewart Island (Adams *et al.* 1974), New Zealand subantarctic islands (Hay *et al.* 1985)].

Marine Water Masses and Circulation

The outer continental shelf of the West Coast and Tasman Sea has been a focus in New Zealand oceanographic studies since the 1970s. Major oceanographic features affecting the West Coast are shown in Figure 2, and the superscript numerals in the following discussion refer to the numbered features in the figure.

The New Zealand area is the only continental shelf landmass, apart from Chile/Argentina, to lie across one of the most significant ocean boundaries in the southern hemisphere - the Subtropical Convergence¹ (Robertson 1982). This circumglobal front separates subtropical water in the north from subantarctic water in the south. It is accompanied by strong physical and nutrient gradients which have major implications for planktonic growth and the richness of the surface waters (Vincent *et al.* 1991). The location of the boundary between the polar and temperate waters varies with the seasons and from year to year, but Figure 2 shows the generally accepted "average situation" (Heath 1985). The West Coast is near the southern limit of the subtropical oceanic water mass, to the north of the convergence.

Ocean surface currents^{2,3}, driven primarily by wind systems, flow on either side of this convergence. In the north, the Tasman Current² is considered to be a broad, slow flow of warm northern water that approaches the West Coast from the Tasman Sea (Heath 1985). To the south of the Subtropical Convergence, the strong westerly winds of the "Roaring Forties" drive a cool westerly ocean current (a component of the Antarctic Circumpolar Current³ that lies north of the Subantarctic Front), but this current does not have a direct impact on the West Coast.

The New Zealand continental shelf and coastline act as a barrier to the ocean currents, which are forced to flow around the landmass as shelf surface currents⁴. On the West Coast, the shelf current is fed mostly by the warmer water derived

from the Tasman Current. The direction of the surface current along the coast is determined primarily by local winds (which prevail from the southwest) and "coastal trapped waves" (see below). As a result, the West Coast is washed by a northward-moving current (the Westland Current⁵) on some occasions, and a southward-moving current (the beginnings of the Southland Current⁶) on others (Stanton 1976). Over most of the region, the mean flow moves weakly northward towards Taranaki and Cook Strait (Heath 1982).

A pattern of very long waveforms runs along the West Coast at least as far south as Milford. It is generated by the combined effects of the wind component parallel to the West Coast and the slow wind-generated oscillation of water⁷ in the northern Cook Strait/Taranaki Bight region (Cahill *et al.* 1991). Because these waves are often thousands of kilometres long and only a few centimetres high, they are virtually imperceptible but they can be measured by sensitive tide gauges. The Earth's rotation (the Coriolis force) causes these "coastal-trapped waves" to move southward down the West Coast, their speed of travel modified by the slope of the sea bed. These waves in turn cause the West Coast's coastal surface current to speed up or slow down (and to change direction regularly) every few days, much as normal sea waves will cause a floating stick to rock back and forth on the surface.

The Southland Current⁶ begins in the vicinity of Westland/northern Fiordland (Heath 1985), forming from southern subtropical water. It flows southward and around the bottom of the South Island, and continues northward along the South Island's east coast as far as Canterbury/Marlborough, becoming less saline and cooler through incorporation of subantarctic water. While the Southland Current is relatively warm for those latitudes, the east coast tends overall to be cooler than the west coast, and this has a great effect on the comparative ecology of the two coasts.

A distinct inshore zone⁸ approximately 30 kilometres wide appears to exist on the West Coast, extending from the coastline out to depths of 100-200 metres. It comprises relatively cool seawater with a lowered salinity (Moore & Murdoch 1993). It is prob-

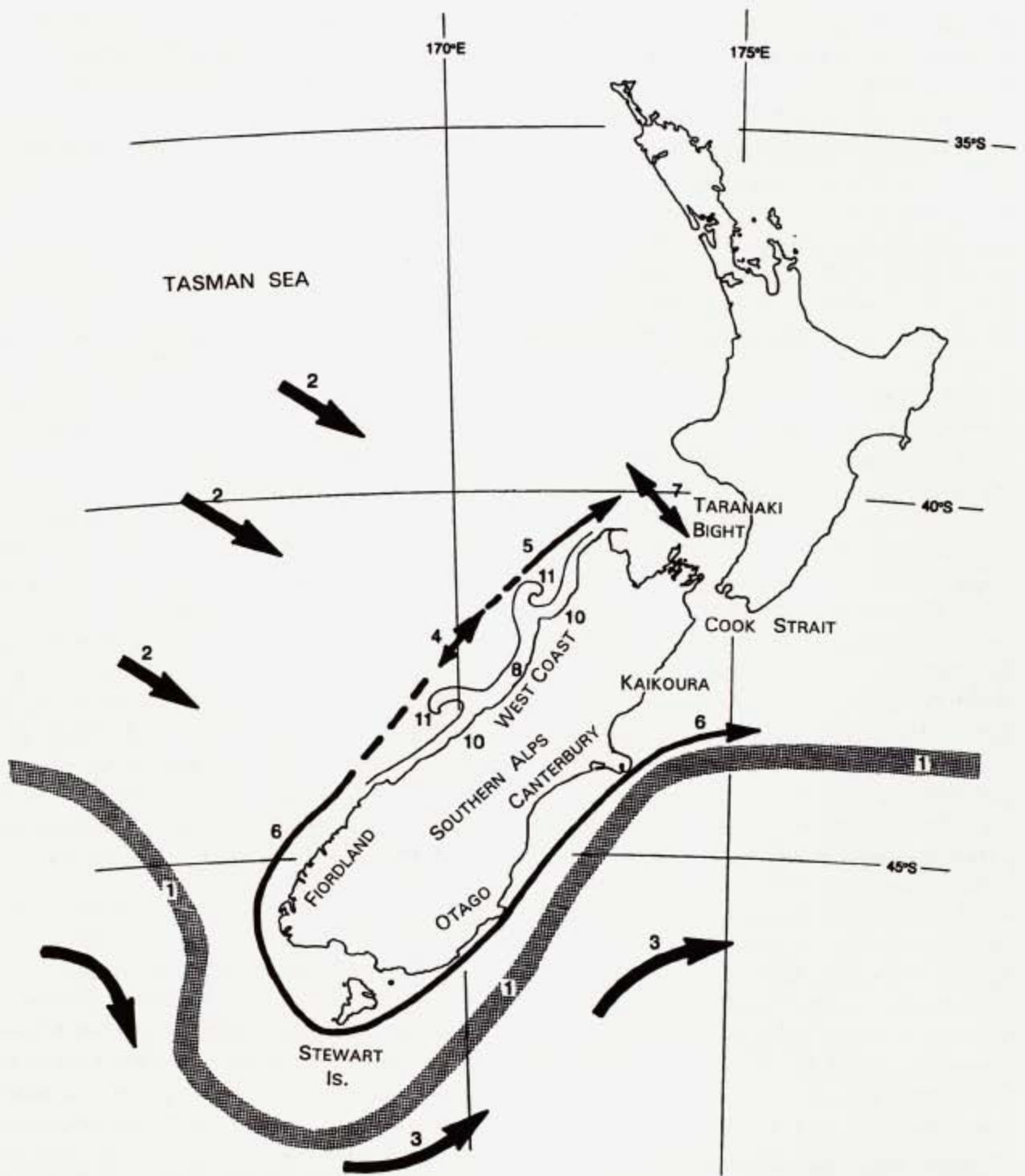


Figure 2. Oceanography and Currents of the West Coast

Numbers refer to features described in the text, as follows:

- 1 = Subtropical Convergence; 2 = Tasman Current; 3 = Antarctic Circumpolar Current; 4 = West Coast shelf surface currents; 5 = Westland Current; 6 = Southland Current; 7 = Wind-generated oscillations in Cook Strait; 8 = West Coast inshore zone; 9 = Upwelling (not depicted); 10 = Freshwater inflows; 11 = "Squirts"

ably this water that most affects the ecology of the West Coast's shores. The subtropical water in this zone is impacted by coastal upwelling and river inflow.

Coastal upwelling⁹ of cool water, originating from depths of up to 200 metres (Shirtcliffe *et al.* 1990), can occur right along the West Coast under westerly or southwesterly winds (Heath & Ridgway 1985).

The west coast of the South Island has in excess of 2.4 metres of rain annually, feeding several major rivers which drain on to the West Coast continental shelf (Heath 1982). These inflows of fresh water¹⁰ from the West Coast's many large rivers mix with the upwelling water, producing a shallow surface layer that readily exchanges heat with the atmosphere and further decreases the temperature of the inshore zone (Moore & Murdoch 1993). The sediment loading of the inshore zone is also high compared to the oceanic waters, due to the suspended loads of rivers and bottom disturbance by waves as they approach shallow water. The marked hydrographical differences between the inshore zone and the open sea inhibit mixing of the water, and the boundary between the two water masses is quite clear.

Water escapes the inshore zone in the form of transient plumes or "squirts"¹¹ (Vincent *et al.* 1991, Moore & Murdoch 1993). These shallow surface layers of low-salinity water extend up to 75 kilometres seawards and are associated with specific topographic features (e.g., Hokitika Canyon). The water within the squirts eventually merges with the more saline seawater offshore. This process is an important mechanism for the across-shelf exchange of coastal and oceanic water. These features are important to the biological productivity of the continental shelf because their plumes stabilise the surface layer, preventing the mixing of phytoplankton at the surface with deeper levels in the water column (Moore & Murdoch 1993).

Tides

The West Coast, like the rest of New Zealand, has a dominantly semi-diurnal tide. Due to the anticlockwise movement of the tidal wave around the New Zealand coast, the West Coast's tides tend to become progressively later towards the south, with Jackson Bay

tides lagging those at Karamea by about 75 minutes. Spring tides at Westport rise and fall by up to 3.7 metres, while the difference between high and low water at neap tides is as little as 1.2 metres (OceanFun 1996). The tidal range right along the West Coast is likely to be similar to this.

Waves and Weather

Exposure to the weather and the sea has an important effect on the ecology of rocky shores, and the West Coast is extremely dynamic in this regard. Since New Zealand lies across a belt dominated by westerly winds, the West Coast is on a windward shore. This causes wave conditions to be generally rougher than on the eastern coasts and weather conditions to be generally more humid. Such conditions typically increase the vertical widths of intertidal zones, since organisms can satisfy their water requirements further up the shore than they could on dry, sheltered shores.

Daily observations made at Punakaiki since 1984 give an indication of the sea wave climate of the West Coast. There, Jones (1994) found that high-energy wave events (wave heights at the shore greater than 1.5 m) occur 36% of the time, but waves seldom exceed 3.0 m in height. Jones also found that about twice as many high-energy wave events arrive from the south than from the north.

Geomorphology of the Marine Environment

The active uplifting of the West Coast has played a large part in shaping the physical structure of the region's coast. It has created steep bluffs leading down to rocky coasts, and the many large rivers carry down massive amounts of sediment to form long beaches of sand and gravel.

Glaciation has also had a major effect on the geomorphology of the West Coast shoreline. During the Otira Glaciation (10,000+ years ago), glaciers extended past most of the present coastline from Hokitika south to Fiordland, though the sea level at that time was 100-200 metres lower than present (Soons & Selby 1982). Today the coast between Hokitika and Paringa is of long beaches at the end of glaciated river catch-

ments, interrupted by lateral moraines that have been truncated into steep bluffs and boulder shores by the erosion of the sea. South of Paringa, the Fiordland ice sheet once covered the land, but these catchments are mostly no longer glaciated.

Sheltered Shores

Unlike many other regions of New Zealand (the eastern coasts in particular), the distinction between exposed and sheltered coasts of the West Coast is very clear. Except for a very few small rocky sites nestled behind small islands (e.g., Seal Is, Open Bay Is) or headlands (e.g., Jackson Head) that are included in the discussion on rocky coasts below, the West Coast's sheltered shores comprise enclosed estuaries and river mouths that connect with the sea only through narrow entrances across barrier beaches. They include broad tidal flat estuaries (e.g., Okarito Lagoon), ribbon lagoons and dune lakes (e.g., Totara Lagoon) and gravel river mouths (e.g., Haast River).

Rocky Coasts

Some five major mountain systems run out from the spine of the Southern Alps and inland South Island, forming rocky shores and reefs where they reach the sea. The geology, form and character of these shores are extremely varied, ranging in age from the Precambrian gneiss at Charleston to the Quaternary moraine deposits of central Westland and the Cascade Bluffs (Thornton 1985).

The frequent sea storms and abundant supply of gravel from the rivers cause the West Coast's rocky shores to be heavily battered by the effects of sand scour. Only a few areas on the West Coast are relatively unaffected by sand scour. Bays sheltered behind islands and headlands are less affected by the turbulent force of the westerly waves, while rocky shores with deep water close inshore (such as on headlands and islands) are seldom covered by sand or affected by scouring.

Only a few islands occur off the West Coast, but smaller rock stacks are a significant ecological and visual feature in some areas. The largest and most significant islands of the West Coast are the kilometre-long Open Bay Islands (Taumaka and Popotai),

located some four kilometres off Haast.

A number of offshore submarine reefs occur up to ten kilometres off the coast. These include the Kahurangi Shoals in the north of the region, and some unnamed reefs off the Jackson Head area. Upwellings of fresh water from submarine river outlets up to 10 kilometres off the Paparoa limestone coast are another interesting feature of the West Coast marine environment.

Beaches

Uplift along the alpine fault, along with the region's high rainfall, has caused massive erosion of the land. It has been estimated that 127 million tonnes of sediment is carried down the West Coast's rivers and glaciers to the sea every year, giving this region one of the greatest terrestrial erosion rates in the world (Griffiths & Glasby 1985). Most of this sediment clothes the continental shelf with a deep bed of fine sands and mud, and forms gravelly beaches that fill embayments or enclose tidal lagoons and estuaries along much of the coast. Littoral drift rates on West Coast beaches are typically high, with net rates for most beaches probably in the range of 0.1 to 1 million cubic metres per year northwards (Benn & Neale 1992).

West Coast beaches vary greatly in their composition, character and functioning. Their plan forms are largely determined by the presence or absence of rocky headlands and major rivers. Pocket beaches, such as those nestled between headlands on the Kahurangi, Paparoa and Paringa coasts, contrast with the long beaches where broad river plains meet the sea at Karamea, Foulwind, Greymouth-Bruce Bay and Haast. The forms of beaches in profile are mostly shaped by their sediments, ranging from the gently shelving sand beaches of the Karamea and Foulwind plains to the steep cobble beaches near Granity, Barrytown and Greymouth. Despite the prevalence of strong onshore winds, West Coast sand dunes are low in height due to the coarse, heavy, moist nature of the beach sediments, which reduces their ability to be moved by the wind.

In the north of the region, the coastal sandplains are mostly modified by agricultural, industrial and residential development. To the south, coastal land de-

velopment is less extensive, and the Haast sandplain remains the least modified in the whole country.

Continental Shelf

Off the West Coast, the continental shelf reaches out to the broad Challenger Plateau in the north, but narrows greatly toward the south, becoming virtually non-existent off the steep coast of Fiordland (Fig. 1). Along its length, the shelf drops off sharply to the depths of the oceanic environment of the Tasman Sea. The West Coast shelf is dissected by submarine canyons, the largest of which originate near the Hokitika and Cook Rivers.

The shelf is covered with a deep bed of sediments ranging from fine muds to coarse sands and gravels. Not surprisingly, the sedimentation rates of the West Coast's shelf bed are among the highest in New Zealand, estimated by Norris (1978) to be 1.3mm/year. The patterns of sedimentation for this coast have been summarised by Carter (1975). Most sediment is supplied by the major rivers and it is mainly deposited on the beaches and continental shelf, or is lost offshore via the Hokitika and Cook Canyons and northwards alongshore toward the Challenger Plateau and Farewell Spit/Cook Strait regions. The mobile sediments tend to be finer further offshore (due to the lesser currents at these depths), but lag surfaces of gravels derived from rivers during times of lowered sea levels may be exposed in some locations.

Coastal Ecology and Zonation

Sheltered Shores

Most of the West Coast's river mouths are dominated by high water flows and massive movements of gravels down to the coast from their mountainous catchments. Consequently, their beds are heavily scoured and provide little habitat for algae and other benthic aquatic organisms.

In some locations where the catchments are small and the low-lying land slows the flow of the waterways near the coast, sufficient habitat exists to support benthic molluscs (e.g., cockles, pipi and wedge shells), annelids, vascular saltmarsh plants and algae. Though seldom abundant, algae such as *Gracilaria chilensis*, *Enteromorpha* spp. and *Gelidium* spp. occur in the channels and wet sand flats of the region's tidal

flat estuaries. Little Wanganui, Okari and Okarito support some of the most significant estuarine algal habitat on the West Coast.

Exposed Rocky Shores

Most West Coast rocky shores are a jumble of bedrock and boulders, providing a range of habitats for many species of plants and animals.

Many of the West Coast's rocky coasts retain a cover of indigenous forest vegetation right down to the shoreline, which usually stops near the splash zone of the prevailing westerly storms. The splash zone is typically quite barren of any life, with just a few species of periwinkle snails (*Littorina* spp.) and lichens able to survive in this harsh zone. The high tide zone is inhabited by karengo (*Porphyra* spp.) and a few other small and encrusting seaweeds, and by limpets (*Cellana* spp.) and small black mussels (*Xenostrobus* spp.).

Intertidally, the rocky shore biota can vary greatly, depending mainly on the physical nature of the shore. Most are dominated by animals such as mussels, reef stars, anemones, limpets and rockpool fish. Nevertheless, in some locations, especially north of about Okarito, algal turfs dominated by *Gigartina* spp., *Champia novaezealandiae*, *Halopteris* spp., and *Gymnogongrus furcatus* can be found covering the lower intertidal zone. Shores comprising granite boulders usually appear quite barren, but can harbour a number of animal species concealed in spaces and beneath the rocks. Limestone shores are often barren intertidally, perhaps because of their substrate instability, but are probably significantly richer in the subtidal zone.

The frequency of storm activity and the action of sand and gravel scouring mean that many plants and animals that attach to rocks find it very difficult to survive, since they can be scoured off the rocks soon after settling. As a result, many West Coast rocky shores are generally lower in species diversity than other New Zealand shores, though this appears to have a lesser effect on mobile and non-benthic species such as fish.

The swirling fronds of the bull kelp (*Durvillaea* spp.) are tossed about by the waves at the low tide level; this large brown seaweed is a char-

acteristic feature of many southern coasts in New Zealand. The bull kelp zone is absent in localised areas of the West Coast (notably at Jackson Head and Open Bay Islands), and the communities that replace it give such coasts a distinctive character. Localised occurrences of bull kelp die-off (and regrowth over several years) have been reported along the Coast Road (e.g., pers. comm by K. Dalzell, at 17 Mile and 12 Mile; and pers. obs. at 10 Mile). Other brown seaweeds also occur in this zone, but are known to form dense beds only in a few locations (e.g., Open Bay Islands).

The shallow subtidal rocky reefs of the West Coast's shores are dominated by encrusting fauna, including sponges, sea squirts and hydroids. Although not forming a large biomass, a diversity of red seaweeds also grow subtidally. Many species of reef fish swim among the rocks, with the banded wrasse, marbled fish, blue cod and tarakihi being among the most noticeable. Red rock lobsters are also common occupants of the reefs.

Biogeography of the West Coast Marine Region

The combined effects of a number of features of the West Coast's marine environment distinguish it from other New Zealand coasts. The latitudinal location, the high degree of exposure to waves, the effects of sedimentation and sand scour, the shelf and river hydrology described earlier, the dynamic and spectacular landscape, and the rich offshore fisheries all combine to give the West Coast its own natural character. The first two of these are particularly diagnostic features.

Recent studies have shown that the West Coast marine environment shares many biological characteristics with other South Island coasts, with respect to fish (Francis 1988, 1996) and algae (Nelson 1994). Nevertheless, a number of features make the West Coast quite clearly different from:

- the North Island west coast, owing to its higher latitudes and related hydrography, and its very different geology
- the Fiordland coast, owing to the absence of sheltered inlets and the dominance of sediments on the beaches and broad continental shelf
- the South Island east coast, owing to the exposure to New Zealand's dominant westerly storms, higher rainfall and sedimentation, and its very different geology
- the Stewart Island coast, owing to the dominance of mobile sediments
- the greater Cook Strait coasts, owing to the exposure to westerlies and absence of sheltered bays.

Such differences are also reflected to some degree in the species assemblages that are found on the West Coast. For this reason, the West Coast can be considered to be a distinct marine ecological region, with features that are not represented elsewhere in the country, nor indeed the world. The boundaries of this region might not be sharp, but are most likely around Cape Farewell in the north and Martin's Bay in the south.

The West Coast marine region can be divided into three biogeographic districts (Fig. 1), primarily influenced by the glacial geomorphology of the region, and partly verified by an analysis of continental shelf communities by Grange (1990). The three districts also closely parallel the terrestrial ecological regions defined by McEwan *et al.* (1987).

The Buller Marine District

This coast has a diverse geology, but no glacial history. The shores are either of bedrock (often scoured by gravels), or prograded coastal sediments that enclose tidal flat estuaries on some of the coastal plains. Vegetated rock stacks that occur here are seldom scoured by sand, so often support dense beds of algae. This district probably extends past the northern boundary of this report to Cape Farewell.

Bull kelp (*Durvillaea* spp.) dominates the algal flora of Buller. The intertidal rocks are covered by dense turfs of *Gigartina*, *Gymnogongrus*, *Glossophora*, and *Champia* in some places, but are scoured almost bare of algae by the waves and sand over large parts of this district.

The Westland Marine District

Mobile sediments dominate this coast, and the heavily scoured moraine boulder ramps are the only rocky shore habitats, with no offshore islands or stacks. The shore has been, and still is very much dominated by glacial activity (moraines, outwash gravels, glacial flour) and high river discharges. Scouring by wave-tossed gravels and cobbles lowers the biomass and species diversity of the beaches and rocky shores. Biologically rich and relatively unmodified coastal wetlands and tidal flat estuaries are a feature of the low-lying backshore. Offshore, the continental shelf is dissected by two major canyons, the Cook and the Hokitika.

Bull kelp (*Durvillaea* spp.) is common in this district but in most places the intertidal shore is too heavily scoured by sand to allow the growth of algae. Intertidal algae beds that occur in this district are often dominated by *Gigartina* spp., and are usually associated with *Perna* mussel beds.

The South Westland Marine District

These shores have a history of glaciation, but the sediments now reaching the shore are predominantly from non-glaciated catchments. "Glacial flour" is thus mostly absent from the coastal waters and the sea is often quite clear close inshore. The shores are either of bedrock (sometimes scoured by sand), or prograded coastal sediments dominated by medium to coarse sands. Offshore islands, rock stacks and reefs provide important habitats for algae. Some biological features suggest that the southern parts of this district might be similar to the outer coast of Fiordland (B. Marshall, Te Papa, pers. comm.).

Bull kelp is patchy in South Westland (being notably absent from Jackson Head and Open Bay Islands), and the southern alga *Apophlaea hyallii* is a prominent occupant of many intertidal shores. Notable features are the virtual absence of several species (e.g. *Gigartina* spp., *Champia*) and the paucity of algae at

Table 1: Marine Ecological Districts of the West Coast (✓ = present, ✗ = absent)

| Environmental feature | Marine Ecological District | | |
|---|----------------------------|----------------|-------------------------------------|
| | Buller | Westland | South Westland |
| Exposed windward coastline | ✓ | ✓ | ✓ |
| Temperate latitudes & currents | ✓ | ✓ | ✓ |
| High river inputs | ✓ | ✓ | ✓ |
| High sedimentation & sand scour | ✓ | ✓ | ✓ |
| South Island fish & algae assemblages | ✓ | ✓ | ✓ |
| NZ fur seal haulout sites | ✓ | ✓ | ✓ |
| Prevailing coastal current direction | north | north/south | south |
| Adjoins terrestrial ecological region(s) | NW Nelson - N Westland | Whataroa | Aspiring/Olivine |
| Glacial history & moraine coasts | ✗ | ✓ | ✓ |
| Catchments mostly now glaciated | ✗ | ✓ | ✗ |
| Bedrock coasts | ✓ | ✗ | ✓ |
| Stacks and islands | ✓ | ✗ | ✓ |
| Broad continental shelf | ✓ | ✓ | ✗ |
| Low relief shelf | ✓ | ✗ | ✗ |
| NZ fur seal breeding sites | ✓ | ✗ | ✓ |
| Fiordland crested penguin breeding sites | ✗ | ✗ | ✓ |
| Little blue penguin breeding sites | ✓ | ✓ | ✗ |
| Spotted shag breeding sites | ✓ | ✗ | ✓ |
| Tidal flat estuaries | ✓ | ✓ | ✗ |
| Numerous ribbon lagoons | ✗ | ✓ | ✓ |
| Macrobenthos of inshore shelf (Grange 1990) | sand bivalve | sand bivalve | mud bivalve |
| Macrobenthos of offshore shelf (Grange 1990) | mud polychaete | mud polychaete | non-existent (no offshore shelf) |

some sites with apparently suitable habitat. The algal flora of Open Bay Islands is unusually rich for a West Coast site.

Table 1 summarises the main features of each marine district, listing first the common features that make them part of the West Coast marine region, and then the distinctive features that distinguish the districts from one another.

The boundaries of these three marine districts mark limits of marine algal and faunal species distributions only to a degree. The West Coast is nevertheless notable for the number of species that reach their latitudinal limits within the region, and many of these limits seem instead to occur at almost random locations along the coast, and be more influenced by the gradual latitudinal and associated hydrographical changes. The marine district boundaries do however, mark significant changes in the biomass and distributions of species on the shore. In particular, the Westland marine district is heavily dominated by mobile sediments, a feature that tends to lower the biomass and extent of marine biota on these shores.

Marine Algae of the West Coast

History of Algal Collections on the West Coast

Marine algae of the West Coast have received little detailed scientific attention. In the 1940s, several small collections were made by visiting naturalists (Suggate, Wellman, Miles, McNeur and Scott) to assist Lucy Moore (Botany Division, DSIR) in her studies of New Zealand algae. In the 1970s, visits to the Open Bay Islands led to reports on the islands' algal flora by Burrows (1972) and Parsons & Fenwick (1984), the latter producing a list of 76 species, the first algal flora for any part of the region.

Through the 1990s, the authors and their field assistants have built on these early studies to compile a more comprehensive picture of the West Coast's algal flora. Collections have been made from about 35 sites throughout the region, most from the intertidal, but also including specimens from subtidal habitats derived from a limited number of scuba surveys (at the Steeples, Open Bay Islands and Jackson Head) and from drift specimens.

Characteristics of the Algal Flora

The relationships of the algal flora of the west coast of the South Island will only be fully understood when more thorough collections from throughout the study area have been achieved. While we have recorded more than 175 taxa, a number of species are listed from a single locality and sometimes from a single specimen. Only further field work and collections will provide an understanding of the West Coast distribution of such species.

A major limiting factor is also the state of systematic knowledge: the systematics of a number of genera (e.g. *Porphyra*) and key families (e.g. Gigartinae, Corallinaceae - particularly non-geniculate species, Delesseriaceae) require urgent attention.

It is not clear yet how to interpret the distributional data. When species have not been recorded for all or part of the West Coast region, we do not know whether the absence reflects (a) incomplete collecting, (b) lack of appropriate habitat (including absence of substrate) or (c) that the species is genuinely absent in that part of the region.

Chlorophyta - No material of *Caulerpa* has been collected from this region whereas four species are recorded from the neighbouring northern South Island (Nelson *et al.* 1992), and *C. brownii* is recorded from both Kaikoura and Stewart Island (Adams *et al.* 1974, South & Adams 1976). Only two species of *Codium*, one prostrate and one branched, have been collected from this region whereas in the northern South Island, Kaikoura and Stewart Island, four, three and five species are recorded respectively. It is likely that further records will be found of both *Monostroma latissimum* and *Prasiola stipitata*, taxa with very distinctive niches.

Phacophyta - Fuclean species typical of the low intertidal and upper subtidal in other parts of the New Zealand coastline (e.g. *Carpophyllum* spp.) are much less conspicuous along the West Coast than in other areas of New Zealand. Five species are present in the north and again appear in the far south of the coastline covered by this list, but are absent from the

middle region. A further six species are known only from the south of the region, including three species recorded only from the Open Bay Islands. The absence of fuclean algae from a large stretch of the coast appears to be related to the physical conditions and the lack of appropriate habitat/substrate. The two kelp species *Lessonia variegata* and *Ecklonia radiata* are restricted to the Open Bay Islands, with one drift record of *Ecklonia* from neighbouring coastline at Okuru. In other parts of New Zealand these two kelp species are significant elements of coastal ecosystems, structuring the subtidal forests.

The record of *Petrospongium rugosum* from southern Paparoa extends the known distribution of this alga, previously known from the North and Chatham Islands. *Endarachne binghamiae* has been found from Cape Foulwind to the southern Paparoa coast, extending its known distribution from the North Island to the South Island.

Rhodophyta – Species tolerant of sand and gravel abrasion fare well in the northern part of the coast, such as *Gymnogrongrus furcatus* and *G. torulosus*, with *G. furcatus* also occurring in the far south. *Helminthocladia dotyi* is an interesting record as previously this species has been known solely from the Otago coast. The other species of *Helminthocladia* recorded here is undescribed although recognised as a distinct entity for many years (distributed by Lindauer in the Algae Exsiccatae Novae Zealandiae as No. 261 as '*Nemalion* sp. nov.'). It is a summer species with a primarily northern distribution, so its appearance at the Open Bay Islands is of interest.

Champia novae-zelandiae is abundant from the north through to the Paparoa coast. *Catenellopsis oligarthra* is recorded from a single record at Charleston, extending the known distribution of this alga. Species of Gigartinaceae are a conspicuous part of the flora, and dominate the low intertidal reefs that are found from Karamea south to about Okarito. A number of species that have previously been known as species of *Gigartina* are now placed in the genus *Sarcotalia*, following the treatment of Hommersand *et al.* (1993, 1994). The taxonomic placement of at least two of the Gigartinaceae from the West Coast is

far from clear, and work is under way to elucidate their relationships. This includes studies of their anatomy and morphology, cell wall polysaccharides and DNA.

Although we have made separate entries for *Pachymenia laciniata* and *P. lusoria*, it is likely, as suggested by Adams (1994) and supported by evidence from polysaccharide studies (Miller *et al.* 1997), that *P. laciniata* is a leathery thickened form of *P. lusoria*, found on open coasts in areas of extreme exposure.

The southern species *Apophlaea lyallii* and *Hildenbrandia lecannelieri* are found from Jackson Bay southwards.

Collections Examined

The material on which this list is based is primarily housed in the herbarium of the Museum of New Zealand Te Papa Tongarewa (WELT). In addition, material housed at CHR has been examined, particularly the collections on which Parsons and Fenwick (1984) based their list. Not all CANU records have been seen by the authors and are cited directly from Parsons and Fenwick (1984). The records that we cite are either accompanied by reference to a voucher specimen or to a sighting, indicated by "!".

The taxonomic arrangement of this list substantially follows the catalogue of Silva *et al.* (1996) although we have recognised the Halymeniales (Saunders & Kraft 1996), and merged the Cryptonemiales with the Gigatinales (following Kraft & Robbins 1985).

Further Work Required

This report by no means completes the study of the West Coast's algae. New species records for the region are still made on almost every trip into the field, and our knowledge of the region's algae will undoubtedly benefit from further work. The authors recommend that future surveys and research focus on the following aspects:

- remote coasts such as Kahurangi, Kongahu, Charleston, Paringa and northern Fiordland
- subtidal habitats throughout the region
- seasonal variations in the algal flora along the coast

Acknowledgements

We would like to thank the following people for assistance in the preparation of this survey report, while acknowledging that any errors that might be present in the report are the fault of the authors: for comments on the oceanography – Janet Grieve, Steve Chiswell and Mike Moore, NIWA; numerous field assistants, including Glenys Knight (Te Papa), Martin Abel, Dr Bill Ballantine, Tania Fechney, Ian Hadland, Mal Hanson, Craig Miller, Stephen O’Dea and Rodney Phillips. Field costs for W.A. Nelson have been assisted by FRST contract NAG301.

References

- Adams, N. M. 1972. The marine algae of the Wellington area. *Records of the Dominion Museum* 8(4): 43-98.
- Adams, N.M. 1994. Seaweeds of New Zealand. Christchurch, Canterbury University Press. 360p.
- Adams, N.M.; Conway, E.; Norris, R.E. 1974. The marine algae of Stewart Island. *Records of the Dominion Museum* 8(14): 185-245.
- Adams, N.M.; Nelson, W.A. 1985. The marine algae of the Three Kings Islands. *National Museum of New Zealand, Miscellaneous Series* 13: 1-29.
- Benn, J.L.; Neale, D.M. 1992. A report on coastal hazards of the West Coast region, South Island, New Zealand. West Coast Regional Council. 73p.
- Bradford, J.M. (ed.) 1991. The Marine Environment of the West Coast: A Bibliography. Unpublished report for the 1991 West Coast Workshop, DSIR Marine and Freshwater, Wellington. 19p.
- Burrows, C.J. 1972. The flora and vegetation of Open Bay Islands. *Journal of the Royal Society of New Zealand* 2(1):15-42
- Cahill, M.L.; Middleton, J.H.; Stanton, B.R. 1991. Coastal-trapped waves on the West Coast of South Island, New Zealand. *Journal of Physical Oceanography* 21(4): 541-557.
- Carter, L. 1975. Sedimentation on the continental terrace around New Zealand: a review. *Marine Geology* 19: 209-237.
- Francis, M. 1988. Coastal fishes of New Zealand. Heinemann Reed, 63p.
- Francis, M. 1996. Geographic distribution of marine reef fishes in the New Zealand region. *New Zealand Journal of Marine and Freshwater Research* 30: 35-55.
- Grange, K.R. 1990. Macrobenthic Communities of the New Zealand Continental Shelf. Unpublished report to the Director, Science and Research, Department of Conservation, Wellington. 5p.
- Griffiths, G.A.; Glasby, G.P. 1985. Input of river-derived sediment to the New Zealand Continental shelf: 1. Mass. *Estuarine, coastal and shelf science* 21: 773-787.
- Hay, C.H.; Adams, N.M.; Parsons, M.J. 1985. The marine algae of the subantarctic islands of New Zealand. *National Museum of New Zealand, Miscellaneous Series* 11: 1-70.
- Heath, R.A. 1982. What drives the mean circulation on the New Zealand west coast continental shelf? *New Zealand Journal of Marine and Freshwater Research* 16: 215-226.
- Heath, R.A. 1985. A review of the physical oceanography of the seas around New Zealand – 1982. *New Zealand Journal of Marine and Freshwater Research* 19: 79-124.

- Heath, R.A.; Ridgway, N.M. 1985. Variability of the oceanic temperature and salinity fields on the West Coast continental shelf, South Island, New Zealand. *New Zealand Journal of Marine and Freshwater Research* 19: 233-245.
- Hommersand, M.H.; Guiry, M.D.; Fredericq, S.; Leister, G.L. 1993. New perspectives in the taxonomy of the Gigartinales (Gigartinales, Rhodophyta). *Hydrobiologia* 260/261: 105-120.
- Hommersand, M.H.; Fredericq, S.; Freshwater, D.W. 1994. Phylogenetic systematics and biogeography of the Gigartinales (Gigartinales, Rhodophyta) based on sequence analysis of *rbcL*. *Botanica Marina* 37: 193-203.
- Jones, C.L. 1994. Pororari Beach wave analysis report. Unpublished report to Department of Conservation, Hokitika. 13p.
- Kraft, G.T.; Robbins, P.A. 1985. Is the order Cryptonemiales (Rhodophyta) defensible? *Phycologia* 24: 67-77.
- Laing, R.M.; Gourlay, H.W. 1929. The New Zealand species of *Gigartina*. *Transactions of the New Zealand Institute* 60: 102-135.
- McEwen, W.M., (ed.). 1987. Ecological regions and districts of New Zealand. *New Zealand Biological Resource Centre Publication No. 5*, Department of Conservation, Wellington.
- Miller, I.J.; Falshaw, R.; Furneaux, R.H.; Hemmingsen, J.A. 1997. Variations in the constituent sugars of the polysaccharides from New Zealand species of *Pachymenia* (Halymeniaceae). *Botanica Marina* 40: (119-127).
- Moore, M.; Murdoch, R. 1993. Physical and biological observations of coastal squirts under non-upwelling conditions. *Journal of Geophysical Research* 98(C11):20043-20061.
- Nelson, W.A. 1994. Distribution of macroalgae in New Zealand - an archipelago in space and time. *Botanica Marina* 37: 221-233.
- Nelson, W.A.; Adams, N.M. 1984. Marine algae of the Kermadec Islands. *National Museum of New Zealand, Miscellaneous Series* 10: 1-29.
- Nelson, W.A.; Adams, N.M. 1987. Marine algae of the Bay of Islands area. *National Museum of New Zealand, Miscellaneous Series* 16: 1-47.
- Nelson, W.A.; Adams, N.M.; Hay, C.H. 1991. Marine Algae of the Chatham Islands. *National Museum of New Zealand, Miscellaneous Series* 23: 1-58.
- Nelson, W.A.; Adams, N.M.; Fox, J.M. 1992. Marine algae of the northern South Island - a list of species. *National Museum of New Zealand, Miscellaneous Series* 26: 1-70.
- Norris, R.M. 1978. Late Cenozoic geology of the West Coast shelf between Karamea and the Waiho River, South Island, New Zealand. *New Zealand Oceanographic Institute Memoir* 81.
- OceanFun Unlimited 1996. West Coast tide tables and fishing rules. OceanFun Unlimited, Ltd., Kaikoura.
- Parsons, M.J.; Fenwick, G.D. 1984. Marine algae and a marine fungus from Open Bay Islands, Westland, New Zealand. *New Zealand Journal of Botany* 22: 425-432.
- Robertson, C.J.R. 1982. New Zealand's subantarctic islands are an important bird resource. *Forest & Bird* 13 (11): 30-35.
- Saunders, G.W.; Kraft, G.T. 1996. Small-subunit rDNA gene sequences from representatives of selected families of the Gigartinales and Rhodiales (Rhodophyta). 2. Recognition of the Halymeniaceae ord. nov. *Canadian Journal of Botany* 74: 694-707.
- Shirtcliffe, T.G.L.; Moore, M.I.; Cole, A.G.; Viner, A.B.; Baldwin, R.; Chapman, B. 1990. Dynamics of the Cape Farewell upwelling plume, New Zealand. *New Zealand Journal of Marine and Freshwater Research* 24: 555-568.
- Silva, P.C.; Basson, P.W.; Moe, R.L. 1996. Catalogue of the benthic marine algae of the Indian Ocean. University of California Press, Berkeley. 1259p.
- Soons, J.; Selby, M.J. 1982. Landforms of New Zealand. Longman Paul, Auckland. 392p.
- South, G.R.; Adams, N.M. 1976. The marine algae of the Kaikoura coast. *National Museum of New Zealand, Miscellaneous Series* 1: 1-71.
- Stanton, B.R. 1976. Circulation and hydrology off the West Coast of the South Island, New Zealand. *New Zealand Journal of Marine and Freshwater Research* 10: 445-467.
- Thornton, J. 1985. Field guide to New Zealand Geology. Heinemann Reed, New Zealand. 226p.
- Vincent, W.F.; Howard-Williams, C.; Tildesley, P.; Butler, E. 1991. Distribution and biological properties of oceanic water masses around the South Island, New Zealand. *New Zealand Journal of Marine and Freshwater Research* 25: 21-42.

Chlorophyta

ULVALES

MONOSTROMATACEAE

Monostroma latissimum Wittrock

Okari Lagoon, Cape Foulwind, *Neale*, Mar 1997, WELT A21817-8.

In shallow channel of estuary.

ULVACEAE

Enteromorpha compressa (L.) Nees

Okari Lagoon, Cape Foulwind, *Neale*, Mar 1997, WELT A21815-6.

Seal Is, Paparoa, *Neale*, Aug 1992, WELT A21409.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 354244, 354245.

On rock, intertidal on moderately sheltered reefs.

Enteromorpha ramulosa (J.E.Smith) Carmichael

Okari Lagoon, Cape Foulwind, *Neale*, Feb 1997, WELT A21813-4.

In shallow channel of estuary.

Enteromorpha spp.

Scott's Beach, Heaphy, *Neale*, Nov 1992, WELT A20229.

Little Wanganui Head, Karamea, *Neale*, Nov 1992, WELT A21701.

Constant Bay, Charleston, *Neale*, Feb 1993, WELT A20228.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21630.

Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A20247.

Ulva laetevirens Aresch.

Little Wanganui Head, Karamea, *Neale*, Nov 1992, WELT A21587.

Seal Is, Paparoa, *Nelson*, Mar 1996, WELT A21806.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21590.

On rock, intertidal to subtidal.

Ulva spathulata Papenf.

Scott's Beach, Heaphy, *Neale*, Nov 1992, WELT A20229, A21664.

Constant Bay, Charleston, *Neale*, Feb 1993, WELT

A20228, A20275.

Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A20248.

Cascade Is, *Neale*, Feb 1996, WELT A21792.

On rock, intertidal to subtidal.

Ulva sp.

Okari Lagoon, Cape Foulwind, *Neale*, Jul 1997, WELT A21988.

Ulipa Hill, Abut Head, *Neale*, Oct 1995, WELT A21101.

PRASIOLALES

PRASIOLACEAE

Prasiola stipitata Suhr

Taumaka, Open Bay Islands, *Burnip*, Aug 1970, CHR 64202.

On rock at or above high tide in surf spray zone, on exposed rocks where seabirds congregate.

CLADOPHORALES

CLADOPHORACEAE

Chaetomorpha aerea (Dillwyn) Kuetz.

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21762.

Okari Lagoon, Cape Foulwind, *Neale*, Jul 1997, WELT A21985.

In patches in the upper intertidal.

Cladophora crinalis Harv.

Constant Bay, *Neale*, Feb 1993, WELT A21870.

Okarito Bluffs, *Neale*, Dec 1992, WELT A21672.

Ocean Beach, Jackson Head, *Neale*, Jul 1992, WELT A20118.

Cladophora daviesii Harv.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 367935.

Cladophora valonioides Sond.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 35246.

Cladophora sp.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21634.

Cladophoropsis herpestica (Mont.) M.Howe
Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21643.
Greig's, Coast Rd, *Neale*, Nov 1992, WELT A20253.
On rock, low intertidal to subtidal.

BRYOPSIDALES BRYOPSIDACEAE

Bryopsis vestita J.Agardh
Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21725.
Joyce Bay, Charleston, *Neale*, Jan 1995, WELT A21089.
Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21932.
Jackson Bay, *Neale*, Apr 1994, WELT A21652.
Intertidal rocks.

Bryopsis spp.
Little Wanganui Head, Karamea, *Neale*, Nov 1992, WELT A2022.
Constant Bay, Charleston, *Neale*, Feb 1993, WELT A21721.

CODIACEAE

Codium convolutum (U.V.Dellow) P.C.Silva
The Steeples, Cape Foulwind, *Neale*, Feb 1993, WELT A20289.
Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21724.
Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A21617.
Jackson Bay, *Nelson*, Sep 1995, WELT A21411.
Sublittoral and tidal pools on exposed rocky shores.

Codium fragile (Suringar) Har. ssp. *novae-zelandiae* (J.Agardh) P.C.Silva.
Mokihinui, *Hay*, May 1990, WELT A21113.
Constant Bay, Charleston, *Neale*, Feb 1993, WELT A20270.
Joyce Bay, Charleston, *Neale*, Jan 1995, WELT A21072.
Seal Is, Paparoa, *Neale*, Aug 1992, WELT A21410; *Nelson*, Mar 1996, WELT A21784.
Te Miko, Paparoa, *Neale*, Jan 1993, WELT A21940.
Hokitika Beach, *Neale*, Jun 1992, WELT A21572.

Cascade Is, *Neale*, Feb 1996, WELT A21768.
Intertidal pools and subtidal.

Phaeophyta

ECTOCARPALES ECTOCARPACEAE

Hincksia granulosa (Sm.) P.C.Silva
Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21647.

Hincksia sandriana (Zanardini) P.C.Silva
Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357116.

Hincksia sordida (Harv.) P.C.Silva
Seal Is, Paparoa, *Nelson*, Sep 1995, WELT A21084.

RALFSIACEAE

Ralfsia sp.
Constant Bay, Charleston, *Nelson*, Sep 1995, WELT A21775.
Greig's, Coast Rd, *Nelson*, Mar 1996, WELT A21808.
Jackson Bay, *Nelson*, Sep 1975, WELT A21874.
On rock and shells, mid-intertidal. Also found growing on plastic bags that were partially buried in sand.

SPHACELARIALES

CLADOSTEPHACEAE

Cladostephus spongiosus (Huds.) C.Agardh
Jackson Bay, *Miles*, Mar 1943, CHR 63450.

SPHACELARIACEAE

Sphacelaria variabilis Sauv.
Jackson Bay, *Miles*, Mar 1943, CHR 312685, 312690.

STYPOCAULACEAE

Halopteris congesta (Reinke) Sauv.
Little Wanganui Head, Karamea, *Neale*, Nov 1992, WELT A20277.
The Steeples, Cape Foulwind, *Neale*, Feb 1993, WELT A20286.

Belfast Creek, Paparoa, *Neale*, Aug 1992, WELT A21583.
 Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A20236.

Ocean Beach, Jackson Head, *Neale & Hadland*, Oct 1992, WELT A21581.

Intertidal pools and subtidal rocks.

Halopteris funicularis (Mont.) Sauv.

Mossy Creek, Karamea, *Allan*, Mar 1941, CHR 34200.

Seal Island, Paparoa, *Neale*, Aug 1992, WELT A20301, A21380.

Twelve Mile Beach, *Scott*, Jul 1941, CHR 39259.

Jackson Bay, *Miles*, Mar 1943, CHR 63597; *Nelson*, Sep 1995, WELT A21121.

Subtidal rocks, 5-15m depth.

Halopteris novae-zelandiae Sauv.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357134.

Halopteris virgata (Hook.f. et Harv.) Adams

Constant Bay, Charleston, *Neale*, Feb 1993, WELT A20269.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21651.

Greig's, Coast Rd, *Neale*, Nov 1992, WELT A20252.

Smoothwater Bay, Jackson Head, *Neale*, Apr 1994, WELT A20910.

On rock, low intertidal and subtidal.

DICTYOTALES

DICTYOTACEAE

Dictyota dichotoma (Huds.) J.V.Lamour.

The Steeples, Cape Foulwind, *Neale*, Feb 1993, WELT A21943.

Big Bay, South Westland, *Nichol*, Feb 1997, WELT A21831.

Glossophora kuntzii (C.Agardh) J.Agardh

Wekakura Pt, Kahurangi, *Neale*, Feb 1995, WELT A21070.

South of Heaphy River mouth, *Wellman*, Dec 1947, CHR 61983.

Little Wanganui Head, Karamea, *Neale*, Nov 1992,

WELT A20282.

The Steeples, Cape Foulwind, *Neale*, Feb 1993, WELT A20287.

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21739.

Greig's, Coast Rd, *Neale*, Nov 1992, WELT A20258.

Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A21607.

Jackson Bay, *McMillan*, Jan 1987, CHR 402798; *Neale*, Feb 1996, WELT A21799.

Big Bay, South Westland, *Nichol*, Feb 1997, WELT A21828.

On rock, low intertidal to subtidal.

Spatoglossum chapmanii Lindauer

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357122.

Ocean Beach, Jackson Head, *Neale & Hadland*, Oct 1992, WELT A21657.

Subtidal rocks, 5-15m depth.

Zonaria turneriana J.Agardh

Whakapohai, Moeraki, *Neale*, Jul 1991, WELT A20299, A21680.

Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A20224.

Low intertidal to subtidal, in pools and channels.

SCYTOSIPHONALES

SCYTOSIPHONACEAE

Colpomenia peregrina Sauv.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357123-24.

Jackson Bay, *Nelson*, Sep 1995, WELT A21383.

Colpomenia sinuosa (Mert. ex Roth) Derbès et Solier

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21723.

Greig's, Coast Rd, *Neale*, Nov 1992, WELT A21942.

Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A21593.

Enderachne binghamiae J.Agardh

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT

A21728.

Okari Lagoon, Cape Foulwind, *Neale*, Jul 1997, WELT A21984.Constant Bay, Charleston, *Neale*, Feb 1993, WELT A21715.Joyce Bay, Charleston, *Neale*, Jan 1995, WELT A21071; *Nelson*, Mar 1996, WELT A21811.Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21626.Greig's, Coast Rd, *Neale*, Nov 1992, WELT A20254-5.

Mid-intertidal rocks.

Petalonia fascia (O.F.Müll.) KuntzeGreig's, Coast Rd, *Scott*, Jul 1941, CHR 39254; *Nelson*, Mar 1996, WELT A21809.Mussel Point, Jackson Bay, *Nelson*, Sep 1995, WELT A21165.

Mid-intertidal rocks.

Scytosiphon lomentaria (Lyngb.) LinkWall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21760.Okari Lagoon, Cape Foulwind, *Neale*, Jul 1997, WELT A21986.Charleston, *Wellman*, Dec 1948, CHR 67378.Constant Bay, Charleston, *Neale*, Feb 1993, WELT A21718.Belfast Creek, Paparoa, *Neale*, Aug 1992, WELT A21722.Te Miko, Paparoa, *Suggate*, Jul 1948, CHR 63577.Greig's, Coast Rd, *Neale*, Nov 1992, WELT A20259; *Nelson*, Sep 1995, WELT A21382.Greymouth, *Wellman*, Dec 1947, CHR 57228.Mussel Point, Jackson Bay, *Nelson*, Sep 1995, WELT A21164, A21381.

On rock, mid-intertidal and in pools.

CHORDARIALES

CHORDARIACEAE

Myriogloea intestinalis (Harv.) LindauerTaumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A21609.*Papenfusiella lutea* KylinScott's Beach, Heaphy, *Neale*, Nov 1992, WELT

A21662.

Greymouth, *Wellman*, Dec 1947, CHR 57223.Okarito Bluffs, *Neale*, Dec 1992, WELT A21676.

Intertidal rocks.

LEATHESIACEAE

Leathesia difformis (L.) Aresch.Greig's, Coast Rd, *Neale*, Nov 1992, WELT A20256.Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357123.Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A20245.

On rock, low intertidal.

Petrospongium rugosum (Okamura) Setch. et N.L.GardnerGreig's, Coast Road, *Neale* & *Nelson*, Sep 1995, WELT A21378.

On rock, mid to low intertidal.

SCYTOTHAMNALES

SCYTOTHAMNACEAE

Scytothamnus australis (J.Agardh) Hook.f. et Harv.
Wekakura Pt, Kahurangi, *Neale*, Feb 1995, WELT A21081.Little Wanganui Head, Karamea, *Wellman*, Jan 1949, CHR 66995.Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21727.Tauranga Bay, Cape Foulwind, *Allan*, Mar 1941, CHR 34109.Constant Bay, Charleston, *Neale*, Feb 1993, WELT A21719.Fox River, Paparoa, *Wellman*, Sep 1948, CHR 67329.Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A20246; *Fenwick*, Feb 1976, CHR 357121.Ocean Beach, Jackson Head, *Neale*, Jul 1992, WELT A20113.

Mid to low intertidal rocks.

SPLACHNIDIACEAE

Splachnidium rugosum (L.) Grev.Little Wanganui Head, Karamea, *Neale*, Nov 1992, WELT A20284.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21930.
 Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A21616.
 Jackson Bay, *Neale*, Sep 1995, WELT A21120.
 Intertidal on rock.

DICTYOSIPHONALES
 PUNCTARIACEAE

Adenocystis utricularis (Bory) Skottsbo.
 South of Heaphy River mouth, *Wellman*, Dec 1947, CHR 61996.
 Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A21620.
 Intertidal rocks.

CUTLERIALES
 CUTLERIACEAE

Microzonia velutina (Harv.) J.Agardh
 Little Wanganui Head, Karamea, *Neale*, Nov 1992, WELT A20283.
 Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21736.
 The Steeples, Cape Foulwind, *Neale*, Feb 1993, WELT A20288.
 Tauranga Bay, Cape Foulwind, *McNeur*, Nov 1942, CHR 38341.
 Constant Bay, Charleston, *Neale*, Feb 1993, WELT A20273.
 Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21926.
 Greig's, Coast Rd, *Neale*, Nov 1992, WELT A21707.
 Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357126.
 Jackson Bay, *Miles*, Mar 1943, CHR 367802; *Neale*, Apr 1994, WELT A20923.
 Ocean Beach, Jackson Head, *Neale*, Jul 1992, WELT A20117.
 On rock, low intertidal to upper subtidal, intertidal pools.

DESMARESTIALES
 DESMARESTIACEAE

Desmarestia ligulata (Lightf.) J.V.Lamour.
 Tauranga Bay, Cape Foulwind, *McNeur*, Nov 1942, CHR 38215.

Te Miko, Paparoa, *Neale*, Jan 1993, WELT A21927.
 Camerons, Greymouth, *Suggate*, Apr 1949, CHR 67047.
 Hokitika, *Neale*, Jun 1992, WELT A21598.
 Mikonui, *Neale*, Mar 1993, WELT A21600.
 Drift specimens only.

SPOROCHNALES
 SPOROCHNACEAE

Carpomitra costata (Stackh.) Batters
 Whakapohai, Moeraki, *Neale*, Jul 1991, WELT A20297-8.
 Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357117-9.
 Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A20240.
 Ocean Beach, Jackson Head, *Neale*, Oct 1992, WELT A21656.
 Subtidal rocks, 5-15m depth.

Sporochnus stylosus Harv.
 Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357130, 357131.

LAMINARIALES
 ALARIACEAE

Ecklonia radiata (C.Agardh) J.Agardh
 Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357146; *Neale*, Feb 1993, WELT A21612.
 Okuru, *Neale*, Oct 1990, WELT A20276.
 Subtidal growing along channel margins.

LESSONIACEAE

Lessonia variegata J.Agardh
 Taumaka, Open Bay Islands, *Burrows*, Apr 1970, CANU

Macrocystis pyrifera (L.) C.Agardh
 Rapahoe, *Neale*, Oct 1996, WELT A22007.
 Drift. First record for the West Coast; this specimen possibly drifted from Fiordland.

DURVILLAEALES
 DURVILLAEACEAE

Durvillaea antarctica (Cham.) Har.
 Wekakura Pt, Kahurangi, *Neale*, Feb 1995.

Cape Foulwind, *Neale*, Jun 1992, WELT A20109.
Tauranga Bay quarry, *Neale*, Jun 1992, WELT A21929.

Constant Bay, Charleston, *Nelson*, Mar 1996, WELT A21376.

Seal Island, *Neale!*

Pahautane, Paparoa, *Neale!*, 1993.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21925.

Dolomite Point, Paparoa, *Neale!*

Seventeen Mile, Coast Rd., *Neale!*

Greig's, Coast Rd., *Wellman*, Apr 1948, CHR 63519.

Point Elizabeth, *Neale!*

Okarito, *Nelson*, Sep 1995, WELT A21924.

Bruce Bay, *Allan*, Mar 1941, CHR 34233.

"Rocks" off Okuru, *Neale!*

Cascade Point, *Neale*, Feb 1996, WELT A22016.

Zone-forming at low tide level on exposed rocky shores.

Durvillaea willana Lindauer

Kahurangi light, *Anderson*, Oct 1996, WELT A21871.

Wekakura Pt, Kahurangi, *Neale!*, Feb 1995.

Tauranga Bay, Cape Foulwind, *Nelson*, Mar 1996, WELT A21374.

Constant Bay, Charleston, *Neale!*, Jan 1995

Greig's, Coast Rd., *Suggate*, Aug 1948, CHR 63553.

Okarito bluffs, *Neale*, Sep 1995, WELT A21786.

Gillespie Point, *Neale!*

Bruce Bay, *Lawn*, Feb 1948, CHR 63516.

Subtidal on exposed coasts.

FUCALES

CYTOSEIRACEAE

Cystophora distenta J.Agardh

Big Bay, South Westland, *Nichol*, Feb 1997, WELT A21834.

Cystophora retroflexa (Labill.) J.Agardh

Saltwater Lagoon beach, *Neale*, Oct 1995, WELT A21103.

Jackson Bay, *Nelson*, Sep 1995, WELT A21384.

Big Bay, South Westland, *Nichol*, Feb 1997, WELT A21835.

Cystophora scalaris J.Agardh

Wekakura Pt, Kahurangi, *Neale*, Feb 1995, WELT A21065.

Taumaka, Open Bay Islands, *Burrows*, Apr 1970, CANU.

Jackson Bay, *Woods & McMillan*, Jan 1987, CHR 402799; *Neale*, Apr 1994, WELT A20912.

Ocean Beach, Jackson Head, *Neale*, Jul 1992, WELT A20119.

Cascade Is, *Neale*, Feb 1996, WELT A21796.

Low intertidal pools to subtidal on exposed shores.

Landsburgia quercifolia (Hook.f. et Harv.) Harv.

Kahurangi area, *McShane!*, 1994.

The Steeples, Cape Foulwind, *Neale*, Feb 1993, WELT A21665.

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21748.

Seal Island, Paparoa, *Neale*, Aug 1992, WELT A21386, A21578.

Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A21606.

Ocean Beach, Jackson Head, *Neale!*

Big Bay, South Westland, *Nichol*, Feb 1997, WELT A21833.

Zone-forming at low tide level on sheltered rocky shores or as emergent plants on subtidal rocks.

FUCACEAE

Xiphophora gladiata (Labill.) Mont. ssp. *novae-zelandiae* Rice

Taumaka, Open Bay Islands, *Burrows*, Apr 1970, CANU.

Ocean Beach, Jackson Head, *Neale*, Jul 1992, WELT A20116, A21654.

Low intertidal rocks on exposed shore.

HORMOSIRACEAE

Hormosira banksii (Turner) Decne.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21928.

Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A21611.

Jackson Bay, *McMillan*, Jan 1987, CHR 402797.

Jackson Bay, *Neale*, Apr 1994, WELT A20925.

Ocean Beach, Jackson Head, *Neale*, Jul 1992, WELT A20116.

Big Bay, South Westland, *Nichol*, Feb 1997, WELT A21832.

Sheltered or semi-sheltered tidal pools on rocky shores.

NOTHEIACEAE

Notheia anomala Bailey et Harv.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357127.

Epiphytic on *Hormosira banksii*.

SARGASSACEAE

Carpophyllum flexuosum (Esper) Grev.

Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A21610.

Carpophyllum maschalocarpum (Turner) Grev.

Wekakura Pt, Kahurangi, *Neale*, Feb 1995, WELT A21063, A21075.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357142.

On rock low intertidal to subtidal on open coasts.

Sargassum sinclairii Hook.f. et Harv.

The Steeples, Cape Foulwind, *Neale*, Feb 1993, WELT A21595.

Bruce Bay, *Allan*, Mar 1941, CHR 34234; *Lawn*, Feb 1948, CHR 63508.

Okuru Beach, *Neale*, Oct 1990, WELT A21679.

Taumaka, Open Bay Islands, *Burrows*, Apr 1970, CANU.

Cascade Is, *Neale*, Feb 1996, WELT A21798.

Big Bay, South Westland, *Nichol*, Feb 1997, WELT A21829.

Low intertidal pools to subtidal on open coasts.

SEIROCOCCACEAE

Marginariella boryana (A.Rich.) Tandy

Taumaka, Open Bay Islands, *Neale*, Feb 1996, WELT A21802.

Single bladders of both *M. boryana* (ellipsoid) and *M. urvilliana* (globose) were found in the drift at Okarito, Sep 1995.

Rhodophyta

BANGIALES

BANGIACEAE

Bangia atropurpurea (Roth) C.Agardh

Seal Is, *Nelson & Knight*, Sep 1995, WELT A21777.

The genus *Porphyra* is currently being revised and a number of taxa have been recognised but are not yet described. The following list gives voucher numbers for examples of *Porphyra* spp. collected on the West Coast:

Porphyra sp.

Little Wanganui Head, Karamea, *Neale*, Nov 1992, WELT A20279.

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21761.

Motukutuka Point, Paparoa, *Neale*, Aug 1992, WELT A21576.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21629.

Fourteen Mile, Coast Rd, *Neale*, Nov 1992, WELT A21709.

Splash zone rocks, rosette growth form.

Porphyra sp.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21628.

Abut Head, *Neale*, Oct 1995, WELT A21887.

High tide boulders, conspicuous reproductive "streaks".

Porphyra sp.

Abut Head, *Neale*, Oct 1995, WELT A21803.

High intertidal, fine pink/golden ribbons.

Porphyra sp.

Seal Is, *Knight & Nelson*, Mar 1996, WELT A21888.

Smoothwater Bay, Jackson Head, *Neale*, Apr 1994, WELT A20909.

Upper intertidal, deeply incised blades.

ACROCHAETIALES

ACROCHAETIACEAE

Audouinella dictyota (Collins) Woelk.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357224.

Growing on *Spatoglossum chapmanii*.

Audouinella purpurea (Lightf.) Woelk.

Jackson Bay, *Neale*, Feb 1996, WELT A21765.

Audouinella sp.

Constant Bay, Charleston, *Neale*, Feb 1993, WELT A21714.

Camontagnea oxyclada (Mont.) Pujals

Kohaihai Beach, Karamea, *Wellman*, Jan 1949, CHR 66943.

Tauranga Bay, Cape Foulwind, *McNeur*, Nov 1942, CHR 390425.

This species was previously known as *Ballia scoparia* (Womersley 1994).

NEMALIALES

GALAXAURACEAE

Nothogenia fastigiata (Bory) P.G.Parkinson

Okarito Bluffs, *Neale*, Dec 1992, WELT A21678.

LIAGORACEAE

Helminthocladia dotyi Womersley

Joyce Bay, Charleston, *Neale*, Jan 1995, WELT A21073.

Helminthocladia sp.

Joyce Bay, Charleston, *Neale*, Jan 1995, WELT A21074.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 367930, WELT A10241.

GELIDIALES

GELIDIACEAE

Capreolia implexa Guiry et Womersley.

Tauranga Bay quarry, Cape Foulwind, *Neale*, Jun 1992, WELT A21567.

Constant Bay, Charleston, *Nelson*, Sep 1995, WELT A21421.

Te Miko, Paparoa, *Suggate*, Jul 1948, CHR 177374;

Phillips, Feb 1993, WELT A21939.

Punakaiki, *Suggate*, Dec 1947, CHR 61993, Jul 1948, CHR 177374.

Greig's, Coast Rd, *Nelson*, Sep 1995, WELT

A21416.

Okarito Bluffs, *Neale*, Dec 1992, WELT A21673.

Open Bay Islands, Taumaka, *Neale*, Feb 1993, WELT A21594.

High tide level among *Xenostrobus* mussels, forming compact turf. Specimens previously identified as *Gelidium pusillum*, or *Gelidium caulacanthum* var. *pygmeum*.

Gelidium caulacanthum J.Agardh.

Little Wanganui Head, *Neale*, Nov 1992, WELT A21933.

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21733.

Belfast Creek, Paparoa, *Neale*, Aug 1992, WELT A21573.

Jackson Bay, *Nelson*, Sep 1995, WELT A21422.

Mid-intertidal as turf and in pools.

Gelidium microphyllum (Crosby-Sm.) Kylin

Jackson Bay, *Nelson*, Sep 1995, WELT A21771.

In mid-intertidal turf.

Pterocladia lucida (Turner) J.Agardh

Wekakura Pt, Kahurangi, *Neale*, Feb 1995, WELT A21077-9.

Kohaihai Beach, Karamea, *Wellman*, Jan 1949, CHR 66959.

Mossy Creek, Karamea, *Allan*, Mar 1941, CHR 34194.

Little Wanganui Head, Karamea, *Wellman*, Jan 1949, CHR 66932; *Neale*, Nov 1992, WELT A21691.

Low intertidal pools and in the upper subtidal.

Pterocladia capillacea (J.F.Gmel.) Santel. et Hommers.

Little Wanganui Head, Karamea, *Neale*, Nov 1992, WELT A21700.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357107-9; *Neale*, Feb 1993, WELT A20226.

Jackson Bay, *Miles*, Jul 1942, CHR 38622; *Neale*, Apr 1994, WELT A20921-2; *Nelson*, Sep 1995, WELT A21426.

Ocean Beach, Jackson Head, *Neale*, Jul 1992, WELT A20123.

Intertidal pool margins. (Previously known as *Pterocladia capillacea*.)

HILDENBRANDIALES

HILDENBRANDIACEAE

Apoplalea lyallii Hook.f. et Harv.

Jackson Bay, *Miles*, Mar 1943, CHR 385161; *Neale*, Apr 1994, WELT A20924.

Cascade Is, *Neale*, Feb 1996, WELT A21795.

Big Bay, South Westland, *Nichol*, Feb 1997, WELT A21836.

Upper intertidal rocks.

Hildenbrandia lecancellieri Hariot

Jackson Bay, *Nelson*, Sep 1995, WELT A21873.

On rocks and cobbles, low intertidal.

CORALLINALES

CORALLINACEAE

Arthrocardia corymbosa (Lam.) Decne.

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21749.

Tauranga Bay quarry, Cape Foulwind, *Neale*, Jun 1992, WELT A21570.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21935.

Abut Head, *Neale*, Oct 1995, WELT A21100.

Open Bay Islands, Taumaka, *Neale*, Feb 1993, WELT A21614.

Ocean Beach, Jackson Head, *Neale & Hadland*, Oct 1992, WELT A20225.

Intertidal pools.

Arthrocardia wardii (Harv.) Aresch.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 354260, 354262.

Corallina officinalis L.

Constant Bay, Charleston, *Neale*, Feb 1993, WELT A21720.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21936.

Greig's, Coast Rd, *Neale*, Nov 1992, WELT A20262.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 354261.

Ocean Beach, Jackson Head, *Neale*, Jul 1992, WELT A20121.

Big Bay, South Westland, *Nichol*, Feb 1997, WELT A21824.

Intertidal pools.

Haliptilon roseum (Lam.) Garbary et H.W.Johans.

Wekakura Pt, Kahurangi, *Neale*, Feb 1995, WELT A21067.

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21734.

Cape Foulwind, *Neale*, Jul 1992, WELT A20114.

Constant Bay, Charleston, *Neale*, Feb 1993, WELT A21872.

Te Miko, Paparoa, *Neale & Phillips*, Feb 1993, WELT A21937.

Abut Head, *Neale*, Oct 1995, WELT A21099.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR354263.

Jackson Bay, *Neale*, Apr 1994, WELT A20915; Jul 1992, WELT A20111.

Ocean Beach, Jackson Head, *Neale*, Jul 1992, WELT A20292.

Intertidal pools, low intertidal and subtidal rocks.

Jania micrarthrodia J.V.Lamour.

Constant Bay, Charleston, *Neale*, Feb 1993, WELT A21717.

Fourteen Mile, Coast Rd, *Neale*, Nov 1992, WELT A20292.

Greig's, Coast Rd, *Neale*, Nov 1992, WELT A20261; *Neale & Nelson*, Mar 1996, WELT A21804.

Taumaka, Open Bay Islands, *Burrows*, Apr 1970, CANU.

Epiphytic in intertidal pools.

Jania sp.

Ocean Beach, Jackson Head, *Neale*, Jul 1992, WELT A20120.

Intertidal pools.

Non-geniculate coralline algae - the systematics of this important group of algae in New Zealand are very poorly known and the taxa are very under-represented in collections. Identifications of crustose coralline algae from this region as *Lithophyllum*, *Litothamnion*, *Melobesia*, and *Mesophyllum* remain unconfirmed.

Synarthrophyton patena (Hook.f. et Harv.) R.A.Towns.
Fourteen Mile, Coast Rd, *Neale*, Nov 1992, WELT
A21716.

GRACILARIALES
GRACILARIACEAE

Curdiea flabellata V.J.Chapm.
Kohaihai Beach, Karamea, *Wellman*, Jan 1949,
CHR 66966.
Little Wanganui Head, Karamea, *Neale*, Nov 1992,
WELT A21687; *Wellman*, Jan 1949, CHR 67034.
Te Miko, Paparoa, *Phillips*, Feb 1993, WELT
A21633.
Greig's, Coast Rd, *Wellman*, Apr 1948 CHR 63546.
Hokitika, *Parsons*, Jul 1945, CHR 52081.
Mikonui, *Neale*, Mar 1993, WELT A21599.
Saltwater Lagoon beach, *Neale*, Oct 1995, WELT
A21107-8.
Low intertidal to subtidal on rock.

Gracilaria chilensis C.J.Bird, McLachlan et
E.C.Oliveira
Little Wanganui River mouth, Karamea, *Neale*,
Nov 1992, WELT A21686.
Okari Lagoon, Cape Foulwind, *Neale*, Feb 1997, WELT
A21820.
Okarito Lagoon, *Fenwick*, May 1976, CHR 319666;
Nelson, Sep 1995, WELT A21791.
Margins and beds of estuary channels.

Gracilaria secundata Harv.
Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT
A21746.
Constant Bay, *Neale* & *Nelson*, Sep 1995, WELT
A21115-6.
Seal Is, Paparoa, *Nelson*, Mar 1996, WELT A21810.
On low intertidal and subtidal rock.

BONNEMAISONIALES
BONNEMAISONIACEAE

Asparagopsis armata Harv.
Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR
357106, 357203.

HALYMENIALES
HALYMENIACEAE

Aeodes nitidissima J.Agardh
Constant Bay, Charleston, *Neale*, Feb 1993, WELT
A21712.
Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21636.
Okarito Bluffs, *Neale*, Dec 1992, WELT A21675.

Grateloupia stipitata J.Agardh
Little Wanganui Head, Karamea, *Wellman*, Jan
1949, CHR 67033; *Neale*, Nov 1992, WELT
A21688.
Punakaiki, *Wellman*, Aug 1949, CHR 67626.
Saltwater Lagoon beach, *Neale*, Oct 1995, WELT
A21106.
Low intertidal pools.

Grateloupia urvilleana (Mont.) P.G.Parkinson.
Te Miko, Paparoa, *Phillips*, Feb 1993, WELT
A21648.
On rock, low intertidal pools.

Pachymenia laciniata J.Agardh
Wekakura Pt, Kahurangi, *Neale*, Feb 1995, WELT
A21076.
Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT
A21744.
Constant Bay, *Nelson*, Sep 1995, WELT A21117.
Cobden Beach, *Suggate*, Oct 1948, CHR 67365.
Greymouth Beach, *Wellman*, Jul 1948, CHR
63567.
Ulipa Hill, Abut Head, *Neale*, Oct 1995, WELT
A21090-2.
On intertidal rocks on exposed coasts.

Pachymenia lusoria (Grev.) J.Agardh
Scott's Beach, Heaphy, *Neale*, Nov 1992, WELT
A21661.
Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT
A21753.
Tauranga Bay, Cape Foulwind, *McNeur*, Nov 1942,
CHR 39654a.
Constant Bay, Charleston, *Miller*, Oct 1991, WELT
A20126.
Hokitika, *Allan*, Mar 1941, CHR 34232.
Mikonui, *Neale*, Mar 1993, WELT A21601.

Cascade Is, *Neale*, Feb 1996, WELT A21797.
On exposed coasts, intertidal.

GIGARTINALES

CAULACANTHACEAE

Catenella fusiformis (J.Agardh) Skottsberg
Jackson Bay, *Nelson*, Sep 1995, WELT A21772.

Caulacanthus ustulatus (Turner) Kuetz.
Taumaka, Open Bay Islands, *Fenwick*, Feb 1976,
CHR 367931.

CYSTOCLONIACEAE

Rhodophyllis acanthocarpa (Harv.) J.Agardh
Ocean Beach, Jackson Head, *Neale*, Oct 1992,
WELT A21886.
Epiphytic, low intertidal.

Rhodophyllis membranacea (Harv.) Hook.f. et Harv.
ex Harv.
Taumaka, Open Bay Islands, *Fenwick*, Feb 1976,
CHR 354258.
Ocean Beach, Jackson Head, *Neale*, Oct 1992,
WELT A20291, A20293.
Jackson Bay, *Neale*, Apr 1994, WELT A20913.
(Drift - epiphyte on *Halopteris*) Subtidal rocks, 5-15
m depth.

GIGARTINACEAE

Gigartina ancistroclada Mont.?
Okarito Bluffs, *Neale*, Dec 1992, WELT A21677.
Jackson Bay, *Neale*, Apr 1994, WELT A21889.

'*Gigartina*' sp. - cf *Gigartina clavifera* var. *tortuosa* sensu
Laing & Gourlay 1929
Kohaihai, Karamea, *Wellman*, Jan 1949, CHR
66960.
Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT
A21896-900.
Constant Bay, Charleston, *Nelson & Knight*, Mar 1996,
WELT A21779.
Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21650.
Twelve Mile, *Neale*, Nov 1992, WELT A21249; *Nelson*
& *Knight*, Mar 1996, WELT A21778.
Ten Mile, Coast Rd, *Wellman*, Oct 1948, CHR
67364.

Cobden Beach, Greymouth, *Suggate*, Oct 1948, CHR
67344, 67347.

Camerons, Greymouth, *Suggate*, Apr 1949, CHR 66899.
Mikonui, *Neale*, Mar 1993, WELT A21603.

Ulipa Hill, Abut Head, *Neale*, Oct 1995, WELT A21890-
92.

Okarito Bluffs, *Neale*, Dec 1992, WELT A21671.
Bruce Bay, *Lawn*, Feb 1948, CHR 63532.
Terete, robust thalli, locally abundant.

Gigartina atropurpurea (J.Agardh) J.Agardh.
Adams (1994): "southern limit at Westport".

Gigartina circumcincta J.Agardh
Constant Bay, Charleston, *Parsons*, Mar 1974,
CHR 360236.
Te Miko, Paparoa, *Phillips*, Feb 1993, WELT
A21639, WELT A21646.

'*Sarcothalia*' *decipiens* (Hook.f. et Harv.) Hommers.
Wekakura Pt, Kahurangi, *Neale*, Feb 1995, WELT
A21901.

Buller River mouth, Westport, *McNeur*, May 1942,
CHR 38776.

Tauranga Bay, Cape Foulwind, *Allan*, Mar 1941, CHR
34107.

Constant Bay, Charleston, *Neale*, Feb 1993, WELT
A21711.

Mikonui, *Neale*, Mar 1993, WELT A21605.

Thalli are very robust and appear to be an extreme
form of *G. decipiens*. Hommersand *et al.* (1994)
states "'S'. *decipiens*...is clearly separate from true
Sarcothalia and is sister to *Iridaea*".

Sarcothalia lanceata (J.Agardh) Hommers.

Little Wanganui Head, Karamea, *Neale*, Nov 1992,
WELT A21695.

Wekakura Pt, Kahurangi, *Neale*, Jan 1995, WELT
A21064.

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT
A21740, A21754.

Constant Bay, Charleston, *Nelson & Knight*, Mar
1996, WELT A21492-96.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT
A21637-8, A21645.

Mikonui, *Neale*, Mar 1993, WELT A21604.

Ulipa Hill, Abut Head, *Neale*, Oct 1995, WELT A21093-6.

Iridaea lanceolata Harv.

Ulipa Hill, Abut Head, *Neale*, Oct 1995, WELT A21097.

KALLYMENIACEAE

Callophyllis calliblepharoides J.Agardh

Wekakura Pt, Kahurangi, *Neale*, Feb 1995, WELT A21066.

Kohaihai River, Karamea, *Allan*, Mar 1941, CHR 34260.

Little Wanganui Head, Karamea, *Neale*, Nov 1992, WELT A21585, A21685.

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21738, A21755.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21625, A21635.

Cameron, Greymouth, *Suggate*, Apr 1949, CHR 66907.

Hokitika, *Allan*, Mar 1941, CHR 34208.

Ulipa Hill, Abut Head, *Neale*, Oct 1995, WELT A21098.

Bruce Bay, *Lawn*, Feb 1948, CHR 63538.

Low intertidal and subtidal, often epiphytic.

NEMASTOMATACEAE

Catenellopsis oligarthra (J.Agardh) V.J.Chapm.

Joyce Bay, Charleston, *Neale*, Jan 1995, WELT A21080.

Upper-mid-intertidal, in small clumps.

PHYLLOPHORACEAE

Gymnogongrus furcatus (Hook.f. et Harv.) Kuetz.

Wekakura Pt, Kahurangi, *Neale*, Feb 1995, WELT A21083.

South of Heaphy River mouth, *Wellman*, Dec 1947, CHR 61969.

Scotts Beach, Heaphy Track, *Neale*, Nov 1992, WELT A20232.

Mossy Creek, Karamea, *Allan*, Mar 1941, CHR 34203.

Little Wanganui Head, Karamea, *Neale*, Nov 1992, WELT A20281.

Little Wanganui Head, Karamea, *Wellman*, Jan 1949, CHR 67036.

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT

A21741.

Tauranga Bay, Cape Foulwind, *McNeur*, Nov 1942, CHR 38994.

Constant Bay, Charleston, *Neale*, Feb 1993, WELT A21710; *Nelson & Knight*, Mar 1996, WELT A21780.

Belfast Creek, Paparoa, *Neale*, Aug 1992, WELT A20300.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21591.

Greig's, Coast Rd, *Neale*, Nov 1992, WELT A20257.

Ten Mile, Coast Rd, *Wellman*, Nov 1948, CHR 67352.

Greymouth Beach, *Wellman*, Jul 1948, CHR 367733.

Mikonui, *Neale*, Mar 1993, WELT A21602.

Bruce Bay, *Allan*, Mar 1941, CHR 34237.

Abut Head, *Neale*, Oct 1995, WELT A21111.

Jackson Bay, *Miles*, Mar 1943, CHR 63308.

Low intertidal rocks on exposed coasts.

Gymnogongrus torulosus (Hook.f. et Harv.) Schmitz
Westport, *McNeur*, Jun 1942, CHR 39027, 39032.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21589.

Seal Is, Paparoa, *Neale*, Mar 1996, WELT A21789.

Greig's, Coast Rd, *Wellman*, Apr 1948, CHR 63560.

Hokitika, *Allan*, Mar 1941, CHR 34206.

Okarito, *Neale*, Sep 1995, WELT A21122.

Low intertidal rocks on exposed coasts.

SARCODIACEAE

Trematocarpus acicularis (J.Agardh) Kylin

Scott's Beach, Heaphy, *Neale*, Nov 1992, WELT A20231.

Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A20237.

SCHIZYMENIACEAE

Schizymenia novae-zelandiae J.Agardh

Little Wanganui Head, Karamea, *Neale*, Nov 1992, WELT A21689.

PLOCAMIALES

PLOCAMIACEAE

Plocamium angustum (J.Agardh) Hook.f. et Harv.

Kohaihai Beach, Karamea, *Wellman*, Jan 1949, CHR 66949.

Little Wanganui Head, Karamea, *Wellman*, Jan 1949, CHR 66934; *Neale*, Nov 1992, WELT A21698.

Tauranga Bay, Cape Foulwind, *McNeur*, Nov 1942, CHR 39186.

Constant Bay, Charleston, *Neale*, Feb 1993, WELT A20266.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21941.

Fourteen Mile, Coast Rd, *Neale*, Nov 1992, WELT A20263.

Greig's, Coast Rd, *Wellman*, Jan 1949, CHR 63555; *Neale*, Nov 1992, WELT A20250.

Whakapohai, Moeraki, *Neale*, Jul 1991, WELT A20294.

Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A20234.

Abut Head, *Neale*, Oct 1995, WELT A21110.

Jackson Bay, *Neale*, Apr 1994, WELT A20918.

Ocean Beach, Jackson Head, *Neale & Hadland*, Oct 1992, WELT A20290, A21580, *Neale*, Jul 1992, WELT A21655.

Barn Is, Barn Bay, *Neale*, Feb 1996, WELT A21800.

Big Bay, South Westland, *Nichol*, Feb 1997, WELT A21826.

Intertidal pools to subtidal rocks, to 15m depth.

Plocamium cartilagineum (L.) P.S.Dixon

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21731.

Big Bay, South Westland, *Nichol*, Feb 1997, WELT A21827.

Plocamium costatum (C.Agardh) Hook.f. et Harv.

Kohaihai River, *Allan*, Mar 1941, CHR 34259.

Little Wanganui Head, Karamea, *Neale*, Nov 1992, WELT A21699.

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21732.

The Steeples, Cape Foulwind, *Neale*, Feb 1993, WELT A20285.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357112, 357114, 357115; *Neale*, Feb 1993, WELT A20235.

Jackson Bay, *Neale*, Apr 1994, WELT A20919.

Ocean Beach, Jackson Head, *Neale & Hadland*, Oct 1992, WELT A21579.

Subtidal to 15m depth.

Plocamium microcladioides South et N.M.Adams

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357111, 357113.

Jackson Bay, *Dell*, Jul 1969, WELT A3627 (holotype); *Nelson*, Sep 1995, WELT A21423.

Plocamiocolax sp.?

Big Bay, South Westland, *Nichol*, Feb 1997, WELT A21826

On *Plocamium angustum*. Red algal parasite that forms minute hemispherical thalli of cylindrical, pectinately branched, radiating branchlets.

RHODYMENIALES

RHODYMENIACEAE

Rhodymenia leptophylla J.Agardh

Tauranga Bay, Cape Foulwind, *McNeur*, Nov 1942, CHR 62792.

Rhodymenia sp.

The Steeples, Cape Foulwind, *Neale*, Feb 1993, WELT A21667.

CHAMPIACEAE

Champia novae-zelandiae (Hook.f. et Harv.) J.Agardh

Wekakura Pt, Kahurangi, *Neale*, Feb 1995, WELT A21068.

Scott's Beach, Heaphy, *Neale*, Nov 1992, WELT A20233.

Little Wanganui Head, Karamea, *Neale*, Nov 1992, WELT A21584.

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21729.

Joyce Bay, Charleston, *Nelson*, Sep 1995, WELT A21418.

Constant Bay, Charleston, *Neale*, Feb 1993, WELT A20274; *Nelson*, Mar 1996, WELT A21805.

Seal Island, Paparoa, *Neale*, Aug 1992, WELT A21413, A21569.

Grieg's, Coast Rd, *Neale*, Nov 1992, WELT A20260; *Nelson*, Sep 1995, WELT A21119.

Low tide rocks, often forming a dense turf.

CERAMIALES

CERAMIACEAE

Anotrichium crinitum (Kuetz.) Baldock

Whakapohai, Moeraki, *Neale*, Jul 1991, WELT A20295.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357105; *Neale*, Feb 1993, WELT A21613.

Jackson Bay, *Neale*, Apr 1994, WELT A20917.

Antithamnion applicitum (Harv.) J. Agardh

Joyce Bay, Charleston, *Nelson*, Sep 1995, WELT A21419;

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357204, CHR 357103.

Ballia callitricha (C. Agardh) Kuetz.

Mossy Creek, Karamea, *Allan*, Mar 1941, CHR 34201.

Kohaihai Beach, Karamea, *Wellman*, Jan 1949, CHR 66890.

Little Wanganui Head, Karamea, *Wellman*, Jan 1949, CHR 66936; *Neale*, Nov 1992, WELT A21685.

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21742.

The Steeples, Cape Foulwind, *Neale*, Feb 1993, WELT A21597.

Tauranga Bay, Cape Foulwind, *McNeur*, Nov 1942, CHR 47136.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21627.

Abut Head, *Neale*, Oct 1995, WELT A21112.

Okarito, *Nelson*, Sep 1995, WELT A21812.

Jackson Bay, *Neale*, Apr 1994, WELT A20926; *Nelson*, Sep 1995, WELT A21425;

Ocean Beach, Jackson Head, *Neale*, Jul 1992, WELT A21653.

Centroceras clavulatum (C. Agardh) Mont.

Okari Lagoon, Cape Foulwind, *Neale*, Jul 1997, WELT A21983.

Joyce Bay, *Neale*, Jan 1995, WELT A21086.

Te Miko, Paparoa, *Suggate*, Jul 1948, CHR 63575; *Phillips*, Feb 1993, WELT A21624, A21931.

Blowholes, Paparoa, *Suggate*, Dec 1947, CHR 390464.

Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A21592.

Ceramium apiculatum J. Agardh

Okari Lagoon, Cape Foulwind, *Neale*, Jul 1997, WELT A21987.

Ceramium rubrum (Huds.) C. Agardh

Okari Lagoon, Cape Foulwind, *Neale*, Mar 1997, WELT A21823.

Epiphytic on *Gracilaria chilensis* in lagoon channel.

Ceramium tasmanicum (Kuetz.) Womersley

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21632.

Ceramium sp.

Constant Bay, Charleston, *Neale*, Feb 1993, WELT A20272.

Greig's, Coast Rd, *Nelson*, Mar 1996, WELT A21807. Jackson Bay, *Neale*, Apr 1994, WELT A20921.

Epiphytic on *Lophurella hookeriana*, *Plocamium angustum* and *Pterocladia capillacea*.

Euptilota formosissima (Mont.) Kuetz.

Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A21619.

Jackson Bay, *Neale*, Apr 1994, WELT A20920; *Nelson*, Sep 1995, WELT A21424.

Ocean Beach, Jackson Head, *Neale*, Jul 1992, WELT A20110.

Big Bay, South Westland, *Nichol*, Feb 1997, WELT A21825.

Subtidal rocks.

Griffithsia antarctica Hook.f. et Harv.

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21758.

Griffithsia traversii (J. Agardh) Baldock

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357103.

Epiphytic on *Zonaria*.

Microcladia novae-zelandiae J. Agardh.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357225, 354254.

Microcladia sp.

Joyce Bay, Charleston, *Nelson*, Sep 1995, WELT A21790.

Pleonosporium birtum (Hook.f. et Harv.) Laing

Seal Island, Paparoa, *Neale*, Aug 1992, WELT A21415, A21568.

Grieg's, Coast Rd, *Neale*, Nov 1992, WELT A21703.

Pterothamnion lindaueri (Feldm.-Maz.) Athanas. et Kraft

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357205.

Previously known as *Antithamnion lindaueri* and *Platythamnion lindaueri* (Adams 1994).

Ptilothamnion rupicolum Gordon-Mills

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21938.

Spongoconium pastorale Laing

Little Wanganui Head, *Neale*, Nov 1992, WELT A21696.

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21764.

Constant Bay, Charleston, *Neale*, Feb 1993, WELT A20271.

DASYACEAE

Heterosiphonia concinna (Hook.f. et Harv.) Reinbold

Little Wanganui Head, Karamea, *Neale*, Nov 1992, WELT A21683.

Grieg's, Coast Rd, *Neale*, Nov 1992, WELT A21706.

Abut Head, *Neale*, Oct 1995, WELT A21087.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 354259.

Cascade Is, *Neale*, Feb 1996, WELT A21766.

Heterosiphonia tessellata (Harv.) Reinbold

The Steeples, Cape Foulwind, *Neale*, Feb 1993, WELT A21596.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357202.

DELESSARIACEAE

Abroteia orbicularis J.Agardh.

Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A21608.

Genus et species nov.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357104.

As noted by Parsons and Fenwick these specimens differ from *Abroteia* J.Agardh.

Caloglossa lepreurii (Mont.) J.Agardh

Okari Lagoon, Cape Foulwind, *Neale*, Mar 1997, WELT A21816.

Epiphytic tangled with *Enteromorpha compressa*, growing amongst salt-marsh turf in the upper intertidal.

Apoglossum oppositifolium (Harv.) J.Agardh.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976.

Record from Parsons and Fenwick (1984) but no specimen cited.

Phycodrys profunda E.Y.Dawson

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 354250-1.

Previously recorded as *Cladodonta lyallii* and *Cladodonta* sp. (Parsons & Fenwick 1984).

Hymenena affinis (Harv.) Kylin

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21649.

Hymenena palmata (Harv.) Kylin

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 354257.

Hymenena variolosa (Harv.) Kylin

Grieg's, Coast Rd, *Neale*, Nov 1992, WELT A21705.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 354264, CHR 357226.

Hymenena sp.

Little Wanganui Head, Karamea, *Neale*, Nov 1992, WELT A21684.

Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 354252.

Marionella prolifera (Kylin) F.S.Wagner
Abut Head, *Neale*, Oct 1995, WELT A21102.

Myriogramme denticulata (Harv.) Kylin
Joyce Bay, Charleston, *Nelson*, Sep 1995, WELT A21876.
Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT A21877.

Phytomphora linearis (Laing) Kylin
Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 354253.

Schizoseris dichotoma (Hook. f. et Harv.) Kylin
Wekakura, *Neale*, Jan 1995, WELT A21085.
Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21737.

Schizoseris griffithsia (Suhr) Wynne
Little Wanganui Head, *Neale*, Nov 1992, WELT A21884.
Twelve Mile Creek, *Nelson*, Sep 1995, WELT A21875.

RHODOMELACEAE

Aphanocladia delicatula (Hook.f. et Harv.) Falkenb.
The Steeples, Cape Foulwind, *Neale*, Feb 1993, WELT A21666.
Grieg's, Coast Rd, *Neale*, Nov 1992, WELT A21704.
Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 357201.

Bostrychia harveyi Mont.
Jackson Bay, *Nelson*, Sep 1995, WELT A21773.
Mid-intertidal in turf.

Bryocladia ericoides (Harv.) F.Schmitz
Taumaka, Open Bay Islands, *Fenwick*, Feb 1976, CHR 354255.

Chondria macrocarpa Harv.
Little Wanganui Head, Karamea, *Neale*, Nov 1992, WELT A21586.

Chondria sp.
Grieg's, Coast Rd, *Nelson*, Sep 1995, WELT A21770.

Cladhymenia oblongifolia Harv.
Wekakura Pt, Kahurangi, *Neale*, Feb 1995, WELT A21069.
Little Wanganui Head, Karamea, *Neale*, Nov 1992, WELT A21697.

Dasyclonium bifurcatum Scagel
Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21759.
Tauranga Bay, Westport, *McNeur*, Nov 1942, CHR 397806.
Constant Bay, Charleston, *Nelson*, Sep 1995, WELT A21420.
Epiphytic on *Gymnogongrus* and *Gigartina* spp.

Dasyclonium bipartitum (Hook.f. et Harv.) Scagel
Little Wanganui Head, Karamea, *Neale*, Nov 1992, WELT A21692.
Epiphytic.

Dasyclonium harveyanum (Decne. ex Harv.) Scagel
Kohaihai Beach, *Wellman*, Jan 1949, CHR 66959.
Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21752.
Tauranga Bay, Westport, *McNeur*, Nov 1942, CHR 397806.
Constant Bay, Charleston, *Nelson*, Sep 1995, WELT A21774.
Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21641.
Abut Head, *Neale*, Oct 1995, WELT A21163.
Jackson Bay, *Neale*, Apr 1994, WELT A21882.
Epiphytic.

Dasyclonium incisum (J.Agardh) Kylin
Kohaihai Beach, *Wellman*, Jan 1949, CHR 66957.
Jackson Bay, *Neale*, Apr 1994, WELT A21881.
Epiphytic.

Dipterosiphonia heteroclada (J.Agardh) Falkenb.

Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT A21751
 Joyce Bay, Charleston, *Nelson*, Sep 1995, WELT A21417.
 Belfast Creek, Paparoa, *Neale*, Aug 1992, WELT A21573.
 Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21643.
 Grieg's, Coast Rd, *Neale & Nelson*, Mar 1996, WELT
 A21472; *Nelson*, Sep 1995, WELT A21769.
 Abut Head, *Neale*, Oct 1995, WELT A21161.
 Taumaka, Open Bay Islands, *Fenwick*, Feb 1976,
 CHR 357102.
 Jackson Bay, *Neale*, Apr 1994, WELT A21883.
 Epiphytic.

Echinothamnion hystrix (Hook.f. et Harv.) Kylin
 Constant Bay, Charleston, *Nelson & Knight*, Mar
 1996, WELT A21781.

Echinothamnion lyallii (Hook.f. et Harv.) Kylin
 Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT
 A21757.

Little Wanganui Head, Karamea, *Neale*, Nov 1992,
 WELT A21690.
 Te Miko, Paparoa, *Phillips*, Jan 1993, WELT A21621.
 Abut Head, *Neale*, Oct 1995, WELT A21088.
 Okarito Bluffs, *Neale*, Dec 1992, WELT A21879.

Echinothamnion sp.
 Cascade Is, *Neale*, Feb 1996, WELT A21767.

Herposiphonia cenatoclada (Mont.) Reinbold
 Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT
 A21750.

Herposiphonia sp.
 Taumaka, Open Bay Islands, *Fenwick*, Feb 1976,
 CHR 354256.
 Epiphytic on *Arthrocardia wardii*.

Lophurella caespitosa (Hook.f. et Harv.) Falkenb.
 Seal Island, Paparoa, *Neale*, Aug 1992, WELT
 A21414, A21574.
 Grieg's, Coast Rd, *Neale*, Nov 1992, WELT
 A21708.
 Taumaka, Open Bay Islands, *Fenwick*, Feb 1976,
 CHR 357110.
 Low intertidal rocks.

Lophurella bookeriana (J.Agardh) Falkenb.
 Little Wanganui Head, *Neale*, Nov 1992, WELT
 A21702.

Constant Bay, Charleston, *Neale*, Feb 1993, WELT
 A20272.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT
 A21622.

Abut Head, *Neale*, Oct 1995, WELT A21109.

Taumaka, Open Bay Islands, *Neale*, Feb 1993,
 WELT A20241-3.

Jackson Bay, *Neale*, Apr 1994, WELT A20914.

Ocean Beach, Jackson Head, *Neale*, Oct 1992,
 WELT A21577.

Cascade Is, *Neale*, Feb 1996, WELT A21793.

Lophurella pericladus (Sond.) F.Schmitz
 Jackson Bay, *Neale*, Apr 1994, WELT A21880.

Polysiphonia pernacola N.M.Adams
 Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT
 A21735.

Te Miko, Paparoa, *Phillips*, Feb 1993, WELT A21631.
 Growing on mussels, shells, and worm tubes on ex-
 posed low intertidal rocks.

Polysiphonia sertularioides (Gratel.) J.Agardh
 Scott's Beach, Heaphy, *Neale*, Nov 1992, WELT
 A21660.

Polysiphonia strictissima Hook.f. et Harv.
 Constant Bay, Charleston, *Neale*, Feb 1993, WELT
 A21713.

Polysiphonia sp.
 Taumaka, Open Bay Islands, *Fenwick*, Feb 1976,
 CHR 357206.

Pterosiphonia pennata (Roth) Falkenb.
 Taumaka, Open Bay Islands, *Fenwick*, Feb 1976,
 CHR 354264.

Stictosiphonia arbuscula (Harv.) R.J.King et Puttock
 Wall Is, Cape Foulwind, *Neale*, Sep 1996, WELT
 A21763.

Tauranga Bay quarry, Cape Foulwind, *Neale*, Jun
 1992, WELT A21571.

Seal Is, Paparoa, *Neale*, Aug 1992, WELT A21412.

Ocean Beach, Jackson Head, *Neale*, Jul 1992,
WELT A20122.

Smoothwater Bay, Jackson Head, *Neale*, Apr 1994,
WELT A20911.

Jackson Bay, *Nelson*, Sep 1995, WELT A21428.

Mid-intertidal rocks forming bands.

Stictosiphonia hookeri (Harv.) Hook.f. et Harv.

Okari Lagoon, Cape Foulwind, *Neale*, Mar 1997,
WELT A21819.

Mid-intertidal on platform ledge.

Streblocladia glomerulata (Mont.) Papenf.

Taumaka, Open Bay Islands, *Neale*, Feb 1993, WELT
A21618.

Appendix 1

Collection Localities, West Coast

Map references are for NZMS 260 map series (scale 1:50 000).

Buller Marine Ecological District

| | |
|---------------------------|-----------------|
| 1. Wekakura Point | L26 24341 60327 |
| 2. Heaphy River mouth | L26 2434- 6023- |
| 3. Scott's Beach | L26 24345 6013- |
| 4. Kohaihai Beach | L26 2434- 6010- |
| 5. Mossy Creek | L26 2434- 6008- |
| 6. Little Wanganui Head | L28 2430- 5978- |
| 7. Mohikinui | L28 2421- 5964- |
| 8. Westport | L29 2392- 5940- |
| 9. The Steeples | K29 23830 59412 |
| 10. Cape Foulwind | K29 2382- 5938- |
| 11. Wall Island | K29 2381- 5936- |
| 12. Tauranga Bay quarry | K29 2381- 5935- |
| 13. Okari Lagoon | K29 2382- 5930- |
| 14. Joyce Bay | K29 23800 59216 |
| 15. Constant Bay | K29 23800 59214 |
| 16. Belfast Creek | K30 23772 59107 |
| 17. Fox River mouth | K30 2375- 5907- |
| 18. Woodpecker Bay | K30 2375- 5906- |
| 19. Seal Island | K30 23748 59070 |
| 20. Pahautane | K30 2374- 5905- |
| 21. Motukutuka Point | K30 23745 59038 |
| 22. Te Miko | K30 2372- 5900- |
| 23. Punakaiki | K30 2372- 5898- |
| 24. Dolomite Point | K30 2371- 5897- |
| 25. Seventeen Mile | J31 2369- 5879- |
| 26. Fourteen Mile | J31 23689 58786 |
| 27. Grieg's (Twelve Mile) | J31 2367- 5875- |
| 28. Ten Mile | J31 2366- 5873- |
| 29. Point Elizabeth | J31 2363- 5868- |

Westland Marine Ecological District

| | |
|----------------------------|-----------------|
| 30. Cobden Beach | J31 2362- 5862- |
| 31. Grey River Tip | J31 23611 58614 |
| 32. Greymouth Beach | J32 2360- 5859- |
| 33. Camerons | J32 2357- 5849- |
| 34. Hokitika | J32 23433 58306 |
| 35. Mikonui | I33 2328- 5810- |
| 36. Poerua Bluffs | I34 2298- 5792- |
| 37. Saltwater Lagoon beach | I34 22934 57865 |
| 38. Ulipa Hill | I34 22927 57863 |
| 39. Abut Head | I34 2290- 5786- |
| 40. Okarito Lagoon | H34 228- 577- |
| 41. Okarito Bluffs | H34 22785 57717 |
| 42. Gillespie Point | H35 2255- 5752- |
| 43. Bruce Bay | G36 2235- 5729- |
| 44. Heretaniwha Point | G36 2232- 5729- |

South Westland Marine Ecological District

| | |
|-----------------------|-----------------|
| 45. Whakapohai | F36 2207- 5715- |
| 46. Murphy Beach | F36 2206- 5715- |
| 47. Knight's Point | F36 2205- 5714- |
| 48. Okuru | F37 2180- 5692- |
| 49. Mussel Point | F37 21788 56906 |
| 50. Taumaka | F37 2179- 5697- |
| 51. "Rocks" off Okuru | F37 21757 56951 |
| 52. Jackson Bay | E37 2158- 5683- |
| 53. Ocean Beach | E37 2157- 5684- |
| 54. Smoothwater Bay | E37 2156- 5683- |
| 55. Cascade Point | E38 2138- 5678- |
| 56. Big Bay (Awarua) | D39 21190 56460 |