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Subtidal Macroalgal Assemblages in Temperate Australian Coastal Waters

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Preface

Australia: State of the Environment 1996 (the first ever independent and comprehensive assessment of the state of Australia's environment) was presented to the Commonwealth Environment Minister in 1996. This landmark report, which draws upon the expertise of a broad section of the Australian scientific and technical community, was prepared by seven expert reference groups working under the broad direction of an independent State of the Environment Advisory Council. While preparing the report, the former Department of the Environment, Sport and Territories, on behalf of the reference groups, commissioned a number of specialist technical papers. These have been refereed and are now being published as the State of the Environment Technical Paper Series. Reflecting the theme chapters of the report, the papers relate to human settlements, biodiversity, the atmosphere, land resources, inland waters, estuaries and the sea, and natural and cultural heritage. The topics covered range from air and water quality to sea grasses and historic shipwrecks.

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Abstract

Bioregionalization and macroalgal assemblages are considered for temperate Australian CONCOM regions. These are eight regions which were proposed at the Second Council of Nature Conservation Ministers Technical Workshop (February 1985), in cooperation with the Bureau of Flora and Fauna (IUCN 1986).

Ordination and cluster analyses of species complement of the different regions is consistent with the traditional biogeographic splitting of the temperate Australian coast into the Flindersian (transitional warm–cold temperate) along the southern Australian coast, and the south-east Maugean sub-province (cold temperate). The west Australian coast shows a gradual transition from the south to the subtropical flora of the Abrolhos Islands, while a Peronian Province is supported on the east coast.

The analysis does not strongly support the Victorian and part of the South Australian coast as part of the Maugean. While visually conspicuous algae such as *Durvillaea potatorum* and *Phyllospora comosa* indicate that this region is closely aligned with the Tasmanian in the Maugean sub-province, when all species are taken into consideration, their contribution appears limited. Lord Howe Island is shown to have a rich and unique flora compared to the Australian mainland.

In terms of macroalgal assemblages, distribution records for the larger, visually prominent algae are the most reliable and the review concentrates on these. *Sargassum* spp., *Caulerpa* spp. and *Ecklonia radiata* are conspicuous algae throughout temperate Australia. *Cystophora* spp. and *Acrocarpia* spp. are common along the southern coastline. *Durvillaea potatorum* and *Phyllospora comosa* dominate in the upper sublittoral from the west South Australian coast through to southern New South Wales including Tasmania. *Macrocystis angustifolia* is conspicuous in Victoria and northern Tasmania. In south-eastern Tasmania, *Xiphophora gladiata, Caulocystis cephalornithos* and *Lessonia corrugata* are common in shallower waters and *Macrocystis pyrifera* is prevalent in mid-water depths.

The areal extent of assemblages are presently of being determined for South Australia, Western Australia and Port Phillip Bay. Regular mapping of the areal extent of macroalgal beds and monitoring changes would give a good indication of the state of the marine environment.

Significant problem areas of large algal biomass blooms have been reported in the Peel–Harvey Estuary, and Princess Royal and Oyster harbours in Western Australia. Minor blooms are reported regularly in all States. ‘Blooms’ of algae as epiphytes on seagrasses have caused die-back of seagrasses in all States. Monitoring of frequency, severity and type of macroalgal bloom may indicate trends in environmental quality.

There are number of macroalgal species believed to have been introduced to Australian waters. Two of the more significant are *Undaria pinnatifida* in Tasmania and *Caulerpa filiformis* on the New South Wales coast. Both blanket the rocky reef bottom for large areas, limiting colonisation by native algae. The first published record of a macroalgal extinction, that of *Vanvoorstia bennettiana* is believed to have been recorded at Botany Bay.

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1 Summary

In this review, bioregionalization and macroalgal assemblages are considered for temperate Australian CONCOM regions. These regions were proposed at the Second Council of Nature Conservation Ministers (CONCOM) Technical Workshop (February 1985), in cooperation with the Bureau of Flora and Fauna

(1986). The CONCOM regions are: the Lower West Coasts and the South West Coast both in Western Australia (LWC & SWC), the South Gulfs Coast and the Great Australian Bight in South Australia (SGC & GAB), Bass Strait and the Tasmanian Coast (BS & TC), and Lower East Coast and Central East Coast in New South Wales (LEC & CEC). Lord Howe Island (LHI) is also considered in this review.

Evidence using macroalgal floras (Womersley 1990) has supported that the southern Australian coast should be considered as a single province: the Flindersian (transitional warm–cold temperate), and the south-east coast regarded as a sub-province: the Maugean (cold temperate).

On the west Australian coast, the data suggests a gradual transition from the south to the subtropical flora of the Abrolhos Islands, while a Peronian Province is supported on the east coast extending from the southern coast of Queensland down the New South Wales coast, to become cool temperate near the Victorian border.

1.1 Species in CONCOM regions

The last four years (1990–1994) have seen significant contributions to macroalgal literature in terms of species lists and distributions. These additions have expanded the capacity to analyze the biogeographic distribution of macroalgae in Australian temperate waters since the previous consideration by Womersley (1990).

Preliminary analyses indicate, the South West Coast (SWC), Tasmanian Coast (TC), Central East Coast (CEC) and Lord Howe Island (LHI) regions have lower species numbers compared to the others.

For SWC, TC and CEC this is more than likely an artefact of sampling intensity. These regions tend to be sampled intermittently and as a result are not as well known. The LHI region is lower in species numbers relative to the other regions largely because of the length of coastline concerned. If this is taken into consideration, this area has one of the highest diversities per length of coastline in Australia.

The remaining regions—Lower West Coast (LWC), Great Australian Bight (GAB), South Gulfs Coast (SGC) and Bass Strait (BS)—all have high species numbers.

Cluster analysis reveals that SWC, GAB, SGC and BS are closely related in their species complement and the remaining regions separate out from this group.

Ordination of species complement of the different regions is interpretable in terms of oceanic currents and water temperature. SWC, GAB, SGC, BS and TC are influenced predominantly by the Leeuwin Current and the West Wind drift and CEC, LHI and CEC by the East Coast Current. LWC, LEC, CEC and LHI all have a mixture of tropical and temperate species, whilst TC has a complement of cold temperate species.

These interpretations are not inconsistent with the traditional biogeographic splitting of the Australian coast. This puts TC in the Maugean, LWC, SWC, GAB, SGC, BS in the Flindersian, and LEC, CEC and LHI in the Peronian. Interestingly, the inclusion of the Victorian and part of the South Australian coast as part of the Maugean is not strongly supported. While visually conspicuous algae such as *Durvillaea potatorum* and *Phyllospora comosa* in BS may indicate that this region is closely aligned with TC in the Maugean sub-province, when all species are taken into consideration, their contribution appears limited.

Lord Howe Island has a rich and unique flora compared to the Australian mainland.

1.2 Macroalgal assemblages

Subtidal macroalgal community research is still in its infancy in Australia as it is in most other countries, and much of the available data is qualitative. Distribution records for the larger, visually prominent algae are the most reliable, and this review concentrates on these. Large algae often determine the surrounding biota and so are a good reflection of assemblage distributions. Smaller algae also often present taxonomic problems. This review is also confined largely to subtidal rocky reefs, usually in wave-exposed, oceanic waters.

1.2.1 Western Australia

At the Abrolhos Islands, at the northern extent of temperate waters in Western Australia, seasonally variable *Sargassum, Cystoseira trinodis* and *Ecklonia radiata* can be found with an under-storey of small fleshy and filamentous algae in association with coral reefs.

In the vicinity of Perth, *Ecklonia radiata* and *Sargassum* spp. are visually conspicuous algae; *Caulerpa* spp. and red algae make up the majority of the under-story species.

The flat limestone reefs off Western Australia are proving to be of interest as they are more extensive than was previously considered. They support principally *Dictyopteris* spp., *Scaberia agardhii* and *Sargassum* spp.

In the southwest coast of Western Australia, in the upper subtidal, *Cystophora* spp., *Acrocarpia robusta*, and in some places *Platythalia angustifolia* and, to a lesser degree, *Sargassum* spp. dominate the upper sublittoral zone. The lower subtidal reef is dominated by *Ecklonia radiata* and *Scytothalia dorycarpa.*

1.2.2 South Australia

Upper: On wave-exposed coasts, the upper (to 3–5 m depth at the sites studied) was characterized by a dense turf, mainly of *Corallina* or *Haliptilon* spp. (mainly *H. roseum*). Just below the level of low tide was the 'fringe zone' with *Cystophora intermedia* and barnacles. Below this were turf-like *Gelidium asperum* with *Sargassum* spp. and *Homeostrichus sinclairii*. On less-exposed coasts this band is only 1 m broad. *Cystophora intermedia* disappears and is replaced by other species of *Cystophora* or other fucoid genera. With further lessening of surge, the zone is about 0.5 m broad with dense *Pterocladia* in the lower part.

Mid: The mid-zone (5–50 m depth—actual depth site-dependent, exclusive of upper and lower zones) was dominated by the kelp *Ecklonia radiata* at the highest water movement, but at lesser exposure, *Scytothalia dorycarpa, Cystophora* spp., *Myriodesma* spp., and *Acrocarpia paniculata* were also present. On calmer coasts, this zone of brown algae comes to the lower tide level, with no coralline algal mat.

Lower: The lower zone (17–60 m depth—actual depth site-dependent, exclusive of mid-zone) below the zone of larger brown algae, was described as consisting of a dense cover of diverse red algae, including *Plocamium* spp.

1.2.3 Victoria

Fairly general within Port Phillip Bay: *Ulva lactuca, Caulerpa remotifolia*, probably *Codium harveyi, Cutleria multifida, Soleria robusta, Griffithsia teges, Wrangelia protensa, Polysiphonia cancellata, Dictymenia harveyana, Laurencia filiformis.*

Around the Bay, excluding the central Bay and very calm western areas: *Caulerpa brownii, Dictyopteris muelleri, Ecklonia radiata, Cystophora retroflexa, Sargassum paradoxum, S. verruculosum.*

Black Rock (mid-Victorian coast): *Macrocystis angustifolia* (shallow) and *Ecklonia radiata* were described as being the community dominants. Other common algae were *Sargassum* spp. (*S. distichum, S. fallax* and *S. vestitum), Cystophora* spp., *Cheilosporum sagitatum, Corallina officinalis* and *Plocamium* spp.

Victorian waters generally are described as having in the shallow (0–20 m) wave-exposed waters extensive beds of *Durvillaea potatorum* (0–5 m) and *Phyllospora comosa*, whereas in sheltered waters *Ecklonia radiata* dominates. Small beds of the southern giant kelp *Macrocystis angustifolia* occur in moderately sheltered localities. *Sargassum, Cystophora* and *Caulocystis* prefer sheltered reefs of shallow to moderate depths.

1.2.4 Tasmania

In south-eastern Tasmania, at sheltered sites, shallow (<3 m) waters are dominated by fucoids, including *Cystophora* spp., *Caulocystis cephalornithos* and *Acrocarpia panniculata*. In deeper waters, *Ecklonia* and *Sargassum* spp. became more prominent, and at the sand edge *Caulerpa* spp. and seagrass species were common.

In moderately wave-exposed sites in shallow waters, *Phyllospora comosa* and *Lessonia corrugata* are common. *Macrocystis pyrifera* is prevalent in mid-water depths (3–15 m) as a canopy over *Ecklonia radiata*.

In more wave-exposed waters, *Durvillaea potatorum* dominates the shallow waters, with *Xiphophora gladiata* overlaying a coralline–algal covered substratum. *Phyllospora comosa* occupies the next zone down, and *Ecklonia radiata, Cystophora* spp. and *Sargassum* spp. are deeper still.

1.2.5 New South Wales

The shallow subtidal areas of rocky reefs in central and southern New South Wales have been described as a mosaic of habitats. The fringe habitat is generally found only in the most shallow waters. Forests of *Ecklonia radiata* are often found at intermediate

depths. In deeper or more sheltered water, sponges, ascidians and red algae are more abundant and the numbers of sea urchins and other invertebrate grazers decline. Overlying this broadbrush pattern are patches of crustose coralline algae ('Barrens' habitat) the distribution of which is not clearly related to depth. Invertebrate herbivores, sea urchins in particular, are abundant in the Barrens habitat. The Barrens habitat was most represented at the more southern locations. At two northerly locations, reefs were shorter in length and dominated by ascidians.

At Coffs Harbour on the northern New South Wales coast, *Ecklonia radiata* is abundant on the mainland and near-shore islands but is absent from the offshore islands, and some tropical species are common on the islands (including some recorded in Japan) but not on the adjacent mainland. The distribution of algal species here parallels that of the corals and fish and would seem to indicate the proximity of the northern limit of temperate coastal waters.

1.3 Areal extent of macroalgal assemblages

The areal extent of assemblages is presently in the process of being determined for South Australia, Western Australia and Port Phillip Bay, with results expected to be published for Port Phillip Bay late in 1994. The Western and Southern Australian work is being conducted using satellite images to give 1:100 000 maps. Port Phillip Bay mapping is processed from images obtained from aerial flights, allowing greater resolution. Both are covering much larger areas and more species than previous attempts.

Recent surveys of the distribution of stands of *Macrocystis pyrifera*, believed to be an ecologically important species in Tasmanian waters, are a fraction of values determined in the early 1950s.

Regular mapping of the areal extent of macroalgal beds would give a good indication of the state of the marine environment.

1.4 Blooms

Significant problem areas of large algal biomass blooms have been reported in the Peel–Harvey Estuary, and Princess Royal and Oyster harbours in Western Australia. Many of these problem areas can be alleviated by improving nutrient exchange with more regular flushing of the estuaries concerned. Minor blooms are reported regularly in all States, resulting from a variety of species including prominently *Enteromorpha, Ulva, Cladophora* and *Hinksia* spp. 'Blooms' of algae as epiphytes on seagrasses have caused die-back of the seagrass in all States. A database monitoring frequency and type of macroalgal blooms may have some value for determining changing patterns of incidence and indicate trends in environmental quality.

1.5 Introduced species

There are a number of macroalgal species believed to have been introduced to Australian waters, principally through ballast waters and on ships' hulls. The actual numbers are unknown due to lack of proper baseline knowledge and previous accurate taxonomic records. Two of the more significant are *Undaria pinnatifida* in Tasmania and *Caulerpa filiformis* on the New South Wales coast. Both blanket the rocky reef bottom for large areas, limiting colonization by native algae.

A relatively recent introduction, a red alga—*Schottera nicaeensis*—first recorded in Port Phillip Bay in 1972, is now recorded from every port or harbour in south-eastern Australia.

A potential area of concern is the introduction of macroalgae through the live aquarium trade. *Caulerpa taxifolia* has been identified being sold in aquarium shops in Perth, Western Australia. *Caulerpa taxifolia* is invasive and smothers other algae and seagrasses. The possible threat of species being introduced through the aquarium trade, not only macroalgae but animals as well, needs to be more highly publicized and better controlled.

The first published record of a macroalgal extinction, that of *Vanvoorstia bennettiana* has been recorded at Botany Bay. It may have disappeared as a result of human activities such as heavy shipping traffic, dredging and urban runoff, all of which have caused heavy siltation.

2 Introduction

This review covers aspects of macroalgal assemblages within temperate Australian coastal waters. The ecological accounts deal primarily with the subtidal region due to time restrictions. This region is far more extensive than the intertidal and of significance to near-shore coastal ecosystems. The review complements comprehensive reviews presented by Clayton and King (1990). Clayton and King (1990) also include aspects of macroalgal taxonomy and biology in the Australasian region.

Species distributions (subtidal and intertidal) are examined on the basis of their occurrence within CONCOM regions (see Figures 1 and 2). These are regions which were proposed at the Second Council of Nature Conservation Ministers Technical Workshop (February 1985), in cooperation with the Bureau of Flora and Fauna (IUCN 1986).

Temperate waters can be divided into warm and cold components. Cold temperate waters are defined as those that are typified by sea temperatures of (5–)10–15°C, with an annual variation of 8–10°C. Warm temperate regions are typified by sea temperatures of (12–)15–20(–25)°C, with annual variation of 10°C or more. Of the CONCOM regions considered, Bass Strait and the Tasmanian Coast (BS & TC) classify as cold temperate, while the Lower West Coast, the Lower East Coast and the Central East Coast (LWC, LEC & CEC) are warm temperate. The remaining regions, South West Coast, the South Gulfs Coast and the Great Australian Bight (SWC, SGC & GAB), are intermediate or transitional warm to cold temperate regions.

The review is part of the response to environmental obligations Australia has as a member of the OECD and is a contribution to the 1996 national State of Environment Report. It also complements SOMER that is being compiled as part of the Ocean Rescue 2000 program.

While the review was limited by time, the author believes that, while not all references are included, the greater proportion have. More time would have allowed for a more comprehensive analysis of the literature presented. What is presented here is a stepping stone for subsequent reviews.

Figure 1: Map of the southern half of Australia showing CONCOM regions

Figure 2: Map of the southern half of Australia showing place names mentioned in the text

3 Factors affecting macroalgal distributions within Australia

The following is a very brief summary of the principal factors affecting macroalgal distributions taken from Schiel and Foster (1986), Druehl (1981) and the author's experience.

The principal abiotic factors affecting algal stands are temperature, nutrients, water motion, light, salinity, substratum, sedimentation and pollution. Herbivores are the principal biotic effect.

These factors operate at local scales as well as on the scale of biogeographic regions.

3.1 Temperature and nutrients

There is now considerable evidence that low nitrogen levels are correlated with high temperatures. It is thus best to consider these two factors together as it is difficult to separate the two in the field.

Field correlations have often indicated that temperature is the primary cause of the geographic boundaries of species of macroalgae. Seawater temperatures are often determined largely by prevailing oceanic currents; as a result, biogeographic regions do not directly correlate with latitude. The southward-flowing Leeuwin and East Australian currents mean that warmer waters are found further south on Australian coasts compared to corresponding north–south coasts on other continents in the Southern Hemisphere.

Minor upwelling occurs off Robe–Port McDonnell and the west coast of the Eyre Peninsula in South Australia. The lower temperatures and increased nutrients are believed to affect the macroalgal complement in that region.

Geographic boundaries as determined by temperature and associated nutrient levels can vary from year to year and over years in some areas. In California, El Niño caused the decline in beds of *Macrocystis pyrifera* in 1983/84, and in Tasmania the loss of *Macrocystis pyrifera* on the State's east coast in the late 1980s has been attributed to the increasing incidence of the East Australian Current.

At the local level, mortality and declines in growth occur within individual stands of macroalgae during periods of high temperatures and associated low nitrogen.

3.2 Water motion

Wave action is one of the most cited causes of adult plant mortality. Differential mortality within a species may produce differing population age or size

structures in wave-exposed compared to protected locations and among patches within a stand.

On a geographic scale wave action can affect species distributions. In Tasmania for example, while the east and west coasts are both termed ‘exposed to wave action’, the east coast experiences infrequent large swells while the west coast is subject to continual large wave action. This has the effect of selecting for more wave-tolerant species, such as *Durvillaea potatorum* on the west coast, while infrequent swell action results in more patchy distributions of a combination of wave-action tolerant and intolerant species such as found on the east coast.

Depth distribution of a particular species often has been correlated with water motion. Hardier, more robust species, more able to withstand higher wave action, are found in deeper waters in more wave exposed areas.

3.3 Light

In the absence of other possible limiting factors, stands of Laminarian algae are restricted to where benthic irradiance is 1% of surface irradiance or greater (Lüning 1981). Local variations in water quality and, therefore, light penetration can affect the depth distribution of algal stands.

On a geographic scale, turbidity can affect algal distributions through a decline in light penetration. This often occurs where there are large freshwater inputs such as in areas of high rainfall or in shallow water areas where bottom sediments are often stirred.

In the south-west of Tasmania, tannin-stained freshwaters affect light penetration. In some areas, algae normally found in deeper waters are much shallower due to decreased light penetration. The growth rate, density and biomass of algal stands generally decrease with depth and patchiness may increase.

3.4 Salinity

Large subtidal and fucalean algae are rare in estuaries and it is generally assumed that these plants are open coast species intolerant of low salinities.

3.5 Substratum and siltation

Stands of large algae are usually restricted to hard substrata where plants can remain attached in moving water, and much of the patchiness found within a particular depth can be due to the presence of sandy areas unsuitable for algal attachment. In more sheltered waters, algae are sometimes found attached to unconsolidated substrata such as rubble and shells. The hardness of the substratum can affect the survival and age structure of the stands.

Sedimentation, with its associated effects on light, nutrients, and the ability of plants to attach, can drastically reduce the survival of spores and gametophytes.

Long stretches of sandy beaches, such as the Ninety Mile Beach in south-eastern Victoria and the Coorong in South Australia, are barriers to algal dispersal and may represent significant boundaries between biological provinces.

3.6 Grazers

Much of the small-scale patchiness in intertidal assemblages is the result of grazing by gastropods on filamentous and foliose plants, as well as on algal spores. In the subtidal, limpets may decline in abundance while larger gastropods such as trochids and abalone may increase. Sea urchins are often cited as the major large invertebrate grazer. Herbivorous fish can also affect subtidal algal assemblages. On larger geographic scales, urchins have been implicated as the cause of patchiness of algal assemblages on the southern New South Wales coast.

3.7 Pollution

Generally, macroalgal communities respond to pollution by showing decreased species diversity, an enhanced Chlorophytan component, and selection for small, often turf-like plants. Pollution effects are usually evident only at a local level. In Bass Strait however, output of ferrous hydroxide from a titanium-producing plant on the north-western Tasmanian coast extends east from Burnie to Sulfer Creek and perhaps as far as Devonport, a distance of 50 km. Primary effects of the effluent were attributed to light reduction caused by the floc (Ritz et al. 1985).

4 Biogeographic regions within temperate Australian coastal waters

The flora of cold temperate regions are typically rich and diverse in species. The larger brown algae

(especially Laminariales) are prominent and often of considerable biomass, and algae are usually present throughout most of the intertidal zone. In Australia, *Macrocystis angustifolia* and *Durvillaea potatorum* are typical of the cold temperate regions, together with a wide variety of Fucales and Rhodophyta. The Tasmanian coasts also have some species with subantarctic affinities; these include the prominent Laminaran algae *Macrocystis pyrifera* and *Lessonia corrugata.*

The flora of warm temperate regions is usually less rich than in cooler temperate waters. In the intertidal zone, algae are restricted largely to the lower zone, while animals dominate above. Large kelps are less conspicuous in the upper sublittoral and members of the Fucales are often more prominent just below low-tide level.

Evidence using macroalgal floras to support the division of the temperate Australian coastline has been limited to the south coast where the majority of phycological work has been conducted. Within this area, Womersley (1984, 1990) has grouped the distribution of macroalgal species as southern Australian (44%, found generally along the coast), eastern (81%, from eastern South Australia, Victoria and Tasmania, 54% in Tasmania) and western (54%, west of Kangaroo Island), with a very few species of restricted occurrence in South Australia. Womersley and Edmonds (1958) and Womersley (1959) considered that this showed that the southern Australian coast should be considered as a single province (the Flindersian, transitional warm–cold temperate) and the south-east coasts regarded as a sub-province, the Maugean (cold temperate).

The Maugean Province was designated by Iredale and May (1916) for the fauna of south-eastern Tasmania, and the name was transferred by Bennett and Pope (1953) to the Victorian and Tasmanian coasts. The South Australian, Victorian (west of Wilsons Promontory), and north and west Tasmanian coasts were the essence of Hedley's (1904) Adelaidean Province which was renamed the Flindersian by Cotton (1930).

In Western Australia, a West Australian Province has been recognized on the basis of fauna (Knox 1963), and Kott (1952) has presented evidence from the distribution of ascidians for recognition of a Baudinian Province from Fremantle to Albany. From an algal point of view there are inadequate data to support either of these provinces. There are, however, several distinctive taxa of Fucales on the south-west coast of Western Australia (Womersley 1984, 1990). What data are available suggest that a gradual transition occurs on the west coast from the south to the subtropical flora of the Abrolhos Islands. A Peronian Province (warm temperate) is supported extending from the southern coast of Queensland, down the New South Wales coast, to become cool temperate near the Victorian border.

Recent work as part of the 'Ocean Rescue 2000' program has seen a draft division of the temperate Australian coastline into 30 smaller provinces from the original 4 described above (56 in total for Australia, IMCRA March 1995).

5 Species distributions in temperate waters of Australia

The last four years have seen significant contributions to macroalgal literature in terms of species lists and distributions. These include Huisman and Walker's account of the macroalgae of Rottnest Island (1990 & Huisman 1993: supplement), Womersley's (1994) first volume of the red algae of southern Australia (which includes the Bangiophyceae and the Nemaliales, Gelidiales, Hildenbrandiales and Gigartinales of the Florideophyceae), and Millar and Kraft's catalogues of the algae of New South Wales and Lord Howe Island (1993, 1994a, 1994b).

These additions have expanded the capacity to analyze the biogeographic distribution of macroalgae in Australian temperate waters since a previous consideration by Womersley (1990). While such interpretations are to be treated with caution because of the evolving nature of species identification and the unequal distribution of sampling effort around the coast, there is still the potential to reveal overall patterns.

The following analyses are derived from the above-mentioned publications, as well as publications mentioned in Kraft and Woelkerling (1990) for groups not covered by Womersley's (1994) latest volume of the red algae. Not all known Australian species are represented, however, as Kraft and Woelkerling (1990) allude to a number of other species (see Appendix 2) for which information

regarding distribution within Australia could not be located in the literature.

In Table 1, algal distributions are divided on the basis of occurrence on the west, south or east coasts of Australia. They demonstrate an apparent greater number of species in the east compared to the west (if Lord Howe Island is included in the analysis), with a much greater number for the cooler southern coast. At present, it is not known how real these differences are as the south coast has been relatively intensively sampled for a number of years. The east and particularly the west coast have only relatively recently become the subjects of ongoing systematic sampling.

In Table 2, algal distributions have been divided on the basis of CONCOM regions (see Figure 1). At this level, the variation in sampling intensity may be more evident. Species numbers may also be artificially inflated due to differing taxonomic interpretation (e.g. some species are probably listed twice under two different names) especially within the Rhodophyta.

SWC, TC, CEC and the LHI regions have lower species numbers for which there may be a number of reasons. For SWC and TC this is possibly an artifact of sampling intensity. These regions tend to be sampled intermittently and as a result are not as well known. The CEC region similarly is undersampled and is only represented by the northern corner of New South Wales in this review. There are publications that relate to algal occurrences in south-eastern Queensland but they were not consulted in this study (e.g. Lewis 1984, 1985, 1987). The LHI region is lower in species numbers relative to the other regions solely because of the length of coastline concerned. If this is taken into consideration, this area probably has one of the highest diversities per length of coastline in Australia.

Table 1: Algal species numbers for west, south and east Australian coasts

	West Lower WA Coast	**South** Southern Australia	**East** New South Wales & Lord Howe Island
Number:			
Chlorophyta	83	125	113
Phaeophyta	107	226	141
Rhodophyta	368	800**	398
Total	**558**	**1151**	**652**
Ratios:			
R/P	3.44	3.54	2.82
(R + C)/P	4.21	4.09	3.62
Percentage:			
Chlorophyta	15	11	17
Phaeophyta	19	20	22
Rhodophyta	66	70	61

** Species number obtained from Womersley 1990

Table 2: Algal species numbers per CONCOM region (from published literature, 1994)

	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI	
Number:										
Chlorophyta	83	64	80	106	87	54	67	32	59	
Phaeophyta	107	96	131	178	174	107	107	37	71	
Rhodophyta	368	221	300	397	381	212	272	151	175	
Total	**558**	**381**	**511**	**681**	**642**	**373**	**446**	**220**	**305**	
Ratios:										
R/P	3.44	2.30	2.29	2.23	2.19	1.98	2.54	4.08	2.46	
(R + C)/P	4.21	2.97	2.90	2.83	2.69	2.49	3.17	4.95	3.30	
Percentage of each plant phylum:										**Overall average**
Chlorophyta	15	17	16	16	14	14	15	15	19	16
Phaeophyta	19	25	26	26	27	29	24	17	23	24
Rhodophyta	66	58	59	58	59	57	61	69	57	60
Number of unique species records per CONCOM REGION (from published literature, 1994):										
Chlorophyta	13	0	2	6	3	3	7	4	27	
Phaeophyta	7	1	0	15	8	6	9	1	21	
Rhodophyta	117	1	4	24	18	11	49	17	66	
Total	**137**	**2**	**6**	**45**	**29**	**20**	**65**	**22**	**114**	
Percentage of each plant phylum:										**Overall average**
Chlorophyta	9	0	33	13	10	15	11	18	24	15
Phaeophyta	5	50	0	33	28	30	14	5	18	20
Rhodophyta	85	50	67	53	62	55	75	77	58	65

The percentage of green algae is relatively consistent across the regions. The proportions of reds and browns change however. The warmer regions with tropical elements have a greater proportion of reds and less of browns than the cooler temperate areas. It has been suggested by Feldman (1937) that a high proportion of species of Rhodophyta to those of Phaeophyta (R/P > 4) is typical of tropical floras, and a low proportion (R/P < 2) is typical of cold temperate regions. Cheney (1977) incorporated the Chlorophyta in a similar ratio, (R+C)/P, and found that values less than 3 indicate a temperate or cold water flora, while 6 or greater indicates a tropical flora (see also Womersley 1990). The Southern Australian coast has ratios of 3.5 and 4. This reflects a great richness and high level of endemism of Rhodophyta in the region with sea temperatures well below the range of the tropics.

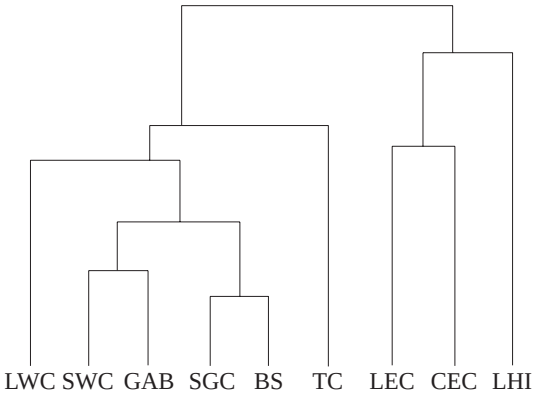
Ratios of these numbers (R/P and (R+C)/P) give values that are close to tropical for CEC, warm temperate for SWC, LWC LEC and LHI, cool

temperate for GAB, SGC and BS and cold temperate for TC. (**Note:** these figures only include published red algal distributions, see Appendix 2) For comparison, Lewis (1984, 1985, 1987) lists species numbers of 406 Rhodophyta, 160 Phaeophyta and 222 Chlorophyta for tropical and sub-tropical areas of Northern Australia for ratios of 2.5 and 3.9.

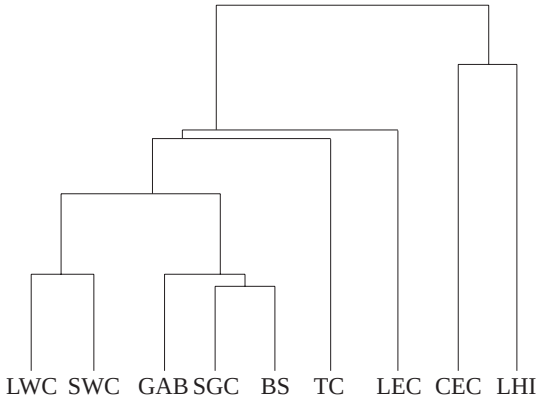
Cluster analysis of the CONCOM region data was conducted using presence/absence data, the Bray–Curtis similarity coefficient and average linkage clustering options. Each of the macroalgal phylum—the Chlorophyta, Phaeophyta and Rhodophyta—were considered separately as well as combinations of all three and just the Chlorophyta and Phaeophyta. By analyzing the different data sets separately and together, any taxonomic shortcomings biasing the results would be demonstrated. For example if inconsistent taxonomy within the Rhodophyta was influencing the result, then its cluster result may be expected to be significantly different from the other groupings. The taxonomy of the Chlorophyta and the Phaeophyta has been better known for a number of years and may be expected to show less influence of sampling bias.

Clustering results (Figure 3(a)–(e)) consistently show that the floral complements of SWC, GAB, SGC and BS are most similar; LWC, TC and LEC are aligned with this group, while CEC and LHI may be considered a second group.

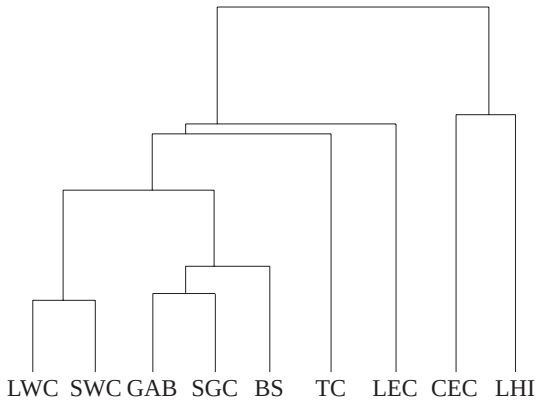
LHI separates out from the other regions particularly for the Chlorophyta (Figure 3(c)). This may be due to the fact that they have been more thoroughly monographed than either the Rhodophyta or Phaeophyta at Lord Howe Island (Kraft, pers. comm.). When these two other groups have been treated in equal detail, Lord Howe Island will probably stand alone with respect to these groups as well.



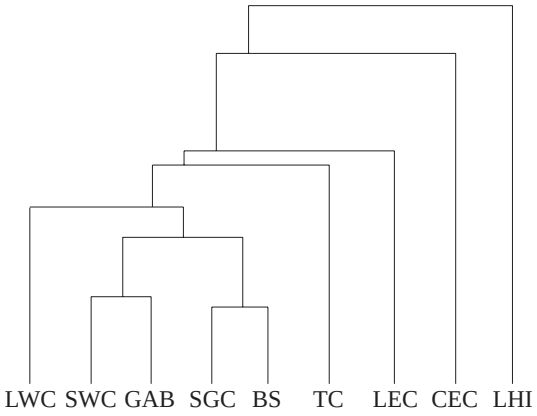
(a) All algae



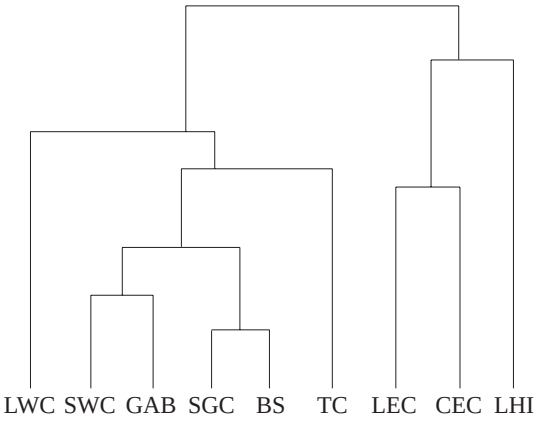
(b) Chlorophyta and Phaeophyta



(c) Phaeophyta



(d) Chlorophyta

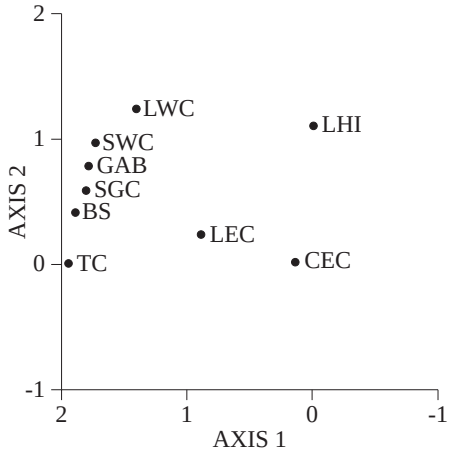


(e) Rhodophyta

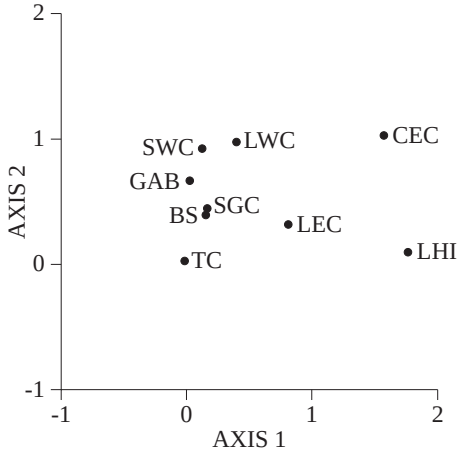
Figure 3(a)–3(e): Cluster analysis of the CONCOM region data using presence/absence data, the Bray–Curtis similarity coefficient and average linkage clustering options

Ordination of the data was also conducted using global non-metric multidimensional scaling based on the Bray–Curtis similarity coefficient. Different groupings were used for similar reasons to those above. The results obtained are consistent with that obtained through clustering (Figure 4 (a)–(e)).

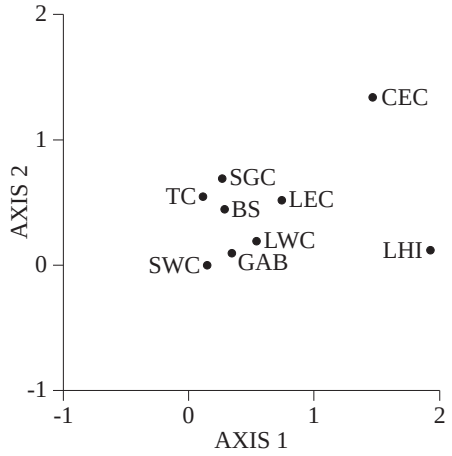
The trends may be interpreted in terms of environmental parameters. The separation along Axis 1 may be explained by oceanographic current patterns. LWC, SWC, GAB, SGC BS and TC are all influenced by the West Wind Drift and the Leeuwin Current. Species dispersions may be expected to occur from west to east, maintaining a similar complement between these six regions.



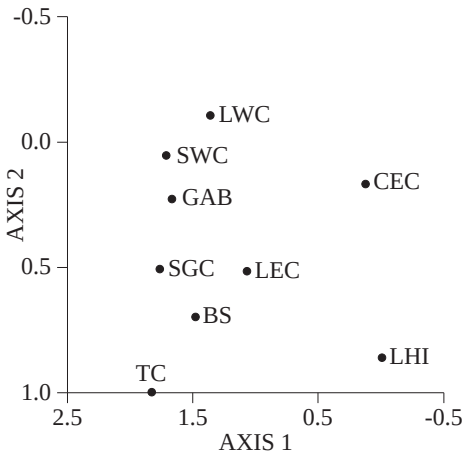
(a) All algae



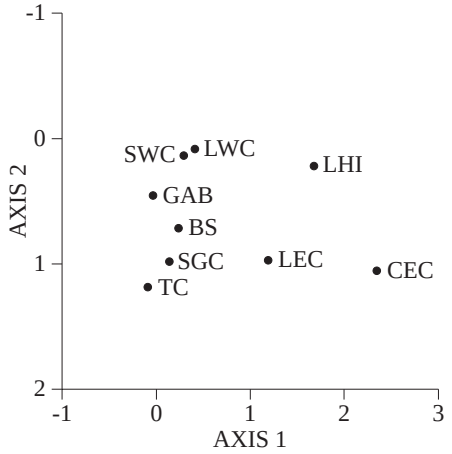
(b) Chlorophyta and Phaeophyta



(c) Chlorophyta



(d) Phaeophyta



(e) Rhodophyta

Figure 4(a)–4(e): Ordination of data using global non-metric multidimensional scaling based on the Bray–Curtis similarity coefficient

In contrast, the major influencing factor for CEC, LEC and LHI is the East Australian Current (EAC).

Axis 2 scores may be interpreted in terms of water temperatures. Northern and southern regions are distributed top to bottom on the ordinations. The northern regions have tropical elements while the southern have cold temperate. The combined tropical and temperate influence at Lord Howe Island causes this region to have either a high or low axis rating depending on the groups of algae being ordinated.

These interpretations are not inconsistent with traditional biogeographic splitting of the Australian coast. This would see TC in the Maugean, LWC, SWC, GAB, SGC, BS in the Flindersian, and LEC, CEC and LHI in the Peronian. At the other extreme, however, there is some basis as a result of these analyses to include LWC, SWC, GAB, SGC and BS in the one region and all the remaining four regions as separate. Interestingly, the inclusion of the Victorian and part of the South Australian coast in the Maugean is not supported. While visually conspicuous algae such as *Durvillaea potatorum* and *Phyllospora comosa* in BS may indicate that BS is closely aligned with TC in the Maugean sub-province, when all species are taken into consideration, their contribution appears limited.

6 Subtidal macroalgal assemblages in temperate Australian waters

Subtidal macroalgal community research is still in its infancy in Australia as it is in most other countries, and much of the available data is qualitative. Distribution records for the larger, visually prominent algae are the most reliable, and this review concentrates on these. Large algae often determine the surrounding biota and so are a good reflection of assemblage distributions. Smaller algae also often present taxonomic problems. The recent updating of taxonomy in Australia will hopefully see significant in-roads in this area in the years to come.

Studies in this area Australia-wide occur mainly about the larger cities in each of the States (e.g. Sydney, Melbourne, Perth). This review will treat each State separately, working from west to east.

6.1 Western Australia

Hatcher (1985) provided a brief description of kelp-beds and coral reefs occurring on hard substrata at the Houtman Abrolhos Islands. These two assemblages were in different places: the algae dominated the windward slopes and flats; the corals were on the leeward slope. Hatcher and Rimmer (1985) also noted that shallow reef habitats had seasonally variable *Sargassum* and an under-storey of small fleshy and filamentous algae on dead coral. Brown algae such as *Sargassum* and *Cystoseira trinodis* dominate the substrata provided by dead coral on the back reef and submerged platforms (Wilson & Marsh 1978).

Twinspan analysis of quadrat data at the Marmion Marine Park north of Perth divided the species assemblages (flora and fauna) into six groups forming a reef (shallow and deep) association and an inshore association (Simpson & Ottaway 1987). Principal macroalgal species associated with these groups were the green algae: *Caulerpa cactoides, C. distichophylla, C. vesiculifera, Halimeda cuneata, Codium* spp.; the brown algae: *Ecklonia radiata, Colpomenia peregrina, Dictymenia sonderi, Lobophora variegata, Lobospira bicuspidata, Halopteris* sp.; and the red algae: *Hypnea* spp., *Galaxaura* sp. and *Vidalia spiralis*.

Ecklonia radiata is the visually dominant alga on shallow reefs near Perth. It constitutes 95% of algal biomass on reefs between 6 and 10 m depth of the northern metropolitan coast (Kirkman 1981) and covers approximately 30% of subtidal reef at Rottnest Island (Walker et al. 1988), where it exhibits the highest net biomass and primary production of all primary producers. There have been a number of ecological studies concerning the growth and production of *Ecklonia radiata* in Western Australia; these include Kirkman (1984), Hatcher et al. (1987) and Wood (1987a, b).

Sargassum species are the other major canopy-forming algae common on subtidal reefs in this area. They have not been as thoroughly studied as *Ecklonia* because of taxonomic problems in species identification. *Sargassum* species were found to cover 20% of total substratum (rock and sand) to 10 m depth and accounted for 20% of total annual production and 27% of biomass at Rottnest Island. The *Sargassum spinuligerum-distichum-podacanthum* complex was the most abundant group in the intertidal and the subtidal. *Sargassum spinuligerum* occurred in the greatest numbers followed by *S. distichum* (Kendrick 1993).

Le Provost et al. (1981) recognized a number of biotic assemblages at Point Peron, south of Perth, of which four were macroalgal-dominated. These were: a green algal assemblage dominated by *Caulerpa* spp. and *Codium* spp. with *Bryopsis* spp. and *Ulva lactuca* common; a kelp assemblage consisting of *Ecklonia* radiata forming a canopy over a variety of foliose and coralline red algae, *Sargassum* spp. forming up to 20% of the biomass; a foliose red algal assemblage with no one species dominating but including prominently *Dictymenia* spp. *Vidalia spiralis, Botryocladia obovata, Osmundaria prolifera* and *Gloiosaccion brownii*; and a coralline algal assemblage consisting of encrusting or low-growing articulated *Corallinaceae* plus *Zonaria* spp., *Padina* spp. and the foliose red algae *Rhodymenia* and *Curdiea*. Solidarity of the substrate had a determining effect on the assemblage type. Crumbly rock surfaces did not support the larger macrophytes such as *Ecklonia*.

On the south-west coast of Western Australia, in the upper subtidal, *Cystophora* spp., *Acrocarpia robusta*, and in some places *Platythalia angustifolia* and, to a lesser degree, *Sargassum* spp. dominate the upper sublittoral zone. From Point Peron north, however, this region is dominated by species of *Sargassum* (Womersley 1981a).

6.2 South Australia

The most significant publications are those of Shepherd and Womersley (1970, 1971, 1976 & 1981), which described distributions of species at different depths at West Island, Pearson Island, St Francis Island and Waterloo Bay. A further paper details algal distributions in the Gulf of St Vincent (Shepherd & Sprigg 1976). Biomasses of various species were examined for correlations with several environmental variables, such as substrata, depth, light and movement of water.

Shepherd and Womersley (op cit. and reviewed by Womersley 1981b, Womersley & King 1990) concluded that there was a consistent pattern of sublittoral zonation on South Australian coasts with an upper, mid and lower sublittoral zone.

Upper: On wave-exposed coasts, the upper zone (to 3–5 m depth at the sites studied) was characterized by a dense turf, mainly of *Corallina* or *Haliptilon* spp. (mainly *H. roseum*). Just below the level of low tide was the ‘fringe zone’ with *Cystophora intermedia* and barnacles. Below this were turf-like *Gelidium asperum* with *Sargassum* spp. and *Homeostrichus sinclairii*. On less exposed coasts this band is only 1m broad. *Cystophora intermedia* disappears and is replaced by other species of *Cystophora* or other fucoid genera. With further lessening of surge, the zone is about 0.5 m broad with dense *Pterocladia* in the lower part.

Mid: The mid-zone—5–50 m depth (site-dependent, exclusive of upper and lower zones)—was dominated by the kelp *Ecklonia radiata* at the highest water movement, but at lesser exposure, *Scytothalia dorycarpa*, *Cystophora* spp., *Myriodesma* spp., and *Acrocarpia paniculata* were also present. On calmer coasts, this zone of brown algae comes to the lower tide level, with no coralline algal mat.

Lower: The lower zone—17–57 m depth (site-dependent, exclusive of mid-zone)—below the zone of larger brown algae, was described as consisting of a dense cover of diverse red algae, including *Plocamium* spp.

The limits to these zones are determined largely by physical factors of wave surge and light availability. With an increase in wave action, the lower limit of the upper sublittoral increases. The bottom of the second zone, the mid-sublittoral, is set by light limitation of the larger brown algae.

Studies are currently under way in South Australia to determine bioregionalization as part of the Ocean Rescue 2000 program (Edyvane, pers. comm.) and some of the processes determining macroalgal distributions are being investigated at the University of Adelaide.

6.3 Victoria

Much of the Victorian work is limited to Port Phillip Bay and is reviewed in Light and Woelkerling (1992). In 1966, Womersley published species lists for Port Philip Bay in the most comprehensive study to date. Species counts were reduced compared to outside the Bay, and Womersley attributed this mostly to the lack of hard substrate in the Bay. Other factors were believed to be the relatively shallow water of the Bay, more variable and often higher water temperatures, more suspended matter and a greater level of pollution from shipping and from the city of Melbourne.

One of the more prevalent genera was *Caulerpa* spp. (principally *C. remotifolia*), which attaches to soft substrata and is widely distributed about the Bay. Womersley described the general distributions of attached macroalgae within the Bay as follows:

- Fairly general within the Bay: *Ulva lactuca*, *Caulerpa remotifolia*, probably *Codium harveyi*, *Cutleria multifida*, *Soleria robusta*, *Griffithsia teges*, *Wrangelia protensa*, *Polysiphonia cancellata*, *Dictymenia harveyana*, *Laurencia filiformis*
- Around the Bay, excluding the central Bay and very calm western areas: *Caulerpa brownii*, *Dictyopteris muelleri*, *Ecklonia radiata*, *Cystophora retroflexa*, *Sargassum paradoxum*, *S. verruculosum*.

Brown et al. (1980) reported the subtidal reef community in the Werribee region was dominated by the green alga *Caulerpa remotifolia*, *Caulerpa longifolia*, *Ulva lactuca* and various red algae and crustose coralline algae. Brown et al. (1980) noted the absence of large brown algae of the Laminariales (*Ecklonia radiata*) and Fucales (*Caulocystis cephalornithos*, *Sargassum* spp., *Cystophora* spp.). These algae feature prominently on the subtidal reefs elsewhere in Port Phillip Bay, including Williamstown, St Leonards, Corio Bay (King et al. 1971), Altona and Portarlington (Spencer 1972), Hobsons Bay (O'Brien 1975).

Lewis (1975) recognized five communities occurring on a reef at Gloucester Reserve in Williamstown: a *Corallina officinalis–Rhodymenia australis* community; the *Caulerpa* community; the *Sargassum* community; the *Ecklonia* community; and a sand-patch community.

In a study of algal communities associated with mangrove ecosystems of Victoria, Davey and Woelkerling (1980) recorded *Enteromorpha clathrata* and *Ulva lactuca* attached to pneumatophores of *Avicennia marina* at Kororoit Creek, Hobsons Bay.

More recent surveys done as ground-truthing for the remote sensing of Port Phillip Bay trials include those of Rollings et al. (1993) and Chidgey and Marshall (1994). Communities described in these studies were consistent with those described already for Port Phillip Bay.

Outside of Port Phillip Bay, some subtidal work has been conducted at Black Rock between Torquay and Ocean Grove. *Macrocystis angustifolia* (shallow) and *Ecklonia radiata* were described as being the community dominants. Other common algae were *Sargassum* spp. (*S. distichum*, *S. fallax* and *S. vestitum*), *Cystophora* spp., *Cheilosporum sagitatum*, *Corallina officinalis* and *Plocamium* spp. (Ashton et al. 1992).

Studies have been conducted concerning 'Bull Kelp', or *Durvillaea potatorum*, in Victoria, King Island and Tasmania by researchers based at Monash University. These include publications by Cheshire and Hallum (1989) concerning aspects of the alga's morphology and estimates of the productivity (Rolley 1980, Hons thesis). This alga is a prominent marker of the upper sublittoral and has a distribution from Cape Jaffa in South Australia east to Bermagui in New South Wales and around Tasmania (Womersley 1984).

The Land Conservation Council (1993) made a qualitative assessment of subtidal algal distributions in Victorian waters. Shallow (0–10 m) wave-exposed waters were described as having extensive beds of *Durvillaea potatorum* (0–5 m) and *Phyllospora comosa*, whereas in sheltered waters *Ecklonia radiata* dominates. Small beds of the southern giant kelp *Macrocystis angustifolia* occur in moderately sheltered localities. *Sargassum*, *Cystophora* and *Caulocystis* prefer sheltered reefs of shallow to moderate depths.

6.4 Tasmania

In Tasmania, Sanderson and Thomas (1987) and Edgar (1983a) have done quantitative studies of subtidal macroalgae in the D'Entrecasteaux Channel. Sanderson and Thomas found community composition to vary depending primarily on exposure to wave action.

At the sheltered site, they found the shallow (< 3 m) waters dominated by fucoids, including *Cystophora* spp., *Caulocystis cephalornithos* and *Acrocarpia panniculata*. In deeper waters, *Ecklonia* and *Sargassum* spp. became more prominent, and at the sand edge *Caulerpa* spp. and seagrass species were common.

In moderately wave-exposed sites in shallow waters, *Phyllospora comosa* and *Lessonia corrugata* are common. *Macrocystis pyrifera* is prevalent in mid-water depths (3–15 m) as a canopy over *Ecklonia radiata*.

In more wave-exposed waters, *Durvillaea potatorum* dominates the shallow waters, with some *Xiphophora gladiata* overlaying a coralline-algal covered substratum. *Phyllospora comosa* occupies the next zone down, and *Ecklonia radiata*, *Cystophora* spp. and *Sargassum* spp. are deeper still.

The patterns determined by Sanderson and Thomas (1987) show similarities to the three zones described by Shepherd and Womersley (1970, 1971, 1976, 1981) for South Australian waters. The turfing algae present in shallow waters in South Australia are, however, replaced by *Durvillaea potatorum* and *Phyllospora comosa*, and *Macrocystis pyrifera* is often present in deeper (5–20 m depth) waters in Tasmania. The genera *Cystophora* and *Sargassum* are common in both States but actual species complements differ.

Edgar (1984a) described a generalized distribution of algae for the whole of Tasmania, but did not attribute much difference between the north and south coasts. In other reports, however, he notes conspicuous algae on the north coast (Strezlecki National Park), including *Macrocystis angustifolia, Seirococcus axillaris* and *Scaberia agardhii* which are not present or are rare in the south of Tasmania (Edgar 1981). In a later report, also for National Parks, Edgar (1984b) described the subtidal vegetation of the Kent Group. This mentions the predominantly mainland Australian species, *Cystophora monilifera, C. subfarcinata* and the seagrass *Posidonia australis* as being well established.

Sanderson (1990) described the community at George III Reef in the south of Tasmania as having a zone of *Durvillaea potatorum* to 3 m, followed by *Phyllospora comosa* to 5 m and the rest of the reef to 15 m depth as a red algal association with sparse distribution of *Ecklonia radiata* and occasional periodic cover of *Macrocystis pyrifera*. At a site at Bicheno on Tasmania's east coast, *Durvillaea potatorum* was described as being the dominant alga to 2 m depth, followed by a mixed *Ecklonia–Phyllospora comosa* association to 11 m. Below this depth *Ecklonia* dominates to 20 m. *Macrocystis pyrifera* forms occasional cover over this. The cover of *Macrocystis pyrifera* was found to vary greatly on a seasonal basis and between years at both sites. This was attributed to large-scale oceanographic factors including the presence or absence of the East Australian Current on the east coast of Tasmania.

For the red algal community at George III Reef, Sanderson (1990) found many similarities to the red algal community studied by Shepherd (1979, 1981) at Cape Northumberland. Common major species for

both sites were *Plocamium* spp. (*P. dilatatum* and *P. angustum*), *Sonderopelta* and *Callophyllis* spp. Major differences were the greater quantities of *Caulerpa flexilis, Thamnoclonium dichotomum* and *Ptilonia australasica* at George III Reef, and *Nizymenia australis, Hymenena affinis* and *Myriogramme pristoidea* at Cape Northumberland.

Long-term studies are currently under way in Tasmania to examine the effects of the introduction of marine parks. These studies incorporate seasonal and longer term variation in numbers and percentage cover of subtidal plants and animals.

6.5 New South Wales

The flora at a subtidal location near Jervis Bay was monitored by May and Larkum (1981) for a period of five years (1974–1979). In areas exposed to more wave action, May and Larkum noted that the large algae common in the area (*Ecklonia radiata* and *Phyllospora comosa*) were restricted to deep water below an upper turf zone. At a site in calm water, the mid-zone extended up to the level of low tides. May and Larkum (1981) concluded that storms were the controlling factors for sizes and densities of kelp-forests and caused heterogeneous distributions of turfing and larger species. They also considered that studies shorter than two years would be unlikely to indicate reliably the amount of temporal variability in subtidal systems.

In a study in Botany Bay, van der Velde and King (1984) determined vegetation profiles of subtidal reefs where they identified three zones. There was an upper zone of *Corallina, Zonaria, Sargassum* and only juvenile *Ecklonia radiata*; a mid-zone dominated by *Ecklonia*, with some of the previous species and a great cover of encrusting coralline algae; and a lower zone of filamentous red algae overlapping with erect sponges and corals in deeper water. They also noted clumps of filamentous algae (largely *Polysiphonia* and *Hinksia*) and the presence of ‘white rock’—areas dominated by sea urchins and lacking filamentous turfing algae. Van der Velde and King (1984) noted that the habitat contained a mosaic of patches of smaller algae and mature kelps, which they considered was caused by storms removing the older, well-established plants. In deeper waters they reported an increase in patchiness which was attributed to the action of herbivores, principally *Centrostephanus rodgersii*. Farrant and King (1982) found similar vegetation profiles along four transects in Port Jackson (Sydney).

An algal bed in Sydney Harbour was described by Kennelly (1983), who provided a vegetation map and a profile of a kelp bed. *Ecklonia radiata* produced a canopy over an under-storey of encrusting species, with patches of turfing algae (mostly *Zonaria* and *Lobophora*) in clearings amongst the canopy. These clearings were believed to be the result of storms that removed the mature *Ecklonia*.

Kennelly and Larkum (1983) included an examination of seasonal variation in early colonization on artificial substrata within an *Ecklonia radiata* community. *Hinksia mitchelliae* had a peak of colonization in October and April. Species of Ulvales showed peaks and troughs in rates of settlement in autumn and winter, and had only limited colonization in summer. Diatoms settled at the fastest rates in winter whereas *Polysiphonia* species were the most abundant in spring and autumn. *Ecklonia radiata* colonized at its fastest rate in summer, whilst *Zonaria* and *Lobophora* were most abundant colonists in summer but scarce at other times of the year.

Fletcher (1987) described a Cape Banks habitat as having extensive areas of rocky substrata composed of boulders from 1–10 sq m in area. These boulders were mainly covered by encrusting algae of the genera *Lithothamnion, Melobesia* and *Neogonolithon*. Also occurring were large foliose algae (*Ecklonia radiata* and *Sargassum* spp.) and turfing algae *(Zonaria* spp. and *Corallina* spp.).

In a wide-ranging study of subtidal marine assemblages of the New South Wales coast, Underwood et al. (1991) described the shallow subtidal areas of rocky reefs in central and southern New South Wales as a mosaic of habitats, the distribution of which is seemingly related to depth, wave exposure and a number of biological processes, particularly herbivory. The fringe habitat is generally found only in the most shallow waters. Forests of *Ecklonia radiata* are often found at intermediate depths. In deeper or more sheltered water, sponges, ascidians and red algae are more abundant and the numbers of sea urchins and other invertebrate grazers decline. Overlying this broadbrush pattern are patches of crustose coralline algae (‘Barrens’ habitat) the distribution of which is not clearly related to depth.

Invertebrate herbivores, sea urchins in particular, are abundant in the Barrens habitat. The Barrens habitat was most represented at the more southern locations. At two northerly locations, reefs were shorter in length and dominated by ascidians.

Chidgey (1987, MSc thesis) noted in a study of the algae of the Solitary Islands offshore from Coffs Harbour that the diversity decreases with distance from the mainland. The islands have a mixture of tropical and temperate species. *Ecklonia radiata* is abundant on the mainland and near-shore islands but is absent from the offshore islands, and some tropical species are common on the islands (including some recorded in Japan) but not on the adjacent mainland. This phenomenon was attributed to the East Australian Current. The distribution of algal species here parallels that of the corals and fish and would seem to indicate the proximity of the northern limit of temperate coastal waters. The northernmost limit of *Ecklonia*, an alga that may be considered to be an indicator of temperate waters, is believed to be Double Island Point (Kirkman, pers. comm.), just north of Noosa Heads.

The presence of 'Barrens' is a consistent observation in New South Wales coastal waters. Van der Velde and King (1984) noted the presence of 'white rock' at their site in Botany Bay and discussed whether this should be classed as a further assemblage, albeit with much reduced species richness. 'White rock' consists of encrusting coralline-covered substrata. These areas are claimed to be maintained by the actions of herbivores, principally *Centrostephanus rodgersii*.

Andrew (1991, 1993) monitored the recovery of reef bottom after loss of *C. rodgersii* due to mass mortality. Filamentous algae, *Sargassum* spp. and *Ecklonia radiata* returned to the areas. Fletcher (1987) found patches of 'white rock' around crevices containing *C. rodgersii*. With increasing distance from the crevices, the composition of the algal assemblages changed from one dominated by crustose species to one in which foliose algae were more abundant. Millar and Kraft (1994a) claim that *C. rodgersii* 'is presently besieging our coast of NSW'. Abalone divers in New South Wales are concerned that *C. rodgersii* is taking habitat away from their prey, thus significantly reducing total catches (Andrew, pers. comm.).

Numbers of *C. rodgersii* are apparently increasing on the east coast of Tasmania (Edgar, pers. comm., pers. obs.). It has been postulated that this may be occurring as a result of the impact of the East Australian Current in 1987 on the coast of Tasmania and the transport of *C. rodgersii* larvae. Barren areas have already resulted from this urchin in Tasmania where before 1987 there were none.

6.6 General

The gaps in the data regarding macroalgal assemblages are plain. The available literature stretches across a span of quantitative and qualitative literature. The most detailed and realistic work is that conducted in South Australia. This is the only part of Australia where a consistent systematic approach has been applied.

The division of the sublittoral into upper, mid and lower zones has been a common finding for a number of studies at widely separated sites, in South Australia (Shepherd & Womersley 1970, 1971, 1976 & 1981) the D'Entrecasteaux Channel, Tasmania (Sanderson & Thomas 1987) and in New South Wales (Farrant & King 1982; Van der Velde & King 1984). Kennelly (1995) warns of the danger of trying to force macroalgal distributions into a generalized scheme.

Underwood and Kennelly (1990) comment on the lack of quantitative studies. Real differences between any biophysical regions cannot be determined without extensive and accurate data; future studies should also take into account seasonal and temporal variation.

Of some concern also is the validity of determining areas of maximum species diversity based on surveys done within limited time frames. May and Larkum (1981) found very different species complements from year to year at a wave-exposed sites at Jervis Bay. Engler (1984) found *Cystophora* spp. replaced *Ecklonia radiata* when *Ecklonia* was cleared after storms in South Australia. Sanderson (1990) found beds of *Macrocystis pyrifera* at a fraction of levels determined in 1954 (Cribb 1954). Millar and Kraft (1993, 1994a, 1994b) note that many species formerly recorded for Lord Howe Island are no longer found there and 'Barren' areas appear to be becoming more prevalent on the Tasmanian coast. These are long-term trends which are not accommodated within usual time frames of experimental studies.

Two macroalgal groups long thought of as being more indicative of tropical waters have proven to be common throughout temperate Australia as well.

These are brown algae in the Dictyotales and green algae of the Caulerpales. These groups, along with algae such as *Sargassum* spp., *Turbinaria* spp., *Halimeda* spp. and many red algae, have long been considered typically tropical. The prominence of the Dictyotales and Caulerpales in temperate waters is masked by the abundance of many other species of algae, especially the high biomass of algae in the Fucales and Laminariales. The Caulerpales in particular have high species numbers and biomass in temperate waters of southern Australia.

This review indicates that there are many sections of the Australian coast that have been studied only sporadically, if at all, with respect to macroalgal ecology. These include the Victorian coast, west Tasmanian coast and southern Western Australian coast. There are considerable opportunities for research on the occurrence, growth biomass and productivity of subtidal algal communities on temperate Australian coasts, and the contribution they make to their ecosystems.

Most studies defining macroalgal assemblages and their distributions in Australia have been baseline research for marine reserve planning and management or studies of proposed or existing impacts of human development and industrialization on marine habitats. This review is only a brief survey and more value would be gained by more intensively analyzing quantitative papers. There is a demand for more such studies, however, before results become meaningful, preferably with an Australia-wide theme to provide a consistency of approach.

7 Areal extent of macroalgal assemblages

Significant work on the areal extent of macroalgal assemblages in Australia has not been conducted until relatively recently. This is because the cost is high and there is little immediate commercial gain. With mounting interest in the environment, the use of computers for data management, aerial and satellite pictures and mapping of algal communities is becoming a reality.

In the western half of Australia, CSIRO have mapped underwater features at a scale of 1:100 000 from Exmouth, Western Australia, to Victor Harbor, South Australia. The regions are at different stages of completion, but all of South Australia will be completed by December 1995.

The areas have been divided into eight categories:

1. Patchy seagrass
2. Sparse seagrass
3. Medium seagrass
4. Dense seagrass
5. Bare sand
6. Flat limestone reef
7. Heavy reef (limestone reef with vertical relief)
8. Granite reef.

Coastal South Australia and Western Australia have been ‘ground truthed’ (underwater features checked against satellite photographs). Some of the satellite images show algal reef down to 50 m in Geographe Bay.

The flat limestone reef in Western Australia is proving to be of interest as it is more extensive than previously considered. It supports principally *Dictyopteris* spp., *Scaberia agardhii* and *Sargassum* spp. In Western Australia, the heavy reef is dominated by *Ecklonia radiata*, *Scytothalia dorycarpa*, and in South Australia, *Cystophora* spp., *Caulerpa* spp. and *Scytothalia dorycarpa* (Kirkman, pers. comm.).

Previous estimates of kelp bed cover in Western Australia have been limited to an estimate of areal extent of kelp beds around Perth to calculate the nitrogen budget of the coastal ecosystem (Paling 1991).

In Victoria, there has been some experimental work done with CASI, an aerial means of photographing the ocean. Pictures are analyzed for different wavelengths and related to vegetation or other features on the sea-floor. Preliminary ground-truthing has been done and the results are consistent with algal assemblages as determined previously (Chidgey & Marshall 1994; Rollings et al. 1993).

Other areal surveys include that of McShane et al. (1986), who mapped the abalone supporting reefs of Victoria, and that of Sanderson (1987), who mapped the extent of *Macrocystis pyrifera* beds in Tasmania.

The work of Sanderson (1987) has shown a large reduction in the area of the *Macrocystis pyrifera* beds since Cribb’s survey of 1954. This was related to a number of factors, but changes in oceanographic

currents were considered to be the principal cause. Other possible causes are:

- disturbing the substrate through dredging for scallops in the 1950s. This has resulted in the silting up of inshore reef areas that were formerly colonized by *M. pyrifera* forests.
- increasing sediment load in coastal waters as a result of land clearing and wood-chipping
- increase in boat traffic which cuts off growing fronds
- the over-fishing of rock lobster which are believed to feed on sea urchins. This has led to an increase in sea urchins which then feed on *M. pyrifera*.
- the commercial harvesting of *M. pyrifera* in the early 1970s
- the recent introduction of *Undaria pinnatifida* (a Japanese seaweed thought to have been introduced through ballast waters) which occupies a similar ecological niche to *M. pyrifera* and is thus a potential competitor.

Mapping of marine vegetation has the potential to be an important indicator for the state of the environment. It is important that any mapping done using aerial means (satellite imagery, aerial photography) is backed up with adequate ground-truthing.

8 Blooms of macroalgae in temperate Australian coastal waters

Perhaps the best known site of macroalgal bloom problems is the Peel–Harvey estuary in Western Australia about which there is an extensive list of publications. Some of these are listed in Hodgkin et al. (1985). The problem was first investigated in 1976. The macroalgae were predominantly *Chaetomorpha* sp., *Enteromorpha* sp. and *Cladophora* sp. In 1980, the blue green alga *Nodularia* first bloomed, compounding the problem. Over the years a number of solutions have been proposed: more effective flushing of the estuary and limiting nutrient input are recognized as priorities that are presently being considered and addressed.

Two other similarly affected estuaries in Western Australia are the Princess Royal and Oyster harbours near Albany. Blooms of macroalgae have smothered seagrasses, causing die-off. The principal macroalgal species here are *Cladophora* sp. and *Enteromorpha* sp. In both the Peel–Harvey system and the Albany estuaries, algal harvesting has relieved the problem resulting in thousands of harvested tonnes (Simpson & Masini 1990). No use has been found for this alga and it is dumped (Kirkman, pers. comm.).

In South Australia, Connolly (1986) describes the abundance and distribution of *Ulva* directly off the Bolivar Sewage outfall in Barker Inlet and discusses alternative waste disposal methods for the plant at Bolivar to alleviate the problem. These solutions include: using more effluent for irrigation of crops, ameliorating the high salinity of the effluent, piping the effluent further offshore, and further filtration of secondarily treated effluent to remove incorporated nutrients.

Blooms of *Ulva* have been implicated in the die-off of the Grey Mangrove, *Avicennia marina*, off metropolitan Adelaide (Edyvane 1991).

Smothering of seagrass by macroalgae is not an uncommon problem Australia-wide. Algal epiphytes have higher potential growth rates than seagrasses (Masini et al. 1990; Cambridge 1979; Cambridge et al. 1986) and Silberstein et al. (1986) have correlated seagrass decline to increases in epiphyte biomass. Neverauskas (1987a, 1987b, 1988) has related the shading effect of epiphytes to seagrass loss in the eastern Gulf St Vincent in South Australia. Epiphyte growth is enhanced in many of these areas due to nutrient enhancement from either sewage outlets or run-off from agricultural land. As macroalgae can utilize excess nutrients much faster than the seagrasses, blooms of them are evidence of likely eutrophication.

Loss of seagrass due to epiphyte loads has also occurred in Cockburn Sound in Western Australia, Westernport Bay in Victoria, Botany Bay in New South Wales and a number of New South Wales coastal rivers including the Georges, Clarence and Tweed (Shepherd et al. 1989).

In Tasmania, Buttermore (1977) reported blooms of algae in Orielton Lagoon due to eutrophication caused by impoundment (with in-flowing primary treated sewage!). This has recently been alleviated by opening the Lagoon to allow flushing (Mercury 1994).

In Tasmania a persistent bloom of red algae has been noted at Cloudy Bay on Bruny Island. This 'bloom' is a free-floating red alga consisting of the *Falkenbergia* stage of *Asparagopsis armata*. The alga colours a large area of the inshore part of the Bay and has done so on a continual basis for a number of years. There is no evidence to suggest this is anything other than a natural bloom and there is no obvious problem to anybody other than the local surfers (pers. obs.).

Smaller blooms are a regular occurrence in all States usually in late winter–early spring. These are largely 'naturally' derived and of minor nuisance value, although there have been no investigations as to whether they are of increasing frequency or whether or not they are occurring at more sites. Blooms of macroalgae have been recorded for the Swan River Estuary (WA EPA, pers. comm.), as have blooms of *Giffordia* and *Ulva* in South Australia (Connolly, pers. comm.), *Plocamium leptophyllum* and *Rhodymenia* spp. in Tasmania (pers. obs.), *Hinksia* (Campbell, pers. comm.), *Cladophora, Hinksia* and *Ceramium* (Brown et al. 1980) in Port Phillip Bay in Victoria, *Rhodymenia australis* in Jervis Bay and *Acrosorium venulosum* and *Asparagopsis armata* at other sites on New South Wales Coast (Millar, pers. comm.).

9 Introduced species of macroalgae

A potentially serious adventive is the Japanese kelp *Undaria pinnatifida*, introduced to Tasmania probably by wood-chip vessels (Sanderson 1988, 1990). Although a summer annual, the sporophytes (up to 1.5 m long) may well displace other algae in the upper sublittoral zone, and spread to other parts of southern Australia. Fishing activities have been implicated in the alga's translocation within Australia through entrapment in fishing nets and gear, via catches of abalone and urchins and on anchors (pers. obs.). A heightening of awareness of the presence of this alga in the waters concerned, including public education as to what the plant looks like and hygenic boating and fishing practises, would reduce the likelihood of transport by these avenues.

Another ecologically important adventive on the New South Wales coast is *Caulerpa filiformis*, a South African species that was first recorded from Botany Bay and Sydney Harbour in the early 1920s (May 1976) and which now covers extensive areas of the lower eulittoral on rock platforms as far north as Port Stephens.

Of concern is the introduction of macroalgae through the live aquarium trade. *Caulerpa taxifolia* has been identified being sold in aquarium shops in Perth, Western Australia (Kendrick, pers. comm.). *Caulerpa taxifolia* is invasive and recently became established in the French Riviera, Mediterranean Sea. In 1984, it escaped from aquaria at the Oceanographic Museum at Monaco and became established at Cape Martin. By late 1991, 30 hectares of subtidal habitat in the vicinity of Monaco was covered with the alga. In 1992, it was found in Majorca, 600 kilometres away. *Caulerpa taxifolia* smothers other algae and seagrasses (Meinesz et al. 1993). *Caulerpa taxifolia* is not eaten by fish due to high levels of toxins (Caulerpenes) within the algal thallus; thus fishes associated with other seagrasses and seaweeds do not occur in areas where it is common. While the threat of this particular alga to the marine environment may be limited in Australia, as *C. taxifolia* occurs naturally in tropical Australia and we already have many species of *Caulerpa* with similar characteristics, the possible threat of species being introduced through the aquarium trade, not only macroalgae but animals as well, needs to be more highly publicized and better controlled.

Several northern hemisphere species have been found near Australian ports (e.g. *Arthrocladia villosa, Asperococcus compressus, Antithamnion spirographidis, Polysiphonia brodiaei, P. pungens, Schottera nicaeenis, Stictyosiphon soriferus* and *Mediothamnion lyalli*) and may have well come on ships hulls or in ballast waters (Womersley 1990; Lewis 1983).

Also noteworthy are a few deep-water Mediterranean taxa of Phaeophyta which have been collected (Womersley 1987) in South Australia (e.g. *Discosporangium mesarthocarpum, Sphacella subtilissima* and a species of *Zosterocarpus*).

A relatively recent introduction, a red alga—*Schottera nicaeensis*—first recorded in Port Phillip Bay in 1972, is now recorded from every port or harbour in south-eastern Australia.

Transportion by shipping is not the only means of dispersal. Other methods include ocean currents but this is unlikely to occur through the temperature

barrier of the tropics. Spread by migratory sea birds may be effective in rare cases.

A more thorough knowledge of distributions and occurrences of macroalgae around Australia would possibly indicate many more introductions.

Introductions of algae from Australia overseas have been reported to have occurred. Womersley (1990) lists algae that have been transferred from Australia to overseas.

Millar and Kraft (1993, *Sydney Morning Herald*, 20 August 1994) have published on the first believed macroalgal extinction, that of *Vanvoorstia bennettiana*. It was collected by W.H. Harvey and C. Moore between Shark Island and Point Piper in Port Jackson in 1855, and this distinctive species has not been found since in any of the recent and intensive collections. It may have disappeared as a result of human activities such as heavy shipping traffic, dredging and urban runoff, all of which have caused heavy siltation.

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Key to common abbreviated titles of journals and proceedings

AMSA Bull.	Australian Marine Science Association Bulletin
Aquat. Bot.	Aquatic Botany
Aust. J. Bot.	Australian Journal of Botany
Aust. J. Bot. Suppl.	Australian Journal of Botany Supplement
Aust. J. Ecol.	Australian Journal of Ecology
Aust. J. Mar. Freshw. Res.	Australian Journal of Marine Freshwater Research
Aust. Syst. Bot.	Australian Systematic Botany
Bot. Mar.	Botanica Marina
Bot. Mongr.	Botanical Monographs
Bot. Rev.	Botanical Review
Br. Phycol. J.	British Phycological Journal
Est. Coast. Shelf Science	Estuarine and Coastal Shelf Science
J. Ecol.	Journal of Ecology
J. Exp. Mar. Biol. Ecol.	Journal of Experimental Marine Biology and Ecology
J. Phycol.	Journal of Phycology
Mar. Biol.	Marine Biology
Mar. Ecol. Prog. Ser	Marine Ecology Progress Series
Mar. Poll. Bull.	Marine Pollution Bulletin
Mem. Nat. Mus. Vict.	Memoirs of the Natural Museum of Victoria
Oceangr. Mar. Biol. Ann. Rev.	Oceanography and Marine Biology an Annual Review
Pap. Proc. R. Soc. Tas.	Proceedings of the Royal Society of Tasmania
Proc. 5th Int. Coral Reef Cong. Tahiti	Proceedings of the 5th International Coral Reef Congress, Tahiti
Proc. Int. Seaweed Symp.	Proceedings of the International Seaweed Symposium
Proc. Linn. Soc. NSW	Proceedings of the Linnean Society of NSW
Proc. Malac. Soc. Lond.	Proceedings Malacological Society London
Proc. Roy. Soc. Vict.	Proceedings of the Royal Society of Victoria
Rec. S. Aust. Mus.	Records of the South Australian Museum
Revue Algol.	Revue Algologique
Trans. R. Soc. S. Aust.	Transactions of the Royal Society of South Australia

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Appendix 1: Species distributions by CONCOM region from the literature

Key to CONCOM regions

LWC	Lower West Coast
SWC	South West Coast
GAB	Great Australian Bight
SGC	South Gulfs Coast
BS	Bass Strait
TC	Tasmanian Coast
LEC	Lower East Coast
LHI	Lord Howe Island

Appendix 1A: Species distributions by CONCOM region from the literature: Chlorophyta

SPECIES	SOURCE	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Acetabularia calyculus	H & WR 90, M & K 94 b, W 84	X		X	X			X		X
Anadyomene brownii	H in p.	X								
Anadyomene stellata	W 84					X				
Apjohnia laetevirens	M & K 94 b, W 84,H & WR 90	X	X	X	X	X		X		
Avrainvillea calathina	M & K 94 b									X
Avrainvillea clavatiramea	H & WR 90, W 84	X	X	X	X	X				
Blidingia marginata	W 84		X	X	X					
Blidingia minima	M & K 94 b, W 84				X	X		X		
Boergesenia forbesii	M & K 94 b								X	
Boodlea composita	H in p., M & K 94 b	X								X
Bryopsis australis	H & WR 90, W 84	X	X	X	X					
Bryopsis foliosa	H & WR 90, W 84	X								
Bryopsis gemellipara	W 84			X	X	X	X			
Bryopsis indica	M & K 94 b							X	X	X
Bryopsis indica f. unilateralis	M & K 94 b							X		
Bryopsis macraildii	H & WR 90, W 84	X	X	X	X	X				
Bryopsis minor	W 84				X	X				
Bryopsis plumosa	H & WR 90, M & K 94 b, W 84	X	X	X	X	X	X	X	X	
Bryopsis vestita	M & K 94 b, W 84					X	X			X
Callipsygma wilsonis	H & WR 90, W 84	X			X	X	X			
Caulerpa alternans	W 84				X	X				
Caulerpa annulata	W 84					X	X			
Caulerpa brachypus	H & WR 90, M & K 94 b	X						X	X	X
Caulerpa brownii	M & K 94 b, W 84	X	X	X	X	X	X			X
Caulerpa cactoides	H & WR 90, M & K 94 b, W 84	X	X	X	X	X	X	X	X	
Caulerpa cliftonii	W 84	X	X	X	X	X				
Caulerpa cupressoides	H & WR 90, M & K 94 b, M & K 94 b	X								X
Caulerpa distichophylla	H & WR 90, W 84	X	X							
Caulerpa ellistoniae	H & WR 90, W 84	X	X	X	X					
Caulerpa fergusonii	H in p.	X								

Appendix 1A (continued): Species distributions by CONCOM region from the literature: Chlorophyta

SPECIES	SOURCE	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Caulerpa filiformis	M & K 94 b							X		
Caulerpa flexilis	H & WR 90, M & K 94 b, M & K 94 b, W 84	X	X	X	X	X	X	X		
Caulerpa flexilis var. muelleri	H & WR 90, W 84	X	X	X	X	X	X			
Caulerpa geminata	H & WR 90, W 84, M & K 94 b	X	X	X	X	X	X	X	X	
Caulerpa hedleyi	H & WR 90, W 84	X	X	X	X					
Caulerpa hodgkinsoniae	M & K 94 b								X	
Caulerpa lentillifera	H in p.	X								
Caulerpa longifolia	H & WR 90, W 84	X		X	X	X	X			
Caulerpa longifolia f. crispata	W 84	X	X	X	X	X	X			
Caulerpa obscura	H & WR 90, W 84	X	X	X	X	X	X			
Caulerpa papillosa	W 84		X	X	X	X				
Caulerpa peltata	M & K 94 b, M & K 94 b							X	X	X
Caulerpa racemosa	H in p., M & K 94 b	X								X
Caulerpa racemosa f.cylindracea	H & WR 90	X								
Caulerpa racemosa var. laetevirens	W 84	X	X							
Caulerpa remotifolia	W 84				X	X	X			
Caulerpa scalpelliformis	H & WR 90, M & K 94 b, W 84	X	X	X	X	X	X	X		
Caulerpa serrulata	H in p.	X								
Caulerpa simpliciuscula	H & WR 90, W 84	X	X	X	X	X	X			
Caulerpa simpliciuscula var. laxa	W 84				X	X				
Caulerpa taxifolia	M & K 94 b									X
Caulerpa trifaria	W 84	X	X	X	X	X	X			
Caulerpa verticillata	M & K 94 b								X	
Caulerpa vesiculifera	W 84	X	X	X	X	X				
Caulerpa webbiana	M & K 94 b									X
Caulerpa webbiana f. disticha	H in p.	X								
Caulerpa webbiana f. tomentella	H in p.	X								
Caulerpella ambigua	M & K 94 b									X
Chaetomorpha aerea	H & WR 90, M & K 94 b, W 84	X	X	X	X	X	X	X	X	

Appendix 1A (continued): Species distributions by CONCOM region from the literature: Chlorophyta

SPECIES	SOURCE	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Chaetomorpha antennina	M & K 94 b							X		X
Chaetomorpha billardierii	W 84		X	X	X	X	X			
Chaetomorpha capillaris	M & K 94 b, W 84				X	X		X		
Chaetomorpha coliformis	W 84			X	X	X	X			
Chaetomorpha indica	M & K 94 b, W 84		X	X	X	X	X			X
Chaetomorpha javanica	M & K 94 b									X
Chaetomorpha linum	M & K 94 b, W 84		X	X	X	X		X	X	
Chaetomorpha melagonium	M & K 94 b, W 84		X		X			X		
Chaetomorpha valida	M & K 94 b, W 84			X	X	X	X	X		
Chlorodesmis baculifera	W 84			X	X	X				
Chlorodesmis major	M & K 94 b							X	X	X
Cladophora aegagropiloidea	W 84				X					
Cladophora albida	H & WR 90, M & K 94 b, W 84	X	X	X	X	X	X	X		
Cladophora bainesii	W 84				X	X	X			
Cladophora chartacea	M & K 94 b							X		
Cladophora coelothrix	H 93, M & K 94 b, W 84	X	X	X	X	X		X	X	
Cladophora colabense	M & K 94 b									X
Cladophora crinalis	W 84			X	X	X	X			
Cladophora cymopoliae	M & K 94 b									X
Cladophora dalmatica	H & WR 90, W 84	X		X	X					
Cladophora dotyana	M & K 94 b									X
Cladophora feredayi	M & K 94 b, W 84	X	X	X	X	X	X	X	X	
Cladophora glomerata	M & K 94 b									X
Cladophora goweri	M & K 94 b									X
Cladophora hutchinsioides	M & K 94 b, W 84			X	X	X		X		
Cladophora laetevirens	M & K 94 b, W 84, H & WR 90	X	X	X	X	X		X		
Cladophora lehmanniana	H & WR 90, M & K 94 b, W 84	X	X	X	X	X	X	X		
Cladophora liebetruthii	M & K 94 b									X
Cladophora montagneana	W 84	X			X					
Cladophora nigrescens	M & K 94 b							X		

Appendix 1A (continued): Species distributions by CONCOM region from the literature: Chlorophyta

SPECIES	SOURCE	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Cladophora ohkuboana	M & K 94 b									X
Cladophora patentiramea	M & K 94 b									X
Cladophora pellucida	M & K 94 b							X		
Cladophora prolifera	H & WR 90, M & K 94 b, W 84	X	X	X	X	X		X		
Cladophora rhizoclonioidea	W 84, H & WR 90	X				X	X			
Cladophora rupestris	M & K 94 b									X
Cladophora ryukyuensis	M & K 94 b									X
Cladophora sericea	W 84			X	X	X	X			
Cladophora subsimplex	H & WR 90, M & K 94 b, W 84	X			X	X	X	X		
Cladophora vadorum	W 84					X				
Cladophora vagabunda	M & K 94 b, W 84	X	X	X	X	X	X	X		X
Cladophora valonioides	H & WR 90, W 84	X	X	X	X					
Cladophoropsis carolinensis	M & K 94 b									X
Cladophoropsis herpestica	H in p., M & K 94 b, W 84	X	X	X	X			X	X	X
Cladophoropsis magna	W 84			X						
Codium arabicum	M & K 94 b								X	X
Codium australicum	M & K 94 b, W 84	X	X	X	X	X	X	X		
Codium bulbopilum	H & WR 90, M & K 94 b	X								X
Codium capitulatum	W 84		X	X	X	X				
Codium dimorphum	W 84						X			
Codium duthieae	H & WR 90, W 84, M & K 94 b	X	X	X	X	X		X		
Codium extricatum	M & K 94 b							X		X
Codium fragile	W 84, M & K 94 b				X	X	X	X	X	
Codium galeatum	H & WR 90, M & K 94 b, W 84	X	X	X	X	X	X	X	X	
Codium harveyi	M & K 94 b, W 84	X	X	X	X	X	X	X		
Codium laminarioides	H & WR 90, W 84, H in p.	X	X	X						
Codium lucasii	H & WR 90, M & K 94 b, W 84	X	X	X	X	X		X	X	
Codium mamillosum	W 84	X	X	X	X	X				
Codium muelleri	H & WR 90, W 84	X	X	X	X	X				
Codium perriniae	H & WR 90, W 84	X	X	X	X	X				

Appendix 1A (continued): Species distributions by CONCOM region from the literature: Chlorophyta

SPECIES	SOURCE	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Codium platyclados	M & K 94 b									X
Codium pomoides	H & WR 90, W 84	X	X	X	X	X	X			
Codium saccatum	M & K 94 b							X	X	
Codium silvae	W 84			X						
Codium spinescens	H & WR 90, W 84	X	X	X						
Codium spongiosum	H & WR 90, M & K 94 b, W 84	X	X	X	X	X	X	X		X
Dasycladus densus	W 84		X	X						
Derbesia cf. marina	M & K 94 b							X	X	
Derbesia marina	W 84			X	X	X	X			
Derbesia tenuissima	M & K 94 b, W 84			X	X					X
Dictyosphaeria cavernosa	H in p., M & K 94 b	X								X
Dictyosphaeria sericea	H & WR 90, W 84	X	X	X	X	X				
Dictyosphaeria versluysii	H in p.	X								
Enteromorpha clathrata	H & WR 90, M & K 94 b, W 84	X	X	X	X	X	X	X		X
Enteromorpha compressa	H & WR 90, M & K 94 b, W 84	X	X	X	X	X	X	X	X	X
Enteromorpha flexuosa	M & K 94 b, W 84				X					X
Enteromorpha howensis	M & K 94 b									X
Enteromorpha intestinalis	M & K 94 b, W 84				X		X	X	X	
Enteromorpha linza	M & K 94 b, W 84				X	X	X	X		
Enteromorpha multiramosa	M & K 94 b									X
Enteromorpha paradoxa	W 84				X					
Enteromorpha prolifera	M & K 94 b, W 84				X	X	X	X		
Enteromorpha ralfsii	M & K 94 b, W 84				X					X
Entocladia viridis	M & K 94 b, W 84				X	X		X		
Halimeda copiosa	M & K 94 b									X
Halimeda cuneata	H & WR 90, M & K 94 b, W 84	X	X						X	
Halimeda discoidea	M & K 94 b								X	
Microdictyon umbilicatum	H & WR 90, M & K 94 b, W 84	X	X	X	X	X		X	X	X
Neomeris mucosa	M & K 94 b									X
Palmoclathrus stipitatus	W 84			X	X	X				

Appendix 1A (continued): Species distributions by CONCOM region from the literature: Chlorophyta

SPECIES	SOURCE	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Pedobesia clavaeformis	H & WR 90, M & K 94 b, W 84	X	X	X	X	X	X	X		
Penicillus nodulosus	H & WR 90	X								
Percursaria percursa	M & K 94 b, W 84				X	X		X		X
Pilinia novae–zelandiae	W 84			X	X	X	X			
Polyphysa parvula	M & K 94 b									X
Polyphysa peniculus	H & WR 90, W 84	X	X	X	X	X	X	X		
Prasiola crispa	W 84						X			
Prasiola stipitata	W 84					X				
Pseudochlorodesmis australis	M & K 94 b, W 84				X	X			X	
Pseudocodium australasicum	W 84		X	X						
Rhipilia pusilla	W 84				X					
Rhipiliopsis howensis	M & K 94 b									X
Rhipiliopsis multiplex	H & WR 90	X								
Rhipiliopsis peltata	M & K 94 b, W 84		X	X	X	X		X		
Rhipiliopsis robusta	W 84			X	X					
Rhizoclonium curvatum	W 84				X					
Rhizoclonium implexum	M & K 94 b, W 84			X	X	X		X		
Rhizoclonium riparium	M & K 94 b, W 84				X		X	X		X
Rhizoclonium tortuosum	W 84				X					
Rosenvingiella polyrhiza	W 84				X					
Siphonocladus tropicus	H & WR 90	X								
Spongocladia vaucheriaeformis	M & K 94 b									X
Sporocladopsis novae–zelandiae	M & K 94 b							X		
Struvea baterumensis	M & K 94 b							X		X
Struvea plumosa	H & WR 90, W 84	X	X	X	X					
Trichosolen hainanensis	M & K 94 b, H in p.	X						X		X
Ulothrix subflaccida	W 84				X	X				
Ulva australis	W 84	X	X	X	X	X	X	X		
Ulva fasciata	M & K 94 b, W 84				X			X	X	X
Ulva lactuca	H in p., M & K 94 b, W 84	X			X	X		X	X	X
Ulva laetivirens	M & K 94 b							X		

Appendix 1A (continued): Species distributions by CONCOM region from the literature: Chlorophyta

SPECIES	SOURCE	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Ulva rigida	H & WR 90, W 84, M & K 94 b	X			X	X		X	X	X
Ulva spathulata	W 84	X	X	X	X	X		X		
Ulva taeniata	W 84			X	X	X	X			
Ulvaria oxysperma	M & K 94 b, W 84			X	X	X	X	X	X	
Ulvaria shepherdii	W 84			X	X					
Uronema marina	H & WR 90, M & K 94 b, W 84	X	X							X
Urospora pencilliformis	W 84						X			
Valonia macrophysa	H & WR 90, M & K 94 b	X							X	
Valoniopsis pachynema	M & K 94 b									X
Ventricaria sp. as Valonia forbesii	M & K 94 b									X
Wittrockiella salina	M & K 94 b, W 84, X				X	X	X	X		

Appendix 1B: Species distributions by CONCOM region from the literature: Phaeophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Acinetospora crinita	M & K 94 a, W 87				X	X		X		
Acrocarpia paniculata	M & K 94 a, W 87			X	X	X	X	X		X
Acrocarpia robusta	W 87	X	X	X						
Acrotrichium amphiibolis	W 87				X					
Adenocystis utricularis	W 87						X			
Arthrocladia villosa	W 87				X					
Asperococcus bullosus	H & WR 90, M & K 94 a, W 87	X	X	X	X	X	X	X		
Asperococcus compressus	W 87					X				
Asperococcus fistulosus	W 87				X	X	X			
Asteronema ferruginea	W 87					X	X			
Austronereia australis	H & WR 90, M & K 94 a, W 87	X	X	X	X	X	X	X		X
Bachelotia antillarum	M & K 94 a, W 87			X	X	X	X	X	X	X
Bellotia eriophorum	W 87			X	X	X	X			
Carpoglossum confluens	W 87			X	X	X	X			
Carpomitra costata	M & K 94 a, W 87				X	X	X	X		
Caulocystis cephalornithos	M & K 94 a, W 87	X	X	X	X	X	X	X		
Caulocystis uvifera	H & WR 90, M & K 94 a, W 87	X	X	X	X	X	X	X		
Chlanidophora microphylla	W 87			X	X	X				
Chnoospora implexa	M & K 94 a									X
Chnoospora minima	M & K 94 a							X	X	
Chordaria cladosiphon	W 87					X	X			
Cladosiphon filum	M & K 94 a, W 87	X	X	X	X	X	X	X		
Cladosiphon vermicularis	H & WR 90, M & K 94 a, W 87	X		X	X	X	X	X		
Cladostephus spongiosus	H & WR 90, M & K 94 a, W 87	X	X	X	X	X	X	X		
Colpomenia ecuticulata	M & K 94 a, W 87					X				X
Colpomenia peregrina	H & WR 90, M & K 94 a, W 87	X	X	X	X	X	X	X	X	
Colpomenia sinuosa	H & WR 90, M & K 94 a, W 87	X	X	X	X	X	X	X	X	X

Appendix 1B (continued): Species distributions by CONCOM region from the literature: Phaeophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Corynophlaea cristata	W 87			X	X					
Corynophlaea cystophorae	H & WR 90, M & K 94 a, W 87	X	X	X	X	X	X	X		
Cutleria mollis	M & K 94 a									X
Cutleria multifida	H & WR 90, M & K 94 a, W 87	X	X	X	X	X	X	X		
Cystophora botryocystis	W 87	X	X	X	X	X				
Cystophora brownii	H & WR 90, W 87	X	X	X	X	X				
Cystophora congesta	W 87			X	X	X	X			
Cystophora cuspidata	W 87			X	X	X	X			
Cystophora cymodoceae	W 87					X				
Cystophora expansa	M & K 94 a, W 87	X	X	X	X	X		X		
Cystophora gracilis	W 87	X	X	X	X					
Cystophora grevillei	H & WR 90, W 87	X	X	X	X	X	X			
Cystophora harveyi	W 87	X	X							
Cystophora intermedia	W 87			X	X	X				
Cystophora monilifera	H & WR 90, M & K 94 a, W 87	X	X	X	X	X		X		X
Cystophora moniliformis	M & K 94 a, W 87	X	X	X	X	X	X	X		X
Cystophora pectinata	W 87	X	X	X	X	X				
Cystophora platylobium	M & K 94 a, W 87			X	X	X	X	X		
Cystophora polycystidea	M & K 94 a, W 87		X	X	X	X		X		
Cystophora racemosa	W 87	X	X	X	X	X				
Cystophora retorta	M & K 94 a, W 87	X	X	X	X	X	X	X		
Cystophora retroflexa	M & K 94 a, W 87				X	X	X	X		
Cystophora siliquosa	W 87	X	X	X	X	X				
Cystophora subfarcinata	W 87	X	X	X	X	X	X			
Cystophora tenuis	W 87	X	X							
Cystophora torulosa	W 87					X	X			
Cystophora xiphocarpa	W 87					X	X			
Cystoseira trinodis	H & WR 90, M & K 94 a, W 87	X	X	X	X			X	X	X
Desmarestia ligulata	W 87					X	X			
Dictyopteris acrostichoides	M & K 94 a, W 87					X		X	X	

Appendix 1B (continued): Species distributions by CONCOM region from the literature: Phaeophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Dictyopteris australis	H & WR 90, M & K 94 a, W 87	X	X	X	X					X
Dictyopteris crassinervia	M & K 94 a									X
Dictyopteris delicatula	M & K 94 a									X
Dictyopteris gracilis	W 87				X					
Dictyopteris muelleri	H & WR 90, W 87	X	X	X	X	X	X	X		
Dictyopteris nigricans	W 87				X	X	X			
Dictyopteris plagiogramma	H & WR 90, M & K 94 a	X								X
Dictyopteris repens	M & K 94 a									X
Dictyota acutiloba	M & K 94 a								X	X
Dictyota alternifida	M & K 94 a, W 87			X	X	X		X	X	
Dictyota bartayresii	M & K 94 a							X	X	X
Dictyota bartayresii var. plectens	M & K 94 a									X
Dictyota ciliolata	H & WR 90	X								
Dictyota dichotoma	H & WR 90, M & K 94 a, W 87	X	X	X	X	X	X	X	X	X
Dictyota diemensis	W 87			X	X	X	X			
Dictyota divaricata	H in p., M & K 94 a	X							X	X
Dictyota fenestrata	W 87					X	X			
Dictyota furcellata	H & WR 90, W 87	X	X	X	X	X				
Dictyota naevosa	H & WR 90, W 87	X	X	X	X					
Dictyota prolifera	H & WR 90, W 87	X	X	X	X	X				
Dilophus angustus	W 87			X	X	X				
Dilophus crinitus	H & WR 90, W 87	X								
Dilophus fastigiatus	H & WR 90, W 87	X	X	X	X	X				
Dilophus gunnianus	W 87			X	X	X				
Dilophus intermedius	M & K 94 a							X	X	X
Dilophus marginatus	M & K 94 a, W 87				X	X		X	X	X
Dilophus robustus	H 93, W 87	X	X	X	X	X				
Dilophus tener	W 87			X	X	X				
Discosporangium mesarthrocarpum	W 87				X					
Distromium decumbens	M & K 94 a								X	
Distromium didymothrix	M & K 94 a									X
Distromium flabellatum	H & WR 90, M & K 94 a, W 87	X	X	X	X	X		X		

Appendix 1B (continued): Species distributions by CONCOM region from the literature: Phaeophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Distromium multifidum	W 87		X	X	X	X				
Durvillaea potatorum	M & K 94 a, W 87					X	X	X		
Ecklonia radiata	H & WR 90, M & K 94 a, W 87	X	X	X	X	X	X	X	X	
Ectocarpus fasciculatus	W 87				X	X	X			
Ectocarpus siliculosus	H & WR 90, M & K 94 a, W 87	X	X	X	X	X	X	X		
Elachista australis	W 87					X	X			
Elachista claytoniae	W 87					X				
Elachista orbicularis	M & K 94 a, W 87, H & WR 90	X			X			X		
Encyothalia cliftonii	H & WR 90, W 87	X	X	X	X	X				
Endarachne binghamiae	M & K 94 a							X	X	
Feldmannia globifera	W 87			X	X	X	X			
Feldmannia irregularis	H & WR 90, M & K 94 a, W 87	X	X	X	X	X		X	X	X
Feldmannia lebelii	M & K 94 a, W 87				X	X	X			X
Feldmannia paradoxa	W 87			X	X	X				
Feldmannia simplex	M & K 94 a									X
Flabellonema codii	W 87			X	X					
Giraudia robusta	H & WR 90, W 87	X	X	X	X	X				
Giraudia sphacelarioides	H & WR 90, W 87	X	X	X	X	X	X			
Glossophora nigricans	H & WR 90, W 87	X	X	X	X	X	X			
Gononema ramosum	W 87						X			
Halopteris funicularis	W 87			X	X	X	X			
Halopteris novae–zelandiae	W 87						X			
Halopteris paniculata	M & K 94 a, W 87				X	X	X	X		X
Halopteris platycena	M & K 94 a, W 87				X	X		X		
Halopteris pseudospicata	M & K 94 a, W 87		X	X	X	X	X	X		
Halopteris ramulosa	W 87			X	X	X				
Halothrix ephemeralis	W 87				X	X	X			
Hapalospongidion capitatum	W 87		X							
Hecatonema maculans	W 87					X	X			
Hinksia granulosa	W 87			X	X	X	X			
Hinksia mitchelliae	W 87, H & WR 90, M & K 94 a	X	X	X	X	X	X	X	X	X
Hinksia ovata	W 87					X				
Hinksia sandriana	W 87, M & K 94 a				X	X		X		X

Appendix 1B (continued): Species distributions by CONCOM region from the literature: Phaeophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Hinksia sordida	W 87, M & K 94 a			X	X	X				X
Homoeostrichus canaliculatus	W 87				X	X				
Homoeostrichus flabellatus	M & K 94 a								X	X
Homoeostrichus olsenii	M & K 94 a, W 87					X	X	X	X	
Homoeostrichus sinclairii	M & K 94 a, W 87			X	X	X		X		
Hormophysa cuneiformis	H & WR 90, M & K 94 a	X						X		
Hormophysa triquetra	W 87	X						X		
Hormosira banksii	M & K 94 a, W 87		X	X	X	X	X	X	X	X
Hydroclathrus clathratus	H & WR 90, M & K 94 a, W 87	X	X	X	X	X		X	X	X
Kuckuckia spinosa	W 87				X	X	X			
Kuetzingiella sp.	W 87					X				
Leathesia difformis	M & K 94 a, W 87			X	X	X	X	X		
Leathesia intermedia	W 87					X	X			
Lessonia corrugata	W 87					X	X			
Lobophora variegata	H & WR 90, M & K 94 a, W 87	X	X	X	X	X		X	X	X
Lobospira bicuspidata	H & WR 90, M & K 94 a, W 87	X	X	X	X	X		X		
Macrocystis angustifolia	M & K 94 a, W 87				X	X		X		X
Macrocystis pyrifera	W 87				X	X	X			
Mesogloiopsis tasmanica	W 87					X	X			
Myriactula arabica	W 87				X					
Myriactula caespitosa	W 87				X					
Myriactula filiformis	W 87				X					
Myriactula haydenii	W 87			X	X	X	X			
Myriodesma calophyllum	W 87			X	X	X	X			
Myriodesma harveyanum	W 87			X	X					
Myriodesma integrifolium	H & WR 90, W 87	X	X	X	X	X				
Myriodesma leptophyllum	W 87			X	X	X				
Myriodesma quercifolium	H in p., W 87	X	X	X	X					
Myriodesma serrulatum	W 87	X	X							
Myriodesma tuberosum	W 87			X	X					
Myriogloea sciurus	M & K 94 a, W 87			X	X	X	X	X		
Myrionema cf. corunnae	M & K 94 a									X
Myrionema incommodum	W 87						X			

Appendix 1B (continued): Species distributions by CONCOM region from the literature: Phaeophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Myrionema latipilosum	W 87				X					
Myrionema myriodesmae	W 87				X					
Myrionema ramulans	W 87				X	X	X			
Myrionema strangulans	M & K 94 a, W 87				X	X	X			X
Myriotrichia clavaeformis	W 87				X	X				
Nemacystis decipiens	M & K 94 a									X
Nemacystis novae–zelandiae	H & WR 90, W 87	X	X	X	X	X				
Nereia lophocladia	W 87, M & K 94 a					X				
Notheia anomala	M & K 94 a, W 87		X	X	X	X	X	X		
Pachydictyon aegerrime	M & K 94 a									X
Pachydictyon paniculatum	H & WR 90, M & K 94 a, W 87	X	X	X	X	X	X	X		
Pachydictyon polycladum	H & WR 90, W 87	X	X	X	X	X				
Padina australis	H in p., M & K 94 a	X						X		X
Padina boergesenii	H in p., M & K 94 a	X								X
Padina crassa	M & K 94 a							X	X	X
Padina elegans	H & WR 90, W 87	X	X	X						
Padina fraseri	M & K 94 a, W 87					X		X		X
Padina gymnospora	H & WR 90, W 87	X								
Padina sanctae–crucis	H & WR 90, W 87	X		X						
Padina tenuis	H & WR 90, M & K 94 a	X						X	X	X
Papenfussiella extensa	W 87	X								
Papenfussiella lutea	W 87						X			
Perithalia caudata	W 87				X	X	X			
Petalonia fascia	H & WR 90, M & K 94 a, W 87	X	X	X	X	X	X	X	X	X
Petrospongium rugosum	M & K 94 a, W 87					X		X		
Phloiocaulon foecundum	W 87					X	X			
Phloiocaulon spectabile	W 87	X	X	X	X	X				
Phyllospora comosa	M & K 94 a, W 87				X	X	X	X		X
Pilayella littoralis	M & K 94 a, W 87				X	X	X	X		
Platythalia angustifolia	H & WR 90, W 87	X	X							
Platythalia quercifolia	H & WR 90, W 87	X	X							
Polycerea nigrescens	W 87, H & WR 90, M & K 94 a	X	X	X	X	X	X	X		
Polycerea zostericola	H & WR 90, W 87	X	X							

Appendix 1B (continued): Species distributions by CONCOM region from the literature: Phaeophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Pseudolithoderma australis	W 87			X	X	X				
Punctaria latifolia	W 87				X	X	X			
Ralfsia expansa	M & K 94 a									X
Ralfsia verrucosa	M & K 94 a, W 87	X	X	X	X	X	X	X		
Rosenvingea orientalis	M & K 94 a									X
Sargassum angustifolium	M & K 94 a							X		X
Sargassum brachyphyllum	M & K 94 a									X
Sargassum cf. leptopodum sensu	M & K 94 a							X		X
Sargassum compactum	M & K 94 a									X
Sargassum dasyphyllum	M & K 94 a									X
Sargassum decipiens	W 87	X	X	X	X	X	X			
Sargassum decurrens	H & WR 90, W 87	X			X					
Sargassum distichum	H & WR 90, M & K 94 a, W 87	X	X	X	X	X		X	X	
Sargassum erosum	M & K 94 a							X		
Sargassum fallax	H & WR 90, M & K 94 a, W 87	X	X	X	X	X	X	X	X	
Sargassum flavicans	M & K 94 a							X		
Sargassum fragile	M & K 94 a							X		
Sargassum globulariaefolium	M & K 94 a							X		
Sargassum heteromorphum	H & WR 90, W 87	X	X	X	X	X				
Sargassum howeanum	M & K 94 a							X		X
Sargassum lacerifolium	M & K 94 a, W 87			X	X	X	X	X		
Sargassum linearifolium	H & WR 90, M & K 94 a, W 87	X	X	X	X	X		X		
Sargassum linearifolium var. serrulatum	M & K 94 a							X		
Sargassum lophocarpum	M & K 94 a							X		X
Sargassum macrophyllum	M & K 94 a									X
Sargassum neurophorum	M & K 94 a							X	X	X
Sargassum paradoxum	M & K 94 a, W 87	X			X	X	X	X		
Sargassum peronii	H & WR 90	X								
Sargassum podacanthum	M & K 94 a, W 87	X	X	X	X					X
Sargassum polyacanthum	M & K 94 a							X		

Appendix 1B (continued): Species distributions by CONCOM region from the literature: Phaeophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Sargassum robustum	M & K 94 a							X		
Sargassum sonderi	W 87	X	X	X	X	X	X			
Sargassum spinifex	M & K 94 a							X		X
Sargassum spinuligerum	H & WR 90, M & K 94 a, W 87	X	X	X	X	X		X		X
Sargassum tristichum	H & WR 90, W 87	X	X	X	X					
Sargassum varians	W 87	X	X	X	X	X				
Sargassum verruculosum	M & K 94 a, W 87	X	X	X	X	X	X	X		
Sargassum vestitum	M & K 94 a, W 87					X	X	X		
Scaberia agardhii	H & WR 90, M & K 94 a, W 87	X	X	X	X	X	X	X		
Scoresbeyella profunda	H & WR 90	X								
Scoresbyella profunda	W 87			X	X					
Scytosiphon lomentaria	W 87	X	X	X	X	X	X	X		
Scytosiphon simplicissimus	M & K 94 a							X	X	
Scytothalia dorycarpa	H & WR 90, W 87	X	X	X	X	X				
Scytothamnus australis	M & K 94 a, W 87					X	X	X		X
Scytothamnus fasciculatus	W 87						X			
Seirococcus axillaris	W 87				X	X	X			
Sorocarpus micromorus	W 87					X				
Spatoglossum australasicum	W 87				X					
Spatoglossum macrodontum	M & K 94 a							X	X	X
Spermatochnus paradoxus	W 87		X		X	X				
Sphacelaria biradiata	H & WR 90, W 87	X	X	X	X	X	X			
Sphacelaria brachygonia	W 87				X					
Sphacelaria bracteata	W 87			X	X	X	X			
Sphacelaria carpoglossi	W 87			X	X	X				
Sphacelaria cf. spuria	M & K 94 a									X
Sphacelaria chorizocarpa	H & WR 90, W 87	X								
Sphacelaria cirrosa	M & K 94 a, W 87	X	X	X	X	X		X		
Sphacelaria fusca	W 87	X	X	X	X	X				
Sphacelaria implicata	W 87				X					

Appendix 1B (continued): Species distributions by CONCOM region from the literature: Phaeophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Sphacelaria multiplex	W 87	X	X							
Sphacelaria novae–caledoniae	W 87			X	X					
Sphacelaria novae–hollandiae	H & WR 90, M & K 94 a, W 87	X	X	X	X					X
Sphacelaria reinkei	W 87				X	X	X			
Sphacelaria rigidula	H & WR 90, M & K 94 a, W 87	X	X	X	X	X		X	X	X
Sphacelaria spuria	W 87					X				
Sphacelaria tribuloides	H & WR 90, M & K 94 a, W 87	X	X	X	X	X		X		X
Sphacella subtilissima	W 87			X	X					
Splachnidium rugosum	M & K 94 a, W 87			X	X	X	X	X		
Sporochnema tomentosum	W 87			X	X					
Sporochnus apodus	W 87			X	X	X	X			
Sporochnus comosus	M & K 94 a, W 87	X	X	X	X	X	X	X		
Sporochnus moorei	M & K 94 a, W 87				X	X		X	X	
Sporochnus radiciformis	H & WR 90, M & K 94 a, W 87	X	X	X	X	X	X	X		
Sporochnus stylosus	W 87					X	X			
Sticyosiphon soriferus	W 87		X	X	X	X				
Stilophora rhizodes	W 87				X	X	X			
Stilopsis harveyana	M & K 94 a, W 87		X		X		X	X		
Streblonema fasciculatum	W 87					X				
Strepsithalia aemula	W 87				X					
Strepsithalia leathesiae	W 87				X					
Strepsithalia liagorae	W 87			X	X	X				
Striaria attenuata	M & K 94 a, W 87				X		X	X		
Stypopodium australasicum	M & K 94 a									X
Stypopodium flabelliforme	H & WR 90, M & K 94 a	X							X	X
Stypopodium flabelliforme var. rhabdoides	M & K 94 a									X
Suringariella harveyana	W 87		X	X	X	X	X			
Taonia australasica	M & K 94 a, W 87				X	X		X	X	X
Tinocladia australis	W 87			X	X	X	X			
Tinocladia irregularis	M & K 94 a							X		

Appendix 1B (continued): Species distributions by CONCOM region from the literature: Phaeophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Tomaculopsis herbertiana	M & K 94 a							X		
Turbinaria gracilis	H & WR 90	X								
Xiphophora chondrophylla	W 87				X	X				
Xiphophora gladiata	W 87					X	X			
Zonaria angustata	M & K 94 a, W 87			X	X	X	X	X		
Zonaria crenata	M & K 94 a, W 87	X	X	X	X	X		X	X	
Zonaria diesingiana	M & K 94 a							X	X	X
Zonaria spiralis	H & WR 90, W 87	X	X	X	X	X				
Zonaria turneriana	H & WR 90, W 87	X	X	X	X	X	X			
Zosterocarpus australica	W 87, X				X					

Appendix 1C: Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Acanthophora dendroides	H & WR 90, M & K 93	X						X	X	
Acanthophora spicifera	H in p., M & K 93	X								X
Acrosorium decumbens	M & K 93							X	X	
Acrosorium minus	H & WR 90	X								
Acrosorium venulosum	H in p., M & K 93	X						X	X	X
Acrosymphyton taylorii	H & WR 90, M & K 93, W 94	X		X				X	X	X
Acrosymphyton tenax	M & K 93								X	
Acrothamnion arcuatum	WL 68				X					
Acrothamnion preissii	WL 68, H & WR 90, M & K 93	X	X	X	X	X				X
Acrotylus australis	M & K 93, W & K 94			X	X	X	X	X		
Adelophycus corneus	W & K 94, H & WR 90	X	X	X	X	X				
Aeodes nitidissima	W & L 94						X			
Aglaothamnion cordatum	H in p.	X								
Ahnfeltiopsis fastigiata	W & L 94					X				
Ahnfeltiopsis humilis	W & L 94					X				
Amansia glomerata	M & K 93									X
Amoenothamnion elongatum	WL 68				X					
Amoenothamnion minimum	WL 68				X					
Amoenothamnion planktonicum	WL 68, M & K 93	X	X	X	X	X		X		
Amphiplexia hymenocladioides	H & WR 90, W & K 94	X	X	X	X	X				
Amphiplexia racemosa	H & WR 90, W & K 94	X	X	X						
Amphiroa anceps	H & WR 90, M & K 93	X						X	X	
Amphiroa gracilis	H & WR 90	X								
Amphiroa howensis	M & K 93									X
Anothrichium crinitum	B 76			X	X	X	X			
Anothrichium elongatum	B 76		X	X	X	X	X			
Anothrichium licmophorum	B 76	X	X	X	X	X				
Anothrichium subtile	B 76				X					
Anothrichium tenue	B 76				X			X		
Anotrichium crinitum	M & K 93							X		
Anotrichium licmophorum	H & WR 90	X								

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Anotrichium planatum	M & K 93							X	X	
Anotrichium tenue	H & WR 90, M & K 93	X						X	X	X
Antithamnion amphigeneum	M & K 93							X	X	
Antithamnion antillanum	H in p., M & K 93	X								X
Antithamnion armatum	H & WR 90, WL 68	X	X	X	X	X				
Antithamnion diminuatum	WL 68				X					
Antithamnion divergens	M & K 93, WL 68	X	X	X	X	X				X
Antithamnion gracilentum	H & WR 90, M & K 93, WL 68	X	X	X	X	X	X			X
Antithamnion hanowioides	H & WR 90, M & K 93, WL 68	X	X	X	X	X	X	X		
Antithamnion makroklonion	M & K 93									X
Antithamnion pinnafolium	H & WR 90, M & K 93, WL 68	X		X	X			X		
Antithamnion verticale	H & WR 90, WL 68	X	X	X	X	X				
Antithamnionella breviramosa	M & K 93							X	X	X
Antithamnionella glandifera	WL 68				X	X				
Antithamnionella spirographidis	M & K 93, WL 68				X			X		
Antithamnionella tasmanica	M & K 93, WL 68					X	X	X		X
Antrocentrum nigrescens	M & K 93, W & K 94	X	X	X	X	X		X		
Aphanocladia delicatula	M & K 93							X		
Apoglossum spathulatum	H & WR 90, M & K 93	X								X
Apoglossum unguiculescens	M & K 93							X	X	
Areschougia congesta	H & WR 90, M & K 93, W 94	X	X	X	X	X	X			X
Areschougia ligulata	H & WR 90, W 94	X	X	X	X					
Areschougia stuartii	M & K 93, W 94				X	X	X	X		
Arthrocardia flabellata ssp. australica	W & J 88			X	X	X	X			
Arthrocardia wardii	W & J 88, M & K 93				X	X	X	X		
Asparagopsis armata	H & WR 90, M & K 93	X						X		
Asparagopsis taxiformis	H & WR 90, M & K 93	X								X
Audouinella barbadensis	W & WK 94, M & K 93				X					X
Audouinella blumii	W & WK 94				X					
Audouinella bonnemaisoniae	W & WK 94				X	X	X			

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Audouinella caespitosa	M & K 93, W & WK 94	X	X	X	X	X	X	X	X	
Audouinella concrescens	M & K 93							X		
Audouinella daviesii	H & WR 90, M & K 93, W & WK 94	X	X	X	X	X	X	X	X	X
Audouinella dictyotae	M & K 93, W & WK 94				X	X		X		
Audouinella floridula	W 94				X	X		X		
Audouinella humilis	W & WK 94				X	X				
Audouinella liagorae	M & K 93, W & WK 94				X					X
Audouinella macula	W & WK 94				X	X				
Audouinella microscopica	H & WR 90, M & K 93, W & WK 94	X	X	X	X	X	X	X	X	X
Audouinella nakamurae	W & WK 94				X					
Audouinella pacifica	M & K 93, W & WK 94	X	X	X	X	X	X	X		
Audouinella phacelorhiza	W & WK 94			X						
Audouinella plumosa	W & WK 94				X	X				
Audouinella polyidis	W & WK 94				X	X				
Audouinella porphyrae	W & WK 94				X	X				
Audouinella purpurea	M & K 93							X		
Audouinella repens	W & WK 94			X	X		X			
Audouinella saviana	M & K 93, W & WK 94	X	X	X	X	X		X		
Audouinella secundata	W & WK 94					X	X			
Audouinella simplex	W & WK 94				X					
Audouinella spongicola	W & WK 94	X	X	X	X					
Audouinella unifila	W & WK 94			X	X	X				
Austroclonium charoides	W 94			X	X	X				
Austrophyllis alcicornis	W 94			X	X	X	X			
Austrophyllis harveyana	W 94					X	X			
Baldockia verticillata	M & K 93, M 86								X	
Ballia ballioides	WL 68				X	X	X			
Ballia callitricha	WL 68	X	X	X	X	X	X			
Ballia hirsuta	WL 68						X			
Ballia mariana	WL 68			X	X	X				
Ballia pennoides	WL 68					X				
Ballia scoparia	WL 68				X	X	X			

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Balliella amphiglanda	M & K 93							X	X	X
Balliella grandis	M & K 93									X
Balliella hirsuta	H & WR 90	X								
Balliella repens	M & K 93							X		X
Bangia atropurpurea	M & K 93							X		
Bangia atropurpurea subsp. atropurpurea	W 94	X	X	X	X	X	X	X		
Bangia atropurpurea subsp. brevisegmenta	W 94					X				
Bangia simplex	M & K 93									X
Batrachospermum attrum	M & K 93							X		
Batrachospermum suecicum	M & K 93							X		
Batrachospermum virgato–decaisneanun	M & K 93							X		
Bornetia ? meredithiana	B & W 68				X	X	X			
Bornetia binderiana	B & W 68, H & WR 90	X	X	X	X	X				
Bornetia tenuis	B & W 68, M & K 93				X			X	X	
Bostrychia harveyi	M & K 93, K & P 89					X	X			X
Bostrychia moritziana	K & P 89, M & K 93				X	X		X	X	
Bostrychia simpliciuscula	M & K 93								X	
Bostrychia tenella	M & K 93									X
Bostrychia tenella ssp. flagellifera	M & K 93							X	X	
Bostrychia tenuissima	K & P 89, M & K 93			X	X	X	X	X	X	X
Botryocladia ebriosa	M & K 93							X	X	
Botryocladia leptopoda	H & WR 90, M & K 93	X								X
Botryocladia obovata	H & WR 90	X								
Botryocladia skottsbergii	H in p., M & K 93	X								X
Branchioglossum epiphyticum	M & K 93								X	
Brongniartella australis	P 80, H & WR 90	X	X	X	X	X	X			
Brongniartella australis forma recurva	P 80	X	X							
Calliblepharis planicaulis	W 94	X	X	X	X	X				
Callithamniella cf. flexilis	M & K 93								X	
Callithamnion arrawarricum	M & K 93								X	

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Callithamnion crispulum	H & WR 90	X								
Callithamnion debile	H & WR 90	X								
Callithamnion korffense	M & K 93							X	X	
Callithamnion larcinum	H & WR 90	X								
Callithamnion multifidum	H & WR 90	X								
Callithamnion pusillum	H & WR 90	X								
Callophycus costatus	H & WR 90	X								
Callophycus dorsiferus	H & WR 90, W 94	X								
Callophycus harveyanus	H & WR 90, W 94	X	X	X						
Callophycus laxus	W 94				X	X				
Callophycus oppositifolius	H & WR 90, W 94	X	X	X	X					
Callophycus serratus	H in p.	X								
Callophycus tridentifer	M & K 93							X	X	
Callophyllis sp.	M & K 93							X	X	
Callophyllis cervicornis	W 94			X	X	X				
Callophyllis depressa	M & K 93							X		
Callophyllis lambertii	W 94			X	X	X	X			
Callophyllis rangiferina	W 94, M & K 93	X	X	X	X	X	X	X		
Caloglossa adnata	M & K 93								X	
Caloglossa leprieurii	M & K 93							X	X	X
Caloglossa ogasawaraensis	M & K 93							X	X	
Camontagnea hirsuta	W & WK 94				X	X	X			
Camontagnea oxyclada	M & K 93, W & WK 94				X	X	X	X		
Capreolia implexa	W & G 94			X	X	X	X	X		
Carpopeltis decipiens	H & WR 90	X								
Carpopeltis elata	H & WR 90, W & L 94	X								
Carpopeltis phyllophora	H & WR 90, M & K 93, W & L 94	X	X	X	X	X	X			X
Carpopeltis spongeaplexus	W & L 94	X	X	X	X					
Carpothamnion gunnianum	H in p.	X								
Catenella nipae	M & K 93, W 94					X		X		
Centroceras clavulatum	H & WR 90, M & K 93	X						X	X	
Ceramium australe	W 78	X			X	X				
Ceramium ciliatum	M & K 93									X

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Ceramium clarionense	M & K 93									X
Ceramium cliftonianum	H & WR 90, M & K 93, W 78	X	X	X	X	X	X	X		
Ceramium codii	M & K 93							X	X	X
Ceramium cupulatum	W 78			X	X	X				
Ceramium excellens	W 78			X	X	X	X			
Ceramium filiculum	H & WR 90, M & K 93, W 78	X	X	X	X	X		X	X	
Ceramium flaccidum	H & WR 90, M & K 93, W 78	X	X	X	X	X	X	X	X	X
Ceramium huysmansii	M & K 93									X
Ceramium isogonum	H & WR 90, M & K 93, W 78	X	X	X	X	X	X	X		X
Ceramium lenticulare	W 78				X	X	X			
Ceramium lentiforme	M & K 93							X	X	
Ceramium macilentum	H in p., M & K 93, W 78	X	X	X	X	X		X		X
Ceramium mazatlanense	H in p.	X								
Ceramium monacanthum	W 78, H & WR 90	X			X	X	X			
Ceramium puberulum	H & WR 90, M & K 93, W 78	X	X	X	X	X	X	X		
Ceramium pusillum	H & WR 90, W 78	X	X	X	X	X	X			
Ceramium rubrum	H & WR 90, W 78	X		X	X	X	X			
Ceramium setchellii	M & K 93									X
Ceramium shepherdii	H in p., M & K 93, W 78	X		X	X	X		X		X
Ceramium sympodiale	H in p.	X								
Ceramium tasmanicum	W 78	X	X	X	X	X	X			
Ceramium vagabunde	M & K 93							X		
Ceratodictyon spongiosum	H in p.	X								
Champia affinis	R & W 76		X	X	X	X	X			
Champia compressa	M & K 93							X	X	X
Champia expansa	M & K 93								X	X
Champia insignis	R & W 76						X			
Champia parvula	M & K 93							X	X	X
Champia parvula var. amphibolis	R & W 76				X					
Champia vieillardii	M & K 93									X
Champia viridis	R & W 76, H & WR 90, M & K 93	X	X	X	X	X	X	X		
Champia xishaense	H in p.	X								

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Champia zostericola	R & W 76, H & WR 90, M & K 93	X	X	X	X	X	X	X		
Chauviniella corifolia	H & WR 90	X								
Cheilosporum pulchellum	H & WR 90	X								
Cheilosporum sagittatum	M & K 93							X	X	
Chondria angustissima	GM & K 81, M & K 93	X			X	X		X		
Chondria arcuata	GM & K 81					X				
Chondria armata	M & K 93								X	X
Chondria bulbosa	GM & K 81	X			X	X	X			
Chondria capreolis	GM & K 81				X	X	X			
Chondria curdieana	GM & K 81, H & WR 90	X	X	X	X	X	X			
Chondria dangeardii	M & K 93									X
Chondria foliifera	GM & K 81				X	X				
Chondria fusifolia	GM & K 81		X	X	X	X	X			
Chondria harveyana	GM & K 81		X		X	X	X			
Chondria hieroglyphica	GM & K 81					X				
Chondria incrassata	GM & K 81			X	X	X	X			
Chondria incurva	GM & K 81	X	X	X	X	X				
Chondria infestans	M & K 93							X	X	X
Chondria lanceolata	H & WR 90	X								
Chondria lanceolata	GM & K 81	X		X						
Chondria myriopoda	GM & K 81					X		X		
Chondria subfasciculata	GM & K 81					X	X			
Chondria subsecunda	GM & K 81					X				
Chondria succulenta	GM & K 81, H & WR 90, M & K 93	X	X	X	X	X		X	X	
Chondria suprabulbosa	GM & K 81			X	X					
Chondria viticulosa	M & K 93								X	
Choreonema thuretii	WK 87a	X	X	X	X	X	X			
Chroodactylon ornatum	M & K 93, W 94				X	X	X	X		
Chrysymenia digitata	M & K 93							X		
Chrysymenia kaernbachii	H in p.	X								
Chrysymenia ornata	M & K 93							X	X	
Chylocladia grandis	R & W 76				X					

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Cirrulicarpus nanus	W 94, H & WR 90	X		X	X	X				
Cirrulicarpus polycoelioides	W 94						X			
Cirrulicarpus sp.	M & K 93									X
Cladhymenia coronata	M & K 93							X		
Clathromorphum compactum	WK 88					X	X			
Claudea elegans	H in p.	X								
Claviclonium ovatum	W & K 94, H & WR 90	X	X	X						
Cliftonaea pectinata	H & WR 90	X								
Codiophyllum decipiens	H & WR 90	X								
Codiophyllum flabelliforme	H & WR 90, W & L 94	X	X							
Coelarthrum boergesenii	H 93	X								
Coelarthrum cliftoni	H & WR 90	X								
Coelarthrum muelleri	H 93	X								
Coeloclonium opuntioides	H & WR 90	X								
Coeloclonium umbellulum	H & WR 90	X								
Coeloclonium verticillatum	H & WR 90	X								
Coelothrix irregularis	H in p., M & K 93	X								X
Compsopogon coeruleus	M & K 93							X		
Compsothamnionella huismanii	GM & W 89				X	X				
Corallina berteri	M & K 93							X	X	
Corallina officinalis	M & K 93	X	X	X	X	X	X	X	X	X
Craspedocarpus blepharicarpus	H & WR 90, W 94	X	X	X	X	X				
Craspedocarpus ramentaceus	W 94	X	X	X	X	X	X			
Craspedocarpus tenuifolius	W 94		X	X	X	X				
Craspedocarpus venosus	W 94	X	X	X	X	X				
Crouania capricornica	M & K 93							X	X	X
Crouania destriana	WL 68				X					
Crouania mucosa	WL 68			X	X	X				
Crouania shepleyana	WL 68				X	X				
Cryptonemia digitata	W & L 94				X	X				
Cryptonemia kallymenioides	H & WR 90, W & L 94	X	X	X						
Cryptonemia nitophylloides	W & L 94					X		X		

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Cryptonemia obovata	M & K 93								X	
Cryptonemia sp.	M & K 93							X		
Cryptonemia umbraticola	M & K 93									X
Cryptonemia undulata	H & WR 90, W & L 94	X	X	X	X	X				
Cryptonemia wilsonii	W & L 94					X	X			
Cryptonemia yendoi	M & K 93									X
Curdiea angustata	M & K 93							X		
Curdiea crassa	M & K 93							X	X	
Curdiea obesa	H & WR 90	X								
Dasya capillaris	M & K 93							X		
Dasya ceramioides	P 75	X	X	X	X	X	X			
Dasya cernua	M & K 93							X	X	
Dasya clavigera	P 75		X	X	X	X				
Dasya cliftoni	H & WR 90	X								
Dasya elongata	H & WR 90	X								
Dasya extensa	H & WR 90, P 75	X	X	X	X	X				
Dasya fruiticulosa	M & K 93									X
Dasya frutescens	H & WR 90	X								
Dasya iyengarii	M & K 93							X	X	
Dasya naccarioides	M & K 93, P 75		X	X	X	X	X	X	X	
Dasya pilosa	M & K 93							X	X	X
Dasya trichophora	M & K 93							X	X	
Dasya villosa	P 75		X	X	X	X				
Dasya wilsonis	M & K 93							X		
Dasyclonium flaccidum	H & WR 90	X								
Dasyclonium incisum	H & WR 90, M & K 93	X						X	X	X
Dasyphila preissii	H in p., WL 77	X	X	X	X	X				
Dasyphloea insignis	W 94				X	X	X			
Delesseria aemula	M & K 93							X		
Delisea pulchra	H & WR 90, M & K 93	X						X	X	
Deucalion levringii	H & K 82, M & K 93					X		X		
Dicranema cincinnalis	W & K 94			X	X	X				
Dicranema revolutum	H & WR 90, W & K 94	X	X	X	X	X				

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Dictymenia sonderi	H & WR 90	X								
Dictymenia tridens	H & WR 90, M & K 93	X						X		
Dictyothamnion saltatum	M & K 93							X	X	
Diplothamnion gordoniae	H 91, H 93	X								
Dipterrosiphonia heteroclada	M & K 93							X	X	X
Ditria expleta	H in p.	X								
Ditria zonaricola	M & K 93									X
Dotyophycus abbottiae	H & WR 90	X								
Doxodasya bolbochaete	H in p., P 75	X	X	X	X	X				
Doxodasya lanuginosa	P 75		X	X	X	X	X			
Drewiana nitella	G 72, H & WR 90	X	X	X	X	X				
Dudresnaya australis	W 94		X	X	X	X				
Dudresnaya capricornica	H & WR 90, M & K 93	X							X	X
Dudresnaya hawaiiensis	M & K 93									X
Enantiocladia robinsonii	M & K 93									X
Endosiphonia spinuligera	H in p., M & K 93	X								X
Epiphloea bullosa	H & WR 90, M & K 93	X								X
Episporium centroceratis	M & K 93									X
Erythrocladia irregularis	M & K 93, W 94	X	X	X	X	X	X	X		
Erythrocladia subintegra	W 94	X	X	X	X	X	X	X		
Erythroclonium angustatum	W 94			X	X	X				
Erythroclonium nuelleri	W 94, H & WR 90	X	X	X	X	X	X			
Erythroclonium sedoides	H & WR 90, W 94	X								
Erythroclonium sonderi	H & WR 90, W 94	X	X	X	X	X				
Erythronaema ceramioides	W 94				X	X				
Erythrotrichia australis	M & K 93							X		
Erythrotrichia carnea	M & K 93, W 94	X	X	X	X	X	X	X	X	X
Erythrotrichia foliiformis	W 94						X			
Erythrotrichia ligulata	W 94				X	X	X			
Eucheuma deformans	M & K 93									X
Eucheuma denticulatum	H in p.	X								
Eucheuma gelatinum	H in p.	X								
Eucheuma serra	M & K 93									X

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Eucheuma speciosum	H & WR 90	X								
Euptilocladia spongiosa	H 93, WL 68	X	X	X	X	X				
Euptilocladia villosa	WL 68				X					
Euptilota articulata	H & WR 90, M & K 93	X							X	X
Euptilota coralloidea	H & WR 90	X								
Falkenbergia olens	M & K 93							X		
Fernandosiphonia nana	M & K 93								X	
Fosliella cruciata	H 93	X								
Fosliella farinosa	M & K 93							X		
Galaxaura marginata	H & B 90, H & WR 90, M & K 93, W & H 94	X	X	X	X	X	X	X	X	
Galaxaura obtusata	H & B 90, H & WR 90, M & K 93, W & H 94	X	X					X	X	
Galaxaura rugosa	H & B 90, H & WR 90, M & K 93	X	X	X	X	X	X	X		X
Ganonema farinosa	H in p.	X								
Gattya pinella	WL 68, H & WR 90	X	X	X	X	X				
Gelidiella acerosa	M & K 93									X
Gelidiella antipai	W & G 94			X	X					
Gelidiella bornetii	M & K 93									X
Gelidiella minima	W & G 94			X	X	X				
Gelidiella ramellosa	W & G 94	X								
Gelidiopsis intricata	M & K 93									X
Gelidiopsis variabilis	M & K 93									X
Gelidium asperum	W & G 94				X	X	X			
Gelidium australe	H & WR 90, M & K 93, W & G 94	X	X	X	X	X	X	X		X
Gelidium caulacantheum	M & K 93							X		
Gelidium crinale	W & G 94		X	X	X	X				
Gelidium maidenii	M & K 93									X
Gelidium pusillum	H 93, M & K 93, W & G 94	X	X	X	X	X	X	X	X	X
Gelinaria ulvoidea	H & WR 90, W & L 94	X	X	X	X	X				
Gibsmithia dotyi	M & K 93									X
Gibsmithia womersleyi	W 94		X	X						
Gigartina aciculifera	M & K 93							X		

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Gigartina australis	M & K 93							X	X	
Gigartina brachiata	W & E 94				X	X	X	X		
Gigartina densa	W & E 94		X	X	X	X	X			
Gigartina disticha	H & WR 90, W & E 94	X	X	X	X	X				
Gigartina intermedia	M & K 93							X	X	X
Gigartina macrocarpa	M & K 93									X
Gigartina muelleriana	W & E 94					X	X			
Gigartina pinnata	W & E 94				X	X	X			
Gigartina recurva	W & E 94						X			
Gigartina sonderi	W & E 94			X	X	X	X			
Gigartina wehliae	W & E 94				X	X	X			
Glandothamnus ramulentus	M & K 93							X		
Glaphyrymenia cf. pustulosa	M & K 93							X		
Glaphyrymenia pustulosa	W 94			X	X	X	X			
Gloiocladia halymenioides	H 93	X								
Gloiocladia iyoensis	M & K 93							X		
Gloiocladia minutula	M & K 93							X		
Gloiocladia rubrispora	M & K 93								X	
Gloiophloea rosea	W & H 94					X				
Gloiophloea scinaioides	W & H 94		X	X	X	X				
Gloiophyllis barkeriae	W 94			X	X	X				
Gloiosaccion brownii	H & WR 90	X								
Gloiotrichus fractalis	H in p.	X								
Gracilaria bifaria	M & K 93							X		
Gracilaria canaliculata	H in p.	X								
Gracilaria edulis	M & K 93							X		X
Gracilaria halogenea	M & K 93							X	X	
Gracilaria preissiana	H & WR 90	X								
Gracilaria salicornia	M & K 93									X
Gracilaria secundata	M & K 93							X		X
Gracilaria textorii	H in p., M & K 93	X						X		
Gracilaria veleroae	M & K 93							X	X	
Gracilaria verrucosa	M & K 93							X	X	

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Grateloupia filicina	M & K 93							X	X	
Grateloupia filicina var. luxurians	M & K 93, W & L 94	X	X	X	X	X	X	X		
Grateloupia intestinalis	W & L 94						X			
Grateloupia ovata	W & L 94				X	X				
Grateloupia tasmanica	W & L 94						X			
Grateloupia urvilleana	M & K 93							X		
Griffithsia antarctica	B 76					X	X			
Griffithsia balara	B 76		X							
Griffithsia crassiuscula	B 76				X	X	X			
Griffithsia elegens	B 76, H & WR 90	X		X	X	X				
Griffithsia gunniana	B 76				X	X				
Griffithsia heteromorpha	M & K 93									X
Griffithsia japonica	M & K 93							X	X	
Griffithsia metcalfii	M & K 93							X	X	
Griffithsia monilis	B 76, H & WR 90, M & K 93	X	X	X	X	X		X		
Griffithsia ovalis	B 76, H in p.	X	X	X	X					
Griffithsia pilalyea	B 76					X				
Griffithsia pulvinata	B 76	X	X	X	X	X				
Griffithsia subcylindrica	M & K 93								X	
Griffithsia teges	B 76, H & WR 90	X	X	X	X	X				
Guiryella repens	H 93	X								
Gulsonia annulata	WL 68			X	X	X				
Gymnogongrus crenulatus	M & K 93, W & L 94			X	X	X		X		
Gymnogongrus fastigiatus	M & K 93							X		
Gymnogongrus griffithsiae	W & L 94				X	X				
Gymnogongrus irregularis	M & K 93									X
Gymnophycus hapsiphorus	M & K 93									X
Gymnothamnion elegans	M & K 93									X
Halichrysis coalescens	M & K 93							X	X	
Halichrysis concrescens	M & K 93							X		
Halichrysis depressa	M & K 93									X
Halichrysis peltata	H in p.	X								

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Haliptilon roseum	J & W 86, H & WR 90, M & K 93	X	X	X	X	X	X	X	X	X
Halodictyon robustum	H & WR 90	X								
Haloplegma duperreyi	M & K 93									X
Haloplegma preissi	H & WR 90	X								
Halymenia elongata	M & K 93							X	X	
Halymenia floresia	H in p.	X								
Halymenia floresia subsp. floresia	W & L 94	X	X							
Halymenia floresia subsp. harveyana	W & L 94			X	X	X				
Halymenia harveyana	H & WR 90	X								
Halymenia kraftii	W & L 94						X	X		
Halymenia muelleri	W & L 94				X	X				
Halymenia plana	W & L 94			X	X	X	X			
Haplodasya tomentosa	P 75				X	X				
Haplodasya urceolata	P 75		X	X	X	X				
Haraldiophyllum sinuosum	M & K 93							X		
Helminthocladia australis	M & K 93, W 94	X	X	X	X	X	X	X	X	X
Helminthocladia beaugleholei	W 94					X				
Helminthocladia densa	W 94				X	X				
Helminthocladia dotyi	M & K 93, W 94				X	X	X	X		
Helminthora australis	H & WR 90, W 94	X	X	X	X	X	X			
Helminthora lindaueri	W 94				X	X	X			
Hemineura frondosa	H & WR 90	X								
Hennedya crispa	H & WR 90, W & K 94	X	X	X						
Herposiphonia calva	M & K 93							X	X	
Herposiphonia pectinella	H & WR 90	X								
Herposiphonia rostrata	H & WR 90	X								
Herposiphonia secunda	H in p., M & K 93	X						X	X	X
Herposiphonia secunda f. tenella	M & K 93									X
Herposiphonia subdisticha	M & K 93								X	X
Heterodoxia denticulata	H & WR 90	X								
Heterosiphonia australis	P 75, M & K 93		X	X	X	X	X	X	X	X

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Heterosiphonia callithamnion	H & WR 90	X								
Heterosiphonia crassipes	H & WR 90, M & K 93	X						X	X	X
Heterosiphonia gunniana	P 75, H & WR 90	X	X	X	X	X				
Heterosiphonia lawrenciana	P 75	X	X	X	X	X				
Heterosiphonia muelleri	P 75, H & WR 90	X	X	X	X	X		X		
Heterosiphonia multiceps	H & WR 90	X								
Heterosiphonia wrangelioides	P 75, H & WR 90	X	X	X	X	X				
Heterostroma nereidis	K & WY 92, H in p.	X								
Heterothamnion episiliquosum	WL 68				X	X				
Heterothamnion muelleri	WL 68				X	X				
Heterothamnion sessile	WL 68				X					
Hildenbrandia crouanii	W 94			X	X					
Hildenbrandia expansa	W 94					X	X			
Hildenbrandia lecannellieri	W 94				X		X			
Hildenbrandia rivularis	M & K 93									X
Hildenbrandia rubra	W 94	X	X	X	X	X	X	X		
Hildenbrandia sp.	M & K 93							X		
Holotrichia comosa	H & WR 90	X								
Hormophora australasica	W 94					X				
Husseyella rubra	GM & K 81	X		X	X					
Hydrolithon cymodoceae	P 92a		X	X	X	X				
Hydrolithon farinosa	P & C 93	X	X	X	X	X				
Hydrolithon onkodes	P & WK 92, H 93	X	X							
Hymenocladia conspersa	H & WR 90	X								
Hymenocladia dactyloides	H & WR 90	X								
Hypnea boergesenii	M & K 93							X	X	
Hypnea cenomyce	M & K 93							X		X
Hypnea charoides	W 94	X	X	X	X	X				
Hypnea episcopalis	H & WR 90	X								
Hypnea filiformis	W 94	X	X	X	X	X				
Hypnea johnstonii	M & K 93							X	X	
Hypnea musciformis	H & WR 90	X								
Hypnea ramentacea	W 94	X	X	X	X	X				

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Hypnea saidana	M & K 93								X	
Hypnea spinella	M & K 93								X	X
Hypnea valentiae	H & WR 90, M & K 93, W 94	X		X	X	X		X	X	
Hypoglossum anomalum	M & K 93									X
Hypoglossum armatum	W & S 82		X	X	X	X				
Hypoglossum caloglossoides	H in p., M & K 93	X								X
Hypoglossum dendroides	H & WR 90, W & S 82	X	X	X						
Hypoglossum harveyanum	M & K 93, W & S 82				X			X	X	
Hypoglossum heterocystideum	H & WR 90, M & K 93	X						X	X	
Hypoglossum hypoglossoides	W & S 82	X	X	X	X	X	X	X		
Hypoglossum protendens	W & S 82	X	X	X	X	X				
Hypoglossum revolutum	H & WR 90, W & S 82	X	X	X	X	X				
Hypoglossum simulans	M & K 93									X
Hyponeocolax stellaris	W 94	X	X	X	X	X				
Interthamnion attenuatum	G 72				X					
Involucrana crassa	G 72, M & K 93			X	X	X		X		
Involucrana meredithiana	B & W 68				X	X	X			
Jania affinis	H & WR 90	X								
Jania crassa	M & K 93							X	X	
Jania micrarthrodia	H & WR 90, M & K 93	X						X		
Jania pulchella	H in p.	X								
Jania rubens	M & K 93									X
Jania verrucosa	H & WR 90	X								
Jeannerettia pedicillata	H & WR 90	X								
Kallymenia brachycystidea	M & K 93							X		
Kallymenia cribrogloea	M & K 93, W 94			X	X	X	X	X		
Kallymenia cribrosa	H & WR 90, W 94	X	X	X	X	X	X			
Kallymenia nitophylloides	M & K 93							X	X	
Kallymenia rosea	M & K 93							X	X	
Kallymenia rubra	W 94			X						
Kallymenia spinosa	H 93, W 94	X		X						
Kallymenia tasmanica	W 94				X	X	X			
Kraftia dichotoma	W 94		X	X	X	X				

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Kuetzingia angusta	H & WR 90	X								
Kuetzingia canaliculata	H & WR 90	X								
Laurencia aldingensis	S & W 74			X	X					
Laurencia arbuscula	H & WR 90, S & W 74	X	X	X	X	X				
Laurencia botryoides	S & W 74					X	X			
Laurencia brandenii	S & W 74			X	X					
Laurencia brongniartii	H & WR 90, M & K 93, S & W 74	X		X	X	X		X	X	X
Laurencia clavata	H & WR 90, S & W 74	X	X	X	X	X				
Laurencia cruciata	H & WR 90, M & K 93, S & W 74	X	X	X	X	X		X	X	
Laurencia distichophylla	M & K 93, S & W 74						X	X		
Laurencia elata	H & WR 90, M & K 93, S & W 74	X	X	X	X	X	X	X	X	
Laurencia filiformis	H & WR 90, M & K 93, S & W 74	X	X	X	X	X	X	X		
Laurencia filiformis f. heteroclada	M & K 93									X
Laurencia forsteri	H & WR 90, S & W 74	X	X	X	X	X				
Laurencia majuscula	H & WR 90, M & K 93, S & W 74	X	X	X	X	X	X	X	X	X
Laurencia obtusa	M & K 93							X	X	
Laurencia obtusa var. compacta	M & K 93							X	X	
Laurencia paniculata	S & W 74			X	X	X				
Laurencia papillosa	M & K 93							X		
Laurencia pygmaea	M & K 93							X		
Laurencia rigida	M & K 93							X		
Laurencia shepherdii	S & W 74	X	X	X	X	X				
Laurencia succisa	M & K 93									X
Laurencia tasmanica	S & W 74	X	X	X	X	X	X			
Laurencia tenera	M & K 93							X	X	
Laurencia tumida	S & W 74			X	X	X	X			
Laurencia venusta	M & K 93									X
Lejolisia aegagrophila	G 72, M & K 93	X	X	X	X	X		X		
Lembergia	S & W 74									

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Lenormandia marginata	H & WR 90	X								
Lenormandia prolifera	M & K 93							X		
Lenormandia spectabilis	H & WR 90	X								
Lenormandiopsis latifolia	H in p.	X								
Lenormandiopsis lorentzii	M & K 93									X
Leptofauchea nitophylloides	M & K 93							X		
Lesueria minderiana	WK & D 87	X	X	X	X	X				
Leveillea jungermannioides	H & WR 90, M & K 93	X						X		X
Liagora australasica	H & WR 90	X								
Liagora codii	W 94				X	X				
Liagora farinosa	M & K 93, W 94	X			X					X
Liagora harveyana	W 94	X	X	X	X	X				
Liagora howensis	M & K 93									X
Liagora setchellii	H in p.	X								
Liagora sinensis	M & K 93									X
Liagora wilsoniana	W 94	X	X	X	X	X				
Lithophyllum bermudense	M & K 93							X		
Lithophyllum incrustans	WK 88	X	X	X	X	X	X			
Lithophyllum pustulatum	M & K 93							X		
Lithoporella melobesioides	WK 88					X				
Lithoporella pacifica	M & K 93									X
Lithothamnion muelleri	WK 88		X	X	X	X				
Lomathamnion epicodii	G 72		X	X	X	X				
Lomentaria catenata	M & K 93							X		
Lomentaria corallicola	H in p.	X								
Lomentaria monochlamydea	M & K 93							X	X	
Lophocladia harveyi	H & WR 90, M & K 93	X						X		X
Lophosiphonia calothrix	M & K 93							X		
Lophosiphonia prostrata	H 93, M & K 93	X						X	X	X
Lophosiphonia reptabunda	M & K 93							X		X
Lophothalia verticillata	P 75				X	X				
Lophurella periclados	M & K 93							X		
Macrothamnion pectenellum	WL 68					X	X			

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Macrothamnion pellucidum	WL 68	X	X	X	X	X				
Macrothamnion secundum	WL 68				X	X				
Martensia australis	H & WR 90, M & K 93	X							X	X
Martensia elegans	H & WR 90, M & K 93	X							X	X
Martensia flabelliformis	M & K 93									X
Martensia fragilis	H & WR 90, M & K 93	X						X	X	X
Mastophora licheniformis	WK 88	X								
Mastophora pacifica	H 93	X								
Mastophoropsis canaliculata	WK 88					X	X			
Mazoyerella arachnoidea	GM & K 81			X	X	X				
Medeiothamnion halurum	G 72, H & WR 90	X	X	X	X	X				
Medeiothamnion protensum	G 72				X	X	X			
Medeiothamnion repens	G 72			X	X					
Melanamansia daemelii	M & K 93									X
Melanamansia serrata	H 93	X								
Melanema dumosuk	W 94				X	X	X			
Melanthalia polydactylis	M & K 93							X	X	
Melobesia membranacea	WI & WK 91		X	X	X	X	X			
Melobesia rosanoffii	WI & WK 91					X	X			
Meridiocolax bracteata	M & K 93, N & K 83							X		X
Meristotheca papulosa	H & WR 90, M & K 93	X								X
Meristotheca procumbens	M & K 93								X	X
Mesophyllum engelhartii	WI & WK 91	X	X	X	X	X	X			
Mesophyllum incisum	WI & WK 91	X	X	X	X	X	X			
Mesophyllum macroblastum	WI & WK 91			X	X	X	X			
Mesophyllum printzianum	WI & WK 91					X	X			
Metagoniolithon chara	D 79, H & WR 90, M & K 93	X	X	X	X	X		X		
Metagoniolithon chara var. dichotomum	D 79, H & WR 90	X								
Metagoniolithon radiatum	D 79, H & WR 90	X	X	X	X	X	X			
Metagoniolithon stelliferum	D 79, H & WR 90	X	X	X	X	X				
Metamastophora flabellata	WK 88, H & WR 90	X	X	X						
Micropeuce mucronata	M & K 93							X	X	
Monosporus australis	H & WR 90	X								

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Monosporus indicus	H in p., M & K 93	X								X
Mychodea acanthymenia	M & K 93, W & K 94				X	X	X	X		
Mychodea aciculare	W & K 94		X	X	X	X	X			
Mychodea australis	W & K 94		X	X	X	X	X			
Mychodea carnosa	H in p., W & K 94	X	X	X	X	X	X			
Mychodea disticha	W & K 94	X	X	X	X	X	X			
Mychodea gracilaria	H & WR 90, W & K 94	X	X	X	X	X				
Mychodea hamata	W & K 94				X	X	X			
Mychodea marginifera	H & WR 90, W & K 94	X	X	X	X	X	X			
Mychodea pusilla	H & WR 90, W & K 94	X	X	X	X	X				
Mychodea ramulosa	W & K 94		X	X	X	X				
Mychodea spinulifera	W & K 94			X						
Myriogramme bombayensis	M & K 93							X		X
Myriogramme erosa	H & WR 90	X								
Naccaria naccarioides	M & K 93								X	
Nemalion helminthoides	M & K 93, W 94			X	X	X	X	X		
Nemastoma damaecornis	H & WR 90	X								
Neogoniolithon fosliei	P 92b	X	X	X	X	X				
Neurymenia fraxinifolia	H & WR 90	X								
Nitophyllum delicatum	M & K 93							X	X	X
Nitophyllum pulchellum	H & WR 90	X								
Nizymenia australis	W 94				X	X	X			
Nothogenia fastigiata	M & K 93, W & H 94					X	X	X		
Osmundaria spiralis	H 93	X								
Pachymenia orbicularis	W & L 94	X	X	X	X	X	X			
Pachymenia prostrata	M & K 93							X	X	
Patulophycus eclipes	M & K 93							X	X	
Peltasta australias	W & K 94				X	X	X			
Perithamnion ceramoides	WL 68		X	X	X	X				
Perithamnion densum	WL 68				X					
Perithamnion dispar	WL 68				X	X	X			
Peyssonnelia boudouresquei	W 94			X	X					
Peyssonnelia capensis	H & WR 90, M & K 93, W 94	X	X	X	X	X	X	X	X	

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Peyssonnelia dubyi	W 94			X	X	X				
Peyssonnelia foliosa	W 94			X	X					
Peyssonnelia inamoena	W 94			X	X	X	X			
Peyssonnelia novae–hollandiae	H & WR 90, M & K 93, W 94	X	X	X	X	X	X	X	X	
Peyssonnelia splendens	W 94				X	X				
Phacelocarpus alatus	H & WR 90, W 94	X	X	X	X	X				
Phacelocarpus apodus	W 94	X	X	X	X	X	X	X		
Phacelocarpus complanatus	W 94			X	X	X	X			
Phacelocarpus peperocarpos	W 94, H & WR 90, M & K 93	X	X	X	X	X	X	X		
Phacelocarpus sessilis	W 94	X	X	X	X	X	X			
Phitymophora amansioides	M & K 93							X		
Phycodrys australasica	M & K 93							X	X	X
Phymatolithon calcareum	WK 88						X			
Placophora binderi	H & WR 90	X								
Platoma australica	W & K 94			X	X	X	X			
Platoma foliosa	W & K 94			X	X	X				
Platoma izunosimensis	M & K 93								X	
Platysiphonia delicata	M & K 93	X						X		
Platysiphonia hypneoides	H & WR 90	X								
Platysiphonia marginalis	M & K 93, WY, M & K 84							X	X	X
Platysiphonia mutabilis	M & K 93							X		
Platythamnion cuspidatum	M & K 93, WL 78					X		X		
Platythamnion francisianum	WL 78			X						
Platythamnion nodiferum	H & WR 90, WL 68	X	X	X	X	X				
Pleonosporium boergesenii	M & K 93							X	X	
Pleonosporium caribaeum	M & K 93, H in p.	X								X
Plocamium angustum	H & WR 90, M & K 93, W 94	X		X	X	X	X	X		X
Plocamium cartilagineum	H & WR 90, M & K 93, W 94	X	X	X	X	X	X	X		X
Plocamium costatum	M & K 93, W 94			X	X	X	X	X		
Plocamium dilatatum	W 94				X	X	X			
Plocamium hamatum	M & K 93									X
Plocamium leptophyllum	M & K 93, W 94			X	X	X	X	X	X	
Plocamium mertensii	H & WR 90, W 94	X	X	X	X	X				

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Plocamium microcladioides	M & K 93								X	X
Plocamium patagiatum	W 94			X	X	X	X			
Plocamium preissianum	W 94, H & WR 90	X	X	X	X	X				
Pneophyllum fragile	WK 88, H 93	X	X	X	X	X	X			
Polycoelia laciniata	W 94	X	X	X	X	X	X			
Polyopes constrictus	M & K 93, W & L 94				X	X	X	X		
Polyopes tenuis	W & L 94			X	X	X	X	X		
Polysiphonia abscissoides	W 79						X			
Polysiphonia adamsiae	W 79						X			
Polysiphonia amphibolis	M & K 93, W 79		X	X	X					X
Polysiphonia atricapilla	W 79		X	X	X	X				
Polysiphonia australiensis	H & WR 90, W 79	X	X	X	X	X				
Polysiphonia baxteri	M & K 93									X
Polysiphonia beaudettei	M & K 93								X	
Polysiphonia blandii	H & WR 90, M & K 93, W 79	X	X	X	X	X	X	X	X	
Polysiphonia brevisegmenta	M & K 93, W 79			X						X
Polysiphonia brodiaei	W 79				X	X	X			
Polysiphonia constricta	M & K 93, W 79			X	X	X		X	X	X
Polysiphonia crassiuscula	W 79				X	X	X			
Polysiphonia daveyae	W 79		X	X	X	X				
Polysiphonia decipiens	H & WR 90, M & K 93, W 79	X	X	X	X	X	X	X		
Polysiphonia ferulacea	H in p.	X								
Polysiphonia forfex	H & WR 90, W 79	X	X							
Polysiphonia gelidii	M & K 93									X
Polysiphonia gracilis	H in p., M & K 93	X							X	
Polysiphonia haplodasyae	W 79				X					
Polysiphonia implexa	M & K 93									X
Polysiphonia infestans	H & WR 90, M & K 93, W 79	X	X	X	X	X	X	X		
Polysiphonia isogona	M & K 93, W 79		X	X	X	X	X	X		
Polysiphonia mollis	H & WR 90, W 79	X	X	X	X	X	X			
Polysiphonia perriniae	W 79					X	X			
Polysiphonia propagulifera	W 79				X					
Polysiphonia pungens	W 79					X				

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Polysiphonia scopulorum	H & WR 90, M & K 93, W 79	X	X	X	X	X		X	X	
Polysiphonia sertularioides	H & WR 90, M & K 93, W 79	X	X	X	X	X	X	X		
Polysiphonia shepherdii	W 79				X					
Polysiphonia sparsa	M & K 93									X
Polysiphonia sphaerocarpa	M & K 93							X	X	
Polysiphonia subtilissima	M & K 93, W 79			X	X	X		X		
Polysiphonia succulenta	W 79	X	X	X	X	X				
Polysiphonia teges	W 79		X		X					
Porphyra columbina	M & K 93, W 94			X	X	X	X	X		
Porphyra lucasii	H & WR 90, M & K 93, W 94	X	X	X	X	X	X	X		
Porphyra woolhousiae	W 94				X	X	X			
Porphyridium purpureum	W 94				X					
Porphyropsis minuta	M & K 93, W 94	X	X	X	X	X	X	X		
Portieria hornemannii	M & K 93							X	X	X
Predaea huismanii	H & WR 90, W & K 94	X		X						
Predaea incraspeda	M & K 93									X
Predaea kraftiana	M & K 93							X	X	
Predaea weldii	H in p., M & K 93	X								X
Protokeutzingia australasica	H & WR 90	X								
Psilosiphon scoparium	M & K 93							X		
Psilothalia siliculosa	H & WR 90	X								
Psilothalia striata	H & WR 90	X								
Pterocladia caerulescens	M & K 93									X
Pterocladia caespitosa	H 93	X								
Pterocladia caloglossoides	M & K 93									X
Pterocladia capillacea	H & WR 90, M & K 93, W & G 94	X	X	X	X	X	X	X	X	X
Pterocladia lucida	H & WR 90, M & K 93, W & G 94	X	X	X	X	X	X	X	X	X
Pterocladia rectangularis	W & G 94	X	X	X						
Pterosiphonia pennata	M & K 93							X	X	
Ptilocladia agardhiana	WL 68		X	X	X	X				
Ptilocladia australis	WL 68		X	X	X		X			
Ptilocladia pulchra	WL 68		X	X	X	X				

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Ptilocladia vestita	H & WR 90, WL 68	X	X	X	X	X	X			
Ptilophora pectinata	M & K 93							X	X	
Ptilophora prolifera	H & WR 90, W & G 94	X	X							
Ptilothamnion schmitzii	G 72			X	X	X	X			
Ptilothamnion subsimplex	G 72				X					
Pugetia sp.	M & K 93							X		
Radiathamnion speleotis	GM & K 81				X	X				
Reptataxis rhizophora	M & K 93									X
Rhabdonia clavigera	W 94			X	X	X				
Rhabdonia coccinea	W 94	X	X	X	X	X	X			
Rhabdonia verticillata	M & K 93, W 94			X	X	X	X	X		
Rhipidothamnion secundum	M & K 93							X	X	
Rhodoglossum gigartinoides	W & E 94	X	X	X	X	X	X			
Rhodopeltis australis	H & WR 90, W 94	X	X	X	X	X				
Rhodopeltis borealis	H & WR 90	X								
Rhodophyllis gunnii	M & K 93							X		
Rhodophyllis membranacea	W 94			X	X	X	X	X		
Rhodophyllis multipartita	W 94			X	X	X	X			
Rhodophyllis volans	H & WR 90, W 94	X	X	X	X	X				
Rhodymenia (?) anastomosans	M & K 93									X
Rhodymenia australis	H & WR 90, M & K 93	X						X	X	
Rhodymenia leptophylla	M & K 93							X	X	X
Sarcodia ciliata	M & K 93									X
Sarcodia marginata	W 94				X	X				
Sarcomenia delesserioides	H in p., W & S 59	X	X	X	X	X				
Sarconema filiforme	H & WR 90, M & K 93, W 94	X		X				X	X	X
Sarcothalia crassifolia	W & E 94				X	X	X			
Sarcothalia insidiosa	W & E 94			X	X	X	X			
Sarcothalia radula	W & E 94				X	X	X			
Schizymenia dubyi	W & K 94	X	X	X	X	X				
Schmitzia japonica	M & K 93							X	X	
Schmitzia sp.	H in p.	X								
Schottera nicaeensis	M & K 93, W & L 94				X	X	X	X		

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Scinaia aborealis	H & WR 90, M & K 93, W & H 94	X	X	X	X	X		X	X	
Scinaia australis	M & K 93, W & H 94				X	X	X	X	X	
Scinaia caribaea	M & K 93									X
Scinaia howensis	M & K 93									X
Scinaia moniliformis	M & K 93, W & H 94			X	X	X		X		X
Scinaia proliferata	W & H 94					X				
Scinaia tsinglanensis	H in p., M & K 93, W & H 94, H & WR 90	X	X	X	X	X	X	X		X
Sebdenia flabellata	H 93, M & K 93	X								X
Seirospora orientalis	H in p.	X								
Semnocarpa minuta	H in p.	X								
Sheplya australe	G 72, H & WR 90	X	X	X	X	X				
Sheplya claviformis	G 72	X								
Sheplya verticillata	G 72				X	X				
Sheplya wattsii	G 72				X	X	X			
Solieria anastomosa	M & K 93									X
Solieria robusta	H & WR 90, M & K 93, W 94	X	X	X	X	X	X	X	X	X
Solieria tenera	W 94					X				
Sonderopelta coriacea	W 94			X	X	X	X			
Spermothamnion cymosum	G 72, H & WR 90, M & K 93	X	X							X
Spermothamnion miniatum	H & WR 90, M & K 93	X						X		X
Spermothamnion pinnatum	G 72				X	X	X			
Spirocladia barodensis	H in p., M & K 93	X						X	X	
Spongites fruticulosa	WK 88	X	X	X	X	X	X			
Spongoclonium brounianum	H & WR 90	X								
Spongoclonium conspicuum	WL 90	X	X	X	X	X				
Spongoclonium scopula	H & WR 90	X								
Sporolithon ptychoides	WK 88					X				
Spyridea dasyoides	W & C 75	X	X	X	X	X				
Spyridea filamentosa	W & C 75	X	X	X	X	X	X	X		
Spyridea squalida	W & C 75	X	X	X	X	X				
Spyridea tasmanica	W & C 75			X	X	X	X			
Spyridia dasyoides	M & K 93							X		

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Spyridia filamentosa	H & WR 90, M & K 93	X						X	X	X
Spyridia tasmanica	M & K 93							X		
Stenocladia australis	H & WR 90, W 94	X	X	X	X	X				
Stenocladia furcata	W 94				X	X				
Stenogramme interrupta	M & K 93, W & L 94			X	X	X	X	X	X	
Stenogramme leptophylla	W & L 94				X	X				
Stenogramme phyllophoroides	M & K 93							X	X	
Stictosiphonia hookeri	K & P 89, M & K 93			X	X	X	X	X		
Stictosiphonia kelanensis	M & K 93							X	X	
Stictosporum nitophylloides	W 94	X	X	X	X					
Stylonema alsidii	M & K 93, W 94	X	X	X	X	X	X	X		X
Stylonema cornu–cervi	M & K 93, W 94				X	X	X	X		X
Symphyocladia marchantioides	M & K 93							X	X	X
Synarthrophyton patena	T 79, M & WK 88, M & K 93			X	X	X	X	X		
Taenioma perpusillum	H 93, M & K 93	X								X
Tanakaella itonoi	H & GM 94, H in p.	X		X	X					
Tetrathamnion lineatum	WL 68				X	X	X			
Tetrathamnion pyramidatum	WL 68				X					
Tetrathamnion ramosum	WL 68				X					
Thamnocarpus gunnianus	H & WR 90	X								
Thamnoclonium dichotomum	M & K 93, W & L 94	X	X	X	X	X	X	X		
Thamnophyllis lacerata	W 94			X	X		X			
Thuretia australasica	P 75		X	X	X	X				
Thuretia quercifolia	P 75	X	X	X	X	X				
Tiffaniella cymodoceae	G 72		X	X	X					
Tikvahiella candida	W 94				X	X				
Titanoderma pustulatum	WK 88	X	X	X	X	X	X			
Titanophora weberae	H in p., M & K 93	X								X
Tolypiocladia glomerulata	H & WR 90, M & K 93	X								X
Trematocarpus affinis	W 94				X					
Trematocarpus concinnus	W 94					X	X			
Trichidium pedicellatum	N & K 83	X								
Trichogloea requienii	H in p., M & K 93	X								X

Appendix 1C (continued): Species distributions by CONCOM region from the literature: Rhodophyta

Species	Source	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
Tricleocarpa cylindrica	H & B 90, H & WR 90, M & K 93, W & H 94	X						X	X	
Trithamnion cf. tetrapinnum	M & K 93									X
Trithamnion gracilissimum	WL 68		X	X	X					
Trithamnion tenellum	WL 68, H & WR 90	X								
Trithamnion tetrapinnum	WL 68				X					
Trithamnion vulgare	WL 68			X	X	X	X			
Tsengia comosa	W & K 94			X	X	X				
Tsengia feredayae	W & K 94			X	X	X	X			
Tsengia laingii	W & K 94					X				
Tylotus obtusatus	H & WR 90, W & K 94	X	X	X	X	X				
Valeriemaya geminata	M & K 93							X		
Valeriemaya maculata	M & K 93								X	
Vanvoorstia bennettiana	M & K 93							X		
Vanvoorstia spectabilis	M & K 93									X
Warrenia comosa	WL 71				X	X	X			
Webervanbossea kaliformis	H & WR 90	X								
Webervanbossea splachnoides	H in p.	X								
Wollastoniella mucronata	G 72					X				
Wollastoniella myriophylloides	G 72, H & WR 90	X	X	X	X	X				
Wrangelia abietina	G 72	X								
Wrangelia argus	M & K 93									X
Wrangelia australis	G 72			X	X					
Wrangelia nobilis	G 72				X	X	X			
Wrangelia plumosa	G 72, H & WR 90, M & K 93	X	X	X	X	X	X	X	X	X
Wrangelia princeps	G 72	X	X	X	X	X				
Wrangelia velutina	G 72, H & WR 90	X	X	X	X	X				
Yamadaella cenomyce	M & K 93, H in p.	X						X		X
Zymurgia chondriopsidea	L & K 92, W & L 94				X	X	X			

Appendix 2: Red algal species for which details of distribution in Australia could not be found

Appendix 2: Red algal species for which details of distribution in Australia could not be found

Order	Family	Genus	No. of Species
Corallinales	Corallinales	*Amphiroa*	1
Corallinales	Corallinales	*Arthrocladia*	1
Corallinales	Corallinales	*Cheilosporum*	1
Corallinales	Corallinales	*Corallina*	1
Corallinales	Corallinales	*Jania*	1
Rhodymeniales	Rhodymeniales	*Botryocladia*	4
Rhodymeniales	Rhodymeniales	*Cenacrum*	1
Rhodymeniales	Rhodymeniales	*Ceratodictyon*	1
Rhodymeniales	Rhodymeniales	*Chrysymeia*	4
Rhodymeniales	Rhodymeniales	*Coelarthrum*	2
Rhodymeniales	Rhodymeniales	*Coelothrix*	1
Rhodymeniales	Rhodymeniales	*Cordylecladia*	1
Rhodymeniales	Rhodymeniales	*Drouetia*	1
Rhodymeniales	Rhodymeniales	*Epymenia*	3
Rhodymeniales	Rhodymeniales	*Erythrocolon*	1
Rhodymeniales	Rhodymeniales	*Erythrymenia*	1
Rhodymeniales	Rhodymeniales	*Faucheopsis*	1
Rhodymeniales	Rhodymeniales	*Gelidiopsis*	3
Rhodymeniales	Rhodymeniales	*Gloiocolax*	1
Rhodymeniales	Rhodymeniales	*Gloioderma*	5
Rhodymeniales	Rhodymeniales	*Gloiodermaopsis*	1
Rhodymeniales	Rhodymeniales	*Gloiosaccion*	3
Rhodymeniales	Rhodymeniales	*Halichrysis*	1
Rhodymeniales	Rhodymeniales	*Hymenocladia*	6
Rhodymeniales	Rhodymeniales	*Leptofauchea*	1
Rhodymeniales	Rhodymeniales	*Leptosomia*	1
Rhodymeniales	Rhodymeniales	*Lomentaria*	8
Rhodymeniales	Rhodymeniales	*Rodymenia*	12
Rhodymeniales	Rhodymeniales	*Webervanbossea*	2
Palmariales	Palmariales	*Palmaria*	1
Bonnemaisoniales	Bonnemaisoniales	*Asparagopsis*	2
Bonnemaisoniales	Bonnemaisoniales	*Bonnemaisonia*	1
Bonnemaisoniales	Bonnemaisoniales	*Delisea*	5

Appendix 2 (continued): Red algal species for which details of distribution in Australia could not be found

Order	Family	Genus	No. of Species
Bonnemaisoniales	Bonnemaisoniales	*Leptophyllis*	1
Bonnemaisoniales	Bonnemaisoniales	*Naccaria*	1
Bonnemaisoniales	Bonnemaisoniales	*Ptilonia*	4
Bonnemaisoniales	Bonnemaisoniales	*Anisoschizus*	1
Ceramiales	Ceramiaceae	*Balliella*	4
Ceramiales	Ceramiales	*Callithamnion*	1
Ceramiales	Ceramiales	*Centrocerus*	3
Ceramiales	Ceramiales	*Dasyptilon*	1
Ceramiales	Ceramiales	*Dasythaniella*	1
Ceramiales	Ceramiales	*Diapse*	1
Ceramiales	Ceramiales	*Euptilota*	3
Ceramiales	Ceramiales	*Glandothamnus*	4
Ceramiales	Ceramiales	*Gymnophycus*	2
Ceramiales	Ceramiales	*Gymnothamnion*	1
Ceramiales	Ceramiales	*Haloplegma*	2
Ceramiales	Ceramiales	*Lasiothalia*	1
Ceramiales	Ceramiales	*Lophoth–amnion*	1
Ceramiales	Ceramiales	*Microcladia*	2
Ceramiales	Ceramiales	*Monosporus*	3
Ceramiales	Ceramiales	*Muellerena*	1
Ceramiales	Ceramiales	*Periscelia*	1
Ceramiales	Ceramiales	*Pleonosporium*	5
Ceramiales	Ceramiales	*Psilothalia*	1
Ceramiales	Ceramiales	*Pterothamnion*	1
Ceramiales	Ceramiales	*Ptilota*	1
Ceramiales	Ceramiales	*Rhipidothamnion*	1
Ceramiales	Ceramiales	*Rhodocallis*	1
Ceramiales	Ceramiales	*Scageliopsis*	1
Ceramiales	Ceramiales	*Seirospora*	1
Ceramiales	Ceramiales	*Spencerella*	1
Ceramiales	Ceramiales	*Thamnocarpus*	1
Ceramiales	Ceramiales	*Abroteia*	1
Ceramiales	Ceramiales	*Acrosorium*	2

Appendix 2 (continued): Red algal species for which details of distribution in Australia could not be found

Order	Family	Genus	No. of Species
Ceramiales	Delessariaceae	*Apoglossum*	3
Ceramiales	Delessariaceae	*Branchioglossum*	1
Ceramiales	Delessariaceae	*Caloglossa*	4
Ceramiales	Delessariaceae	*Chauviniella*	1
Ceramiales	Delessariaceae	*Claudea*	1
Ceramiales	Delessariaceae	*Crasingula*	2
Ceramiales	Delessariaceae	*Delesseria*	3
Ceramiales	Delessariaceae	*Erythroglossum*	2
Ceramiales	Delessariaceae	*Gonimophyllum*	1
Ceramiales	Delessariaceae	*Halicnide*	1
Ceramiales	Delessariaceae	*Hemineura*	1
Ceramiales	Delessariaceae	*Heterodoxia*	1
Ceramiales	Delessariaceae	*Hymenena*	9
Ceramiales	Delessariaceae	*Laingia*	1
Ceramiales	Delessariaceae	*Malalaconema*	1
Ceramiales	Delessariaceae	*Marionella*	1
Ceramiales	Delessariaceae	*Martensia*	5
Ceramiales	Delessariaceae	*Myriogramme*	7
Ceramiales	Delessariaceae	*Nitophyllum*	3
Ceramiales	Delessariaceae	*Phitymophora*	2
Ceramiales	Delessariaceae	*Phycodrys*	2
Ceramiales	Delessariaceae	*Platyclinia*	4
Ceramiales	Delessariaceae	*Polycoryne*	1
Ceramiales	Delessariaceae	*Rhodoseris*	1
Ceramiales	Delessariaceae	*Sarcothrichia*	2
Ceramiales	Delessariaceae	*Schizoseris*	2
Ceramiales	Delessariaceae	*Sympodophyllum*	1
Ceramiales	Delessariaceae	*Taenioma*	2
Ceramiales	Delessariaceae	*Vanvoorstia*	1
Ceramiales	Delessariaceae	*Womersleya*	1
Ceramiales	Delessariaceae	*Dictyurus*	1
Ceramiales	Dasyceae	*Colacodasya*	1
Ceramiales	Dasyceae	*Acanthophora*	2

Appendix 2 (continued): Red algal species for which details of distribution in Australia could not be found

Order	Family	Genus	No. of Species
Ceramiales	Dasyceae	*Acrocystis*	1
Ceramiales	Rhodymelaceae	*Amansia*	8
Ceramiales	Rhodymelaceae	*Aphanocladia*	5
Ceramiales	Rhodymelaceae	*Bryocladia*	1
Ceramiales	Rhodymelaceae	*Carradoria*	1
Ceramiales	Rhodymelaceae	*Chamaethamnion*	1
Ceramiales	Rhodymelaceae	*Chiracanthia*	2
Ceramiales	Rhodymelaceae	*Cladhymenia*	3
Ceramiales	Rhodymelaceae	*Cladurus*	1
Ceramiales	Rhodymelaceae	*Cliftonia*	1
Ceramiales	Rhodymelaceae	*Coeloclonium*	2
Ceramiales	Rhodymelaceae	*Dasyclonium*	6
Ceramiales	Rhodymelaceae	*Dawsoniocolax*	1
Ceramiales	Rhodymelaceae	*Dictymenia*	3
Ceramiales	Rhodymelaceae	*Digenia*	1
Ceramiales	Rhodymelaceae	*Diplocladia*	1
Ceramiales	Rhodymelaceae	*Dipterosiphonia*	1
Ceramiales	Rhodymelaceae	*Dolichoschelis*	1
Ceramiales	Rhodymelaceae	*Echinosporangium*	1
Ceramiales	Rhodymelaceae	*Echinothamnion*	4
Ceramiales	Rhodymelaceae	*Enantocladia*	2
Ceramiales	Rhodymelaceae	*Endosiphonia*	2
Ceramiales	Rhodymelaceae	*Gonatogenia*	1
Ceramiales	Rhodymelaceae	*Halodictyon*	2
Ceramiales	Rhodymelaceae	*Herpopteros*	1
Ceramiales	Rhodymelaceae	*Herposiphonia*	15
Ceramiales	Rhodymelaceae	*Heterocladia*	1
Ceramiales	Rhodymelaceae	*Holotrichia*	1
Ceramiales	Rhodymelaceae	*Janczewskia*	1
Ceramiales	Rhodymelaceae	*Jeannerettia*	3
Ceramiales	Rhodymelaceae	*Kuetzingia*	1
Ceramiales	Rhodymelaceae	*Lenormandia*	1
Ceramiales	Rhodymelaceae	*Lenormadiopsis*	8

Appendix 2 (continued): Red algal species for which details of distribution in Australia could not be found

Order	Family	Genus	No. of Species
Ceramiales	Rhodymelaceae	*Leveilla*	3
Ceramiales	Rhodymelaceae	*Lophocladia*	1
Ceramiales	Rhodymelaceae	*Lophosiphonia*	1
Ceramiales	Rhodymelaceae	*Metamorphe*	1
Ceramiales	Rhodymelaceae	*Microcolax*	1
Ceramiales	Rhodymelaceae	*Micropeuce*	1
Ceramiales	Rhodymelaceae	*Neurymenia*	4
Ceramiales	Rhodymelaceae	*Osmundaria*	1
Ceramiales	Rhodymelaceae	*Pityphycos*	1
Ceramiales	Rhodymelaceae	*Pleurostichidium*	1
Ceramiales	Rhodymelaceae	*Protokeutzingia*	1
Ceramiales	Rhodymelaceae	*Pterosiphonia*	1
Ceramiales	Rhodymelaceae	*Rhodolophia*	1
Ceramiales	Rhodymelaceae	*Sondrella*	1
Ceramiales	Rhodymelaceae	*Spirocladia*	1
Ceramiales	Rhodymelaceae	*Sporoglossum*	1
Ceramiales	Rhodymelaceae	*Streblocladia*	1
Ceramiales	Rhodymelaceae	*Symphocladia*	1
Ceramiales	Rhodymelaceae	*Thaumatella*	2
Ceramiales	Rhodymelaceae	*Tolypiocladia*	1
Ceramiales	Rhodymelaceae	*Trigenea*	2
Ceramiales	Rhodymelaceae	*Tylocolax*	1
Ceramiales	Rhodymelaceae	*Veleroa*	1
Ceramiales	Rhodymelaceae	*Vidalia*	4
Ceramiales	Rhodymelaceae	*Wilsonaea*	1
TOTAL NUMBER OF SPECIES			325

Source: Kraft and Woelkerling 1990

Appendix 3: species sorted by number of CONCOM regions in which they occur

Key to CONCOM regions

LWC	Lower West Coast
SWC	South West Coast
GAB	Great Australian Bight
SGC	South Gulfs Coast
BS	Bass Strait
TC	Tasmanian Coast
LEC	Lower East Coast
LHI	Lord Howe Island

Notes:

Species have been sorted in the following ways:

- by number of CONCOM regions in which they occur (from those occurring in one region to those occurring in all nine regions)
- in order of region from tropical to cold temperate CEC, LHI, LEC, SWC, LWC, GAB, SGC, BS, TC)
- in order of Phylum (Chlorophyta, Phaeophyta and Rhodophyta).

Appendix 3: Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
C	*Boergesenia forbesii*								X	
C	*Caulerpa hodgkinsoniae*								X	
C	*Caulerpa verticillata*								X	
C	*Halimeda discoidea*								X	
P	*Distromium decumbens*								X	
R	*Acrosymphyton tenax*								X	
R	*Baldockia verticillata*								X	
R	*Bostrychia simpliciuscula*								X	
R	*Branchioglossum epiphyticum*								X	
R	*Callithamniella cf. flexilis*								X	
R	*Callithamnion arrawarricum*								X	
R	*Caloglossa adnata*								X	
R	*Chondria viticulosa*								X	
R	*Cryptonemia obovata*								X	
R	*Fernandosiphonia nana*								X	
R	*Gloiocladia rubrispora*								X	
R	*Griffithsia subcylindrica*								X	
R	*Hypnea saidana*								X	
R	*Naccaria naccarioides*								X	
R	*Platoma izunosimensis*								X	
R	*Polysiphonia beaudettei*								X	
R	*Valeriemaya maculata*								X	
C	*Avrainvillea calathina*									X
C	*Caulerpa taxifolia*									X
C	*Caulerpa webbiana*									X
C	*Caulerpella ambigua*									X
C	*Chaetomorpha javanica*									X
C	*Cladophora colabense*									X
C	*Cladophora cymopoliae*									X
C	*Cladophora dotyana*									X
C	*Cladophora glomerata*									X
C	*Cladophora goweri*									X
C	*Cladophora liebetruthii*									X

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
C	*Cladophora ohkuboana*									X
C	*Cladophora patentiramea*									X
C	*Cladophora rupestris*									X
C	*Cladophora ryukyuensis*									X
C	*Cladophoropsis carolinensis*									X
C	*Codium platyclados*									X
C	*Enteromorpha howensis*									X
C	*Enteromorpha multiramosa*									X
C	*Halimeda copiosa*									X
C	*Neomeris mucosa*									X
C	*Polyphysa parvula*									X
C	*Rhipiliopsis howensis*									X
C	*Spongocladia vaucheriaeformis*									X
C	*Valoniopsis pachynema*									X
C	*Ventricaria sp. as Valonia forbesii*									X
P	*Chnoospora implexa*									X
P	*Cutleria mollis*									X
P	*Dictyopteris crassinervia*									X
P	*Dictyopteris delicatula*									X
P	*Dictyopteris repens*									X
P	*Dictyota bartayresii var. plectens*									X
P	*Distromium didymothrix*									X
P	*Feldmannia simplex*									X
P	*Myrionema cf. corunnae*									X
P	*Nemacystis decipiens*									X
P	*Pachydictyon aegerrime*									X
P	*Ralfsia expansa*									X
P	*Rosenvingea orientalis*									X
P	*Sargassum brachyphyllum*									X
P	*Sargassum compactum*									X
P	*Sargassum dasyphyllum*									X
P	*Sargassum macrophyllum*									X
P	*Sphacelaria cf. spuria*									X

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
P	*Stypopodium australasicum*									X
P	*Stypopodium flabelliforme var. rhabdoides*									X
R	*Amansia glomerata*									X
R	*Amphiroa howensis*									X
R	*Antithamnion makroklonion*									X
R	*Balliella grandis*									X
R	*Bangia simplex*									X
R	*Bostrychia tenella*									X
R	*Ceramium ciliatum*									X
R	*Ceramium clarionense*									X
R	*Ceramium huysmansii*									X
R	*Ceramium setchellii*									X
R	*Champia vieillardii*									X
R	*Chondria dangeardii*									X
R	*Cirrulicarpus sp.*									X
R	*Cryptonemia umbraticola*									X
R	*Cryptonemia yendoi*									X
R	*Dasya fruiticulosa*									X
R	*Ditria zonaricola*									X
R	*Dudresnaya hawaiiensis*									X
R	*Enantiocladia robinsonii*									X
R	*Episporium centroceratis*									X
R	*Eucheuma deformans*									X
R	*Eucheuma serra*									X
R	*Gelidiella acerosa*									X
R	*Gelidiella bornetii*									X
R	*Gelidiopsis intricata*									X
R	*Gelidiopsis variabilis*									X
R	*Gelidium maidenii*									X
R	*Gibsmithia dotyi*									X
R	*Gigartina macrocarpa*									X
R	*Gracilaria salicornia*									X
R	*Griffithsia heteromorpha*									X

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Gymnogongrus irregularis*									X
R	*Gymnophycus hapsiphorus*									X
R	*Gymnothamnion elegans*									X
R	*Halichrysis depressa*									X
R	*Haloplegma duperreyi*									X
R	*Herposiphonia secunda f. tenella*									X
R	*Hildenbrandia rivularis*									X
R	*Hypoglossum anomalum*									X
R	*Hypoglossum simulans*									X
R	*Jania rubens*									X
R	*Laurencia filiformis f. heteroclada*									X
R	*Laurencia succisa*									X
R	*Laurencia venusta*									X
R	*Lenormandiopsis lorentzii*									X
R	*Liagora howensis*									X
R	*Liagora sinensis*									X
R	*Lithoporella pacifica*									X
R	*Martensia flabelliformis*									X
R	*Melanamansia daemelii*									X
R	*Plocamium hamatum*									X
R	*Polysiphonia baxteri*									X
R	*Polysiphonia gelidii*									X
R	*Polysiphonia implexa*									X
R	*Polysiphonia sparsa*									X
R	*Predaea incraspeda*									X
R	*Pterocladia caerulescens*									X
R	*Pterocladia caloglossoides*									X
R	*Reptataxis rhizophora*									X
R	*Rhodymenia (?) anastomosans*									X
R	*Sarcodia ciliata*									X
R	*Scinaia caribaea*									X
R	*Scinaia howensis*									X
R	*Solieria anastomosa*									X

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Trithamnion cf. tetrapinnum*									X
R	*Vanvoorstia spectabilis*									X
R	*Wrangelia argus*									X
C	*Bryopsis indica f. unilateralis*							X		
C	*Caulerpa filiformis*							X		
C	*Cladophora chartacea*							X		
C	*Cladophora nigrescens*							X		
C	*Cladophora pellucida*							X		
C	*Sporocladopsis novae–zelandiae*							X		
C	*Ulva laetivirens*							X		
P	*Sargassum erosum*							X		
P	*Sargassum flavicans*							X		
P	*Sargassum fragile*							X		
P	*Sargassum globulariaefolium*							X		
P	*Sargassum linearifolium var. serrulatum*							X		
P	*Sargassum polyacanthum*							X		
P	*Sargassum robustum*							X		
P	*Tinocladia irregularis*							X		
P	*Tomaculopsis herbertiana*							X		
R	*Anotrichium crinitum*							X		
R	*Aphanocladia delicatula*							X		
R	*Audouinella concrescens*							X		
R	*Audouinella purpurea*							X		
R	*Bangia atropurpurea*							X		
R	*Batrachospermum attrum*							X		
R	*Batrachospermum suecicum*							X		
R	*Batrachospermum virgato–decaisneanun*							X		
R	*Callophyllis depressa*							X		
R	*Ceramium vagabunde*							X		
R	*Chrysymenia digitata*							X		
R	*Cladhymenia coronata*							X		
R	*Compsopogon coeruleus*							X		

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Cryptonemia sp.*							X		
R	*Curdiea angustata*							X		
R	*Dasya capillaris*							X		
R	*Dasya wilsonis*							X		
R	*Delesseria aemula*							X		
R	*Erythrotrichia australis*							X		
R	*Falkenbergia olens*							X		
R	*Fosliella farinosa*							X		
R	*Gelidium caulacantheum*							X		
R	*Gigartina aciculifera*							X		
R	*Glandothamnus ramulentus*							X		
R	*Glaphyrymenia cf. pustulosa*							X		
R	*Gloiocladia iyoensis*							X		
R	*Gloiocladia minutula*							X		
R	*Gracilaria bifaria*							X		
R	*Grateloupia urvilleana*							X		
R	*Gymnogongrus fastigiatus*							X		
R	*Halichrysis concrescens*							X		
R	*Haraldiophyllum sinuosum*							X		
R	*Hildenbrandia sp.*							X		
R	*Kallymenia brachycystidea*							X		
R	*Laurencia papillosa*							X		
R	*Laurencia pygmaea*							X		
R	*Laurencia rigida*							X		
R	*Lenormandia prolifera*							X		
R	*Leptofauchea nitophylloides*							X		
R	*Lithophyllum bermudense*							X		
R	*Lithophyllum pustulatum*							X		
R	*Lomentaria catenata*							X		
R	*Lophosiphonia calothrix*							X		
R	*Lophurella periclados*							X		
R	*Phitymophora amansioides*							X		
R	*Platysiphonia mutabilis*							X		

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Psilosiphon scoparium*							X		
R	*Pugetia sp.*							X		
R	*Rhodophyllis gunnii*							X		
R	*Spyridia dasyoides*							X		
R	*Spyridia tasmanica*							X		
R	*Valeriemaya geminata*							X		
R	*Vanvoorstia bennettiana*							X		
C	*Anadyomene brownii*	X								
C	*Bryopsis foliosa*	X								
C	*Caulerpa fergusonii*	X								
C	*Caulerpa lentillifera*	X								
C	*Caulerpa racemosa f.cylindracea*	X								
C	*Caulerpa serrulata*	X								
C	*Caulerpa webbiana f. disticha*	X								
C	*Caulerpa webbiana f. tomentella*	X								
C	*Dictyosphaeria versluysii*	X								
C	*Penicillus nodulosus*	X								
C	*Rhipiliopsis multiplex*	X								
C	*Siphonocladus tropicus*	X								
P	*Dictyota ciliolata*	X								
P	*Dilophus crinitus*	X								
P	*Padina gymnospora*	X								
P	*Papenfussiella extensa*	X								
P	*Sargassum peronii*	X								
P	*Scoresbeyella profunda*	X								
P	*Sphacelaria chorizocarpa*	X								
P	*Turbinaria gracilis*	X								
R	*Acrosorium minus*	X								
R	*Aglaothamnion cordatum*	X								
R	*Amphiroa gracilis*	X								
R	*Anotrichium licmophorum*	X								
R	*Balliella hirsuta*	X								
R	*Botryocladia obovata*	X								

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Callithamnion crispulum*	X								
R	*Callithamnion debile*	X								
R	*Callithamnion larcinum*	X								
R	*Callithamnion multifidum*	X								
R	*Callithamnion pusillum*	X								
R	*Callophycus costatus*	X								
R	*Callophycus dorsiferus*	X								
R	*Callophycus serratus*	X								
R	*Carpopeltis decipiens*	X								
R	*Carpopeltis elata*	X								
R	*Carpothamnion gunnianum*	X								
R	*Ceramium mazatlanense*	X								
R	*Ceramium sympodiale*	X								
R	*Ceratodictyon spongiosum*	X								
R	*Champia xishaense*	X								
R	*Chauviniella corifolia*	X								
R	*Cheilosporum pulchellum*	X								
R	*Chondria lanceolata*	X								
R	*Chrysymenia kaernbachii*	X								
R	*Claudea elegans*	X								
R	*Cliftonaea pectinata*	X								
R	*Codiophyllum decipiens*	X								
R	*Coelarthrum boergesenii*	X								
R	*Coelarthrum cliftoni*	X								
R	*Coelarthrum muelleri*	X								
R	*Coeloclonium opuntioides*	X								
R	*Coeloclonium umbellulum*	X								
R	*Coeloclonium verticillatum*	X								
R	*Curdiea obesa*	X								
R	*Dasya cliftoni*	X								
R	*Dasya elongata*	X								
R	*Dasya frutescens*	X								
R	*Dasyclonium flaccidum*	X								

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Dictymenia sonderi*	X								
R	*Diplothamnion gordoniae*	X								
R	*Ditria expleta*	X								
R	*Dotyophycus abbottiae*	X								
R	*Erythroclonium sedoides*	X								
R	*Eucheuma denticulatum*	X								
R	*Eucheuma gelatinum*	X								
R	*Eucheuma speciosum*	X								
R	*Euptilota coralloidea*	X								
R	*Fosliella cruciata*	X								
R	*Ganonema farinosa*	X								
R	*Gelidiella ramellosa*	X								
R	*Gloiocladia halymenioides*	X								
R	*Gloiosaccion brownii*	X								
R	*Gloiotrichus fractalis*	X								
R	*Gracilaria canaliculata*	X								
R	*Gracilaria preissiana*	X								
R	*Guiryella repens*	X								
R	*Halichrysis peltata*	X								
R	*Halodictyon robustum*	X								
R	*Haloplegma preissi*	X								
R	*Halymenia floresia*	X								
R	*Halymenia harveyana*	X								
R	*Hemineura frondosa*	X								
R	*Herposiphonia pectinella*	X								
R	*Herposiphonia rostrata*	X								
R	*Heterodoxia denticulata*	X								
R	*Heterosiphonia callithamnion*	X								
R	*Heterosiphonia multiceps*	X								
R	*Heterostroma nereidis*	X								
R	*Holotrichia comosa*	X								
R	*Hymenocladia conspersa*	X								
R	*Hymenocladia dactyloides*	X								

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Hypnea episcopalis*	X								
R	*Hypnea musciformis*	X								
R	*Jania affinis*	X								
R	*Jania pulchella*	X								
R	*Jania verrucosa*	X								
R	*Jeannerettia pedicillata*	X								
R	*Kuetzingia angusta*	X								
R	*Kuetzingia canaliculata*	X								
R	*Lenormandia marginata*	X								
R	*Lenormandia spectabilis*	X								
R	*Lenormandiopsis latifolia*	X								
R	*Liagora australasica*	X								
R	*Liagora setchellii*	X								
R	*Lomentaria corallicola*	X								
R	*Mastophora licheniformis*	X								
R	*Mastophora pacifica*	X								
R	*Melanamansia serrata*	X								
R	*Metagoniolithon chara var. dichotomum*	X								
R	*Monosporus australis*	X								
R	*Myriogramme erosa*	X								
R	*Nemastoma damaecornis*	X								
R	*Neurymenia fraxinifolia*	X								
R	*Nitophyllum pulchellum*	X								
R	*Osmundaria spiralis*	X								
R	*Placophora binderi*	X								
R	*Platysiphonia hypneoides*	X								
R	*Polysiphonia ferulacea*	X								
R	*Protokeutzingia australasica*	X								
R	*Psilothalia siliculosa*	X								
R	*Psilothalia striata*	X								
R	*Pterocladia caespitosa*	X								
R	*Rhodopeltis borealis*	X								
R	*Schmitzia sp.*	X								

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Seirospora orientalis*	X								
R	*Semnocarpa minuta*	X								
R	*Sheplya claviformis*	X								
R	*Spongoclonium brounianum*	X								
R	*Spongoclonium scopula*	X								
R	*Thamnocarpus gunnianus*	X								
R	*Trichidium pedicellatum*	X								
R	*Trithamnion tenellum*	X								
R	*Webervanbossea kaliformis*	X								
R	*Webervanbossea splachnoides*	X								
R	*Wrangelia abietina*	X								
P	*Hapalospongidion capitatum*		X							
R	*Griffithsia balara*		X							
C	*Cladophoropsis magna*			X						
C	*Codium silvae*			X						
R	*Audouinella phacelorhiza*			X						
R	*Kallymenia rubra*			X						
R	*Mychodea spinulifera*			X						
R	*Platythamnion francisianum*			X						
C	*Cladophora aegagropiloidea*				X					
C	*Enteromorpha paradoxa*				X					
C	*Rhipilia pusilla*				X					
C	*Rhizoclonium curvatum*				X					
C	*Rhizoclonium tortuosum*				X					
C	*Rosenvingiella polyrhiza*				X					
P	*Acrotrichium amphiibolis*				X					
P	*Arthrocladia villosa*				X					
P	*Dictyopteris gracilis*				X					
P	*Discosporangium mesarthrocarpum*				X					
P	*Myriactula arabica*				X					
P	*Myriactula caespitosa*				X					
P	*Myriactula filiformis*				X					
P	*Myrionema latipilosum*				X					

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
P	*Myrionema myriodesmae*				X					
P	*Spatoglossum australasicum*				X					
P	*Sphacelaria brachygonia*				X					
P	*Sphacelaria implicata*				X					
P	*Strepsithalia aemula*				X					
P	*Strepsithalia leathesiae*				X					
P	*Zosterocarpus australica*				X					
R	*Acrothamnion arcuatum*				X					
R	*Amoenothamnion elongatum*				X					
R	*Amoenothamnion minimum*				X					
R	*Anothrichium subtile*				X					
R	*Antithamnion diminuatum*				X					
R	*Audouinella blumii*				X					
R	*Audouinella nakamurae*				X					
R	*Audouinella simplex*				X					
R	*Champia parvula var. amphibolis*				X					
R	*Chylocladia grandis*				X					
R	*Crouania destriana*				X					
R	*Euptilocladia villosa*				X					
R	*Heterothamnion sessile*				X					
R	*Interthamnion attenuatum*				X					
R	*Perithamnion densum*				X					
R	*Polysiphonia haplodasyae*				X					
R	*Polysiphonia propagulifera*				X					
R	*Polysiphonia shepherdii*				X					
R	*Porphyridium purpureum*				X					
R	*Ptilothamnion subsimplex*				X					
R	*Tetrathamnion pyramidatum*				X					
R	*Tetrathamnion ramosum*				X					
R	*Trematocarpus affinis*				X					
R	*Trithamnion tetrapinnum*				X					
C	*Anadyomene stellata*					X				
C	*Cladophora vadorum*					X				

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
C	*Prasiola stipitata*					X				
P	*Asperococcus compressus*					X				
P	*Cystophora cymodoceae*					X				
P	*Elachista claytoniae*					X				
P	*Hinksia ovata*					X				
P	*Kuetzingiella sp.*					X				
P	*Nereia lophocladia*					X				
P	*Sorocarpus micromorus*					X				
P	*Sphacelaria spuria*					X				
P	*Streblonema fasciculatum*					X				
R	*Ahnfeltiopsis fastigiata*					X				
R	*Ahnfeltiopsis humilis*					X				
R	*Ballia pennoides*					X				
R	*Bangia atropurpurea subsp. brevisegmenta*					X				
R	*Chondria arcuata*					X				
R	*Chondria hieroglyphica*					X				
R	*Chondria subsecunda*					X				
R	*Gloiophloea rosea*					X				
R	*Griffithsia pilalyea*					X				
R	*Helminthocladia beaugleholei*					X				
R	*Hormophora australasica*					X				
R	*Lithoporella melobesioides*					X				
R	*Polysiphonia pungens*					X				
R	*Scinaia proliferata*					X				
R	*Solieria tenera*					X				
R	*Sporolithon ptychoides*					X				
R	*Tsengia laingii*					X				
R	*Wollastoniella mucronata*					X				
C	*Codium dimorphum*						X			
C	*Prasiola crispa*						X			
C	*Urospora pencilliformis*						X			
P	*Adenocystis utricularis*						X			
P	*Gononema ramosum*						X			

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
P	*Halopteris novae–zelandiae*						X			
P	*Myrionema incommodum*						X			
P	*Papenfussiella lutea*						X			
P	*Scytothamnus fasciculatus*						X			
R	*Aeodes nitidissima*						X			
R	*Ballia hirsuta*						X			
R	*Champia insignis*						X			
R	*Cirrulicarpus polycoelioides*						X			
R	*Erythrotrichia foliiformis*						X			
R	*Gigartina recurva*						X			
R	*Grateloupia intestinalis*						X			
R	*Grateloupia tasmanica*						X			
R	*Phymatolithon calcareum*						X			
R	*Polysiphonia abscissoides*						X			
R	*Polysiphonia adamsiae*						X			
C	*Codium arabicum*								X	X
P	*Dictyota acutiloba*								X	X
P	*Homoeostrichus flabellatus*								X	X
R	*Champia expansa*								X	X
R	*Chondria armata*								X	X
R	*Herposiphonia subdisticha*								X	X
R	*Hypnea spinella*								X	X
R	*Meristotheca procumbens*								X	X
R	*Plocamium microcladioides*								X	X
C	*Codium saccatum*							X	X	
C	*Derbesia cf. marina*							X	X	
P	*Chnoospora minima*							X	X	
P	*Endarachne binghamiae*							X	X	
P	*Scytosiphon simplicissimus*							X	X	
R	*Acrosorium decumbens*							X	X	
R	*Anotrichium planatum*							X	X	
R	*Antithamnion amphigeneum*							X	X	
R	*Apoglossum unguiculescens*							X	X	

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Bostrychia tenella ssp. flagellifera*							X	X	
R	*Botryocladia ebriosa*							X	X	
R	*Callithamnion korffense*							X	X	
R	*Callophycus tridentifer*							X	X	
R	*Callophyllis sp.*							X	X	
R	*Caloglossa ogasawaraensis*							X	X	
R	*Ceramium lentiforme*							X	X	
R	*Cheilosporum sagittatum*							X	X	
R	*Chrysymenia ornata*							X	X	
R	*Corallina berteri*							X	X	
R	*Curdiea crassa*							X	X	
R	*Dasya cernua*							X	X	
R	*Dasya iyengarii*							X	X	
R	*Dasya trichophora*							X	X	
R	*Dictyothamnion saltatum*							X	X	
R	*Gigartina australis*							X	X	
R	*Gracilaria halogenea*							X	X	
R	*Gracilaria veleroae*							X	X	
R	*Gracilaria verrucosa*							X	X	
R	*Grateloupia filicina*							X	X	
R	*Griffithsia japonica*							X	X	
R	*Griffithsia metcalfii*							X	X	
R	*Halichrysis coalescens*							X	X	
R	*Halymenia elongata*							X	X	
R	*Herposiphonia calva*							X	X	
R	*Hypnea boergesenii*							X	X	
R	*Hypnea johnstonii*							X	X	
R	*Jania crassa*							X	X	
R	*Kallymenia rosea*							X	X	
R	*Laurencia obtusa*							X	X	
R	*Laurencia obtusa var. compacta*							X	X	
R	*Laurencia tenera*							X	X	
R	*Lomentaria monochlamydea*							X	X	

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Melanthalia polydactylis*							X	X	
R	*Micropeuce mucronata*							X	X	
R	*Pachymenia prostrata*							X	X	
R	*Patulophycus eclipes*							X	X	
R	*Pleonosporium boergesenii*							X	X	
R	*Polysiphonia sphaerocarpa*							X	X	
R	*Predaea kraftiana*							X	X	
R	*Pterosiphonia pennata*							X	X	
R	*Ptilophora pectinata*							X	X	
R	*Rhipidothamnion secundum*							X	X	
R	*Schmitzia japonica*							X	X	
R	*Stenogramme phyllophoroides*							X	X	
R	*Stictosiphonia kelanensis*							X	X	
C	*Chaetomorpha antennina*							X		X
C	*Codium extricatum*							X		X
C	*Struvea baterumensis*							X		X
P	*Sargassum angustifolium*							X		X
P	*Sargassum cf. leptopodum sensu*							X		X
P	*Sargassum howeanum*							X		X
P	*Sargassum lophocarpum*							X		X
P	*Sargassum spinifex*							X		X
R	*Balliella repens*							X		X
R	*Gracilaria edulis*							X		X
R	*Gracilaria secundata*							X		X
R	*Hypnea cenomyce*							X		X
R	*Lophosiphonia reptabunda*							X		X
R	*Meridiocolax bracteata*							X		X
R	*Myriogramme bombayensis*							X		X
C	*Valonia macrophysa*	X							X	
R	*Polysiphonia gracilis*	X							X	
C	*Boodlea composita*	X								X
C	*Caulerpa cupressoides*	X								X
C	*Caulerpa racemosa*	X								X

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
C	*Codium bulbopilum*	X								X
C	*Dictyosphaeria cavernosa*	X								X
P	*Dictyopteris plagiogramma*	X								X
P	*Padina boergesenii*	X								X
R	*Acanthophora spicifera*	X								X
R	*Antithamnion antillanum*	X								X
R	*Apoglossum spathulatum*	X								X
R	*Asparagopsis taxiformis*	X								X
R	*Botryocladia leptopoda*	X								X
R	*Botryocladia skottsbergii*	X								X
R	*Coelothrix irregularis*	X								X
R	*Endosiphonia spinuligera*	X								X
R	*Epiphloea bullosa*	X								X
R	*Meristotheca papulosa*	X								X
R	*Monosporus indicus*	X								X
R	*Pleonosporium caribaeum*	X								X
R	*Predaea weldii*	X								X
R	*Sebdenia flabellata*	X								X
R	*Taenioma perpusillum*	X								X
R	*Titanophora weberae*	X								X
R	*Tolypiocladia glomerulata*	X								X
R	*Trichogloea requienii*	X								X
P	*Hormophysa cuneiformis*	X						X		
P	*Hormophysa triquetra*	X						X		
R	*Asparagopsis armata*	X						X		
R	*Dictymenia tridens*	X						X		
R	*Gracilaria textorii*	X						X		
R	*Jania micrarthrodia*	X						X		
R	*Platysiphonia delicata*	X						X		
C	*Caulerpa distichophylla*	X	X							
C	*Caulerpa racemosa var. laetevirens*	X	X							
P	*Cystophora harveyi*	X	X							
P	*Cystophora tenuis*	X	X							

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
P	*Myriodesma serrulatum*	X	X							
P	*Platythalia angustifolia*	X	X							
P	*Platythalia quercifolia*	X	X							
P	*Polycerea zostericola*	X	X							
P	*Sphacelaria multiplex*	X	X							
R	*Brongniartella australis forma recurva*	X	X							
R	*Codiophyllum flabelliforme*	X	X							
R	*Halymenia floresia subsp. floresia*	X	X							
R	*Hydrolithon onkodes*	X	X							
R	*Polysiphonia forfex*	X	X							
R	*Ptilophora prolifera*	X	X							
R	*Polysiphonia brevisegmenta*			X						X
P	*Padina sanctae–crucis*	X		X						
R	*Chondria lanceolata*	X		X						
R	*Kallymenia spinosa*	X		X						
R	*Predaea huismanii*	X		X						
C	*Dasycladus densus*		X	X						
C	*Pseudocodium australasicum*		X	X						
R	*Gibsmithia womersleyi*		X	X						
C	*Enteromorpha flexuosa*				X					X
C	*Enteromorpha ralfsii*				X					X
R	*Audouinella barbadensis*				X					X
R	*Audouinella liagorae*				X					X
R	*Anothrichium tenue*				X			X		
R	*Antithamnionella spirographidis*				X			X		
C	*Cladophora montagneana*	X			X					
P	*Sargassum decurrens*	X			X					
R	*Polysiphonia teges*		X		X					
C	*Rhipiliopsis robusta*			X	X					
C	*Ulvaria shepherdii*			X	X					
P	*Corynophlaea cristata*			X	X					
P	*Flabellonema codii*			X	X					
P	*Myriodesma harveyanum*			X	X					

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
P	*Myriodesma tuberosum*			X	X					
P	*Scoresbyella profunda*			X	X					
P	*Sphacelaria novae–caledoniae*			X	X					
P	*Sphacella subtilissima*			X	X					
P	*Sporochnema tomentosum*			X	X					
R	*Chondria suprabulbosa*			X	X					
R	*Gelidiella antipai*			X	X					
R	*Hildenbrandia crouanii*			X	X					
R	*Laurencia aldingensis*			X	X					
R	*Laurencia brandenii*			X	X					
R	*Medeiothamnion repens*			X	X					
R	*Peyssonnelia boudouresquei*			X	X					
R	*Peyssonnelia foliosa*			X	X					
R	*Wrangelia australis*			X	X					
P	*Colpomenia ecuticulata*					X				X
P	*Petrospongium rugosum*					X		X		
R	*Catenella nipae*					X		X		
R	*Chondria myriopoda*					X		X		
R	*Cryptonemia nitophylloides*					X		X		
R	*Deucalion levringii*					X		X		
R	*Platythamnion cuspidatum*					X		X		
C	*Bryopsis minor*				X	X				
C	*Caulerpa alternans*				X	X				
C	*Caulerpa simpliciuscula var. laxa*				X	X				
C	*Ulothrix subflaccida*				X	X				
P	*Homoeostrichus canaliculatus*				X	X				
P	*Myriotrichia clavaeformis*				X	X				
P	*Xiphophora chondrophylla*				X	X				
R	*Antithamnionella glandifera*				X	X				
R	*Audouinella humilis*				X	X				
R	*Audouinella macula*				X	X				
R	*Audouinella plumosa*				X	X				
R	*Audouinella polyidis*				X	X				

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Audouinella porphyrae*				X	X				
R	*Callophycus laxus*				X	X				
R	*Chondria foliifera*				X	X				
R	*Compsothamnionella huismanii*				X	X				
R	*Crouania shepleyana*				X	X				
R	*Cryptonemia digitata*				X	X				
R	*Erythronaema ceramioides*				X	X				
R	*Grateloupia ovata*				X	X				
R	*Griffithsia gunniana*				X	X				
R	*Gymnogongrus griffithsiae*				X	X				
R	*Halymenia muelleri*				X	X				
R	*Haplodasya tomentosa*				X	X				
R	*Helminthocladia densa*				X	X				
R	*Heterothamnion episiliquosum*				X	X				
R	*Heterothamnion muelleri*				X	X				
R	*Liagora codii*				X	X				
R	*Lophothalia verticillata*				X	X				
R	*Macrothamnion secundum*				X	X				
R	*Peyssonnelia splendens*				X	X				
R	*Radiathamnion speleotis*				X	X				
R	*Sarcodia marginata*				X	X				
R	*Sheplya verticillata*				X	X				
R	*Stenocladia furcata*				X	X				
R	*Stenogramme leptophylla*				X	X				
R	*Tikvahiella candida*				X	X				
R	*Halymenia kraftii*						X	X		
R	*Laurencia distichophylla*						X	X		
R	*Hildenbrandia lecannellieri*				X		X			
C	*Caulerpa annulata*					X	X			
P	*Asteronema ferruginea*					X	X			
P	*Chordaria cladosiphon*					X	X			
P	*Cystophora torulosa*					X	X			
P	*Cystophora xiphocarpa*					X	X			

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
P	*Desmarestia ligulata*					X	X			
P	*Dictyota fenestrata*					X	X			
P	*Elachista australis*					X	X			
P	*Hecatonema maculans*					X	X			
P	*Leathesia intermedia*					X	X			
P	*Lessonia corrugata*					X	X			
P	*Mesogloiopsis tasmanica*					X	X			
P	*Phloiocaulon foecundum*					X	X			
P	*Sporochnus stylosus*					X	X			
P	*Xiphophora gladiata*					X	X			
R	*Audouinella secundata*					X	X			
R	*Austrophyllis harveyana*					X	X			
R	*Chondria subfasciculata*					X	X			
R	*Clathromorphum compactum*					X	X			
R	*Cryptonemia wilsonii*					X	X			
R	*Gigartina muelleriana*					X	X			
R	*Griffithsia antarctica*					X	X			
R	*Hildenbrandia expansa*					X	X			
R	*Laurencia botryoides*					X	X			
R	*Macrothamnion pectenellum*					X	X			
R	*Mastophoropsis canaliculata*					X	X			
R	*Melobesia rosanoffii*					X	X			
R	*Mesophyllum printzianum*					X	X			
R	*Polysiphonia perriniae*					X	X			
R	*Trematocarpus concinnus*					X	X			
C	*Bryopsis indica*							X	X	X
C	*Caulerpa peltata*							X	X	X
C	*Chlorodesmis major*							X	X	X
P	*Dictyota bartayresii*							X	X	X
P	*Dilophus intermedius*							X	X	X
P	*Padina crassa*							X	X	X
P	*Sargassum neurophorum*							X	X	X
P	*Spatoglossum macrodontum*							X	X	X

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
P	*Zonaria diesingiana*							X	X	X
R	*Antithamnionella breviramosa*							X	X	X
R	*Balliella amphiglanda*							X	X	X
R	*Caloglossa leprieurii*							X	X	X
R	*Ceramium codii*							X	X	X
R	*Champia compressa*							X	X	X
R	*Champia parvula*							X	X	X
R	*Chondria infestans*							X	X	X
R	*Crouania capricornica*							X	X	X
R	*Dasya pilosa*							X	X	X
R	*Dipterrosiphonia heteroclada*							X	X	X
R	*Gigartina intermedia*							X	X	X
R	*Nitophyllum delicatum*							X	X	X
R	*Phycodrys australasica*							X	X	X
R	*Platysiphonia marginalis*							X	X	X
R	*Portieria hornemannii*							X	X	X
R	*Rhodymenia leptophylla*							X	X	X
R	*Symphyocladia marchantioides*							X	X	X
P	*Dictyota divaricata*	X							X	X
P	*Stypopodium flabelliforme*	X							X	X
R	*Dudresnaya capricornica*	X							X	X
R	*Euptilota articulata*	X							X	X
R	*Martensia australis*	X							X	X
R	*Martensia elegans*	X							X	X
R	*Acanthophora dendroides*	X						X	X	
R	*Amphiroa anceps*	X						X	X	
R	*Centroceras clavulatum*	X						X	X	
R	*Delisea pulchra*	X						X	X	
R	*Hypoglossum heterocystideum*	X						X	X	
R	*Rhodymenia australis*	X						X	X	
R	*Spirocladia barodensis*	X						X	X	
R	*Tricleocarpa cylindrica*	X						X	X	
C	*Trichosolen hainanensis*	X						X		X

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
P	*Padina australis*	X						X		X
R	*Leveillea jungermannioides*	X						X		X
R	*Lophocladia harveyi*	X						X		X
R	*Spermothamnion miniatum*	X						X		X
R	*Yamadaella cenomyce*	X						X		X
C	*Halimeda cuneata*	X	X						X	
C	*Uronema marina*	X	X							X
R	*Spermothamnion cymosum*	X	X							X
C	*Codium laminarioides*	X	X	X						
C	*Codium spinescens*	X	X	X						
P	*Acrocarpia robusta*	X	X	X						
P	*Padina elegans*	X	X	X						
R	*Amphiplexia racemosa*	X	X	X						
R	*Callophycus harveyanus*	X	X	X						
R	*Claviclonium ovatum*	X	X	X						
R	*Cryptonemia kallymenioides*	X	X	X						
R	*Hennedya crispa*	X	X	X						
R	*Hypoglossum dendroides*	X	X	X						
R	*Metamastophora flabellata*	X	X	X						
R	*Pterocladia rectangularis*	X	X	X						
R	*Bornetia tenuis*				X			X	X	
R	*Hypoglossum harveyanum*				X			X	X	
R	*Liagora farinosa*	X			X					X
P	*Elachista orbicularis*	X			X			X		
C	*Chaetomorpha melagonium*		X		X			X		
C	*Derbesia tenuissima*			X	X					X
C	*Cladophora dalmatica*	X		X	X					
R	*Husseyella rubra*	X		X	X					
R	*Tanakaella itonoi*	X		X	X					
C	*Blidingia marginata*		X	X	X					
R	*Tiffaniella cymodoceae*		X	X	X					
R	*Trithamnion gracilissimum*		X	X	X					
P	*Dictyopteris acrostichoides*					X		X	X	

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
P	*Padina fraseri*					X		X		X
C	*Pseudochlorodesmis australis*				X	X			X	
C	*Blidingia minima*				X	X		X		
C	*Chaetomorpha capillaris*				X	X		X		
C	*Entocladia viridis*				X	X		X		
P	*Acinetospora crinita*				X	X		X		
P	*Halopteris platycena*				X	X		X		
R	*Audouinella dictyotae*				X	X		X		
R	*Audouinella floridula*				X	X		X		
R	*Ceramium australe*	X			X	X				
P	*Spermatochnus paradoxus*		X		X	X				
C	*Chlorodesmis baculifera*			X	X	X				
C	*Palmoclathrus stipitatus*			X	X	X				
P	*Chlanidophora microphylla*			X	X	X				
P	*Cystophora intermedia*			X	X	X				
P	*Dilophus angustus*			X	X	X				
P	*Dilophus gunnianus*			X	X	X				
P	*Dilophus tener*			X	X	X				
P	*Feldmannia paradoxa*			X	X	X				
P	*Halopteris ramulosa*			X	X	X				
P	*Myriodesma leptophyllum*			X	X	X				
P	*Pseudolithoderma australis*			X	X	X				
P	*Sphacelaria carpoglossi*			X	X	X				
P	*Strepsithalia liagorae*			X	X	X				
R	*Audouinella unifila*			X	X	X				
R	*Austroclonium charoides*			X	X	X				
R	*Ballia mariana*			X	X	X				
R	*Callophyllis cervicornis*			X	X	X				
R	*Ceramium cupulatum*			X	X	X				
R	*Crouania mucosa*			X	X	X				
R	*Dicranema cincinnalis*			X	X	X				
R	*Erythroclonium angustatum*			X	X	X				
R	*Gelidiella minima*			X	X	X				

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Gloiophyllis barkeriae*			X	X	X				
R	*Gulsonia annulata*			X	X	X				
R	*Halymenia floresia subsp. harveyana*			X	X	X				
R	*Laurencia paniculata*			X	X	X				
R	*Mazoyerella arachnoidea*			X	X	X				
R	*Peyssonnelia dubyi*			X	X	X				
R	*Platoma foliosa*			X	X	X				
R	*Rhabdonia clavigera*			X	X	X				
R	*Tsengia comosa*			X	X	X				
P	*Striaria attenuata*				X		X	X		
R	*Audouinella repens*			X	X		X			
R	*Thamnophyllis lacerata*			X	X		X			
C	*Bryopsis vestita*					X	X			X
R	*Bostrychia harveyi*					X	X			X
P	*Durvillaea potatorum*					X	X	X		
P	*Sargassum vestitum*					X	X	X		
R	*Nothogenia fastigiata*					X	X	X		
C	*Cladophora rhizoclonioidea*	X				X	X			
C	*Caulerpa remotifolia*				X	X	X			
C	*Cladophora bainesii*				X	X	X			
P	*Asperococcus fistulosus*				X	X	X			
P	*Dictyopteris nigricans*				X	X	X			
P	*Ectocarpus fasciculatus*				X	X	X			
P	*Halothrix ephemeralis*				X	X	X			
P	*Kuckuckia spinosa*				X	X	X			
P	*Macrocystis pyrifera*				X	X	X			
P	*Myrionema ramulans*				X	X	X			
P	*Perithalia caudata*				X	X	X			
P	*Punctaria latifolia*				X	X	X			
P	*Seirococcus axillaris*				X	X	X			
P	*Sphacelaria reinkei*				X	X	X			
P	*Stilophora rhizodes*				X	X	X			
R	*Audouinella bonnemaisoniae*				X	X	X			

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Ballia ballioides*				X	X	X			
R	*Ballia scoparia*				X	X	X			
R	*Bornetia ? meredithiana*				X	X	X			
R	*Camontagnea hirsuta*				X	X	X			
R	*Ceramium lenticulare*				X	X	X			
R	*Chondria capreolis*				X	X	X			
R	*Dasyphloea insignis*				X	X	X			
R	*Erythrotrichia ligulata*				X	X	X			
R	*Gelidium asperum*				X	X	X			
R	*Gigartina pinnata*				X	X	X			
R	*Gigartina wehliae*				X	X	X			
R	*Griffithsia crassiuscula*				X	X	X			
R	*Helminthora lindaueri*				X	X	X			
R	*Involucrana meredithiana*				X	X	X			
R	*Kallymenia tasmanica*				X	X	X			
R	*Medeiothamnion protensum*				X	X	X			
R	*Melanema dumosuk*				X	X	X			
R	*Mychodea hamata*				X	X	X			
R	*Nizymenia australis*				X	X	X			
R	*Peltasta australias*				X	X	X			
R	*Perithamnion dispar*				X	X	X			
R	*Plocamium dilatatum*				X	X	X			
R	*Polysiphonia brodiaei*				X	X	X			
R	*Polysiphonia crassiuscula*				X	X	X			
R	*Porphyra woolhousiae*				X	X	X			
R	*Sarcothalia crassifolia*				X	X	X			
R	*Sarcothalia radula*				X	X	X			
R	*Sheplya wattsii*				X	X	X			
R	*Spermothamnion pinnatum*				X	X	X			
R	*Tetrathamnion lineatum*				X	X	X			
R	*Warrenia comosa*				X	X	X			
R	*Wrangelia nobilis*				X	X	X			
R	*Zymurgia chondriopsidea*				X	X	X			

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
C	*Caulerpa brachypus*	X						X	X	X
P	*Padina tenuis*	X						X	X	X
R	*Acrosorium venulosum*	X						X	X	X
R	*Anotrichium tenue*	X						X	X	X
R	*Dasyclonium incisum*	X						X	X	X
R	*Herposiphonia secunda*	X						X	X	X
R	*Heterosiphonia crassipes*	X						X	X	X
R	*Lophosiphonia prostrata*	X						X	X	X
R	*Martensia fragilis*	X						X	X	X
R	*Spyridia filamentosa*	X						X	X	X
R	*Galaxaura obtusata*	X	X					X	X	
C	*Ulva fasciata*				X			X	X	X
R	*Antithamnion pinnafolium*	X		X	X			X		
R	*Polysiphonia amphibolis*		X	X	X					X
C	*Bryopsis australis*	X	X	X	X					
C	*Caulerpa ellistoniae*	X	X	X	X					
C	*Caulerpa hedleyi*	X	X	X	X					
C	*Cladophora valonioides*	X	X	X	X					
C	*Struvea plumosa*	X	X	X	X					
P	*Cystophora gracilis*	X	X	X	X					
P	*Dictyota naevosa*	X	X	X	X					
P	*Myriodesma quercifolium*	X	X	X	X					
R	*Griffithsia ovalis*	X	X	X	X					
R	*Stictosporum nitophylloides*	X	X	X	X					
P	*Sporochnus moorei*				X	X		X	X	
P	*Sargassum tristichum*	X	X	X	X					
R	*Areschougia ligulata*	X	X	X	X					
R	*Audouinella spongicola*	X	X	X	X					
R	*Callophycus oppositifolius*	X	X	X	X					
R	*Carpopeltis spongeaplexus*	X	X	X	X					
R	*Bostrychia moritziana*				X	X		X	X	
C	*Percursaria percursa*				X	X		X		X
P	*Hinksia sandriana*				X	X		X		X

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
P	*Macrocystis angustifolia*				X	X		X		X
R	*Chondria angustissima*	X			X	X		X		
P	*Hinksia sordida*			X	X	X				X
C	*Cladophora hutchinsioides*			X	X	X		X		
C	*Rhizoclonium implexum*			X	X	X		X		
P	*Homoeostrichus sinclairii*			X	X	X		X		
R	*Gymnogongrus crenulatus*			X	X	X		X		
R	*Involucrana crassa*			X	X	X		X		
R	*Polysiphonia subtilissima*			X	X	X		X		
R	*Cirrulicarpus nanus*	X		X	X	X				
R	*Griffithsia elegens*	X		X	X	X				
C	*Caulerpa papillosa*		X	X	X	X				
C	*Codium capitulatum*		X	X	X	X				
P	*Distromium multifidum*		X	X	X	X				
P	*Sticyosiphon soriferus*		X	X	X	X				
R	*Craspedocarpus tenuifolius*		X	X	X	X				
R	*Dasya clavigera*		X	X	X	X				
R	*Dasya villosa*		X	X	X	X				
R	*Dudresnaya australis*		X	X	X	X				
R	*Gelidium crinale*		X	X	X	X				
R	*Gloiophloea scinaioides*		X	X	X	X				
R	*Haplodasya urceolata*		X	X	X	X				
R	*Hydrolithon cymodoceae*		X	X	X	X				
R	*Hypoglossum armatum*		X	X	X	X				
R	*Kraftia dichotoma*		X	X	X	X				
R	*Lithothamnion muelleri*		X	X	X	X				
R	*Lomathamnion epicodii*		X	X	X	X				
R	*Mychodea ramulosa*		X	X	X	X				
R	*Perithamnion ceramoides*		X	X	X	X				
R	*Polysiphonia atricapilla*		X	X	X	X				
R	*Polysiphonia daveyae*		X	X	X	X				
R	*Ptilocladia agardhiana*		X	X	X	X				
R	*Ptilocladia pulchra*		X	X	X	X				

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Thuretia australasica*		X	X	X	X				
C	*Enteromorpha intestinalis*				X		X	X	X	
C	*Rhizoclonium riparium*				X		X	X		X
P	*Stilopsis harveyana*		X		X		X	X		
R	*Ptilocladia australis*		X	X	X		X			
P	*Homoeostrichus olsenii*					X	X	X	X	
P	*Scytothamnus australis*					X	X	X		X
R	*Antithamnionella tasmanica*					X	X	X		X
P	*Feldmannia lebelii*				X	X	X			X
P	*Myrionema strangulans*				X	X	X			X
C	*Enteromorpha linza*				X	X	X	X		
C	*Enteromorpha prolifera*				X	X	X	X		
C	*Wittrockiella salina*				X	X	X	X		
P	*Carpomitra costata*				X	X	X	X		
P	*Cystophora retroflexa*				X	X	X	X		
P	*Pilayella littoralis*				X	X	X	X		
R	*Areschougia stuartii*				X	X	X	X		
R	*Arthrocardia wardii*				X	X	X	X		
R	*Camontagnea oxyclada*				X	X	X	X		
R	*Chroodactylon ornatum*				X	X	X	X		
R	*Gigartina brachiata*				X	X	X	X		
R	*Helminthocladia dotyi*				X	X	X	X		
R	*Mychodea acanthymenia*				X	X	X	X		
R	*Polyopes constrictus*				X	X	X	X		
R	*Schottera nicaeensis*				X	X	X	X		
C	*Callipsygma wilsonis*	X			X	X	X			
R	*Ceramium monacanthum*	X			X	X	X			
R	*Chondria bulbosa*	X			X	X	X			
R	*Chondria harveyana*		X		X	X	X			
C	*Bryopsis gemellipara*			X	X	X	X			
C	*Chaetomorpha coliformis*			X	X	X	X			
C	*Cladophora crinalis*			X	X	X	X			
C	*Cladophora sericea*			X	X	X	X			

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
C	*Derbesia marina*			X	X	X	X			
C	*Pilinia novae–zelandiae*			X	X	X	X			
C	*Ulva taeniata*			X	X	X	X			
P	*Bellotia eriophorum*			X	X	X	X			
P	*Carpoglossum confluens*			X	X	X	X			
P	*Cystophora congesta*			X	X	X	X			
P	*Cystophora cuspidata*			X	X	X	X			
P	*Dictyota diemensis*			X	X	X	X			
P	*Feldmannia globifera*			X	X	X	X			
P	*Halopteris funicularis*			X	X	X	X			
P	*Hinksia granulosa*			X	X	X	X			
P	*Myriactula haydenii*			X	X	X	X			
P	*Myriodesma calophyllum*			X	X	X	X			
P	*Sphacelaria bracteata*			X	X	X	X			
P	*Sporochnus apodus*			X	X	X	X			
P	*Tinocladia australis*			X	X	X	X			
R	*Anothrichium crinitum*			X	X	X	X			
R	*Arthrocardia flabellata ssp. australica*			X	X	X	X			
R	*Austrophyllis alcicornis*			X	X	X	X			
R	*Callophyllis lambertii*			X	X	X	X			
R	*Ceramium excellens*			X	X	X	X			
R	*Chondria incrassata*			X	X	X	X			
R	*Gigartina sonderi*			X	X	X	X			
R	*Glaphyrymenia pustulosa*			X	X	X	X			
R	*Halymenia plana*			X	X	X	X			
R	*Laurencia tumida*			X	X	X	X			
R	*Mesophyllum macroblastum*			X	X	X	X			
R	*Peyssonnelia inamoena*			X	X	X	X			
R	*Phacelocarpus complanatus*			X	X	X	X			
R	*Platoma australica*			X	X	X	X			
R	*Plocamium patagiatum*			X	X	X	X			
R	*Ptilothamnion schmitzii*			X	X	X	X			
R	*Rhodophyllis multipartita*			X	X	X	X			

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Sarcothalia insidiosa*			X	X	X	X			
R	*Sonderopelta coriacea*			X	X	X	X			
R	*Spyridea tasmanica*			X	X	X	X			
R	*Trithamnion vulgare*			X	X	X	X			
R	*Tsengia feredayae*			X	X	X	X			
R	*Acrosymphyton taylorii*	X		X				X	X	X
R	*Sarconema filiforme*	X		X				X	X	X
C	*Acetabularia calyculus*	X		X	X			X		X
P	*Dictyopteris australis*	X	X	X	X					X
P	*Sargassum podacanthum*	X	X	X	X					X
P	*Sphacelaria novae–hollandiae*	X	X	X	X					X
P	*Dilophus marginatus*				X	X		X	X	X
P	*Taonia australasica*				X	X		X	X	X
P	*Dictyota alternifida*			X	X	X		X	X	
R	*Scinaia moniliformis*			X	X	X		X		X
C	*Rhipiliopsis peltata*		X	X	X	X		X		
P	*Cystophora polycystidea*		X	X	X	X		X		
C	*Avrainvillea clavatiramea*	X	X	X	X	X				
C	*Bryopsis macraildii*	X	X	X	X	X				
C	*Caulerpa cliftonii*	X	X	X	X	X				
C	*Caulerpa vesiculifera*	X	X	X	X	X				
C	*Codium mamillosum*	X	X	X	X	X				
C	*Codium muelleri*	X	X	X	X	X				
C	*Codium perriniae*	X	X	X	X	X				
C	*Dictyosphaeria sericea*	X	X	X	X	X				
P	*Cystophora botryocystis*	X	X	X	X	X				
P	*Cystophora brownii*	X	X	X	X	X				
P	*Cystophora pectinata*	X	X	X	X	X				
P	*Cystophora racemosa*	X	X	X	X	X				
P	*Cystophora siliquosa*	X	X	X	X	X				
P	*Dictyota furcellata*	X	X	X	X	X				
P	*Dictyota prolifera*	X	X	X	X	X				
P	*Dilophus fastigiatus*	X	X	X	X	X				

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
P	*Dilophus robustus*	X	X	X	X	X				
P	*Encyothalia cliftonii*	X	X	X	X	X				
P	*Giraudia robusta*	X	X	X	X	X				
P	*Myriodesma integrifolium*	X	X	X	X	X				
P	*Nemacystis novae–zelandiae*	X	X	X	X	X				
P	*Pachydictyon polycladum*	X	X	X	X	X				
P	*Phloiocaulon spectabile*	X	X	X	X	X				
P	*Sargassum heteromorphum*	X	X	X	X	X				
P	*Sargassum varians*	X	X	X	X	X				
P	*Scytothalia dorycarpa*	X	X	X	X	X				
P	*Sphacelaria fusca*	X	X	X	X	X				
P	*Zonaria spiralis*	X	X	X	X	X				
R	*Adelophycus corneus*	X	X	X	X	X				
R	*Amphiplexia hymenocladioides*	X	X	X	X	X				
R	*Anothrichium licmophorum*	X	X	X	X	X				
R	*Antithamnion armatum*	X	X	X	X	X				
R	*Antithamnion verticale*	X	X	X	X	X				
R	*Bornetia binderiana*	X	X	X	X	X				
R	*Calliblepharis planicaulis*	X	X	X	X	X				
R	*Chondria incurva*	X	X	X	X	X				
R	*Craspedocarpus blepharicarpus*	X	X	X	X	X				
R	*Craspedocarpus venosus*	X	X	X	X	X				
R	*Cryptonemia undulata*	X	X	X	X	X				
R	*Dasya extensa*	X	X	X	X	X				
R	*Dasyphila preissii*	X	X	X	X	X				
R	*Dicranema revolutum*	X	X	X	X	X				
R	*Doxodasya bolbochaete*	X	X	X	X	X				
R	*Drewiana nitella*	X	X	X	X	X				
R	*Erythroclonium sonderi*	X	X	X	X	X				
R	*Euptilocladia spongiosa*	X	X	X	X	X				
R	*Gattya pinella*	X	X	X	X	X				
R	*Gelinaria ulvoidea*	X	X	X	X	X				
R	*Gigartina disticha*	X	X	X	X	X				

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Griffithsia pulvinata*	X	X	X	X	X				
R	*Griffithsia teges*	X	X	X	X	X				
R	*Heterosiphonia gunniana*	X	X	X	X	X				
R	*Heterosiphonia lawrenciana*	X	X	X	X	X				
R	*Heterosiphonia wrangelioides*	X	X	X	X	X				
R	*Hydrolithon farinosa*	X	X	X	X	X				
R	*Hypnea charoides*	X	X	X	X	X				
R	*Hypnea filiformis*	X	X	X	X	X				
R	*Hypnea ramentacea*	X	X	X	X	X				
R	*Hypoglossum protendens*	X	X	X	X	X				
R	*Hypoglossum revolutum*	X	X	X	X	X				
R	*Hyponeocolax stellaris*	X	X	X	X	X				
R	*Laurencia arbuscula*	X	X	X	X	X				
R	*Laurencia clavata*	X	X	X	X	X				
R	*Laurencia forsteri*	X	X	X	X	X				
R	*Laurencia shepherdii*	X	X	X	X	X				
R	*Lesueria minderiana*	X	X	X	X	X				
R	*Liagora harveyana*	X	X	X	X	X				
R	*Liagora wilsoniana*	X	X	X	X	X				
R	*Macrothamnion pellucidum*	X	X	X	X	X				
R	*Medeiothamnion halurum*	X	X	X	X	X				
R	*Metagoniolithon stelliferum*	X	X	X	X	X				
R	*Mychodea gracilaria*	X	X	X	X	X				
R	*Mychodea pusilla*	X	X	X	X	X				
R	*Neogoniolithon fosliei*	X	X	X	X	X				
R	*Phacelocarpus alatus*	X	X	X	X	X				
R	*Platythamnion nodiferum*	X	X	X	X	X				
R	*Plocamium mertensii*	X	X	X	X	X				
R	*Plocamium preissianum*	X	X	X	X	X				
R	*Polysiphonia australiensis*	X	X	X	X	X				
R	*Polysiphonia succulenta*	X	X	X	X	X				
R	*Rhodopeltis australis*	X	X	X	X	X				
R	*Rhodophyllis volans*	X	X	X	X	X				

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Sarcomenia delesserioides*	X	X	X	X	X				
R	*Schizymenia dubyi*	X	X	X	X	X				
R	*Sheplya australe*	X	X	X	X	X				
R	*Spongoclonium conspicuum*	X	X	X	X	X				
R	*Spyridea dasyoides*	X	X	X	X	X				
R	*Spyridea squalida*	X	X	X	X	X				
R	*Stenocladia australis*	X	X	X	X	X				
R	*Thuretia quercifolia*	X	X	X	X	X				
R	*Tylotus obtusatus*	X	X	X	X	X				
R	*Wollastoniella myriophylloides*	X	X	X	X	X				
R	*Wrangelia princeps*	X	X	X	X	X				
R	*Wrangelia velutina*	X	X	X	X	X				
C	*Codium fragile*				X	X	X	X	X	
R	*Scinaia australis*				X	X	X	X	X	
P	*Halopteris paniculata*				X	X	X	X		X
P	*Phyllospora comosa*				X	X	X	X		X
R	*Stylonema cornu–cervi*				X	X	X	X		X
C	*Cladophora subsimplex*	X			X	X	X	X		
P	*Sargassum paradoxum*	X			X	X	X	X		
C	*Chaetomorpha valida*			X	X	X	X	X		
P	*Cystophora platylobium*			X	X	X	X	X		
P	*Leathesia difformis*			X	X	X	X	X		
P	*Myriogloea sciurus*			X	X	X	X	X		
P	*Sargassum lacerifolium*			X	X	X	X	X		
P	*Splachnidium rugosum*			X	X	X	X	X		
P	*Zonaria angustata*			X	X	X	X	X		
R	*Acrotylus australis*			X	X	X	X	X		
R	*Capreolia implexa*			X	X	X	X	X		
R	*Kallymenia cribrogloea*			X	X	X	X	X		
R	*Nemalion helminthoides*			X	X	X	X	X		
R	*Plocamium costatum*			X	X	X	X	X		
R	*Polyopes tenuis*			X	X	X	X	X		
R	*Porphyra columbina*			X	X	X	X	X		

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Rhabdonia verticillata*			X	X	X	X	X		
R	*Rhodophyllis membranacea*			X	X	X	X	X		
R	*Stictosiphonia hookeri*			X	X	X	X	X		
R	*Synarthrophyton patena*			X	X	X	X	X		
C	*Caulerpa longifolia*	X		X	X	X	X			
R	*Ceramium rubrum*	X		X	X	X	X			
C	*Chaetomorpha billardierii*		X	X	X	X	X			
P	*Suringariella harveyana*		X	X	X	X	X			
R	*Anothrichium elongatum*		X	X	X	X	X			
R	*Champia affinis*		X	X	X	X	X			
R	*Chondria fusifolia*		X	X	X	X	X			
R	*Doxodasya lanuginosa*		X	X	X	X	X			
R	*Gigartina densa*		X	X	X	X	X			
R	*Melobesia membranacea*		X	X	X	X	X			
R	*Mychodea aciculare*		X	X	X	X	X			
R	*Mychodea australis*		X	X	X	X	X			
C	*Ulva lactuca*	X			X	X		X	X	X
C	*Ulva rigida*	X			X	X		X	X	X
R	*Polysiphonia constricta*			X	X	X		X	X	X
R	*Hypnea valentiae*	X		X	X	X		X	X	
R	*Ceramium shepherdii*	X		X	X	X		X		X
C	*Chaetomorpha linum*		X	X	X	X		X	X	
R	*Acrothamnion preissii*	X	X	X	X	X				X
R	*Antithamnion divergens*	X	X	X	X	X				X
C	*Apjohnia laetevirens*	X	X	X	X	X		X		
C	*Cladophora laetevirens*	X	X	X	X	X		X		
C	*Cladophora prolifera*	X	X	X	X	X		X		
C	*Codium duthieae*	X	X	X	X	X		X		
C	*Ulva spathulata*	X	X	X	X	X		X		
P	*Cystophora expansa*	X	X	X	X	X		X		
P	*Distromium flabellatum*	X	X	X	X	X		X		
P	*Lobospira bicuspidata*	X	X	X	X	X		X		
P	*Sargassum linearifolium*	X	X	X	X	X		X		

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
P	*Sphacelaria cirrosa*	X	X	X	X	X		X		
R	*Amoenothamnion planktonicum*	X	X	X	X	X		X		
R	*Antrocentrum nigrescens*	X	X	X	X	X		X		
R	*Audouinella saviana*	X	X	X	X	X		X		
R	*Griffithsia monilis*	X	X	X	X	X		X		
R	*Heterosiphonia muelleri*	X	X	X	X	X		X		
R	*Lejolisia aegagrophila*	X	X	X	X	X		X		
R	*Metagoniolithon chara*	X	X	X	X	X		X		
C	*Ulvaria oxysperma*			X	X	X	X	X	X	
R	*Plocamium leptophyllum*			X	X	X	X	X	X	
R	*Stenogramme interrupta*			X	X	X	X	X	X	
P	*Acrocarpia paniculata*			X	X	X	X	X		X
P	*Cladosiphon vermicularis*	X		X	X	X	X	X		
C	*Chaetomorpha indica*		X	X	X	X	X			X
P	*Halopteris pseudospicata*		X	X	X	X	X	X		
P	*Notheia anomala*		X	X	X	X	X	X		
R	*Polysiphonia isogona*		X	X	X	X	X	X		
C	*Caulerpa flexilis var. muelleri*	X	X	X	X	X	X			
C	*Caulerpa longifolia f. crispata*	X	X	X	X	X	X			
C	*Caulerpa obscura*	X	X	X	X	X	X			
C	*Caulerpa simpliciuscula*	X	X	X	X	X	X			
C	*Caulerpa trifaria*	X	X	X	X	X	X			
C	*Codium pomoides*	X	X	X	X	X	X			
P	*Cystophora grevillei*	X	X	X	X	X	X			
P	*Cystophora subfarcinata*	X	X	X	X	X	X			
P	*Giraudia sphacelarioides*	X	X	X	X	X	X			
P	*Glossophora nigricans*	X	X	X	X	X	X			
P	*Sargassum decipiens*	X	X	X	X	X	X			
P	*Sargassum sonderi*	X	X	X	X	X	X			
P	*Sphacelaria biradiata*	X	X	X	X	X	X			
P	*Zonaria turneriana*	X	X	X	X	X	X			
R	*Ballia callitricha*	X	X	X	X	X	X			
R	*Brongniartella australis*	X	X	X	X	X	X			

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Ceramium pusillum*	X	X	X	X	X	X			
R	*Ceramium tasmanicum*	X	X	X	X	X	X			
R	*Chondria curdieana*	X	X	X	X	X	X			
R	*Choreonema thuretii*	X	X	X	X	X	X			
R	*Craspedocarpus ramentaceus*	X	X	X	X	X	X			
R	*Dasya ceramioides*	X	X	X	X	X	X			
R	*Erythroclonium nuelleri*	X	X	X	X	X	X			
R	*Helminthora australis*	X	X	X	X	X	X			
R	*Kallymenia cribrosa*	X	X	X	X	X	X			
R	*Laurencia tasmanica*	X	X	X	X	X	X			
R	*Lithophyllum incrustans*	X	X	X	X	X	X			
R	*Mesophyllum engelhartii*	X	X	X	X	X	X			
R	*Mesophyllum incisum*	X	X	X	X	X	X			
R	*Metagoniolithon radiatum*	X	X	X	X	X	X			
R	*Mychodea carnosa*	X	X	X	X	X	X			
R	*Mychodea disticha*	X	X	X	X	X	X			
R	*Mychodea marginifera*	X	X	X	X	X	X			
R	*Pachymenia orbicularis*	X	X	X	X	X	X			
R	*Phacelocarpus sessilis*	X	X	X	X	X	X			
R	*Pneophyllum fragile*	X	X	X	X	X	X			
R	*Polycoelia laciniata*	X	X	X	X	X	X			
R	*Polysiphonia mollis*	X	X	X	X	X	X			
R	*Ptilocladia vestita*	X	X	X	X	X	X			
R	*Rhabdonia coccinea*	X	X	X	X	X	X			
R	*Rhodoglossum gigartinoides*	X	X	X	X	X	X			
R	*Spongites fruticulosa*	X	X	X	X	X	X			
R	*Titanoderma pustulatum*	X	X	X	X	X	X			
C	*Cladophoropsis herpestica*	X	X	X	X			X	X	X
P	*Cystoseira trinodis*	X	X	X	X			X	X	X
R	*Laurencia brongniartii*	X		X	X	X		X	X	X
C	*Cladophora coelothrix*	X	X	X	X	X		X	X	
C	*Codium lucasii*	X	X	X	X	X		X	X	
P	*Sargassum distichum*	X	X	X	X	X		X	X	

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
P	*Zonaria crenata*	X	X	X	X	X		X	X	
R	*Ceramium filiculum*	X	X	X	X	X		X	X	
R	*Chondria succulenta*	X	X	X	X	X		X	X	
R	*Laurencia cruciata*	X	X	X	X	X		X	X	
R	*Polysiphonia scopulorum*	X	X	X	X	X		X	X	
R	*Scinaia aborealis*	X	X	X	X	X		X	X	
P	*Cystophora monilifera*	X	X	X	X	X		X		X
P	*Sargassum spinuligerum*	X	X	X	X	X		X		X
P	*Sphacelaria tribuloides*	X	X	X	X	X		X		X
R	*Ceramium macilentum*	X	X	X	X	X		X		X
P	*Bachelotia antillarum*			X	X	X	X	X	X	X
R	*Bostrychia tenuissima*			X	X	X	X	X	X	X
R	*Plocamium angustum*	X		X	X	X	X	X		X
R	*Dasya naccarioides*		X	X	X	X	X	X	X	
C	*Caulerpa brownii*	X	X	X	X	X	X			X
R	*Antithamnion gracilentum*	X	X	X	X	X	X			X
R	*Areschougia congesta*	X	X	X	X	X	X			X
R	*Carpopeltis phyllophora*	X	X	X	X	X	X			X
C	*Caulerpa flexilis*	X	X	X	X	X	X	X		
C	*Caulerpa scalpelliformis*	X	X	X	X	X	X	X		
C	*Cladophora albida*	X	X	X	X	X	X	X		
C	*Cladophora lehmanniana*	X	X	X	X	X	X	X		
C	*Codium australicum*	X	X	X	X	X	X	X		
C	*Codium harveyi*	X	X	X	X	X	X	X		
C	*Pedobesia clavaeformis*	X	X	X	X	X	X	X		
C	*Polyphysa peniculus*	X	X	X	X	X	X	X		
C	*Ulva australis*	X	X	X	X	X	X	X		
P	*Asperococcus bullosus*	X	X	X	X	X	X	X		
P	*Caulocystis cephalornithos*	X	X	X	X	X	X	X		
P	*Caulocystis uvifera*	X	X	X	X	X	X	X		
P	*Cladosiphon filum*	X	X	X	X	X	X	X		
P	*Cladostephus spongiosus*	X	X	X	X	X	X	X		
P	*Corynophlaea cystophorae*	X	X	X	X	X	X	X		

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
P	*Cutleria multifida*	X	X	X	X	X	X	X		
P	*Cystophora retorta*	X	X	X	X	X	X	X		
P	*Dictyopteris muelleri*	X	X	X	X	X	X	X		
P	*Ectocarpus siliculosus*	X	X	X	X	X	X	X		
P	*Pachydictyon paniculatum*	X	X	X	X	X	X	X		
P	*Polycerea nigrescens*	X	X	X	X	X	X	X		
P	*Ralfsia verrucosa*	X	X	X	X	X	X	X		
P	*Sargassum verruculosum*	X	X	X	X	X	X	X		
P	*Scaberia agardhii*	X	X	X	X	X	X	X		
P	*Scytosiphon lomentaria*	X	X	X	X	X	X	X		
P	*Sporochnus comosus*	X	X	X	X	X	X	X		
P	*Sporochnus radiciformis*	X	X	X	X	X	X	X		
R	*Antithamnion hanowioides*	X	X	X	X	X	X	X		
R	*Audouinella pacifica*	X	X	X	X	X	X	X		
R	*Bangia atropurpurea subsp. atropurpurea*	X	X	X	X	X	X	X		
R	*Callophyllis rangiferina*	X	X	X	X	X	X	X		
R	*Ceramium cliftonianum*	X	X	X	X	X	X	X		
R	*Ceramium puberulum*	X	X	X	X	X	X	X		
R	*Champia viridis*	X	X	X	X	X	X	X		
R	*Champia zostericola*	X	X	X	X	X	X	X		
R	*Erythrocladia irregularis*	X	X	X	X	X	X	X		
R	*Erythrocladia subintegra*	X	X	X	X	X	X	X		
R	*Grateloupia filicina var. luxurians*	X	X	X	X	X	X	X		
R	*Hildenbrandia rubra*	X	X	X	X	X	X	X		
R	*Hypoglossum hypoglossoides*	X	X	X	X	X	X	X		
R	*Laurencia filiformis*	X	X	X	X	X	X	X		
R	*Phacelocarpus apodus*	X	X	X	X	X	X	X		
R	*Phacelocarpus peperocarpos*	X	X	X	X	X	X	X		
R	*Polysiphonia decipiens*	X	X	X	X	X	X	X		
R	*Polysiphonia infestans*	X	X	X	X	X	X	X		
R	*Polysiphonia sertularioides*	X	X	X	X	X	X	X		
R	*Porphyra lucasii*	X	X	X	X	X	X	X		
R	*Porphyropsis minuta*	X	X	X	X	X	X	X		

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Spyridea filamentosa*	X	X	X	X	X	X	X		
R	*Thamnoclonium dichotomum*	X	X	X	X	X	X	X		
C	*Microdictyon umbilicatum*	X	X	X	X	X		X	X	X
P	*Feldmannia irregularis*	X	X	X	X	X		X	X	X
P	*Hydroclathrus clathratus*	X	X	X	X	X		X	X	X
P	*Lobophora variegata*	X	X	X	X	X		X	X	X
P	*Sphacelaria rigidula*	X	X	X	X	X		X	X	X
P	*Hormosira banksii*		X	X	X	X	X	X	X	X
R	*Heterosiphonia australis*		X	X	X	X	X	X	X	X
C	*Bryopsis plumosa*	X	X	X	X	X	X	X	X	
C	*Caulerpa cactoides*	X	X	X	X	X	X	X	X	
C	*Caulerpa geminata*	X	X	X	X	X	X	X	X	
C	*Chaetomorpha aerea*	X	X	X	X	X	X	X	X	
C	*Cladophora feredayi*	X	X	X	X	X	X	X	X	
C	*Codium galeatum*	X	X	X	X	X	X	X	X	
P	*Colpomenia peregrina*	X	X	X	X	X	X	X	X	
P	*Ecklonia radiata*	X	X	X	X	X	X	X	X	
P	*Sargassum fallax*	X	X	X	X	X	X	X	X	
R	*Audouinella caespitosa*	X	X	X	X	X	X	X	X	
R	*Galaxaura marginata*	X	X	X	X	X	X	X	X	
R	*Laurencia elata*	X	X	X	X	X	X	X	X	
R	*Peyssonnelia capensis*	X	X	X	X	X	X	X	X	
R	*Peyssonnelia novae–hollandiae*	X	X	X	X	X	X	X	X	
R	*Polysiphonia blandii*	X	X	X	X	X	X	X	X	
C	*Cladophora vagabunda*	X	X	X	X	X	X	X		X
C	*Codium spongiosum*	X	X	X	X	X	X	X		X
C	*Enteromorpha clathrata*	X	X	X	X	X	X	X		X
P	*Austronereia australis*	X	X	X	X	X	X	X		X
P	*Cystophora moniliformis*	X	X	X	X	X	X	X		X
R	*Ceramium isogonum*	X	X	X	X	X	X	X		X
R	*Galaxaura rugosa*	X	X	X	X	X	X	X		X
R	*Gelidium australe*	X	X	X	X	X	X	X		X
R	*Plocamium cartilagineum*	X	X	X	X	X	X	X		X

Appendix 3 (continued): Species sorted by number of CONCOM regions in which they occur

Phyllum	Species name	LWC	SWC	GAB	SGC	BS	TC	LEC	CEC	LHI
R	*Scinaia tsinglanensis*	X	X	X	X	X	X	X		X
R	*Stylonema alsidii*	X	X	X	X	X	X	X		X
C	*Enteromorpha compressa*	X	X	X	X	X	X	X	X	X
P	*Colpomenia sinuosa*	X	X	X	X	X	X	X	X	X
P	*Dictyota dichotoma*	X	X	X	X	X	X	X	X	X
P	*Hinksia mitchelliae*	X	X	X	X	X	X	X	X	X
P	*Petalonia fascia*	X	X	X	X	X	X	X	X	X
R	*Audouinella daviesii*	X	X	X	X	X	X	X	X	X
R	*Audouinella microscopica*	X	X	X	X	X	X	X	X	X
R	*Ceramium flaccidum*	X	X	X	X	X	X	X	X	X
R	*Corallina officinalis*	X	X	X	X	X	X	X	X	X
R	*Erythrotrichia carnea*	X	X	X	X	X	X	X	X	X
R	*Gelidium pusillum*	X	X	X	X	X	X	X	X	X
R	*Haliptilon roseum*	X	X	X	X	X	X	X	X	X
R	*Helminthocladia australis*	X	X	X	X	X	X	X	X	X
R	*Laurencia majuscula*	X	X	X	X	X	X	X	X	X
R	*Pterocladia capillacea*	X	X	X	X	X	X	X	X	X
R	*Pterocladia lucida*	X	X	X	X	X	X	X	X	X
R	*Solieria robusta*	X	X	X	X	X	X	X	X	X
R	*Wrangelia plumosa*	X	X	X	X	X	X	X	X	X