APPENDIX A

Site Descriptions and Representative Species

Intertidal

Detailed descriptions and species lists have been published for two sites along west Pt. Loma and two in La Jolla (Stewart and Myers 1980, Stewart 1982). Here, we briefly contrast some major differences between the two areas.

Generally the Pt. Loma beaches are wide, gently sloping, wave-cut platforms where midtidal areas are covered with *Corallina*-anchored algal turf, mostly less than about 7 cm high; beds of *Phyllospadix torreyi* extend from the low intertidal into shallow subtidal regions. The intertidal platform at Cabrillo Tide Pools is broken by channels, loose boulders or slabs, and algal assemblages appear more often dominated by weedy or seasonally abundant, short-lived species (e.g., *Ulva, Lithothrix*). Just to the north, below Ladera St., the platform is more unbroken, with extensive uniform cover of perennial *Corallina* species that provide substrate for large numbers of epiphytic taxa. Here, *Binghamia forkii* and *Heterosiphonia erecta* are abundant seasonally, while uncommon or absent on La Jolla beaches. Interactions between algae and the seagrass within the border region where *Corallina*-anchored turf meets *Phyllospadix* beds, and mechanisms by which *Corallina* establishes and maintains dominance on algal-covered rocks have been described (Stewart 1989a,b).

Pacific Beach Pt. (also referred to as False Pt. or Gunnery Pt.), north of Mission Bay but south of the La Jolla beaches, is an irregular, sloping rocky beach, mostly cobble-boulder substrate, with little or no sand beach at base of cliffs. Abundant *Pelvetia* grows on sides of rocks; coralline-anchored turf is less widespread. *Sargassum agardhianum and S. muticum* both occur here. Erect corallines other than *Corallina* species (*Lithothrix, Jania* spp., *Amphiroa*) are often conspicuous. Limited census data suggest that algal abundances and diversity are lower here than along ocean-facing beaches of Pt. Loma or on La Jolla beaches. Smaller epiphytic taxa include *Chondria arcuata*, common at La Jolla but mostly absent on Pt. Loma, and *Binghamia forkii*, more characteristic of Pt. Loma.

Compared with the Pt. Loma sites, the La Jolla beaches in studies cited above have proportionally less *Corallina* in the algal turf, with *Pterocladia capillacea* a second dominant alga and very conspicuous during winter and spring months. *Gelidium coulteri* and *G. pusillum* also are more common here than at Pt. Loma localities. Among the epiphytes, *Ceramium flaccidum* is very abundant (and rare or absent from Pt. Loma turf) during fall months, *Hypnea* is often conspicuous entangled with *Pterocladia* axes, *Lithothrix* is usually less abundant on La Jolla beaches, and *Chondria arcuata* is common seasonally while rare on Pt. Loma.

Subtidal

On rocky subtidal outcroppings at the southern end of the county offshore from Imperial Beach, *Botryocladia neushullii*, often very abundant *Polyneura*, *Cryptopleura* (*Botryoglossum*) *farlowiana*, large blades of *Kalymenia* or *Halymenia* species, and *Sargassum palmeri* are notably present and elsewhere rare or absent. The few collections we have seen of *Microcladia coulteri* (on *Gigartina exasperata*), *Pterochondria woodii* var. *pygmaea* (on *Pelagophycus*), and *Phycodrys setchellii* have been from this area.

Loma Sea Cliff algal collections are as rich in small taxa as any from other parts of the California coasts; probably more than 50 species can be recognized in any single day's sampling. *Desmarestia ligulata*, *Agarum*, *Pterygophora*, *Laminaria farlowii*, *Macrocystis*, *Pelagophycus*, two species of *Dictyota*, *Dictyopteris*, *Cystoseira osmundacea*, *Sciadophycus*, *Plocamium cartilagineum*, *Gelidium nudifrons*, *G. purpurascens* and *G. robustum*, *Gigartina exasperata*, *Cryptopleura violacea*, *Cryptonemia obovata*, *Calliarthron cheilosporioides*, *Corallina officinalis* var. *chilensis*, *Bossiella orbigniana*, *Prionitis* sp. (*australis/cornea/linearis*), and prostrate *Codium* are among the larger easily-recognized taxa on rocky substrates. Filaments or small blades of *Sorella* spp., *Nienburgia andersoniana*, *Nitophyllum hollenbergii*, *Phycodrys profunda*, *Branchioglossum undulatum*, *Griffithsia pacifica*, *Callithamnion catalinense (?)*, *Antithamnion defectum*, *Platythamnion villosum*, *Pleonosporium* spp., *Pterosiphonia dendroidea*, *Herposiphonia plumula*, and *Tiffaniella* are frequently found on tunicate stalks, sponges, scallop and abalone shells, and on larger specimens of *Gelidium* and *Calliarthron*. Nests of garibaldi fish additionally may include tiny thalli of *Bryopsis* sp., *Cladophora* spp., *Dasya sinicola* var. *abyssicola*, *Veleroa subulata*, *Pterocladia caloglossoides*, and germlings of what probably are *Fauchea laciniata* thalli. These taxa are not restricted to any single association, but are easily recognized among the low-growing turf that is maintained by the fish when eggs are being "incubated." *Ptilothamnionopsis* grows on *Calliarthron* stipes, and *Gelidium* axes often are conspicuously covered with encircling attached blades of *Cryoptopleura* and *Nitophyllum hollenbergii*.

Sarcodiotheca Pt. extends seaward into the shoreward head of the La Jolla Submarine Canyon in La Jolla Bay. This head of the canyon is a popular destination for scuba divers, a short swim from the beach, and 20–25 m deep. The narrow sloping terraces that drop into the canyon here are often densely covered with clumps of *Acrosorium* interspersed with *Stenogramma*, *Sarcodiotheca furcata* and *S. gaudichaudii*. Seasonally, *Dictyopteris*, *Agarum* and scattered *Desmarestia* of all sizes are common. Mats of filamentous diatoms often appear as a brown film over large areas of fine-grained mud. The red "fuzz" that one observes on worm tubes, pieces of broken shells, or larger

attached algae includes species of *Polysiphonia, Ceramium*, and *Antithamnion*. This is one of the few sites where large, to 1 m high, specimens of *Sarcodiotheca (Neoagardhiella) gaudichaudii* can be found. Juvenile, occasionally larger, plants of *Macrocystis* have been noted nearby, but are not consistently present; *Sargassum muticum* also is occasionally present, not abundant. Many of the species noted as characteristic of the Loma Sea Cliff (*Rhodymenia* and *Prionitis*, for example) are generally absent.

The head of the North Branch of the Scripps Canyon at about 30–40 m, just a short distance north of Scripps Institution of Oceanography and also within La Jolla Bay, differs markedly in its algal flora. Predictably *Maripelta* can be seen here; *Ozophora*, abundant *Rhodymenia*, several forms or species of *Callophyllis, Dictyopteris, Schizymenia dawsonii*, and large red blades that variously represent *Halymenia, Gigartina exasperata, Polyneura* or other species are conspicuous while typically absent or more rare in the La Jolla Canyon nearby, just to the south. The sponges, rock surfaces, and stalks of gorgonian are often bare of epiphytes. Characteristically, there is little *Acrosorium* (compared with the large clumps in La Jolla Canyon), and no *Sarcodiotheca furcata* or *Stenogramma*. (These two latter taxa are restricted to the head of the La Jolla Canyon in our experience.) In shallower water, about 20 m deep and north of the North Branch Canyon rim, a stable rocky bottom supports algal assemblages very similar to those on the Loma Sea Cliffs at the same depths.

APPENDIX B

Name Changes Relevant to San Diego County Marine Algae Since Publication of Marine Algae of California (MAC). (Several others are discussed in text but are not accepted at this time.) Numbers refer to pages in **MAC**. References are listed in Literature Cited.

CHLOROPHYTA

Pseudulvella applanata Setch. and Gardn. (61) to: *Ulvella applanata* (Setch. and Gardn.) South and Tittley, South and Tittley 1986

PHAEOPHYTA

Giffordia species (122-146) to: *Hincksia* species. Silva *et al.* 1987

Cylindrocarpus rugosus Okam. (177) to: *Petrospongium rugosum* (Okam.) Setch. and Gardn. [It is unclear why the older name of this alga was cited in Abbott and Hollenberg 1976]

Sphacelaria furcigera Kütz. (218) to: *S. rigidula* Kütz., Prud'homme van Reine 1982

Laminaria dentigera Kjellm. (229) to: *L. setchellii* Silva, Druehl 1979

RHODOPHYTA

Asterocytis ramosa (Thwaites) Schmitz (283) to: *Chroodactylon ornatum* (C. Ag.) Basson, Basson 1979

Goniotrichum alsidii (Zan.) Howe (280) to: *Stylonema alsidii* (Zan.) Drew, Drew 1956

Bangia fusco-purpurea (Dillw.) Lyngb. (294) to: *B. vermicularis* Harv., Sheath and Cole 1984

Pseudogloiophloea confusa (Setch.) Levr. (335) to: *Scinaia confusa* (Setch.) Huisman, Huisman 1985

Pseudoscinaia snyderae Setch. (333) to: *Scinaia snyderae* (Setch.) Huisman, Huisman 1985

Amphiroa zonata Yendo (400) to: *A. beauvoisii* Lamour., Norris and Johansen 1981

Halymenia coccinea (Harv.) Abb. (425) to: *H. gardneri* (Kylin) Parkinson, see Lindstrom 1986

Choreocolax polysiphoniae Reinsch (470) to: *Leachiella pacifica* Kugrens, Kugrens 1982

Neoagardhiella baileyi (Kütz.) Wynne and Taylor (483) to: *Sarcodiotheca gaudichaudii* (Mont.) Gabrielson, Gabrielson 1982

Gracilaria sjoestedtii Kyl. (498) to: *G. lemaneiformis* (Bory) Weber-van Bosse, Abbott 983

Gracilaria verrucosa (Huds.) Papenf. (500) to: *G. pacifica* Abb., Abbott 1985

Gracilaria andersonii (Grun.) Kyl. (495) to: *G. papenfussii* Abb., Abbott 1983

Gymnogongrus platyphyllus Gardn. (508) to: *G. chiton* (Howe) Silva and DeCew, Silva 1979

Gigartina spinosa (Kütz.) Harv. (525) to: *G. ornithorhynchos* J. Ag., Silva 1979

Gigartina papillata (C. Ag.) J. Ag. (523) to: *Mastocarpus papillatus* (C. Ag.) Kütz., Guiry *et al.* 1984

Petrocelis franciscana Setch. and Gardn. (476): see *Mastocarpus papillatus*

Coeloseira compressa Hollenb., *C. parva* Hollenb. (566) to: *Gastroclonium compressum* (Hollenb.) Chang and Xia, *G. parvum* (Hollenb.) Chang and Xia, Chang and Xia 1978

Gastroclonium coulteri (Harv.) Kyl. (567) to: *G. subarticulatum* (Turner) Kütz., Hawkes 1986

Antithamnionella breviramosa (Daws.) Wom. and Bail. (580) to: *A. elegans* (Berthold) Price and John, Price *et al.* 1986 (and see Cormaci and Furnari 1988)

Ceramium gracillimum var. *byssoideum* (Harv.) Maz. (597) to: *C. flaccidum* (Kütz.) Ardissone, Womersley 1978

Ceramium taylorii Daws. (598) to: *C. flaccidum* (Kütz.) Ardissone, Womersley 1978

Scagelia occidentale (Kyl.) Woll. (584) to: *S. pylaisaei* (Mont.) Wynne, Wynne 1985c

Acrosorium uncinatum (Turn.) Kyl. (659) to: *A. venulosum* (Zan.) Kyl., Wynne 1989

Botryoglossum farlowianum (J. Ag.) DeToni (671) to: *Cryptopleura farlowiana* (J. Ag.) Ver Steeg and Josselyn, Ver Steeg and Josslyn 1983

Herposiphonia tenella f. *secunda* (C. Ag.) Hollenb. (702) to: *H. secunda f. tenella* (C. Ag.) Wynne, Wynne 1985a

Pterosiphonia clevelandii (Farl.) Hollenb. (708) to: *P. farlowii* Hollenb., Hollenberg 1976

Murrayellopsis dawsonii Post (701) to: *Veleroa subulata* Daws., Stewart 1989

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INDEX

Presently accepted binomials for species that are documented for the San Diego flora, or that are likely to be present, are marked • (•? if the record cannot be verified).