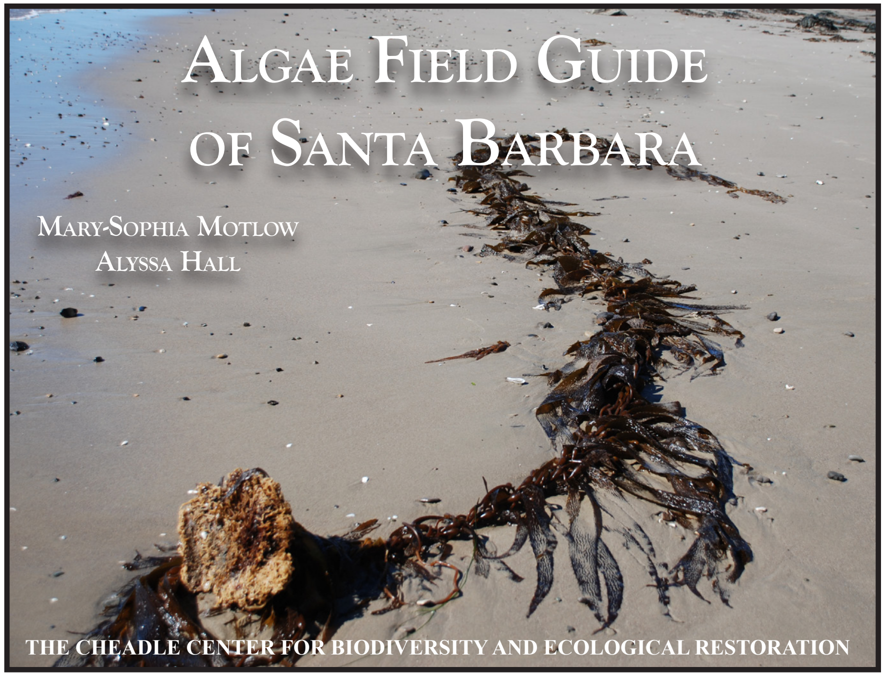
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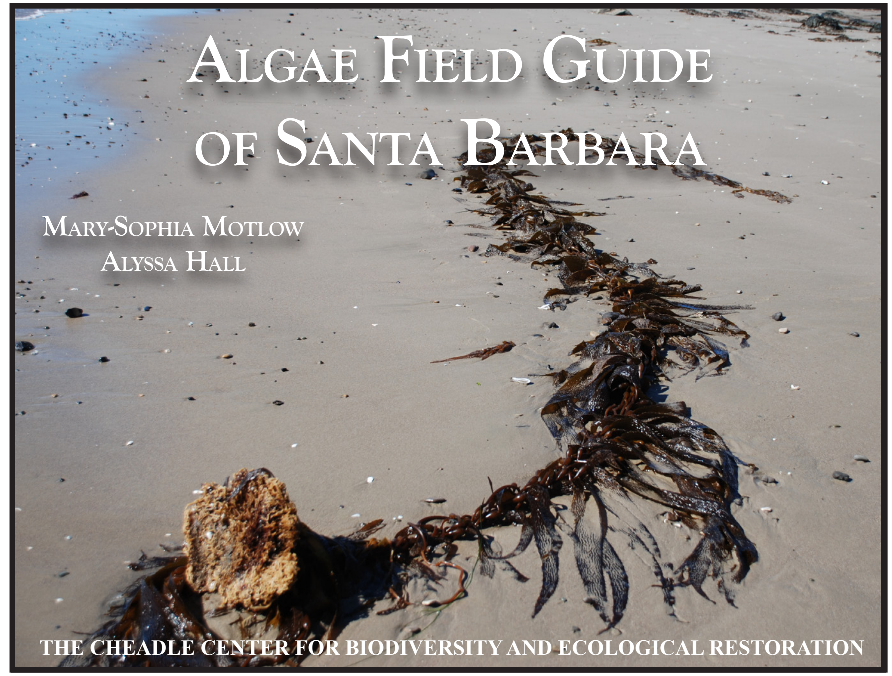
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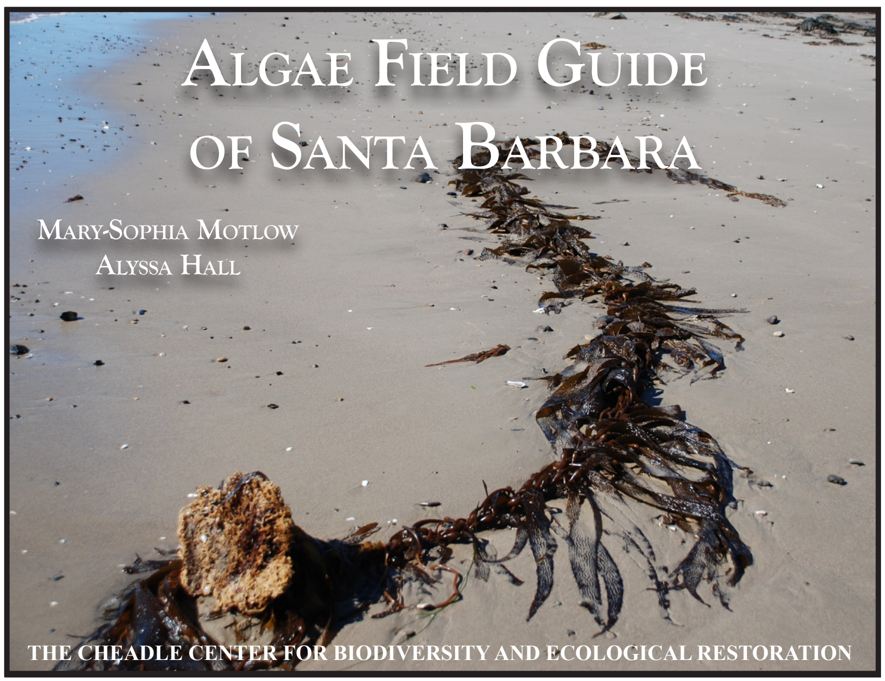
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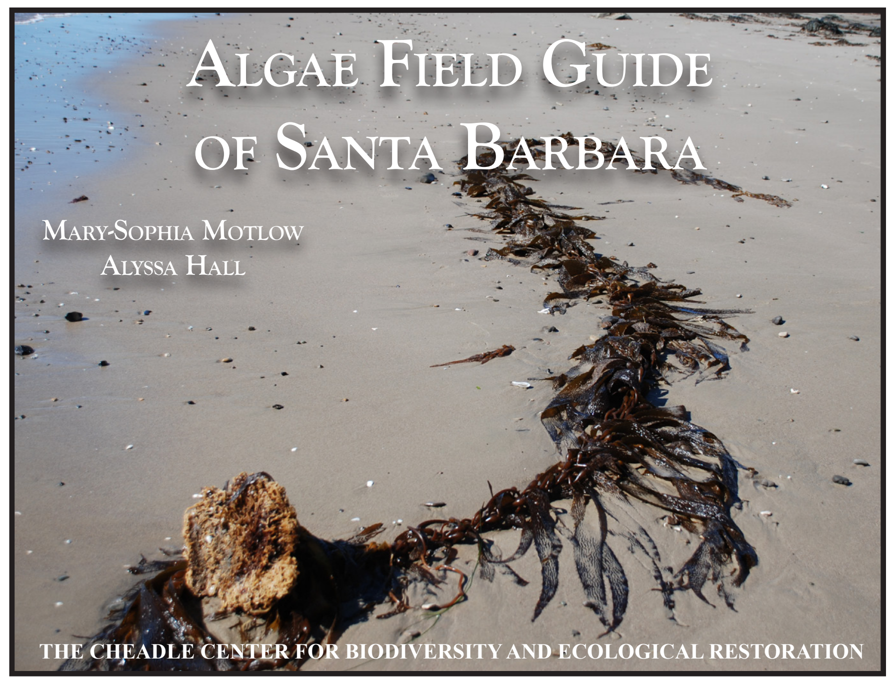
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http://ccber.ucsb.edu

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All seaweeds can be classified into three categories: Red, Green and Brown. The book is organized into these three categories. Within each section the species of algae are listed alphabetically by scientific name. It should be noted that due to specimen quality and exposure, some algae change color or bleach. This most often occurs with red algae, which can appear a variety of colors ranging from green to purple. Confusion may also occur between brown and green specimens, but this is less common.

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7

GREEN ALGAE

9

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9

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9

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9

Scientific name: *Codium fragile*
Common Name: Sea staghorn
Description: *Codium fragile* grows in large clumps of tube-like branches that split into multiple branches at the tips. The color can be dark green to black. *Codium fragile* commonly grows on rocky shores and in the mid to low intertidal zone.
Comments: *Codium fragile* is commonly found with red algae living on it. If a branch is broken off, a green slime oozes from the wound because the entire alga consists of only one cell! The green slime contains the chloroplasts that determine the color of the algae. Although not a problem on the Pacific Coast, the New England coast has problems with *Codium fragile*. The algae can attach to nets used by the shellfish industry making the nets unusable.

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Scientific Name: *Ulva intestinalis*

Common Name: Gut weed

Description: This seaweed is characterized by its long, thin tubes coming from the base and extending out. The tubes are usually dark green, but depending on the type of water it is found in and the amount of time it has been out of water, it may be a yellowish-green or pale green. This alga may be epiphytic (growing on other algae) or it may be free floating. It is most often found in the mid to high intertidal zone and in protected bays or estuaries.

Comments: Although commonly found in clumps, once pulled apart, it becomes clear how this species acquired its name; it bears a clear resemblance to an intestine. The tubes get their clear green color from the chlorophyll in the chloroplasts.

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Scientific Name: *Ulva lobata*
Common Name: Sea lettuce
Description: *Ulva lobata* is characterized by its layers of thin sheets. These sheets may be a rich green color, but are most often transparent. The shape of the sheet is typically a wrinkled, elongated oval, about 2 to 5 inches wide. This alga is found mostly on rocks throughout the subtidal zone.
Comments: Although this seaweed is one of the most fragile (with one blade being only 2 cells thick!), it is commonly seen because it is found in multiple locations on the beach. It is widely used as a food source, either dried or fresh. Since it is easily susceptible to pollutants, such as heavy metals, harvesters must be careful to check for such toxins.

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BROWN ALGAE

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BROWN ALGAE

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BROWN ALGAE

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BROWN ALGAE

17


Made in U.S.A.


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Made in U.S.A.

Scientific Name: *Cystoseira osmundacea*
Common Name: Bladder chain kelp
Description: At the base, the blades are flattened with a subtle midrib and become long and cylindrical. They arise radially around a triangular stipe. The air bladders, the dominant portion of the alga, occur in chain-like formations on the upper branches. This seaweed loses much of its branching during the dormant season. During the growing season it can reach 26 feet in height.
Comments: *Cystoseria osmundacea* forms surface canopies with giant kelp. Its ideal habitat occurs between 12 and 26 feet in depth.

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Scientific Name: *Desmarestia herbacea*
Common Name: Acid algae
Description: *Desmarestia herbacea* is pale brown in color and can be identified by its long rectangular stem with many feather-like branches growing from it. The branches can be short or long depending on the species. It is frequently found on rocks in the low intertidal and subtidal zone.
Comments: This alga secretes sulfuric acid, which means it shouldn't be mixed with other specimens when collecting. Although this alga should not be ingested because of the acids, it can be safely touched.

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Scientific Name: *Egregia menziesii*
Common Name: Feather boa
Description: The stipe of this alga arises from a large holdfast and divides irregularly into multiple branches. The long narrow branches are cylindrical near the base and become flattened towards the end. Densely packed along each branch are air bladders and blades of varying size. *Egregia* can grow to an average of 20 feet in length!
Comments: Like giant kelp, *Egregia* creates dense canopies. Due to its high nutrient levels, *Egregia* can be used as a fertilizer. *Egregia* also produces alginic acid, which is used in pharmaceuticals, cosmetics, detergents, food, and more.

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Scientific Name: *Laminaria farlowii*
Common Name: Oarweed
Description: This species consists of three main parts: a short stipe, rising from a branched holdfast, and a single blade. The blade is unbranched and can reach up to 15 feet in length. The surface of the blade is covered in ridges and depressions, making it appear wrinkled.
Comments: This plant is found in the lower intertidal and upper subtidal zones. Although it is usually found from Central California to Mexico, there may also be populations in British Columbia.

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Scientific Name: *Macrocystis pyrifera*
Common Name: Giant kelp
Description: *Macrocystis pyrifera* grows up to 150 feet in length, and has large air-filled bulbs connected to symmetrical elongated blades. The blades occur at regular intervals along the stipe. The blades are rough and have tooth-like edges. This species frequently creates dense kelp forests in the subtidal zone.
Comments: The largest of all seaweeds, this seaweed grows up to 12 inches a day. It is commercially harvested for its algin, which is used as a gelling agent in a variety of products. *Marcocystis pyrifera* makes up the majority of the kelp forests, which provide a biologically diverse habitat for fish, invertebrates and marine mammals.

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Scientific Name: *Pterygophora californica*
Common Name: Walking kelp
Description: *Pterygophora californica* is characterized by its long, flat stem that can grow up to 2 feet. At the top of the stem, multiple flat blades branch out. The blades are up to 1 foot long and 6 inches wide.
Comments: This kelp is found only in the subtidal regions, but gets its name from its movement under water. It grows until it reaches the water surface where the movement of the waves makes it look as if it is walking. This kelp can live up to 25 years!

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29

Scientific Name: *Sargassum muticum*
Common Name: Japanese weed
Description: The main stipe of this seaweed arises from a holdfast and has alternately spaced branches. Each branch has numerous small blades and air bladders. In summer, these branches detach leaving only the central stipe. This alga is found most commonly in areas sheltered from the waves and usually grows between 3 and 12 feet long.
Comments: *Sargassum muticum* is an invasive species that originated in Japan. It can survive freely floating or anchored by its holdfast in the upper subtidal and intertidal regions. It is highly tolerant of variations in habitat, such as sunlight, salinity, and temperature. These adaptations have made it a successful invasive species. Increased public awareness and vigilance can help limit this invasive from spreading.

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31


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6


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6

Scientific Name: *Scytosiphon dotyi*
Common Name: Soda straw seaweed
Description: *Scytosiphon dotyi* typically has small, narrow cylindrical branches that extend from the base. It can grow up to 4 inches in length and it is commonly found in dense clumps attached to rocks and in tide pools at the high intertidal zone.
Comments: Since *Scytosiphon dotyi* is commonly found in the high intertidal zone, it can survive long periods out of water.

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33

Scientific Name: *Silvetia compressa*
Common Name: None
Description: *Silvetia compressa* has long, flattened branches that bulb out at the ends and commonly split in two. The blades are often a dark brown to green and become lighter as they reach the tips. From the basal portion, the branches create a bush-like appearance. *Silvetia* is common in the high intertidal zone and is attached to the horizontal and vertical faces of rocks.
Comments: *Silvetia compressa* is most often found in large homogenous patches. Because of the leathery quality of the leaves, it can survive long periods of time out of water. *Silvetia compressa* has a symbiotic relationship with many invertebrates, such as molluscs, limpets, and tube worms.

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RED ALGAE

RED ALGAE

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RED ALGAE

37

RED ALGAE

Scientific Name: *Bossiella orbigniana*
Common Name: Coral leaf
Description: This alga is covered by a hard shell of calcium carbonate. Its branches are flat and segmented. There are many offshoots from the main branch and it can grow to about 8 inches tall. It is often found attached to small rocks washed up on shore, but normally grows in the low intertidal and subtidal zones.
Comments: The segmented nature of the branches gives them flexibility, allowing them to bend with the water. However when it is dried, it becomes very fragile. Without proper storage, the specimen will crumble. Although it is in the red algal group, its color is very pink!

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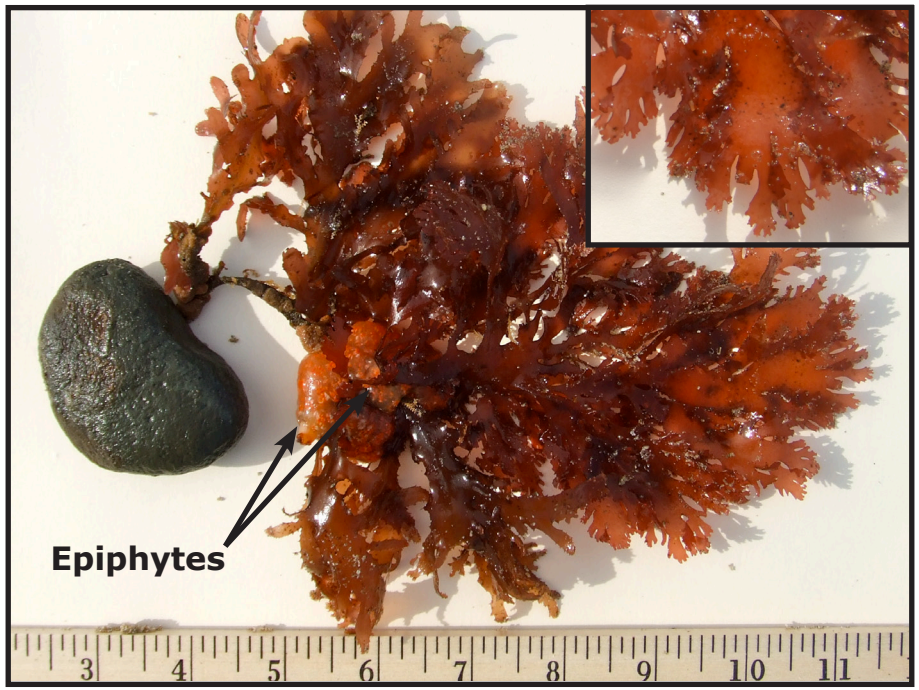
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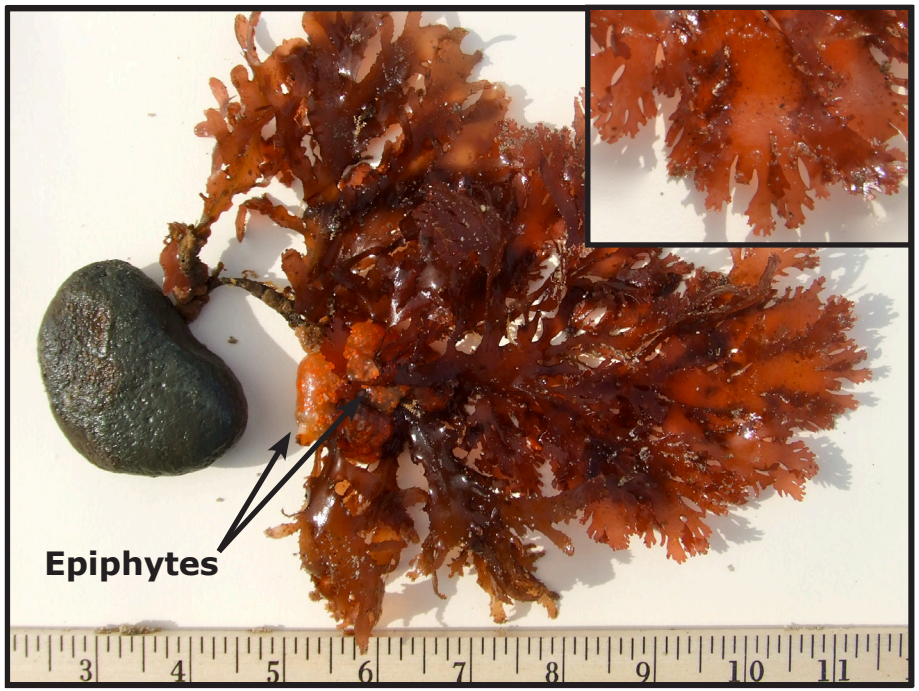
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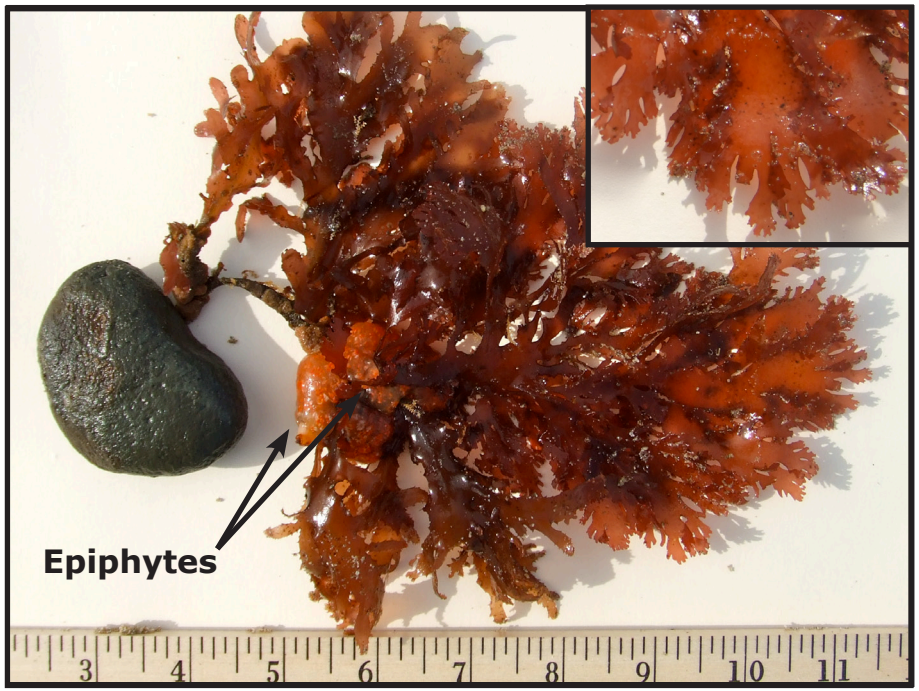
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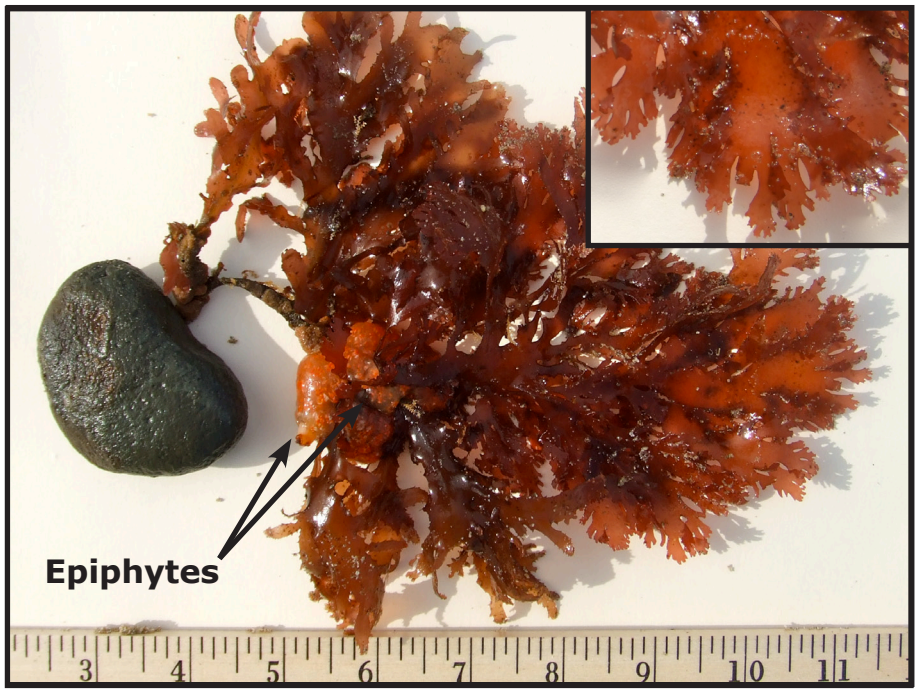
Epiphytes

Scientific Name: *Callophyllis flabellulata*
Common Name: None
Description: This alga is a dense bush of thin blades giving it a leafy appearance. The shape of the blades is roughly fan-like when laid out. The blades branch from two to three long stipes and end in a cut-out pattern.
Comments: *Callophyllis flabellulata* is known for the brilliant red color of its blades. It is found mostly in the subtidal and low intertidal regions of the beach. This alga is commonly found with epiphytes, as shown in the picture.

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41


1 Made in U.S.A. 2 3 4 5 6 7


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Scientific Name: *Callophyllis violacea*
Common Name: None
Description: This alga is characterized by its long, thin branches originating from one base. Its color ranges from dark red to purple-red. At the base there is only one stem, but as it grows, more branches form off of the original stem creating a tree-like appearance. It only grows to a length of 6 inches.
Comments: Although similar looking to *Gelidium robustum, Callophyllis violacea* can be characterized by its branches, and its lack of epiphytic organisms.This alga is usually found in the subtidal regions.

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43

Scientific Name: *Chondracanthus exsperatus*
Common Name: Turkish towel
Description: *Chondracanthus exasperatus* is characterized by its long, teardrop-shaped blades. The blades can grow to about 32 inches in length. The bottom of the blade is smooth, but as the blade grows it has lots of small bumps on its surface. Multiple blades can grow from the basal portion, which is attached to the sea floor in the low intertidal to subtidal regions.
Comments: *Chondracanthus exasperatus* gets its common name from the rough texture of its blades. The blades of *Chondracanthus* have been used as scrubbers for bathing.

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45

Scientific Name: *Corallina chilensis*
Common Name: Coral seaweed
Description: This species ranges in color from yellow to purple. The body of the alga is made of rounded, calcified segments. In contrast, the branches of *Corallina chilensis* are flat and extended, giving it a feather-like appearance. The body of the *Corallina* rises from a disc-like holdfast. Its common habitat is the lower intertidal region.
Comments: The four species of the genus *Corallina* can be differentiated by the reproductive structures located at the tips of their branches. The color of *Corallina* varies due to bleaching by the sun. Specimens exposed to more light will appear paler.

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Scientific Name: *Corallina vancouveriensis*
Common Name: Coral seaweed
Description: Like *Bossiella orbigniana* and other coraline algae, *Corallina vancouveriensis* is covered in calcium carbonate which makes its branches hard and shell-like. The smaller branches extend from the main ones giving it a bush-like appearence. The segments of *Corallina* are usually small, round and smooth, unlike the flat segments of *Bosiella orbigniana*.
Comments: This alga is found in the intertidal zone. It grows in large patches that can become thick and matted.

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49

Scientific Name: *Erythrophyllum delesserioides*
Common Name: None
Description: *Erythrophyllum delesserioides* is characterized by a prominent midrib that is visible throughout the entire length of the blade. The blade grows along the midrib which extends from the base. The blades can grow up to 16 inches and are usually about 2 to 4 inches wide.
Comments: In the winter, *Erythrophyllum delesserioides* loses its blades, leaving only the midrib for reproduction. Once reproduction has finished, blades can grow back onto the same midrib annually.

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Common Name: None
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Comments: In the winter, *Erythrophyllum delesserioides* loses its blades, leaving only the midrib for reproduction. Once reproduction has finished, blades can grow back onto the same midrib annually.

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Scientific Name: *Gelidium robustum*
Common Name: None
Description: *Gelidium robustum* has numerous long, thin branches of 4-12 inches with numerous branchlets. The branches are rigid and usually have epiphytes on them. They range in color from red to black.
Comments: This alga often resembles a twig from a tree with thin branches coming off the main branch. It can be found in the low intertidal to the subtidal regions.

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53

Scientific Name: *Gracilariopsis andersonii*
Common Name: Red spaghetti
Description: This alga has long, thin branches. The branches arise from a holdfast and are a uniform thickness throughout. The branching pattern is irregular and the density of branches varies. *Gracilariopsis andersonii* grows 3-4 feet in length. The species of this genera are very similar and can be distinguished by their reproductive structures.
Comments: *Gracilariopsis andersonii* is easily detached from rocks and continues to grow while drifting. When found on the beach, it is usually in the low intertidal partially covered by sand. This seaweed is edible and a popular sea vegetable in Japan and Hawaii. It is also cultivated for agar production in Asia, South America, and Africa.

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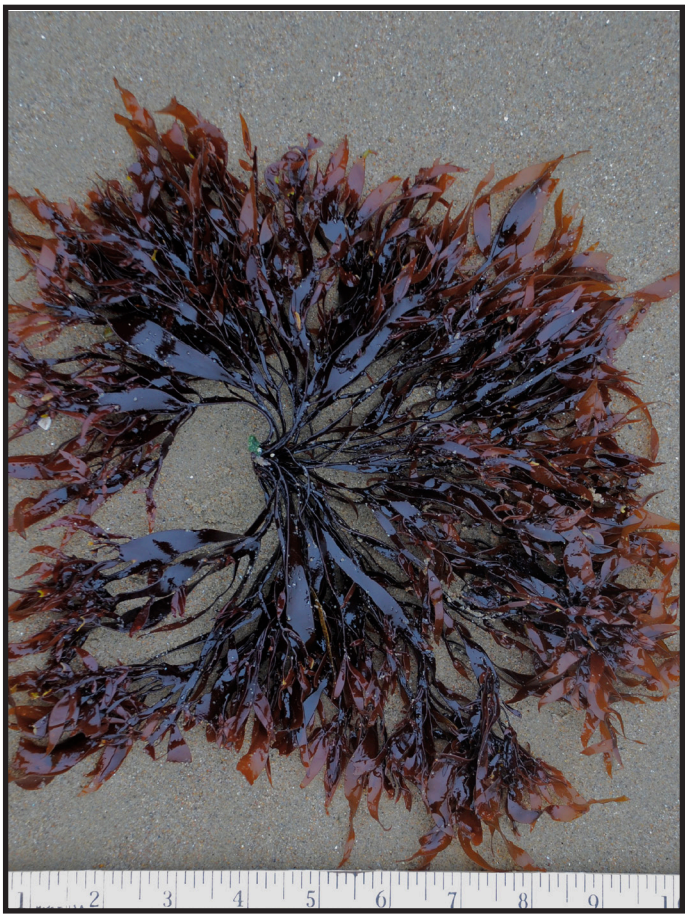

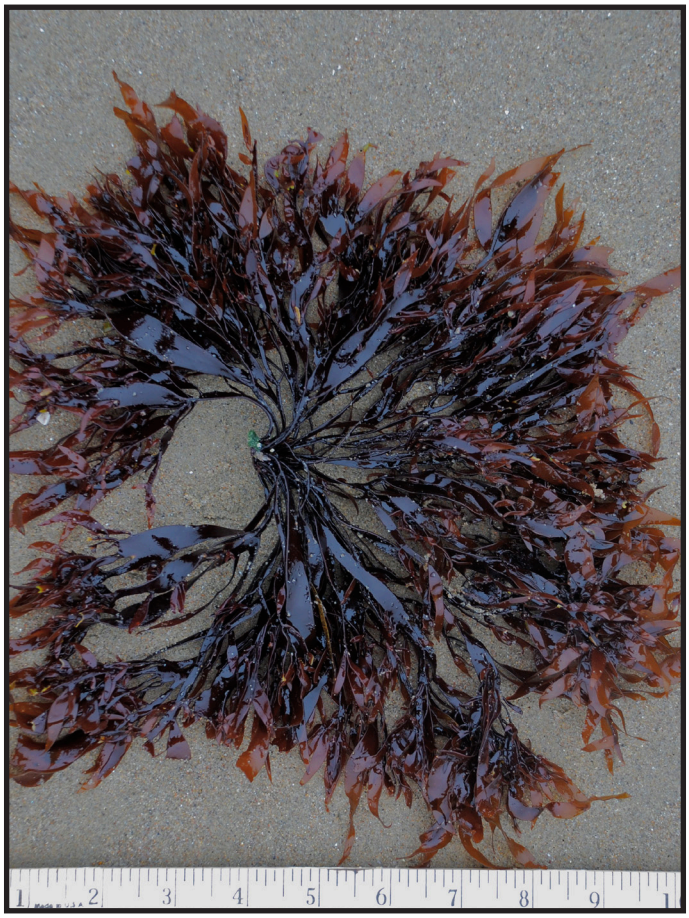

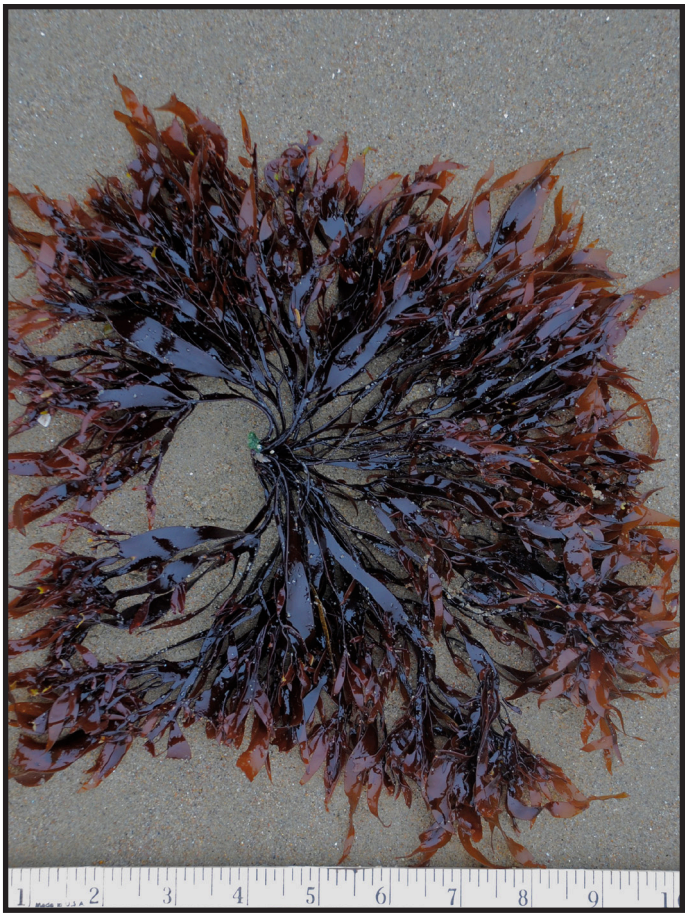

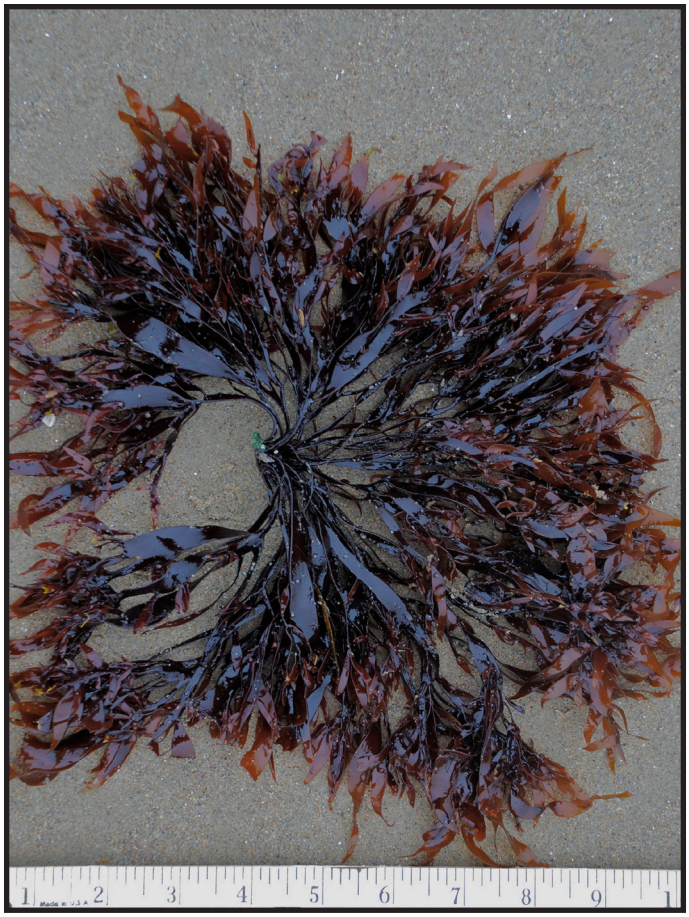

Scientific Name: *Mastocarpus papillatus*
Common Name: Turkish washcloth
Description: The branches of this species are poorly defined, almost "Y" shaped. The blades make up the majority of the alga, extending up to 6 inches in length. Blades can be narrow or wide and appear purple to black in color. Each blade is covered in rough bumps. *Mastocarpus papillatus* is extremely common and found growing on rocks at mid to high intertidal.
Comments: The two species of the genus *Mastocarpus* were included in the genus *Chondracanthus*. However, the two genera are differentiated based on their life cycles.

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Scientific Name: *Mazzaella flaccida*
Common Name: Rainbow leaf
Description: *Mazzaella flaccida*, like *Mazzaella splendens*, is characterized by its smooth, flat, and elongated blades. Although similar in appearance to *Chondracanthus exasperatus*, *Mazzaella flaccida's* blades are smooth from the bottom to the tip. The edges of the blades have a wave-like pattern. They reach 6-9 inches in length and between 2-4 inches wide.
Comments: Although a red alga, the blades of *Mazzaella flaccida* appear in a variety of colors from yellowish-brown to deep red depending on their exposure to the sun.

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59

Scientific Name: *Mazzaella leptorhyncos*
Common Name: None
Description: At the base of this alga, there is only one stem, but as it grows, more branches develop from the original stem. This alga is dark brown to black in color with spine-like branchlets forming on the main branches, which result in a fuzzy appearance.
Comments: The alga is generally small, reaching 6 to 8 inches.

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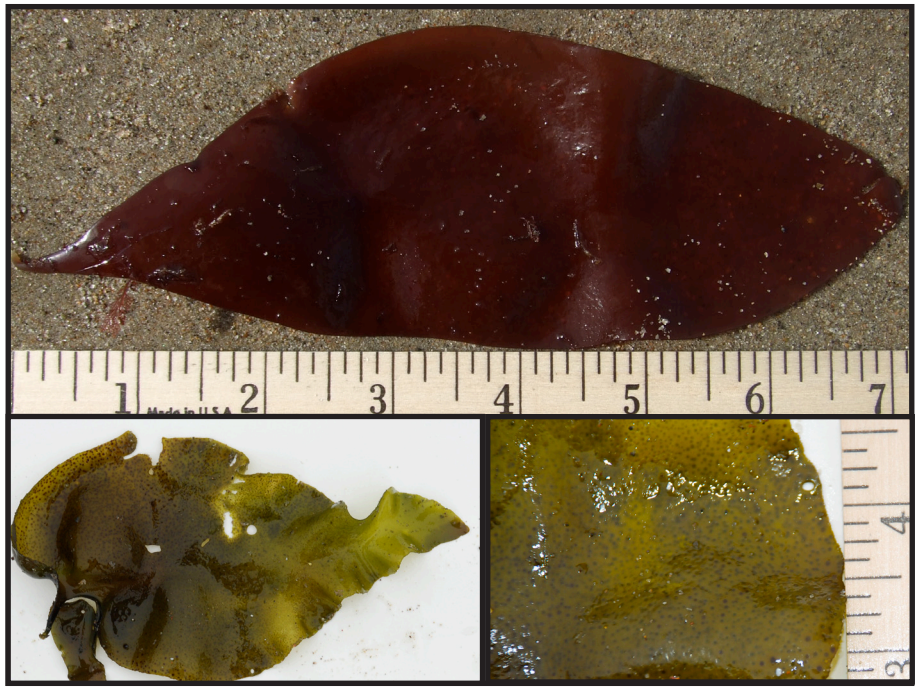

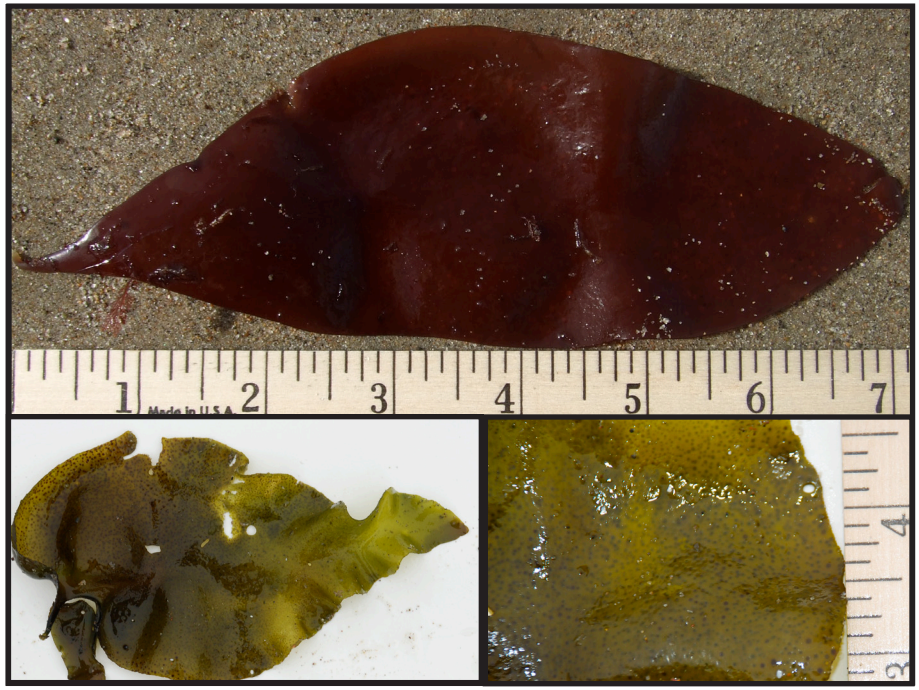

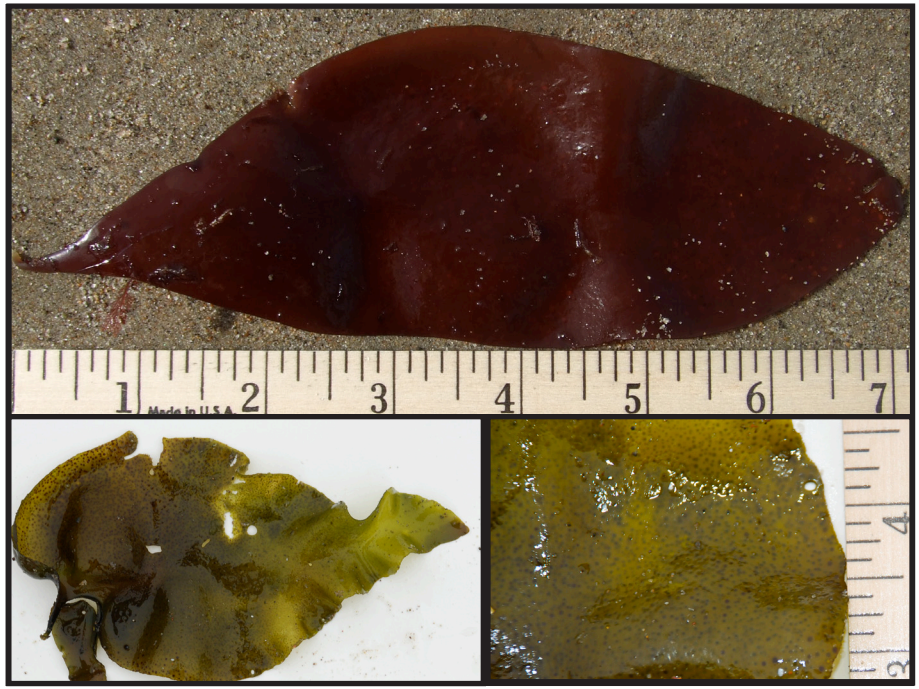

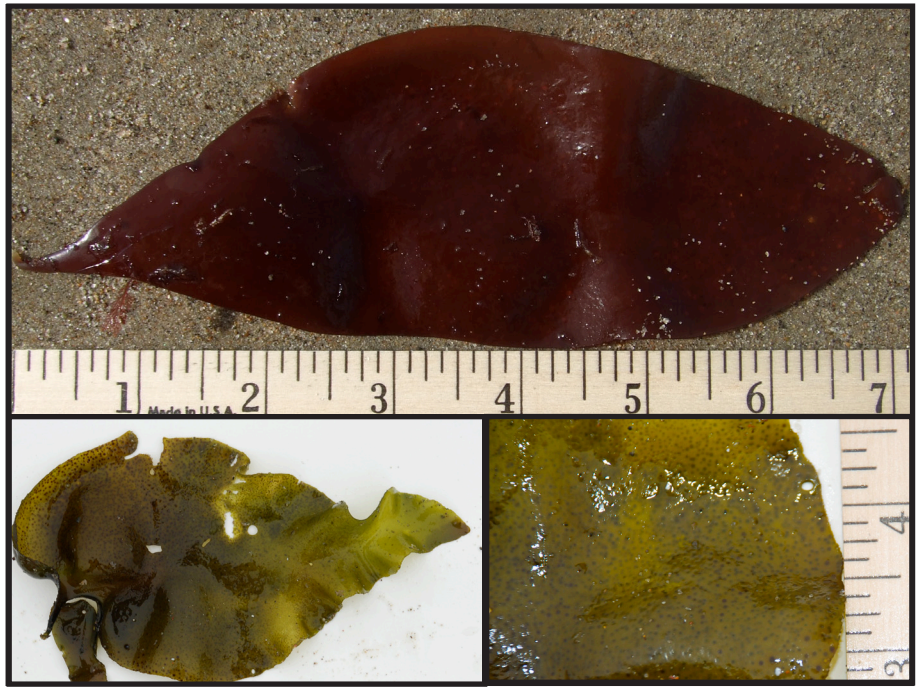

Scientific Name: *Mazzaella splendens*
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Description: *Mazzaella splendens* is generally characterized by its long flat blades. Its shape, however, can depend on its tidal location, but most commonly the blades are elongated or oval and are very thin. This alga is mostly found clumped tpgether.
Comments: Although technically a red alga and usually a dark purple or red, it can be found to be iridescent or even green depending on the amount of bleaching and exposure to the sun.

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63

Scientific Name: *Microcladia coulteri*
Common Name: Sea lace
Description: Unlike some other so-called red algae, this species *is* red in color. The branches are regular and alternately spaced along a straight axis. This species is flat and small, although it can reach up to 16 inches in length. The ends of these delicate branches are often referred to as claw-shaped.
Comments: *Microcladia* is epiphytic, which means it grows attached to other seaweeds. It is commonly found growing on coarse red and brown seaweeds like *Chondracanthus, Mazzaella* and *Prionitis* and is generally found in the mid to subtidal zone.

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Scientific Name: *Neorhodomela larix*
Common Name: Black larch
Description: *Neorhodomela larix* is characterized by its dark brown to black color and its fuzzy appearance. The long branches, growing from the basal portion, have smaller pointed branches extending from them. This alga can grow to be about 12 inches in length and is found throughout the intertidal zone.
Comments: Depending on the amount of sun exposure, it may appear a light brown or tan color. The alga can be found in large, dense mats.

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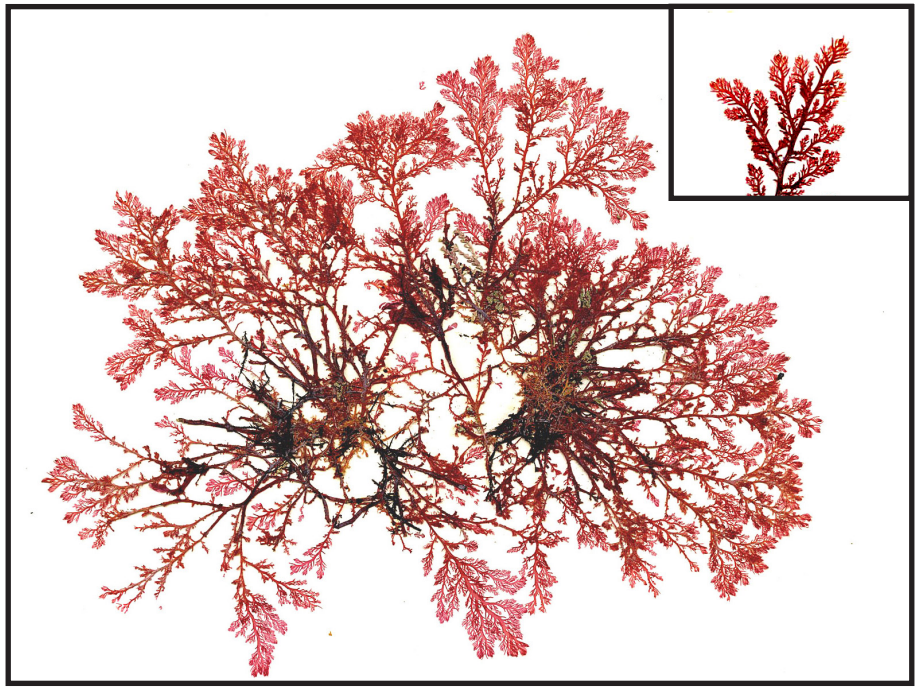

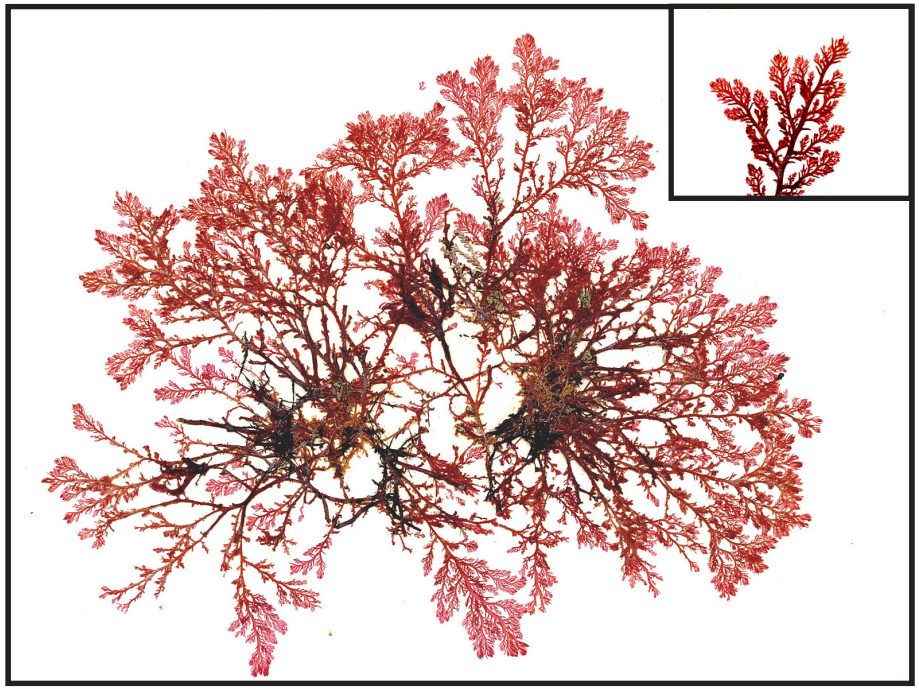

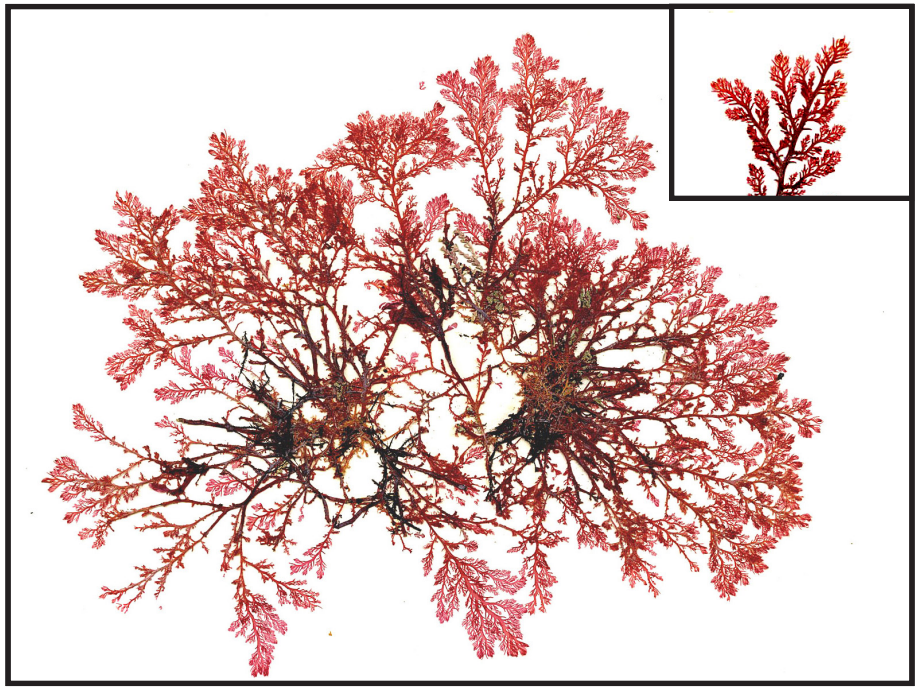

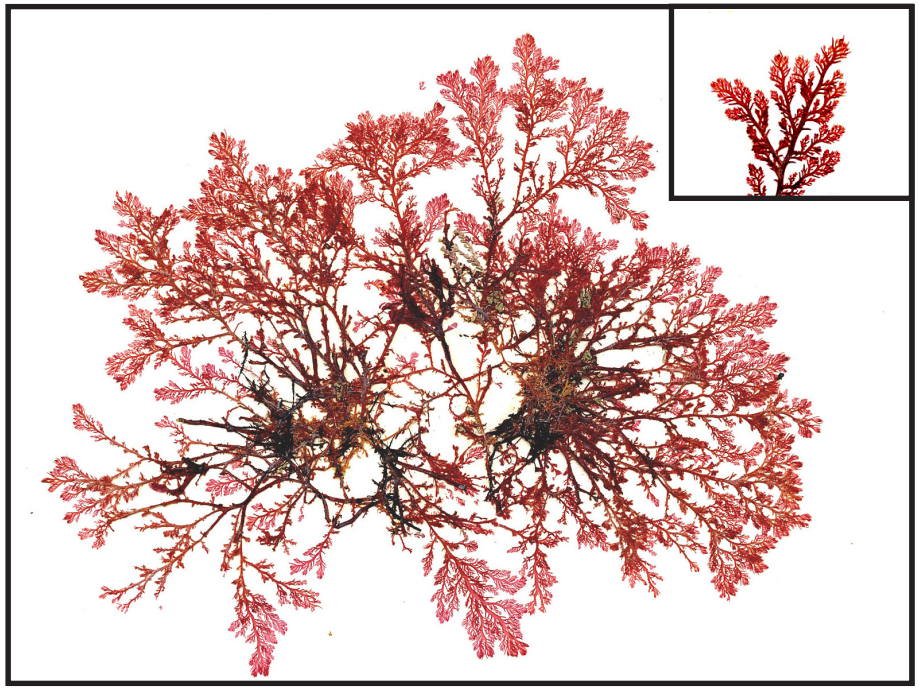

Scientific Name: *Plocamium pacificum*
Common Name: Sea comb
Description: The color of this alga ranges from pink to red. The delicate branches are flat and extend from the stem alternately. The distinguishing characteristic of *Plocamium pacificum* is its ornate fine branching. The fine outer branches resemble a comb and they occur on only one side of the branch.
Comments: Although *Plocamium* is sometimes found growing epiphytically, it usually grows on rocky substrate in the intertidal zone. This alga is a perennial. The blades fall off and regrow each year.

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Scientific Name: *Polyneura latissima*
Common Name: Crisscross network
Description: This alga is a vibrant red color and it has thin paper-like blades that grow from the main branch. The blades split into finger-like shapes towards the end of the blades. The blades have multiple rib lines extending from the bottom of the blade and continuing to the tips. The blades grow to about 12 inches in length.
Comments: This alga can be found in the subtidal zone attached to rocks. The alga’s scientific name means “many nerves or veins,” which describes the alga’s multiple ribs.

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Scientific Name: *Polysiphonia pacifica*
Common Name: Polly
Description: This alga is characterized by its fine branches. Out of water, it may be hard to identify the hair-like quality of the branches, but in water the branches have a fluffy appearance. Although the branches are small and delicate, the entire alga can grow up to 10 inches in length!
Comments: Since this alga's structure is so fine, it is hard to identify the exact species in the field. In order to truly identify the species, the branches must be viewed under a microscope.

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Comments: Since this alga's structure is so fine, it is hard to identify the exact species in the field. In order to truly identify the species, the branches must be viewed under a microscope.

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Scientific Name: *Polysiphonia pacifica*
Common Name: Polly
Description: This alga is characterized by its fine branches. Out of water, it may be hard to identify the hair-like quality of the branches, but in water the branches have a fluffy appearance. Although the branches are small and delicate, the entire alga can grow up to 10 inches in length!
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73


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Made in U.S.A.
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Scientific Name: *Porphyra perforata*
Common Name: Purple laver
Description: Although similar looking to *Ulva lobata, Porphyra perforata*'s blades are much smaller and typically a darker muddy green. The alga connects to a rock by the center edge of a deeply lobed blade. The blades branch out from the rock making a bush-like appearance. Each blade is thin and delicate.
Comments: There are over 20 different species of *Porphyra*. They can be differentiated based on the shape and color of their blades. *Porphyra* is one of the most extensively cultivated seaweeds because it is edible and tasty. It is often used in Japanese dishes.

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Scientific Name: *Rhodymenia californica*
Common Name: None
Description: This alga, like *Polyneura latissima*, has flat thin blades that extend from the basal portion. Unlike Polyneura, its blades form a more bush-like appearance and lack the characteristic ribbing. The branches split into two at the ends and are smooth. This alga is mostly found in the subtidal area.
Comments: None

Scientific Name: *Rhodymenia californica*
Common Name: None
Description: This alga, like *Polyneura latissima*, has flat thin blades that extend from the basal portion. Unlike Polyneura, its blades form a more bush-like appearance and lack the characteristic ribbing. The branches split into two at the ends and are smooth. This alga is mostly found in the subtidal area.
Comments: None

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Comments: None

Glossary of Terms

Bladder- an air filled sack or float.
Blade- the "leaf" of an alga.
Epiphyte- An alga that grows on the surface of another alga but does not harm the organism it grows on.
Genus- the major subdivision of a family or subfamily in the classification of organisms, usually consisting of more than one species.
Holdfast- a root-like or sucker-like organ or part providing attachment.
Intertidal- the area of the seashore that is covered by water at high tide and exposed at low tide.
Stipe- the stalk that bears the blades of the seaweed.
Subtidal- the ocean environment below low tide that is always covered by water.

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Mary-Sophia Motlow is a fourth year environmental studies major with an emphasis in geography and water management. She has interned at CCBER since Fall 2010 working on a variety of projects from water quality to processing plant specimens. She will graduate in June 2012 and plans to enter the environmental field of water management or corporate sustainability.

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