

Invasive?	Common Name	Scientific Name	Flowering	Algae Type	Zonation	Substrate Anchor	Characteristics	Ecology	Species Supporting	Stressors	Commonality in CA
No (native)	Bull Kelp*	<i>Nereocystis luetkeana</i>	no	brown	subtidal	rocky shore (exposed and protected), edge of kelp forest	"single, very long stipe and bulbous air bladder" -> 10-20 m tall; dies annually in winter; appearance of a bull whip; holdfast has many finger like projections (haptera) and is up to 10 cm in diameter; blade shape is dependent on the environ	shelter/canopy via kelp beds; foraging grounds; rapidly colonizes area cleared by urchins; detritus from sloughed off tips = important carbon source for intertidal communities -> feeds filter feeders	young fish and inverts (urchins, sea stars, snails, crabs); sea otters; mussels	predation/consumption; winter months	abundant
Yes (nonnative)	Dead Man's Fingers	<i>Codium fragile</i>	no	green	M to L; estuaries	rocks, shells, other hard substrates	dark green algao, up to 1 m in length; dichotomous cylindrical branches; interwoven filaments ending in a layer of swollen utricles covering thallus surface	habitat (forms canopy); can alter ecosystem by replacing dominant kelp species; shift habitat selection and feeding behaviors; food source (but not primary bc not very palatable); dec native species population	epiphytes, herbivores (ie. molluscs, crustaceans, echinoderms, bryozoans)	high temp; grazing	widespread
Yes (nonnative)	Devil Weed	<i>Sargassum horneri</i>	no	brown	L to Subtidal	rocky habitats; man made structures	young = resembles fern with opposite blades extending from sentral axis, blades are broad with ragged tips; mature = narrow blades, branches with air bladders and receptacles near base of branch; 0.3-1.5 m tall	canopy cover; nursery; biofilter for nutrients released from mainland; no natural predators bc of toxins; feeding (for those adapted)	inverts and juvenile fish; barnacles, diatoms, baby giant kelp	competition with giant kelp; human removal	abundant
	Dwarf Rockweed	<i>Pelvetiopsis limitata</i>	no	brown	H	exposed rocky shore	small discoid holdfast with olive green to light tan thallus; dichotomously branched (no midrib); mature branch tips = inflated conceptacles where gamete are produced; grows up to 15 cm tall	indicator organism of human traffic; feeding	predators = limpets and other invert grazers	grazing; human tramlings	common
No (native)	Eelgrass*	<i>Zostera marina</i>	yes	N/A	L to subtidal	soft bottoms (mud and sand)	blades flat and wide (2-12 mm); up to 3 m long	food, shelter, nursery habitat, filter water; dec wave and water currents; nutrient cycling (inc O2); environ indicator	marine fish and inverts	wasting disease via marine slime mold; smothering from overgrowth; human settlement (dec light, inc runoff)	common
	Encrusting Coralline Algae*	<i>Lithothamnion</i> spp.	no	red	intertidal and subtidals	rocky areas	Typically calcareous and pink algae attached to rocks that either has a plant body that is non-differentiated and sprawls like a blob or has mini flexible branches attached to one another	Serves as food for marine life and is the main builders for algal reefs		Drastic changes, such as shifts in pH, temperature, light, etc	
No (native)	Feather Boa Kelp	<i>Egregia menziesii</i>	no	brown	M to L in protected to moderately wave exposed areas	found mixed w/ <i>Macrocystis</i> and <i>Phyllospadix</i>	smooth rachi (thick, flattened, strap-like axes); wrinkled sporophylls, broash, spatulate, and narrow filiform lateral blades; hapterous holdfast	food and shelter	understory algae, inverts, <i>Notoacmea insessa</i> = limpet found only on <i>Egregia</i>	mortality from <i>N. insessa</i> grazing, desiccation, heat stress, warm water events (ie. El Nino), poor water quality	common
No (native)	Giant (Bladder) Kelp	<i>Macrocystis pyrifera</i>	no	brown	L as recruit, not adulthood	rocky bottoms	grow up to 60 m; grows btwn 5-20 m of water; perennial; many stipes, each w/ oval-elongated pneumatocysts (~gas bladder) and long, tapered blade	kelp forest -> food, habitat, nursery	marine inverts, fish, other marine plants, sea otters	light sensitive; nutrient levels in summer and fall; pathogenic parasites, bacteria, fungi; high water temperatures; grazing	common
No	Golden Rockweed	<i>Silvetia compressa</i>	no	brown	M	rocks, somewhat protected from open surf	up to 90 cm long; thick, narrow, dichotomous fronds appearing to be irregularly branched; narrow fronds and lacks midrib; swollen receptacles at branch terminal (rarely inflated with gases)	creates moist microhabitat to allow algae and animals to live higher up on shore (dense canopy); used for restorative purposes	other algae and animals	human tramlings; oiling -> slow growing, irregular recruitment, low survivorship	common
(native)	Iridescent Weed	<i>Mazzaella splendens</i>	no	red	L to subtidal	rocks (sheltered)	single blade (grown in clusters) = 20-40 cm long and 12-24 cm wide, heart-shaped, rubbery, iridescent sheen when wet; fleshy holdfast with 3-6 cm stipe				common in Central CA
Yes (nonnative)	Japanese Wireweed	<i>Sargassum muticum</i>	no	brown	L and upper subtidal; protected from wave action; estuaries	rocks, boulders	long thin stems w/ multiple side branches w/ small, round bladders/floats; perennial; matures, grows, and sheds with seasonality	food; "steal" oysters by rafting; dec seagrass vegetation; cools water in understory and heats water above canopy; create stagnant water when dense; canopy shade cover; prevent <i>M. pyrifera</i> re-establishment; inc space and light competition	sea urchins, gastropods, sea hare, amphipods	grazing, epiphyte overgrowth -> dec photosynthesis and gas exchange	common
Yes (nonnative)	Killer Algae	<i>Caulerpa taxifolia</i>	no	green	L to subtidal	sandy soil and rocky shores	thallus = creeping stolon, anchored via colorless rhizoids; fronds w/ midrib and feather-like pinnules; size growth is dependent upon the depth of water grown in; primary fronds grow on stolons, branching fronds grow on primary fronds; pinnule spacing and length is dependent on light	appears in dense mats when introduced -> prevent other algae from growing; change habitats where invading -> sublethal effects on native species (dec species diversity and fish habitat); dec food and light for other species and/or toxic effects in foliage (caulerpenyne); wide salinity and water temp range for living	sea slugs, otherwise toxic to almost all others	low salinity and temp; human removal; grazing	officially eradicated in 2006
	Nori	<i>Porphyra</i> spp.	no	red							
	Red Comb Weed	<i>Plocamium cartilagineum</i>	no	red							

Invasive?	Common Name	Scientific Name	Flowering	Algae Type	Zonation	Substrate Anchor	Characteristics	Ecology	Species Supporting	Stressors	Commonality in CA
No (native)	Rockweed/Bladderwrack*	<i>Fucus gardneri</i>	no	brown	M to L	rocky shores, exposed and protected; on rocks and mussels	forms dense, short canopies; up to 50 cm long; has discoid holdfast with branched thallus and distinct midrib with blades branching up to 15mm wide; swollen tips (receptacles) containing air and mucilage at maturity (also where gametes form)	canopy cover to protect from wave action and desiccation; bases of attachment for sessile animals; indigestible to predators due to chemicals	other algae and inverts; predators = periwinkle snails, pacific false limpet, rockweed isopod	predation from animals and humans; desiccation (overstressed -> develop softened areas and reddish spots); dehydration (overstressed -> death from cell membranes bursting)	common
No (native)	Sea Cabbage Kelp	<i>Saccharina sessilis</i>	no	brown	M to L w/ low to moderate wave exposure	rocks in sheltered bays	no stipe as adult; well-developed holdfasts; blades up to 150 cm long (commonly 30-50 cm) and 80 cm wide; morphology varies -> blades can be broad, ruffled, and bullate (protected location) or smooth and deeply divided (exposed area)	canopy cover, feed	inverts	space competition w/ other algae; wave mortality; ocean temp sensitivity; light limitations	
No	Sea Lettuce	<i>Ulva</i> spp.	no	green	M to L; estuaries; eelgrass understory	rocks protected from waves w/ good sun exposure; pilings; dock floats	thin blades = 2 layers of cell; no tissue differentiation; rapid reproduction -> can outgrow and smother other plants and organisms -> dec O2 and inc fish mortality	food; bioindicator (ie. absence/poor growth -> water contamination of heavy metals)	crustaceans (amphipods), molluscs (snails, chitons), echinoderms (esp. sea urchins)	grazing; pollution of dissolved metals; oil contamination	common
No (native)	Sea Palm	<i>Postelsia palmaeformis</i>	no	brown	M	bare patches in mussel beds	resembles palm tree; up to 60 cm tall; thick, flexible, cylindrical stipe; hapterous holdfast; 100+ blades up to 25 cm long			growth range limited by light, desiccation, and competition w/ mussels for space; overharvesting	rare; protected in British Columbia, Washington, Oregon; illegal for recreational harvesting in CA
No (native)	Sea Potato/Sea Cauliflower	<i>Leathesia marina</i> (<i>Leathesia difformis</i>)	no	brown	M to L	rocks, other seaweeds	young = solid; mature = hollow and looks like a small leathery brown bag the size of a tennis ball; rubbery and smooth outer surface; up to 15cm in diameter; brain like appearance				
No (native)	Surf Grass*	<i>Phyllospadix</i> spp.	yes	N/A	L	rocky	~ <i>P. scouleri</i> = flat and wide blades (2-4 mm); no longer than 3 ft; flowers near base on short stalks ~ <i>P. torreyi</i> = blades firm, cylindrical, and wiry (less than 2 mm); up to 10 ft long; flowers on elongated stalks	filter water; stabilize sediment; prevent erosion; inc O2; dec water currents	inverts, juvenile fish, epiphytic algae, birds	desiccation; heat stress; sewage; oiling; coastal development; thermal pollution; invasion of non-natives, dislodgement	common
	Tidepool Coralline	<i>Corallina</i> spp.	no	red							
(native)	Turkish Washcloth/Black Tar Spot	<i>Mastocarpus papillatus</i>	no	red	H to M	rocks (semi-exposed and semi-protected)	irregular branched blades; blades up to 15 cm long; alt btwn male and female foliose form and crustose form; female form = covered in papillae, creating rough washcloth texture; crustose form (present year round) = thick, opaque, tar spot crust growing exnt to foliose blades (regrows and dies)	food/habitat	gastropods, mobile inverts (ie. sea urchins), fish	grazing; wave action	common
Yes (nonnative)	Wakame	<i>Undaria pinnatifida</i>	no	brown	L to Subtidal	stable rocky reefs, mobile cobble, mudstone, on seagrass, shells, epiphytically on seaweeds	1.6-10 ft long; divided blades resembling "fingers" with sporophyll forming around main stem/midrib (not found in native); blades have crinkled texture (not found in native)	intentional introduction for cultivation purposes and accidentally with oysters and shipping activity; animal and human consumption; highly invasive	inverts	high wave action; areas with abundance of local vegetation; feeding	common

References

<https://seaworld.org/animals/ecosystems/tide-pools/intertidal-marine-plants/>
https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5329437.pdf
https://dornsife.usc.edu/assets/sites/291/docs/Southern_California_Tidepool_Organisms_ID_sheet.pdf
<https://marine.ucsc.edu/target/index.html>
<https://sites.google.com/site/islandecologyuncw2015/terrestrial-flora/pickleweed>
<http://www.aquariumofpacific.org/onlinelearningcenter/species/pickleweed>
http://starthrower.org/research/kelpmisc/kelp_mp.htm
<https://sanctuarysimon.org/dbtools/species-database/id/40/macrocystis/pyrifera/giant-kelp>
<https://www.crd.bc.ca/education/our-environment/wildlife-plants/marine-species/sea-lettuce>
http://pugetsoundsealife.sseacenter.org/pugetsoundsealife.com/puget_sound_sea_life/Wireweed.html
<https://www.cabi.org/isc/datasheet/108973>
<https://sanctuarysimon.org/dbtools/species-database/id/758/fucus/gardneri/bladderwrack>
<http://www.fao.org/fishery/species/2777/en>
<https://invasions.si.edu/nemesis/browseDB/SpeciesSummary.jsp?TSN=449>
https://www.algaebase.org/search/species/detail/?tc=accept&species_id=X152e7c2cacbdd423
https://www.inaturalist.org/guide_taxa/315716
<https://sanctuarysimon.org/dbtools/species-database/id/75/nereocystis/luetkeana/bull-kelp>
<https://www.centralcoastbiodiversity.org/turkish-washcloth-bull-mastocarpus-papillatus.html>
http://bioweb.uwlax.edu/bio203/2011/lutz_jose/habitat.htm
<https://blogs.scientificamerican.com/expeditions/usc-dornsife-scientific-diving-an-analysis-of-sargassum-horneri-ecosystem-impact/>