

MARINE INDICATOR SPECIES OF REEFS:

I. CALCAREOUS FLAT REEFS IN TEMPERATE WATERS OF MODERATE WAVE ACTION

Example: Port Willunga and Aldinga, S Australia – soft fossiliferous bryozoan reefs



crumbling calcareous cliffs, boulders and sand at base



extensive flat reef, scattered flat boulders



shallow pools with sand and low ridges



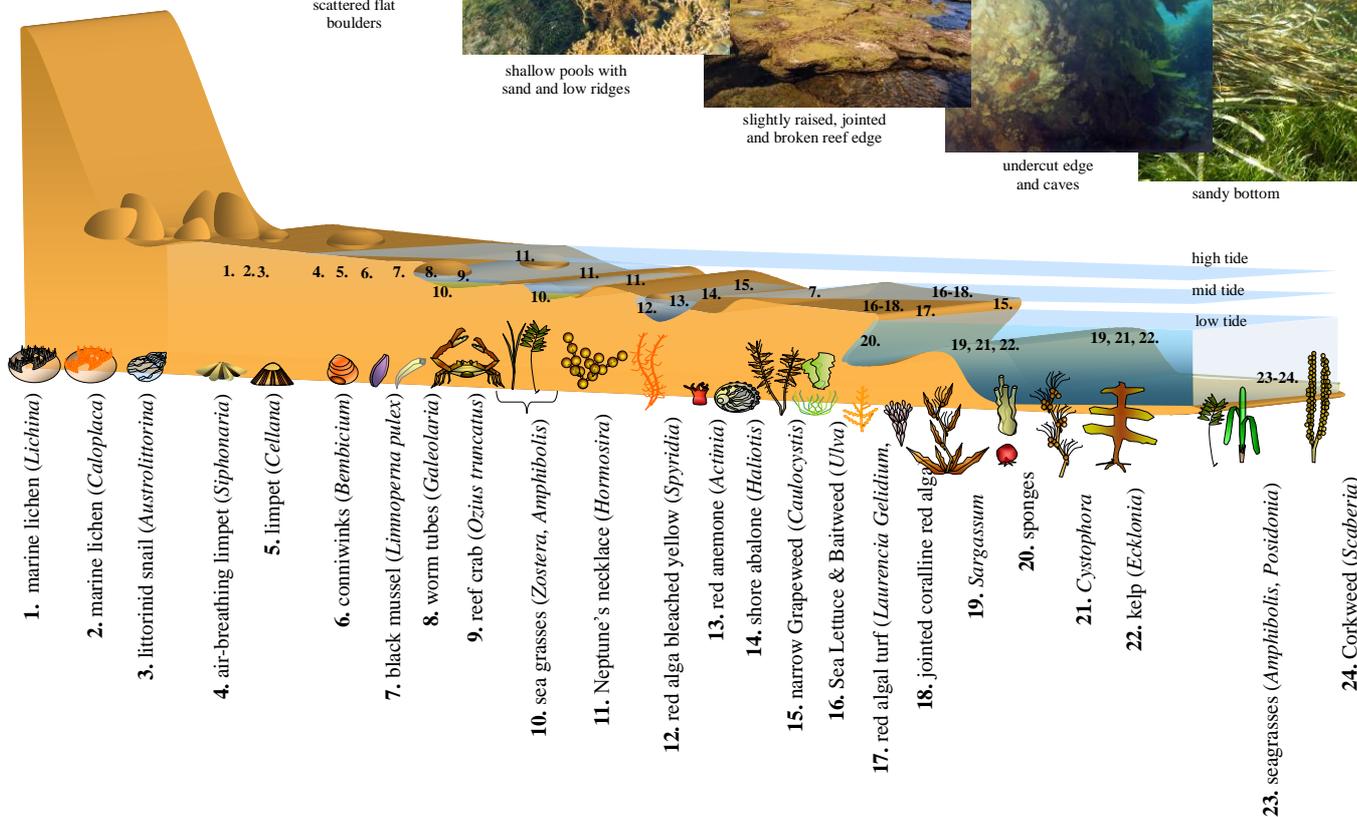
slightly raised, jointed and broken reef edge



undercut edge and caves



sandy bottom



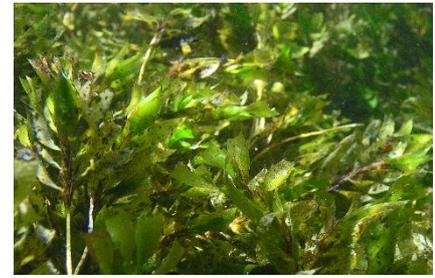
THUMBNAIL SKETCHES OF INDICATOR ORGANISMS — DISTRIBUTED ON THE REEF ACCORDING TO TIDE LEVELS



1. black lichen, *Lichina*, 2 mm tall, found above high tide and only occasionally splashed (hence, belongs to the "splash zone")



6. conniwinks, *Bembicium*, 5 mm across; near high tide mark; sealed with a delicate horn coloured lid during low tide



10. sea Nymph (a sea grass), *Amphibolis*, with stem 400 mm long, growing in sand in deep channels in the reef



2. orange lichen, *Caloplaca*, 4 mm tall; found above high tide in the splash zone



7. tiny black mussels, *Limnoperna pulex* (formerly *Xenostrobus*) to 25mm long, clustered just below high tide, often partly obscured by sand; form black mats of individuals covering rocks



10. eel grass (a sea grass), *Zostera*, with narrow leaves to 150 mm long; in shallow pools; growing in sand; burnt black from exposure during summer low tides



3. the blue snail, to 17 mm tall, grazes algal and lichen crusts in the splash zone



8. white worm tubes, *Galeolaria*, 10 mm long; often clustered in a band around rocks between upper- and mid-tide level; a lid closes the tube protecting the segmented worm inside (also, at top of the frame, stunted plants of Neptune's necklace can be seen)



11. Neptune's necklace, *Hormosira*, about 100 mm long growing along mid intertidal rock ridges or in shallow pools. The ball-shaped, fluid-filled parts protect plants from drying during low tide



4. striped, air-breathing limpet, *Siphonaria*, 15 mm wide; grazes lichens and blue-green algal crusts on rocks in the splash zone; holds its breath during high tide



12. red alga, *Spyridia*, 150 mm long; in mid-intertidal pools; bleaches to an amber colour



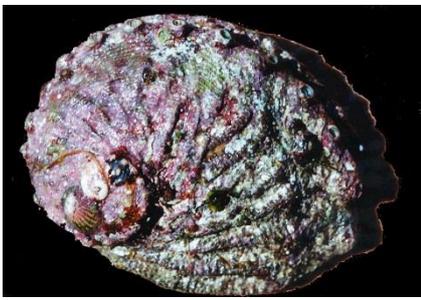
5. limpet, *Cellana*, 40 mm wide; grazes on rocks in the upper intertidal; holds water under the shell at low tide



9. reef crab, *Ozius truncatus*, 80 mm across the body. Females dig burrows in sand under rocks; males with large pincers (usually the right hand one the largest) wander about the reef surface at low tide looking for females



13. red anemone *Actinia*, 30 mm across; under rocks in the mid-intertidal, mainly in rock pools; pulls tentacles in and collapses to a thick disc at low tide



14. abalone, *Haliotis*; 100 mm wide; under rocks, and in crevices in the lower inter-tidal and shallow water



18. red algal turf, a mix of red algae kept low by grazing shellfish, exposed along the lower intertidal outer reef edge at low tide and running below water; mixed with green *Ulva*



21. *Cystophora*, a brown alga, 1 m tall, often with zig-zag stalks and ball-shaped floats



15. narrow Grapeweed, *Caulocystis*; 150 mm tall; outer reef and edge of reef pools; small floats radiate outwards from the stalks



19. sponges; under rocks and in dark crevices and caves, often brightly coloured



22. kelp, *Ecklonia*, a brown alga 1 m tall with tree like base and branched, flat, wrinkled upper blades



16, 17. sea lettuce or baitweed, *Ulva*, 100 mm tall; at the lower intertidal outer reef edge; a green alga blooming seasonally



20. *Sargassum*; brown alga 1 m tall with leafy basal parts, often with ball-shaped floats



23-24. sea grasses and yellow-brown corkweed, *Scaberia*, in sand



Old Wives and a Moonlighter crossing a forest of *Ecklonia*, Aldinga reef, South Australia