



GREEN SEAWEEDS

le One

Common Intertidal Seaweeds and Seagrasses of the SALISH SEA

Including Puget Sound, Georgia Basin, and the Strait of Juan de Fuca



Acrosiphonia sp.
Green rope
Mid to low intertidal L to 20 cm



Cladophora columbiana
Green tuft
Mid to low intertidal L to 6 cm



Urospora
Green bars
High intertidal

Green Seaweeds



Prasiola sp. Bird guano alga
Very high intertidal, splash zone L to 2 cm
Found in areas covered with seabird droppings



Codium fragile
Dead man's fingers
Mid to low intertidal L to 30 cm



Codium setchellii
Encrusting codium
Mid intertidal to upper subtidal



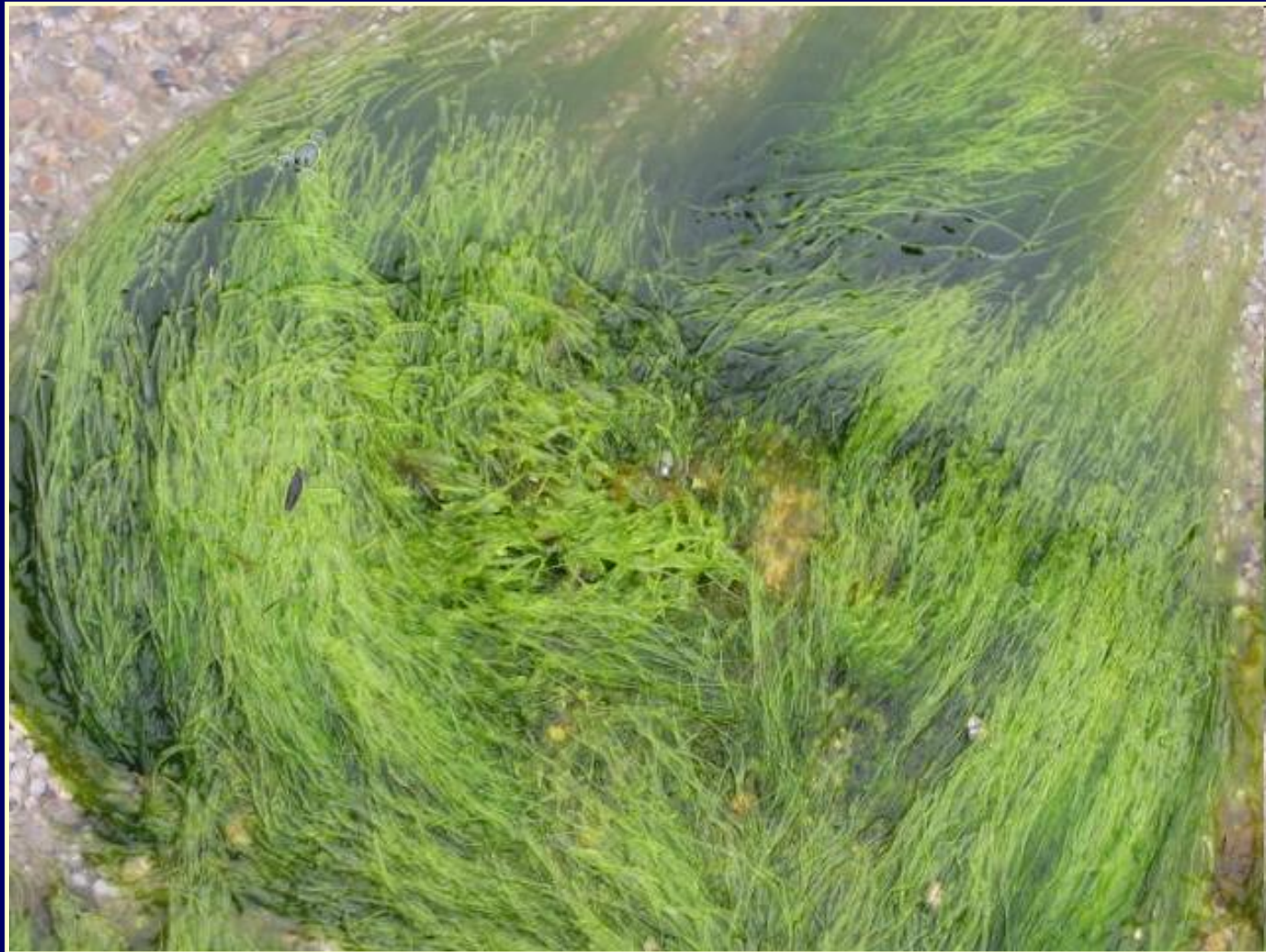
Sea lettuce bloom in Penn Cove
Sea lettuce
Species of *Ulva* and *Ulvaria*
On rocks, seaweeds, wood, and free floating
Mid intertidal to upper subtidal L to 25 cm, W to 18 cm



GREEN SEAWEEDS

Sea Hair - *Ulva intestinalis*

formerly *Enteromorpha*



Seagrasses

Seagrasses Species of *Zostera* and *Phyllospadix* Side Two



***Zostera marina*.** Native eelgrass
 Roots buried in sand or muddy sand
 Low intertidal to shallow subtidal

Low to moderate energy beaches L to 2m, W 3-10 mm
 Eelgrass is a marine flowering plant with roots, leaves, flowers and seeds. Eelgrass beds are species rich and ecologically important habitats for the health and survival of nearshore invertebrate and fish communities. They provide havens for hundreds of marine animals and serve as nurseries and feeding areas for juvenile salmon. Many of the eelgrass food web organisms go unnoticed because they are microscopic. Decaying eelgrass recycles nutrients into the food web.



Zostera marina
 vegetative shoot



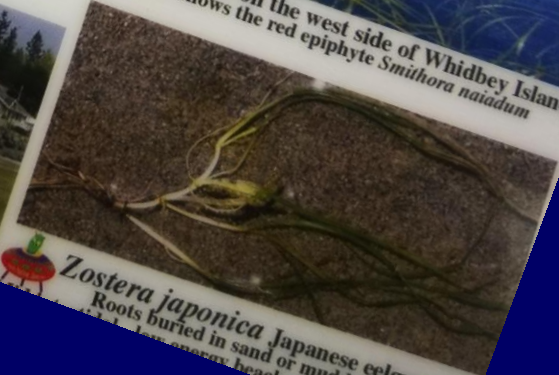
Zostera marina bed on the west side of Whidbey Island
 Photo inset shows the red epiphyte *Smithora naiadum*



Z. marina reproductive shoot
 with inflorescence



1 cm



Zostera japonica Japanese eelgrass
 Roots buried in sand or muddy sand
 Low to moderate energy beaches L to ~20 cm, W ~20 cm

SEAGRASSES

Eelgrass *Zostera marina*



SEAGRASSES

Eelgrass

Zostera marina and *Z. japonica*



Doug Stark

SEAGRASSES

The invasive *Spartina*



Whatcom County

Brown Seaweeds

Brown Seaweeds

Side Three

Key on Sides One and Six



Sargassum muticum
Wireweed L to 5 m
Upper to low intertidal



Cystoseira geminata
Northern bladder chain L to 5 m
Low intertidal to upper subtidal



Melanosiphon intestinalis
Twisted sea tubes L to 15 cm
High to low intertidal



Scytosiphon lomentaria
Soda straws L to 50 cm
Mid to low intertidal



Strap-shaped tongue-shaped branches

BROWN SEAWEEDS

Wireweed

Sargassum
muticum



BROWN SEAWEEDS

Rockweed

Fucus distichus



Whatcom County

BROWN SEAWEEDS

Sea fungus

(like tar spot, but
more loosely
adhered)

Ralfsia sp.



Brown Seaweeds The KELPS

Side Four
Key on Sides
One and Six



Bullations
(puckers)
One midrib

Agarum sp.
Sea collander
Haptera hf L 1-2 meters



No midrib

Saccharina subsimplex
Split kelp
Small haptera hf
L to over 2 meters



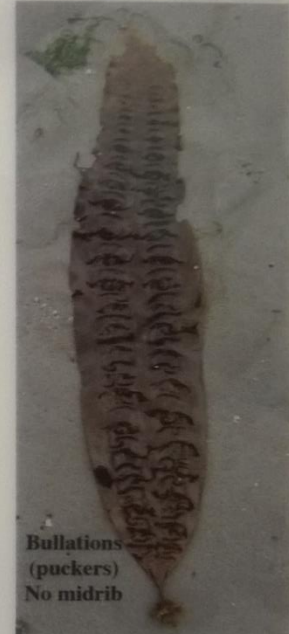
Ruffled edges
One narrow midrib

Alaria marginata
Winged kelp
Haptera hf L to several meters



Bullations
Five midribs

Costaria costata
Seersucker
Haptera hf
L to several meters



Bullations
(puckers)
No midrib

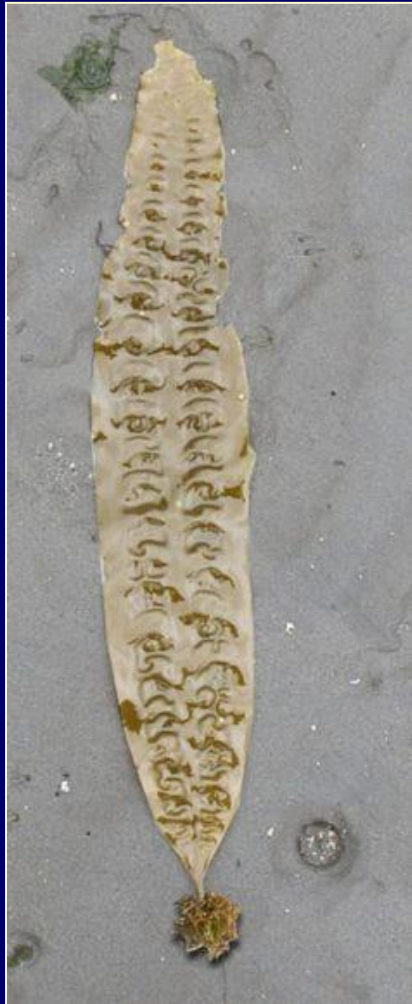
Saccharina latissima
Sugar kelp
Haptera hf
L to several meters

Kelp beds thrive on rocky, high-energy beaches in the low intertidal and subtidal. They provide habitat for a diverse community of invertebrates, fish and other seaweeds. The impressive giants we see on the beach are the macroscopic sporophyte



THE KELPS - BROWN SEAWEEDS

Sugar kelp &
Saccharina latissimi



Mary Jo Adams

Winged kelp
Alaria marginata



THE KELPS – BROWN SEAWEEDS

Bull Kelp

*Nereocystis
leutkeana*



Mary Jo Adams

Red Seaweeds

Side Five
Key on sides one and six



Osmundea spectabilis
Sea laurel
Low, subtidal L to 30 cm



Neorhodomela sp.
Black pine
Mid to low intertidal L to 20 cm



Delesseria decipiens
Winged rib
Low, subtidal L to 25 cm



Plocamium sp.
Sea comb
Low, subtidal L to 25 cm



RED SEAWEEDS

Black pine

Neorhodomela sp.



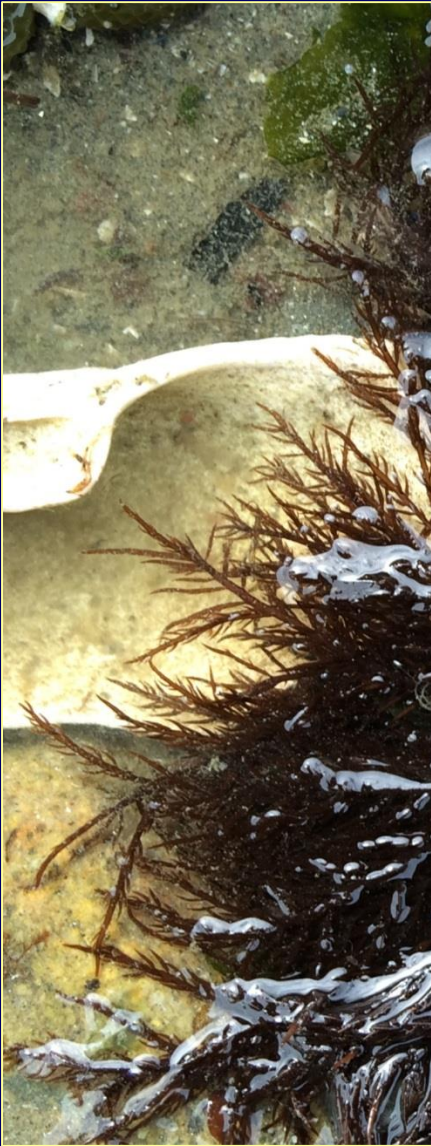
RED SEaweEDS

Flattened sea brush

Odonthalia
washingtoniensis



RED SEAWEED



Red Seaweeds

Side Six



C. flabellulata

Blades without
veins or midribs



Callophyllis
unidentified species



C. violacea

Callophyllis (blades from three species)
Lower intertidal to subtidal depending on species
L ~ 4 - 30 cm depending on species



Blades with fine or prominent veins, midribs,
and ruffled edges depending on species
Hymenena sp. and *Cryptopleura* sp.
Lower intertidal to subtidal depending on species
L ~ 6 - 25 cm depending on species



RED SEaweEDS

Filamentous red

&

Possible red blades



RED SEAWEEDS

Many red blades



RED SEAWEEDS

Red Laver (Nori)

Porphyra sp.



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RED SEAWEEDS

Turkish washcloth – tar spot

Mastocarpus sp.



Tar Phase



Blade Phase

RED SEAWEEDS

Rusty rock

Hildenbrandia sp.



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RED SEaweEDS

Turkish towel

Chondracanthus exasperatus (formerly *Mastocarpus*)



Doug Stark photo

Aggregating Animals

Side One

Common Intertidal Invertebrates

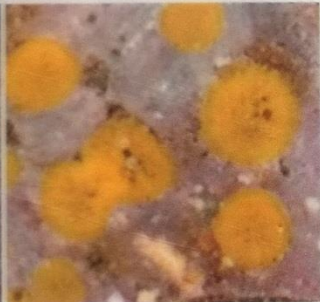
of the S A L I S H S E A



Sponges Phylum Porifera



Suberites sp.
R L, S
Texture is firm and leathery,
less felt-like than other sponges.



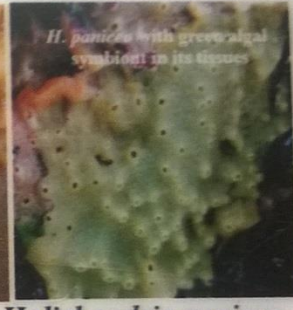
Cliona sp. Boring sponge
R L, S
Bores into calcareous shells
of molluscs and barnacles.



Haliclona sp.
Purple sponge
R, F L, S



Halichondria bowerbanki
Crumb of bread sponge
F L, S
Oscula inconspicuous. Tissue smells like
gunpowder when squeezed.



Halichondria panicea
Green encrusting sponge
R L, S
Yellow or greenish
with prominent oscula.

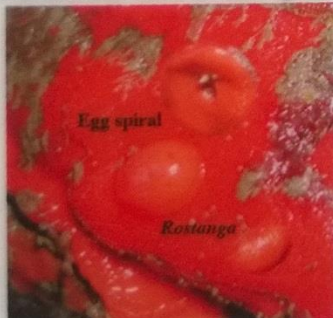


Leucilla sp.
Stalked vase sponge
R, F L, S 3 cm (h)

Most intertidal sponges in our area form thick or thin spreading encrustations. Growth is limited mostly by substrate availability.



Myxilla incrustans
Mycale adhaerens
Scallop encrusting sponge
L, S



Ophlitaspongia pennata
Red sponge
R L, S

Anemones



Anthopleura artemisia
Moonglow anemone
R, Ss L, S 15 cm (w)
Upper 2/3 of column "warty"; tentacles with white banding



Anthopleura elegantissima Aggregating anemone
R M, L, S 8 cm (w)
Entire column "warty"; tentacles pink-tipped.
Algal and dinoflagellate symbionts



Without symbionts

Individual

What does it feel like?



Doug Stark photo

SPONGES (*Porifera*)



Mary Jo Adams photo

Purple sponge
Haliclona sp.

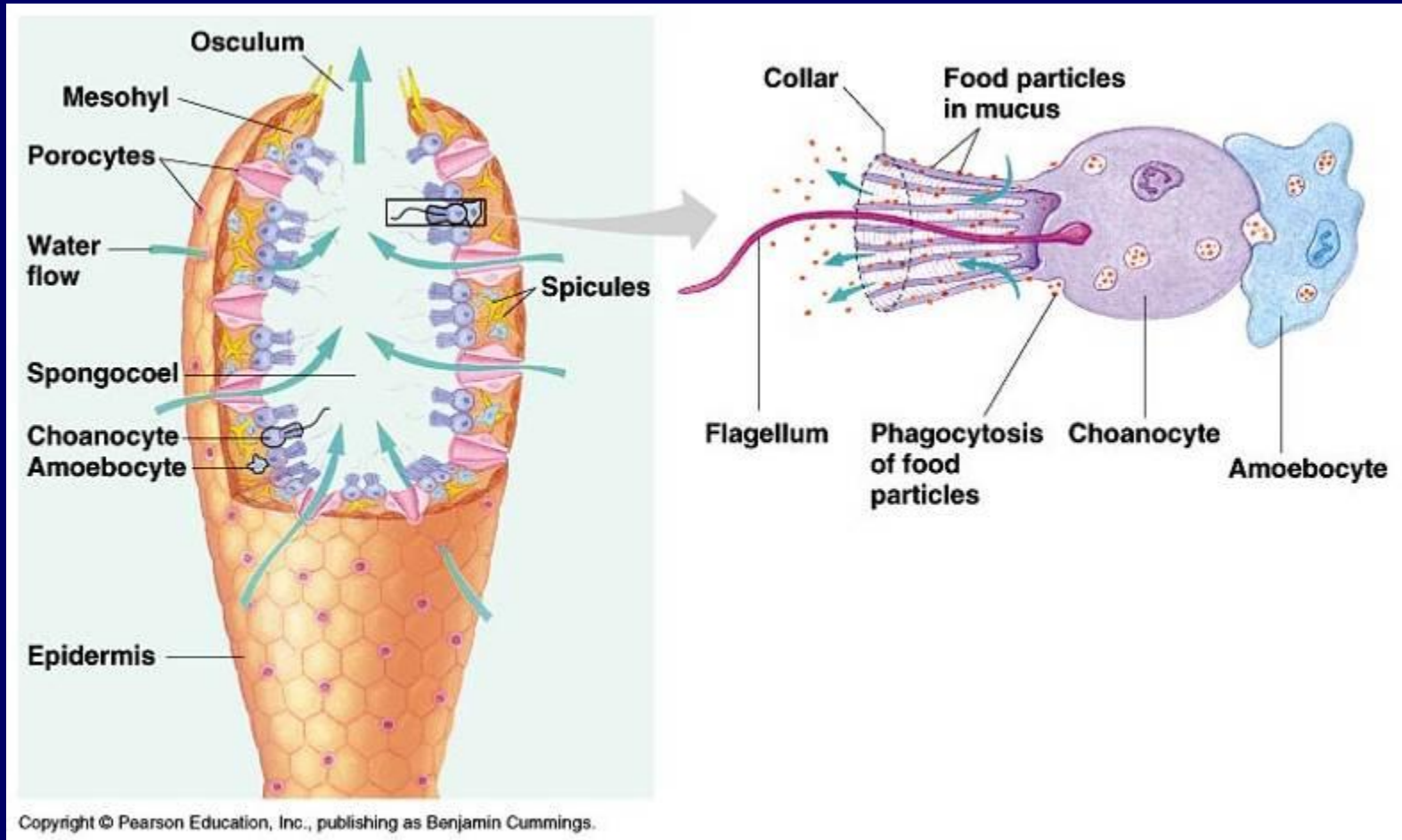


Doug Stark photo

Bread crumb sponge
Halichondria sp.

SPONGES

The sponge very basic body plan...



SPONGES

Rough scallop sponge on young rock scallop

Myxilla incrustans or *Mycale adhaerens*.



Doug Stark photo

ANEMONE

Aggregating / pink-tipped anemone

Anthopleura elegantissima



ANEMONE

Pink-tipped green anemone

a.k.a.

Aggregating anemone

Anthopleura elegantissima



Doug Stark photos



Point Whitehorn







Aggregating Shelled Animals

Barnacles - Side 7 (Also, mussels side 4)

Barnacles - Phylum Arthropoda, Subphylum Crustacea

Side Seven



Chthamalus dalli
Little brown barnacle
R H 6 mm (l)
Tan or brown outer plates,
inner plates form a cross.



Balanus glandula
Acorn barnacle
R,F M 2 cm (l)
Most common intertidal barnacle.
Outer plates are wavy, inner plates
form a sinuous W or M.



Balanus crenatus
Crenate barnacle
R, F, D M, L, S 2 cm (l)
Outer plates are white and
smooth. Inner plates form a
"pinched" W or M.



Semibalanus cariosus
Haystack barnacle
R M, L, S 5 cm (w)
Outer plates have numerous
spiny projections, inner plates
form a recessed "beak"



Inner plates

Balanus nubilus
Giant acorn barnacle
R L, S 8 cm(h)
Prefers high energy beaches.



Pollicipes polymerus
Goose-neck barnacle
R H, M, L 8 cm (l)
Prefers high energy beaches.

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MOLLUSCA

Blue mussels

Mytilus trossulus



Mary Jo Adams

ARTHROPODA

Thatched / Haystack barnacles

Semibalanus cariosus



Beach Naturalists

40 ARTHROPODA

Acorn barnacle

Balanus glandula



Mary Jo Adams photos

ARTHROPODA

Little brown barnacle
Chthalamus dali



Crenate barnacle
Balanus crenatus



ARTHROPODA



Thatched barnacle



Doug Stark photo

ARTHROPODA

Barnacles on shell



Doug Stark photo

Bryozoans – Side 7

Chthamalus dentatus
Little brown barnacle
R H 6 mm (l)
Tan or brown outer plates,
inner plates form a cross.

Acorn barnacle
R, F, M 2 cm (l)
Most common intertidal barnacle.
Outer plates are wavy, inner plates
form a sinuous W or M.

Crenate barnacle
R, F, D M, L, S 2 cm (l)
Outer plates are white and
smooth. Inner plates form a
"pinched" W or M.

Haystack barnacle
CARIOSUS
R M, L, S 5 cm (w)
Outer plates have numerous
spiny projections, inner plates
form a recessed "beak".

Balanus nubilus
Giant acorn barnacle
R L, S 8 cm (l)
Prefers high energy beaches.

Pollicipes polymerus
Goose-neck barnacle
R H, M, L 8 cm (l)
Prefers high energy beaches.

Bryozoans – Phylum Bryozoa



Pos Hippodiplosia sp.
Fluted bryozoan
R, K L, S 15 cm (w)

Grows in double sheets often encrusting
on seaweed. Color of new growth margins
brighter than older parts of the colony.



Pos Lyrula hippocrepis
R M, L, S

Encrusting, pores on the frontal zooecia
arranged in a series of parallel rows.



Nudibranchs *Corambe* sp. and
Doridella sp. feed on *Membranipora*.



Membranipora membranacea
Kelp lace
K L, S

Colonies can grow to many centimeters in diameter. Individual zooids have box-
like shapes. Left photo shows the nudibranch *Doridella steinbergae* (~15 mm long).



Eurystomella bilabiata
Derby hat bryozoan
E L, S

Red colonies, zooecia resemble
little red derby hats (see inset).



Heteropora pacifica
Staghorn bryozoan
R L, S 45 cm (colony)

Colony superficially resembles coral.



Flustrellidra corniculata
Leather bryozoan
K L, S 10 cm (lobe length)

Prefers high energy beaches.



Pos Dendrobeatia sp.
Lichen bryozoan
R, F L, S 2.5 cm (frond)



Pos Dendrobeatia sp.
Fan bryozoan
R, F L, S 7.5 cm (l)

Brachiopods – Phylum Brachiopoda

Lophophorates: Brachiopods and Bryozoans

The Brachiopoda and Bryozoa species are lophophorates, animals that have a
ciliated, tentacled feeding structure organized into a right and left coil (brachiopods)

BRYZOANS



- Crusty
- Can see “pores”, esp with hand lens
- Patterned



BRYZOAN

Kelp lace Bryzoan

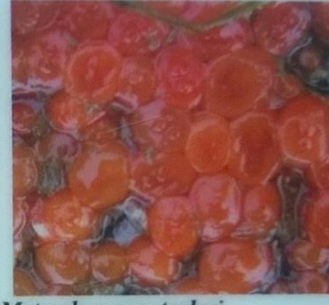
Membranipora membranacea



ASCIDIANS (Tunicates and sea squirts) – Side 7

A twenty million year old fossil shows a stalk (pedicle) made of connective tissue attaches the animal to a substrate.

Ascidians - Phylum Urochordata



Styela montereyensis

Stalked tunicate

R, F L, S 30 cm (l)

Solitary ascidian with a wrinkled tough outer covering connected to the substrate by a long stalk. Light tan with red siphons.

Aplidium spp.

Sea pork

R L, S 20 cm (colonies)

Compound ascidian, colonies are shades of brown orange or red. Prefers high energy beaches.

Metandrocarpa taylora

Orange social ascidian, Sea buttons

R L, S 7 mm (w)

Red, orange, (occasionally yellow or green) social individuals are connected impermanently by thin tunic. Two raised "button hole" siphons in each center.

Clavelina huntsmani

Light-bulb tunicate

R, F L, S 3 cm (individual h)

Social ascidian with two luminous pink streaks showing through the tunic.



Cnemidocarpa finmarkiensis

Red sea squirt

R L, S 5 cm (w)

Smooth bright red solitary tunicate with square-shaped siphon openings.



Pyura haustor

Wrinkled sea squirt

R L, S 8 cm (l)

Solitary ascidian with bright red siphons and a wrinkled exterior. Often covered with shell bits or small organisms.



Didemnum sp.

Invasive didemnum

R L, S In our area it forms smooth firm "rubbery" amorphous colonies with a drippy appearance. Colonies are yellowish to tan.

A fast spreading invasive.



Didemnum / Trididemnum spp.

Native white glove leather ascidian

R L, S Amorphous colonies

Smooth with tiny greyish pits. Often mistaken for sponge.

ASCIDIANS

Tunicates



Doug Stark photo

Sea Pork – colonial tunicates

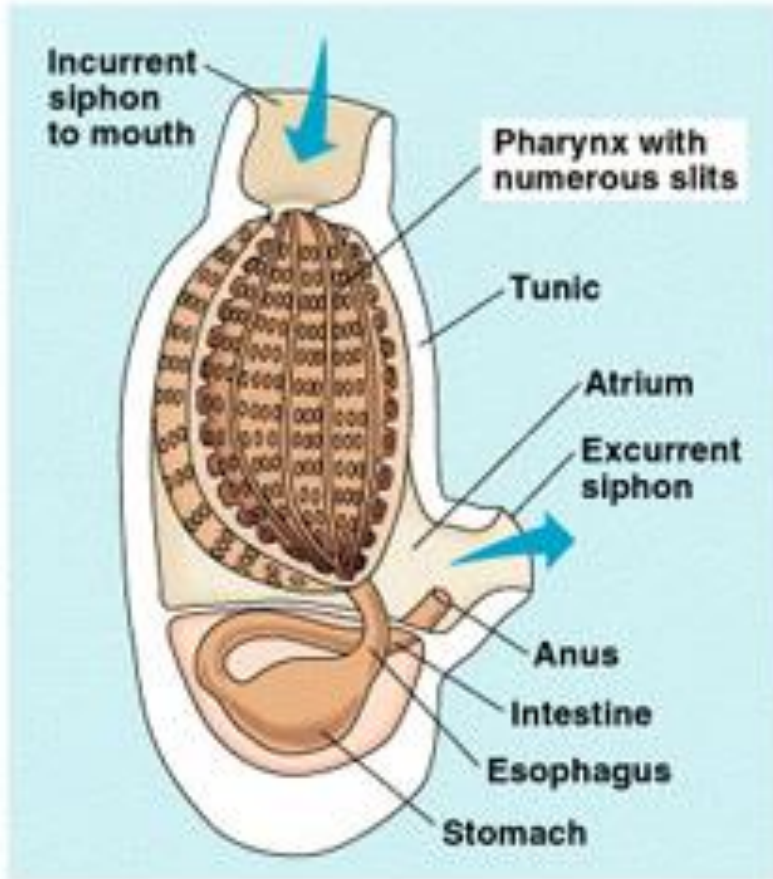


Jim Ramaglia photo

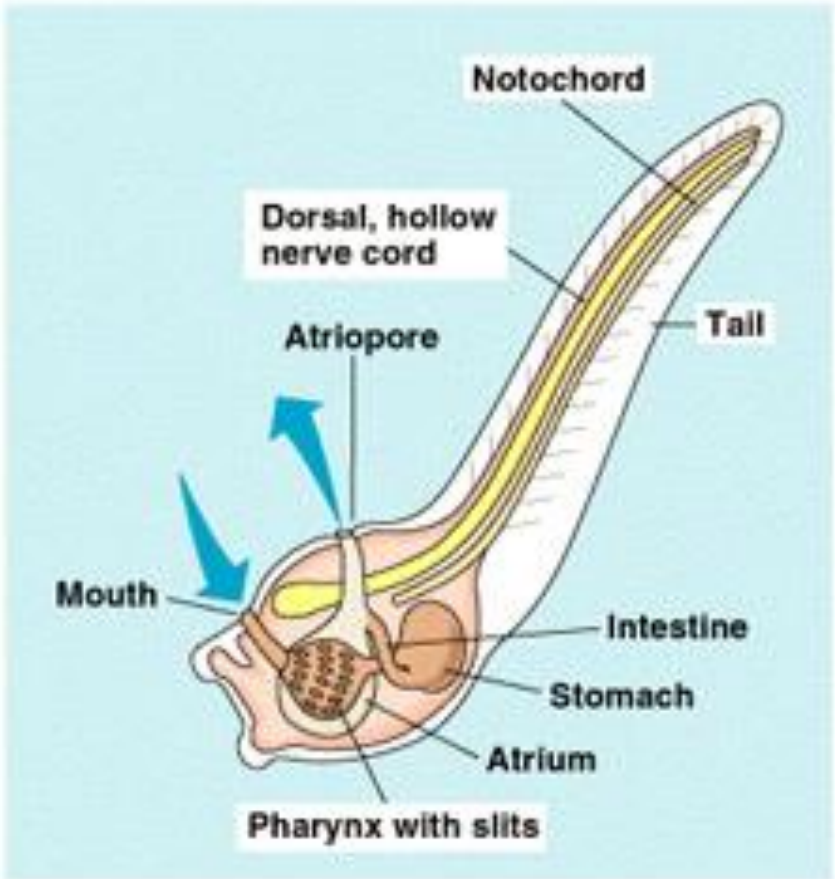
Sea squirt

Tunicate adult

Tunicate "tadpole"



(b)



(c)

ASCIDIANS

Red Colonial Ascidians (Tunicates)

Applidium sp.



ASCIDIANS

Sea pork on Pacific Oyster



Doug Stark photo

ASCIDIANS

“Rock snot” – Invasive colonial Tunicate

Didemnum sp



Doug Stark photo

ASCIDIANS

Other invasive Tunicates

Club tunicate –
Styela clava



Janna Nichols photo

Transparent Ciona Tunicate
Ciona savignyi
Sigh-OH-na sa-VEE-nee



Rick Zade photo



Doug Stark photo

Sponge (or *invasive tunicate?*)

Wrinkled whelk *Nucella lamellosa* egg masses



Barnacle-eating nudibranch

Onchidoris bilamellata & egg masses

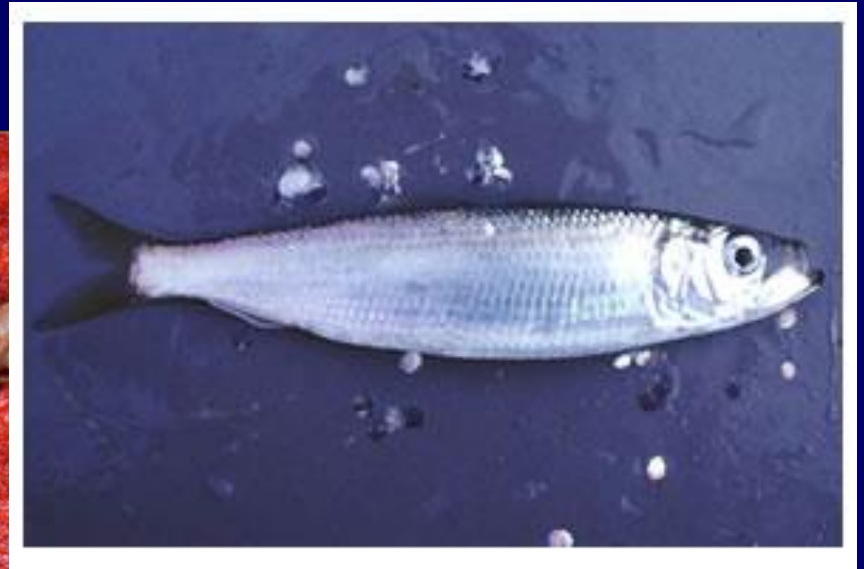




FISH



Pacific Herring eggs



WDFW photo



Al Hanners photo

FISH

Upper shoreline: Sandy gravel shoreline used by spawning forage fish



Surf smelt eggs in sand

Doug Stark photo

FISH

Tidepool sculpin

Porichthys notatus



FISH

Saddleback gunnels in sea lettuce

Ulva sp.*Wendy Harris*

FISH

High cockscomb blenny



FISH

Plainfin Midshipman

Porichthys notatus



Doug Stark photo

Gull with plainfin midshipman

Porichthys notatus



FISH



WDFW photo

Sand Lance