
The Intertidal Zone

The Beach Starts in the Mountains

- Glaciation, terranes, uplift, volcanism and erosion have brought rocks, sediment and sand down from the mountains through 10,000 streams to Puget Sound and created the beaches we see there.

What Lives Where and Why?

- Rock, sand, wave action, tidepools, exposure, temperature, light, dessication, food supply, and predation drive what can live in a particular part of the intertidal zone.

- Example: Purple sea stars live under overhanging rocks and and climb up at high tide to eat barnacles and mussels on the rock. During summer storms or winter, they stay in low intertidal areas and do not feed. The level of barnacles and mussels on the rock reflects the predation of sea stars. Reproduction of sea stars is determined by the amount of light and food supply.

Purple Sea Star

Echinoderm

Barnacles

Arthropod

Intertidal Zone

above water at low tide &

under water at high tide

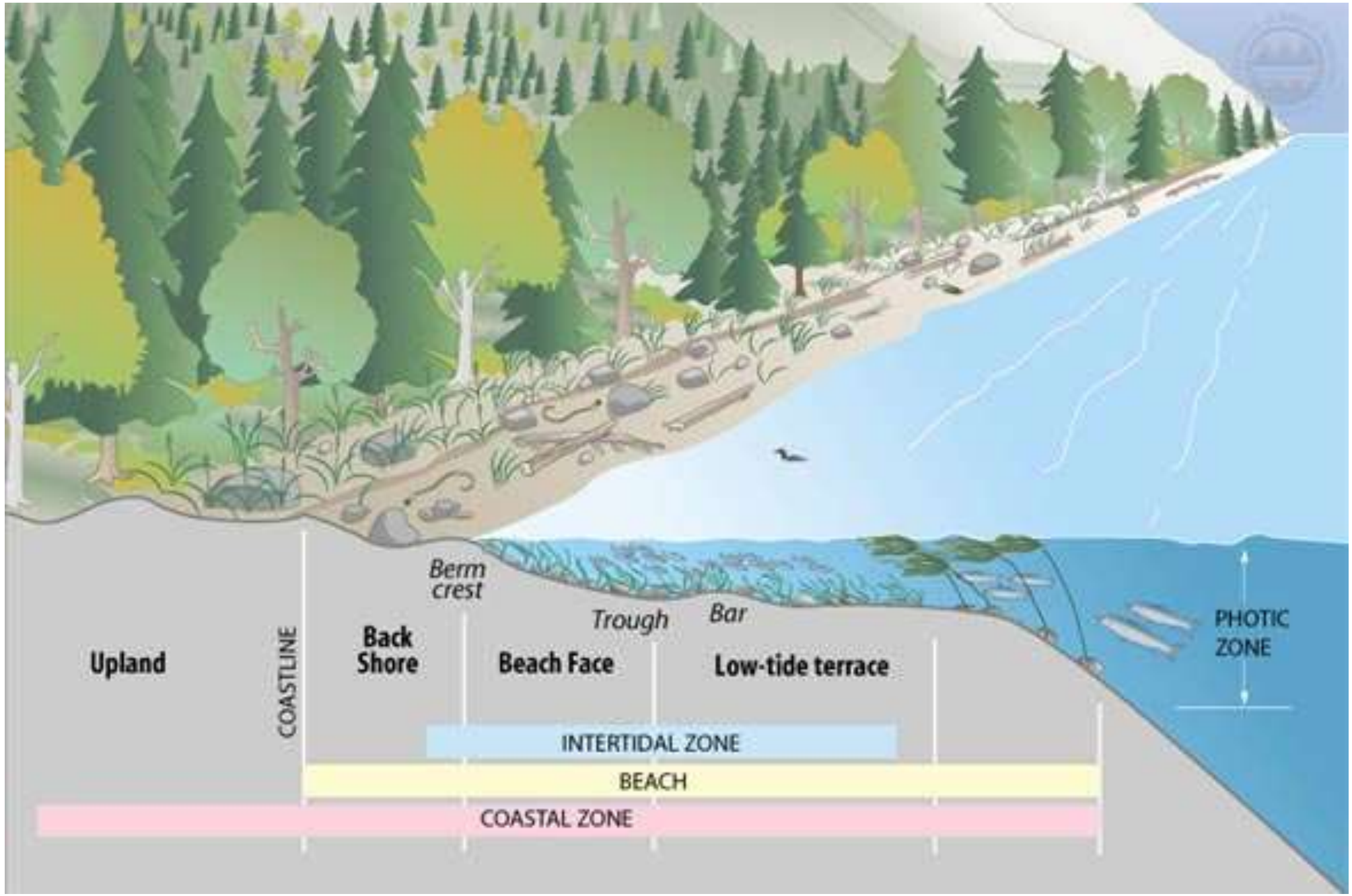
- May include many different types of habitats: rocks, cliffs, sand, wetlands, clay, shale, tidepools, stream outlets

- Organisms in the intertidal zones are adapted to an environment of harsh extremes; sometimes submerged, exposed to sun, dessication, wave action, variable salinity, temperature extremes

INTERTIDAL ZONE CARKEEK BEACH

11.0 ft

-0.4 ft


Berm crest
Trough
Bar
Upland
COASTLINE
Back Shore
Beach Face
Low-tide terrace
PHOTIC ZONE
INTERTIDAL ZONE
BEACH
COASTAL ZONE

Intertidal Zonation on rocks at low tide Species ranges are compressed into very narrow bands

Glacial erratic at Carkeek Park at low tide - encrusted with mussels, barnacles, sea stars, chitons, seaweed

Intertidal Zone Organisms

Life Zones of the Beach

- **Splash or spray zone** – covered by water only during storms
- **Intertidal zone**-between high and low tide extremes
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- **High tide zone**-covered by highest tides, largely terrestrial
- **Middle tide zone**-exposed and submerged by average tides
- **Low tide zone**-exposed only at lowest tides, largely marine

Low Tide Zone
usually under water

- Teeming with life: light and energy for growth, salinity normal, protected from large predators due to waves and relatively shallow water
- Lots of marine vegetation including eel grass, a vascular plant
- Great biodiversity
- Examples: sea anemones, brown seaweed, chitons, crabs, green algae, hydroids, isopods, limpets, mussels, nudibranchs, sculpin, sea cucumber, sea lettuce, sea palms, sea stars, sea urchins, shrimp, snails, sponges, surf grass, tube worms and whelks

Middle Tide Zone

covered and uncovered by tides twice a day

- Examples: anemones, barnacles, chitons, crabs, green algae, isopods, limpets, mussels, sea lettuce, sea palms, sea stars, snails, sponges and whelks

High Tide Zone
underwater only at high tide

- Examples: anemones, barnacles, brittle stars, chitons, crabs, green algae, isopods, limpets, mussels, sea stars, snails, whelks and some marine vegetation

Algae

Sea Wrack
Brown Algae

Little Rockweed
Brown Algae

Nudibranch

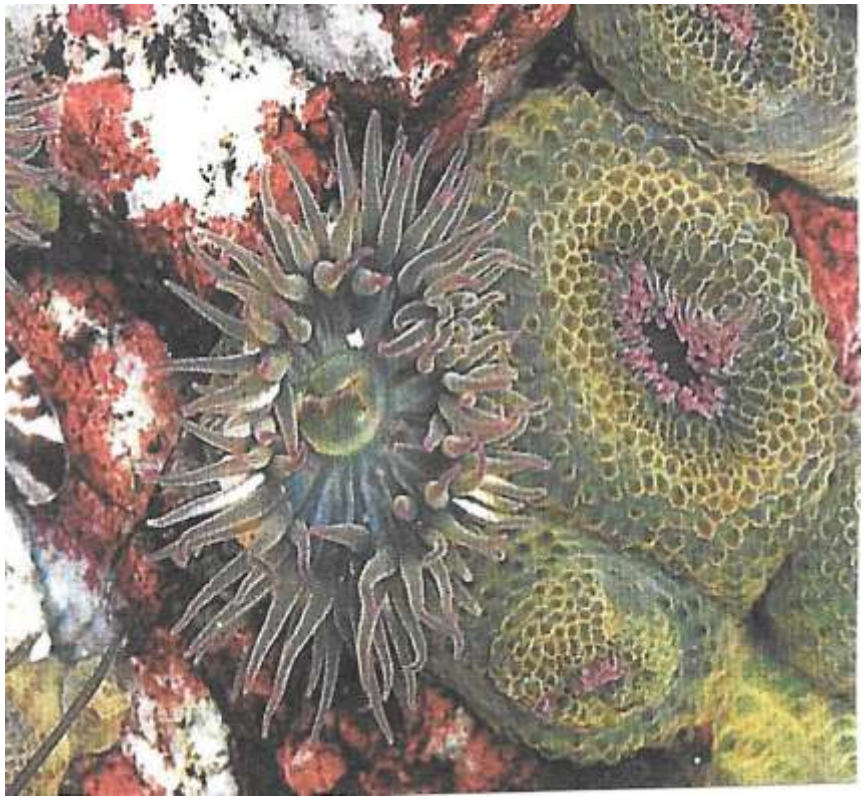
Mollusc

Sea Lemon

Aggregating Anemone

Aggregating Anemone colony

Cnidaria



Chiton

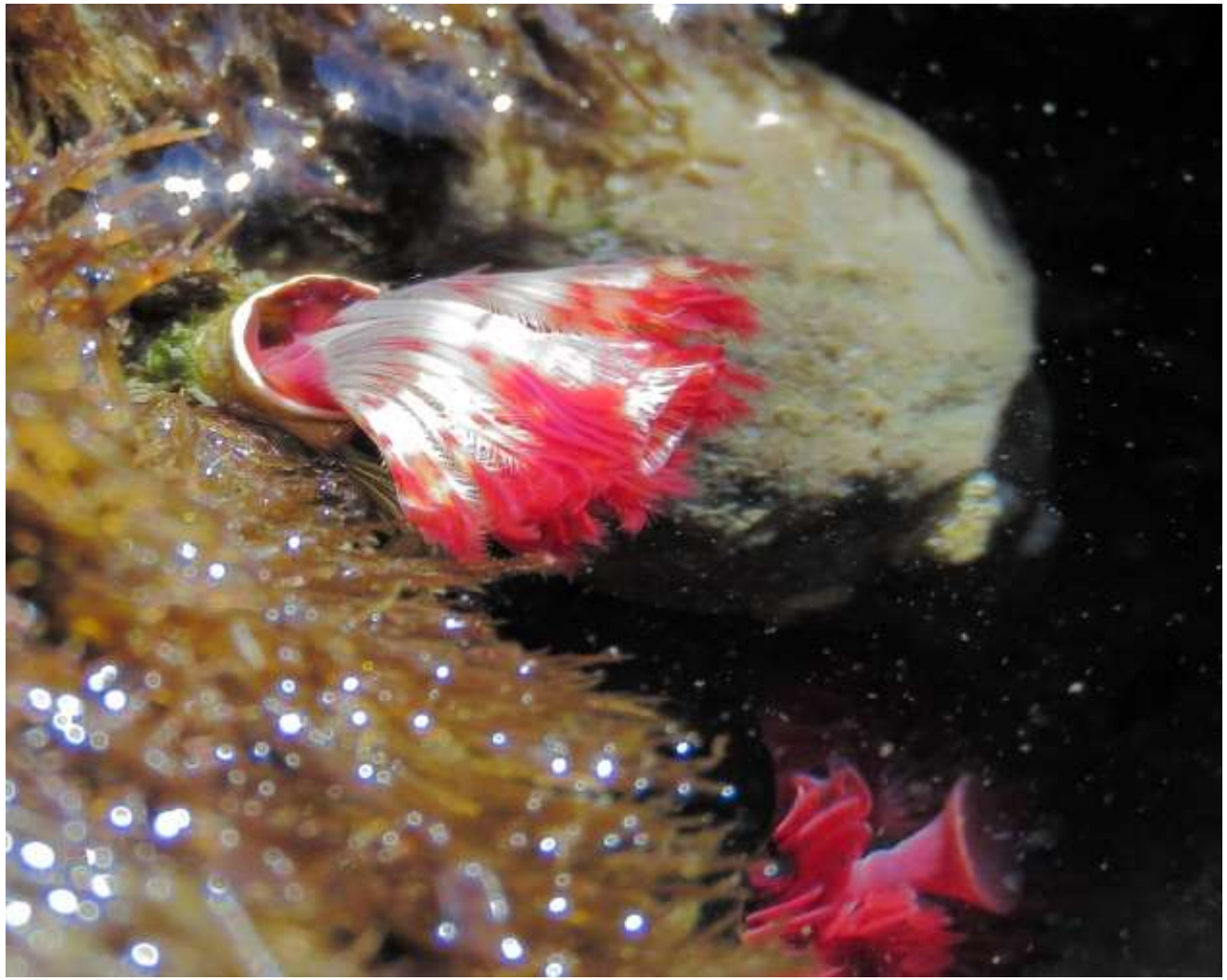
Mollusc

Kelp Crab

Arthropod

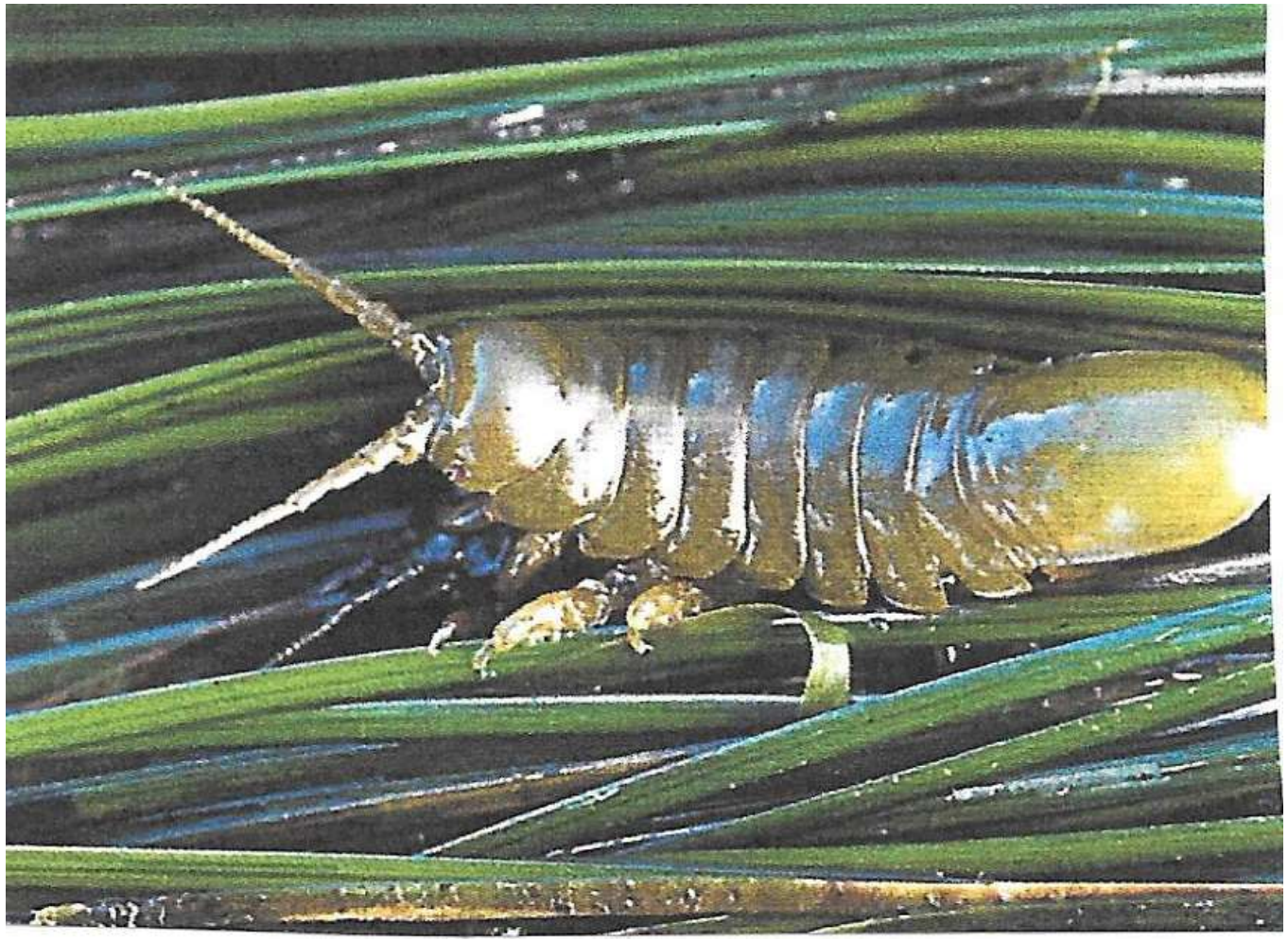
Calcareous Tube Worm

Annelid
By Nancy Morrison



Isopod

Arthropod



Sea Cucumber

Echinoderm

Sand Dollar

Echinoderm

By Nancy Morrison

Naturalists at Clayton Beach
Larrabee State Park