

ESCI 330 NATURAL HISTORY OF THE PACIFIC NORTHWEST

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Intertidal and Nearshore Marine Environments

Activities of intertidal organisms follow tidal patterns closely. Tides also affect our access as observers to many intertidal habitats and the organisms therein. During our visit you will see Larrabee State Park's intertidal habitat under low tidal conditions. You should allocate your time according to the rising tide. For example, if you want to observe organisms at lower tidal depths, you should do so soon after our arrival, because the rising tide will begin to cover those areas during our visit. Feel free to return to Larrabee or other intertidal habitat in mid-morning throughout the week to make more observations during low tidal heights.

1. Create a figure of organism distributions relative to substrate and intertidal zone depth, similar to the drawing on page 78 of Kruckeberg's book. Make your figure specific to Larrabee. Note that the drawing on page 78 shows typical locations; many organisms also occur at other locations. In your drawing, try to show the typical or most common location for each organism.
2. Zonation is a spatial pattern found in rocky intertidal habitats around the world. The organisms involved differ among regions, but organisms in most rocky intertidal habitats are restricted to distinct zones defined by height relative to low tide. Zonation in coastal Washington has been particularly well studied; on the next page is a drawing of intertidal zonation typical in our area (from BC's Capitol Regional District). See if you can determine whether zonation occurs at Larrabee, and if so, where the zones occur relative to low tide. Then identify the organisms in each zone. Describe and/or draw a figure like the one below specific to rocky intertidal habitat at Larrabee. Be sure to name species in each zone, and note that you should find species in addition to those in the figure.
3. Intertidal species must cope with diverse stresses in their environments. One of your most important challenges as a natural historian is to deduce the coping mechanisms that organisms use to survive and reproduce. Coping mechanisms of intertidal organisms have fascinated the likes of ecologists, material scientists, and biomechanics researchers. (Some analyze the "glue" that organisms use to adhere to rocks, others study how shapes of organisms allow turbulent water to flow around them, still others determine how mussels can grow over most other organisms, ...) Stresses affecting intertidal organisms include desiccation, pounding by waves, shear by water currents, changes in water salinity as tidepools shrink, and exposure to predators. Although a stress might not occur at all times, organisms must cope with it if it occurs regularly. For example, you should look for adaptations for withstanding wave action even at low tide when no waves may reach a particular organism. Among species found in the intertidal zone, select a plant, a sessile animal, and a mobile animal. For each species, determine the following:
 - a) How it resists or limits water loss during low tide.
 - b) How it withstands mechanical stresses due to wave action or water currents.
 - c) How it avoids or resists predators.
 - d) How it obtains energy (feeding or photosynthesizing) while coping with the above stresses.
 - e) How it reproduces while coping with the above stresses. Note that for sexual species, successful reproduction requires finding potentially distant partners. Successful reproduction also requires that eggs/spores/larvae etc. reach suitable habitat.

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4. Eelgrass (*Zostera marina*) "meadows" provide important habitat for many marine organisms. How many species can you find associated with eelgrass at Larrabee? How many are free-swimming and how many are attached to eelgrass blades?

5. Describe at least three additional natural history patterns you can observe at Larrabee. Observe with an open curious mind, and you should be able to find dozens of patterns. If you have difficulty, try considering the following.

Where do grazers or predators go during low tide?

Contrast the shape or behavior of an organism in submerged vs. exposed conditions.

Contrast the shape or behavior of a species in crowded vs. dispersed conditions.

Which organisms rarely are found individually, but rather occur in clumps?

Which organisms occur commonly as relatively isolated individuals and in clumps?

Compare species composition in large vs. small tidepools.

Can you find sharp boundaries in species distributions besides zonation described in question 2? How do these boundaries relate to exposure to wave exposure, sun, human trampling or other factors?

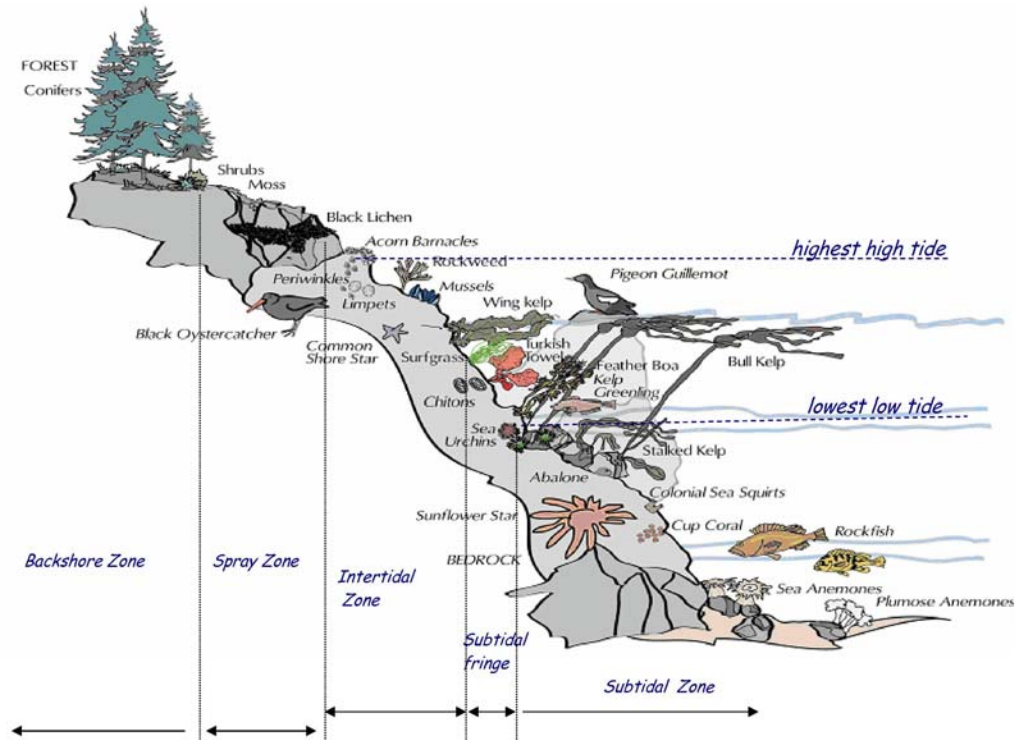


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