

Bio 20 Laboratory: The Rocky Intertidal Ecosystem

The **intertidal**, or **littoral zone**, is that part of the sea floor that is located between the highest high and lowest low tides. The many organisms that often live on the rocky intertidal are adapted to exposure to air, or **desiccation**, as well as other types of stress. Responses to such physiological stress and biological interactions such as predation and competition can result in distinct patterns of zonation among organisms of the intertidal. In today's exercises we will attempt to quantify some patterns of vertical and horizontal zonation in this system.

Objectives

- Recognize the most significant physical and chemical factors affecting the rocky intertidal ecosystem
- Become familiar with the dominant inhabitants of the Pacific rocky shore
- Recognize vertical zonation in rocky shore communities
- Recognize some of the most obvious adaptations of marine organisms to desiccation and wave action in rocky shores
- Recognize the possible effects of environmental factors (physical, disturbance) on the vertical distribution of rocky shore organisms
- Recognize the possible effects of biological and physical factors on the horizontal distribution of rocky shore organisms

Procedure 1. Organisms of the Rocky Intertidal and Physical Factors

Let's begin by recording some important field data.

Date: _____ **Location:** _____

Predicted low tide (in relation to MLLW): _____ m (= _____ ft)

Time of the low tide: _____

General weather conditions:

Sunlight:

Rain:

Wind conditions:

Ocean conditions (wave action, etc.):

Next, record the temperature and salinity of a sample of seawater taken at the water's edge. The salinity will be determined by using a **refractometer**.

Record the open water sample below:

Temperature: _____ °C

Salinity: _____ ‰

General Patterns of Vertical Distribution: Plants and Animals of the Intertidal

Starting at the water's edge table and gradually moving toward the highest levels of the shore, identify the most common species of plants and animals that are seen. Record these in the table below:

Vertical Section	Most common species	Notes on adaptations and appearance of these species
Lower intertidal		
Middle intertidal		
Upper intertidal (and splash zone)		

Patterns in Tidal Pools

Record the following information for several tidal pools indicated by your instructor:

Tide pool location	Temperature	Salinity	Most characteristic forms of life Plant, animal and algae

Some Questions to Think About

Name (s): _____

1. What are some of the morphological adaptations to wave action that have been observed among the organisms? Any examples of adaptations to exposure to air?
2. Other than the lack of oxygen dissolved in water, what kind of problems do invertebrates and seaweeds have to confront when exposed to air?
3. Have you observed any behavioral adaptations to wave action? To exposure to air?
4. How do you account for the differences in temperature, salinity, the number of species, and the abundance of organisms in each of the tide pools that were sampled?
5. Did you observe any particular patterns in the distribution of different species of organisms as you moved from the low-tide level to the highest level, one which is covered only by very high tides?
6. Why is it important to record the general weather conditions? Give some possible differences in what you have observed if the weather conditions were different from today's.