

Student Resource The Kelp Forest



Directions: Read the facts below about the kelp forests of Glacier Bay. Highlight those facts that apply to the topic(s) assigned to your group. Then, complete the chart at the end of this resource to help you make a comparison between the rainforest and the kelp forest for your topic.



In the subtidal zone of lower Glacier Bay the water is more or less clear, and sunlight penetrates the water surface to a depth of over 100 feet.



In some areas of this zone shallow subtidal communities may be dominated by a dense network of kelp called a kelp forest.



Kelp (*Macrocystis*) is a type of marine algae, or brown seaweed, that grows to be very large.



The growth rate and food content of the kelp forests in the Bay may be the greatest of any in the park.



These "kelp forests" provide very important nursery areas for a wide variety of invertebrates and marine fishes.



Kelp forests are prime areas to search for food for sea otters, seals, many diving birds, and schools of adult salmon.



Kelp forests are not found in waters close to the tidewater glaciers. Meltwater from these glaciers carries a lot of silt with it. The silt makes the water too cloudy for photosynthesis to take place.



The rocky walls and floor of this kelp forest are populated by a variety of attached filter-feeding animals that include corals, hydroids, sea pens, sponges, sea anemones, barnacles, scallops and mussels.



These filter-feeding animals provide the base of a food web that includes species such as sculpins, shrimps, flatfish, such as juvenile Pacific halibut, rockfish and greenlings.



Ocean floor that is battered and scraped by the Bay's strong currents is considered prime real estate, as kelp and algae can grip the bottom and grow. It is here you will find the greatest diversity of kelps and algae and these areas are especially known for being rich and productive feeding areas for marine life.



The Bay's kelp forests are also home to major populations of king and Tanner crabs, flatfishes, cods, and eelpouts on the bottom surface and large populations of worms and small crustaceans within the sediments.



The Bay is a perfect home for kelp forests that need cold, nutrient-rich water. Kelp forests require temperatures of less than 20° C.



In Glacier Bay the larger algae found in the underwater forest are kelps, or brown algae. Common types of kelp include Bull Kelp (*Nereocystis leutkeana*) and Giant Kelp (*Macrocystis pyrifera*). These organisms can grow to be over 100 feet in length at a rate of 30cm per day!



The tall kelp provides shade that is helpful to some species and harmful to others. As in any forest, the taller plants create a thick canopy that shuts off the sunlight to other, shorter plants. If the kelp is torn loose from its moorings in a very strong storm, a hole in the canopy lets in sunlight, giving other kelps a chance to grow.



The kelp forests have a 3-dimensional structure and are inhabited by countless species of plants and animals throughout the structure. These forests include distinct horizontal layers: a sunny canopy (top layer), a dimly lit middle, and a dark forest bottom.



The structure of giant kelp affects where organisms live and forage for food. A variety of fish live throughout the forest from the top to the bottom. They are attracted to sections of the kelp where their favorite meal lives or hides out.



The thick canopy slows water currents. This makes it a perfect place for tiny organisms like floating (planktonic) eggs, larvae and very small creatures to gather. The warmth, light and protection found in the canopy make a perfect nursery for these organisms.



Many small animals, and certain types of algae, make the kelp holdfast their home. The holdfast provides protection from predators and from strong ocean currents. Safe inside their kelp-built neighborhood, the inhabitants can avoid hungry predators and strong ocean currents. Some of the animals that live in the holdfast include worms, baby sea urchins, snails, brittle stars, tiny crustaceans, and maybe even mussels or barnacles.



The parts of the kelp plant include the holdfast, stipe, pneumatocysts (pneu=air/cyst=ball), and fronds.



The holdfast of kelp attaches to the surrounding environment, like rocks. The holdfast is the plant's anchor. It does not funnel water and nutrients to the rest of the kelp.



The kelp stipe allows it to reach up high to absorb sunlight. It is hollow and filled with air and can float to the surface of the water to reach the sun's rays. Because of the strong currents in the water, the stipe is flexible to allow for movement.



Kelp often has pneumatocysts, which are like inflated balloons. They help hold the kelp up to get more sunlight.



The kelp's fronds are similar to leaves as they collect sunlight for photosynthesis. Fronds also release spores, the algal equivalent of seeds.



Kelp reproduce by way of spores. A single plant can produce trillions of spores each year.



The kelp gets its nutrients by absorbing them from the water.



Sea urchins are the kelp forest's enemy. A large population of these kelp-grazing creatures will completely destroy the forest leaving urchin barrens in its place.

Rainforest vs Kelp Forest Comparisons

Use the chart below to help you make a comparison for your topic between the rainforest and the kelp forest. Use the Internet Resources on Temperate Rainforests that your teacher gave you for a source of rainforest information.

Our Group's Topic is: _____

Rainforest	Kelp Forest