

## **Plants Rock**

Plants are a major building block of the coastal zone. They modify this zone by trapping sediments, slowing down currents, producing food, and providing shelter to many organisms. Whether it's eelgrass in estuaries, dune grasses in salt marshes, algae beds on rocky shores, or common ice plants in the upper tidal beaches - plants are crucial to the coastal zone.

Intertidal seaweed has an interesting and fundamentally important relationship with the nearshore. Rockweed, for example, grows prolifically on rocky shores. In turbulent seas it breaks loose from its holdfast and moves offshore. Here rockweed forms large algal mats, which provide a temporary habitat for many animals, especially juvenile fish and lobster. Over time these mats raft back to shore, where they become stranded at the high tide mark. Here the seaweed decomposes, and the products of this decomposition (nutrients) are washed back into nearshore waters, providing food for primary producers like seaweed, phytoplankton, and filter feeders such as scallops, clams, and mussels.

### **Salinity and other Forces at Work on the Shore**

The incessant daily movements of the tides subject the intertidal zone to submersion in salty waters, to exposure to air, to drying and warming in sun and wind, to exposure to fresh water in rain, to different sets of predators when covered with water and when exposed, and to wave shock during incoming high tides and storms.

Both animals and plants making their living in this in-between world must:

- Protect themselves from sharp and sudden changes in temperature
- Have access to available food and oxygen
- Get rid of their wastes
- Withstand the impacts of waves
- Protect themselves from predators
- Adapt to seasonal changes in weather

The larger picture includes the relative changes in sea levels and land, to erosion and sediment deposits and transport and other geological and oceanographic processes.

# Sea Wrack

## Traditional Uses of Sea Wrack

- Most coastal First Nations piled Sea Wrack over hot rocks to generate steam for cooking, bending and moulding wood, or medicinal sweat baths.
- Used Bull Kelp and Sea Wrack for collecting herring roe
- Seaweeds ideal for covering fish in boats or canoes to keep them cool on hot days

## Bull kelp

- All coastal groups in BC made fishing lines, nets, ropes and harpoon lines from bull kelp
- Used the hollow upper stalks and bulblike floats as storage containers for Eulachon grease, fish oil and water.
- Some Coast Salish groups used the kelp to form the war in baskets, mats and blankets; others used kelp blades to keep fish fresh and moist in the canoe; other used them to line steaming pits to flavor the food and help generate steam.
- Some used lengths of kelp as water conduits; the Nuxalk name for the modern garden hose means "kelp".

## Eelgrass

Did you know that people on the Northwest coast used to eat eelgrass? Many First Nations people on Vancouver Island and across on the mainland once gathered eelgrass rhizomes (underground stems) for food, and recognized the plant as important habitat for other culturally significant species - as spawning grounds for Pacific herring and nurseries for cod and perch. They harvested eelgrass by manipulating poles from their canoes to entwine the leaves and pulling up entire plants. Elders remember harvesting it year after year from the same location.

## **SOME OTHER HISTORICAL USES FOR EELGRASS**

### **In Europe and/or USA**

Mulch on potato fields  
Upholstery and packing  
Sound and temperature insulation  
Compost for conditioning soil  
Eelgrass cigar-it is rumored that its taste and acrid aroma was without peer (Denmark)  
Fleshy roots eaten (Seri Indians, Mexico)  
Burials beneath eelgrass blankets (Seri Indians)

High grade paper  
Bedding for domestic animals  
Tough, long-lasting roof thatch (Denmark)  
Piled up to make sturdy, durable dikes (Holland)  
Fuel (Europe, USA)  
Basket weaving (Northwest Coast Indians)  
Bedding and mattress filling (Europe, USA)  
Fashioned into dolls (Seri Indians)

## Questions

1. What function could this seaweed debris have for the shore ecology? For the ocean ecology?
2. What does the structure of the bull kelp tell you about where it lives?
3. Give two guesses as to the uses of bull kelp for the Coast Salish people.
4. Whose habitat is this?
5. If eelgrass is present, what does the structure of the plant tell you about where it lives?

## Possible Answers

1. Debris offers food and habitat for crustaceans (sea fleas, for ex.). As the tides take the wrack out into deeper waters, plants can feed animals that live at depth (ratfish found at 10,000 m with eelgrass in its stomach). Plant nutrients dissolve and enter the oceanic system.
2. Holdfast fastens onto rocks and boulders – rocky substrate in the subtidal zone. Blades reach out to the sun – plant lives in zone where light is available.
3. Rope made from the stipe, musical toys from the bulb, blades used to shelter food on canoes, and steamed for pit cooking.
4. Observations of the wrack will tell us who lives in it.
5. Roots on the rhizomes tell us it must live in soft substrate - mud or sand, or a combination of both.

## Gumweed (*Grindelia* spp.)



First Nations peoples utilized this plant to treat skin afflictions of all kinds, including reactions to poison ivy. The leaves and flowering parts are used to treat bronchial problems such as asthma, bronchitis, emphysema, whooping cough and hay fever. Poultice made from the plant is used to treat burns and other skin ailments.

### Questions about this plant

1. As you closely observe the leaves and stems of the Gumweed, what adaptations to its environment are evident (thickness of leaves, for example).
2. How do you think its root system has adapted to this area of the high tide zone?
3. Could this plant have a role in creating habitat for other plants? How?

### Possible Answers:

1. Thickness of leaves evidence that Gumweed holds water in its tissues. Thickness also indicates it could withstand drying out from winds and sun exposure.
2. Root system is shallow and lateral; plant can grow in very little sandy depositions. Also this plant is tolerant of salty conditions (soil, water and wind).
3. May be a plant that helps with succession of other plants by holding and trapping soils in place and helping to retain nutrients from erosional forces of waves and wind.

## Dune Grasses



This hardy grass grows on the dunes just above the beach. By anchoring shifting sand and cutting coastal winds, dune grass creates a place where other plants can grow more easily.

Established coastal sand dunes guard the coast against storm waves that could flood the land beyond the dunes. Conditions here are harsh for plants; few nutrients, almost no water, extreme temperature changes and blowing sand characterize dune habitats. But dune grass's special adaptations make survival possible—its thick, shiny leaves prevent loss of water and also reflect drying sunlight.

The first colonizers of newly formed sand dunes must grow and establish themselves before the sand shifts beneath their "feet". Dune grass is one of these important pioneer plants. It has long, underground stems (rhizomes) that send shoots upward and roots downward. These rhizomes anchor the plant and the surrounding shifting sand, creating places where other dune plants can survive.

### Questions:

- Why are these plants not growing in the lower areas of the high tide zone?
- What does the form and structure of the plant tell you about its adaptations to its environment?
- What do you think First Nations used this plant for?
- Whose habitat could this be?

### Possible Answers:

1. These plants need fresh water only and deeper soils.
2. Leaves can fold in to preserve internal moisture, deeper rooted to conserve water.
3. Native people wove dried brown leaves of dune grass into mats, baskets, tote sacks and ropes. They used the tough, sharply pointed leaves as "needles and thread" for sewing.
4. Mice small birds, insects.

## **Activities**

**1. Salinity & Temperature comparisons** – With a hydrometer and a thermometer, please compare the water salinity and air temperature in both a protected and exposed area of the uppermost reaches of the high intertidal zone (actually = splash zone) with the water salinity and air temperature in both a protected and fully exposed area of the lower reaches of high intertidal zone (e.g. near the water line).

**2. Sketching** – Please make a profile of the beach, including relative elevations, water line, logs, plants and other features you feel are important.

**3. Soil comparisons** – With a trowel and a small container, please collect soil samples from a) Splash Zone, where the dune plants are b) upper reaches of the high intertidal zone, where the logs are situated, and c) the water line.

## **Questions**

1. How would the salinity, temperature and soil texture and composition determine the plants and animals living in each area? Would features such as logs, boulders and hillocks change the conditions? If so, how?

2. How does the texture of the soils determine the plants that grow in each area?

3. Why is there very little soil at the surface where the pebbles are?

4. How might the beach look different in the spring?

5. What do these measurements tell you about the physical forces (wind, sun, exposure/shade, weather) and oceanic forces (tides, currents, waves) at play on this beach?



## Rosehip Shrubs

### Questions

1. Why aren't these shrubs growing lower down in the high tide zone?
2. These plants may be successive plants from ones that came before to set the conditions for these plants to grow successfully. Which plants may these be?
3. Who might be using these plants for habitat (food, shelter, resting)?
4. Possible uses by some First Nations peoples?
5. what is the main nutritional value of these plants?

### Possible Answers

1. Need soil and fresh water to thrive.
2. Possibly gumweed and grasses.
3. Birds, mice, wild cats, insects, worms.
4. Traditional First Nations' use of rose hips varies from group to group. The Vancouver Island Salish and Comox peoples harvested rose hips in the fall and ate the outer rind when fresh. Many groups did not eat rose hips at all, and some ate them only as a famine food. Generally the hairy seeds were avoided, and were known to give one an "itchy bottom."
5. Particularly high in Vitamin C.