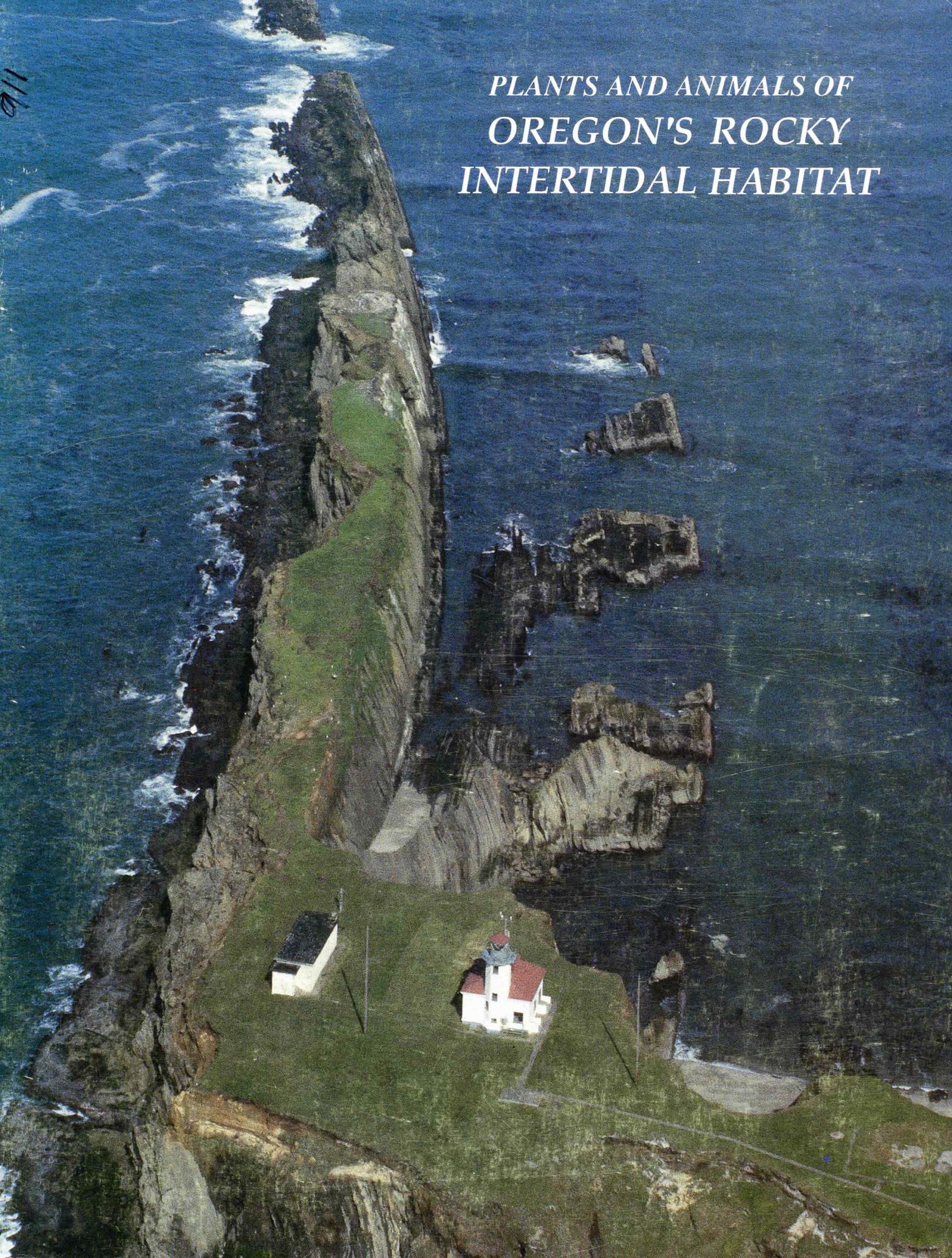


9/11

*PLANTS AND ANIMALS OF
OREGON'S ROCKY
INTERTIDAL HABITAT*

An aerial photograph of a rugged, rocky coastline. A prominent, narrow, vertical rock formation runs along the shore, partially covered in green vegetation. In the foreground, a small, white, two-story building with a red roof and a lighthouse-like structure on top sits on a grassy patch. Another smaller white building is nearby. The ocean is deep blue with white waves crashing against the rocks. The sky is a clear, pale blue.

*PLANTS AND ANIMALS OF
OREGON'S ROCKY
INTERTIDAL HABITAT*

by
Jean McCrae
and
Laimons Osis

Rick Starr
Conceptual Design

Susan Jurasz
©Illustration and Graphic Design

Oregon Department of Fish and Wildlife
Marine Science Dr., Bldg. #3
Newport, OR 97365
1989

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INTRODUCTION

Oregon's rugged and varied coastline has long been of interest to a great many people. Extensive shell mounds along many parts of the coast are evidence that, in the past, Indians lived along the coast and harvested the rich bounty of intertidal areas. Today, fishing, clamming, surfing, picnicing, beachcombing, and other recreational pursuits attract thousands of visitors to the coast annually.

Many people visualize the coast as a sandy beach; however, there are numerous rocky areas along the Oregon coast. These areas range from rocks isolated in the sand to headlands jutting out into the sea with surrounding bedrock or boulders. The rocky intertidal areas have a rich and varied community of plants and animals, with each organism living in a unique habitat or range of environmental conditions.

This pamphlet is a pictorial guide to some of the more common intertidal plants and animals found in Oregon. It is an expansion of "A Guide to Oregon's Rocky Intertidal Areas" written by Laimons Osis in 1975. Here, the plants and animals are arranged by the tidal zone in which they can be found. This guide is designed to help identify species and promote an understanding of the relationship between animals and their environment; why animals live where they do and how they are equipped to live there. The pamphlet also is a guide to the location of Oregon's rocky intertidal areas. In addition to the more popular locations, some excellent underutilized areas are described in an effort to encourage their use and lessen the pressure on the more heavily used areas. Although the major rocky intertidal areas along Oregon's coast are discussed, there are additional smaller areas of interest such as isolated rocks or, especially on the south coast, entire coves accessible only by game and sheep trails.

VIEWING TIPS

A trip to an intertidal area can be fascinating and fun. Planning ahead will make it even more rewarding and keep it safe. Plan for the tides: there are two lows and two highs each day. Tide tables are available at most sporting goods stores and are often published in newspapers.

- Tides of 0.0 ft and lower are better for tidepool viewing.
- It is best to be in the intertidal area at least one hour before low tide.
- Remember the tide will come back in! Don't get stranded on an offshore rock because the channels filled with water before you could get back to shore.
- Don't turn your back to the ocean! The next wave could be an extra large one.
- Watch your step on wet, algae-covered rocks: they can be extremely slippery.
- Be ready to get wet! Wear appropriate attire.

Although rocky intertidal areas are emphasized in this pamphlet, they are not the only areas where marine animals can be easily found. Other habitats contain their own set of organisms that have developed special ways to adapt to their distinct environment. Sandy beaches are an unstable environment with a constant movement of sand. Animals in this environment must be able to either move with the sand or quickly burrow into it for protection. Mud flats are more stable, but the lack of movement of the mud slows the exchange of oxygen. Mud flats also lack hard surfaces animals can attach to. Most animals in muddy areas are found just under the surface or in tubes or shallow burrows that are open to the surface. Wharf pilings offer a hard surface for some animals to attach to, yet are soft enough for others to burrow into.





CONSERVATION

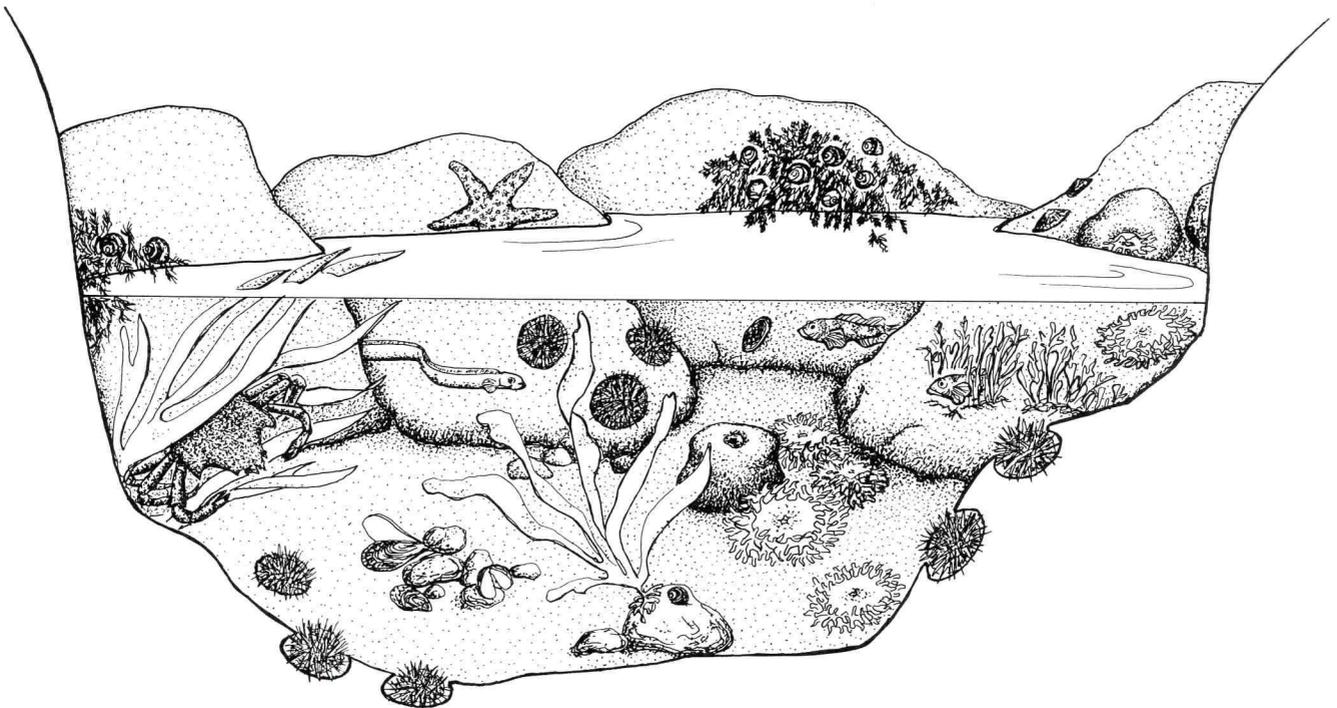
Intertidal areas are unique environments. Animals that live in these areas are specially adapted to specific habitats. Intertidal areas are also very fragile: they can be easily damaged and take a long time to recover.

- After looking at animals under rocks or seaweeds, carefully cover the animals up so the sun and air will not dry them out. Replace rocks in their original positions.
- Avoid walking on plants and animals whenever possible.
- Don't move animals from one area to another. Each animal is specialized to live in a certain habitat and may not survive if put into a different area.
- If you are collecting animals or plants, take only what is necessary and what you will use.
- Better yet, capture them on film and leave the plants and animals for others to see.
- Examine the lines of debris left by the receding tide. Clues to the animals living in the lower tidal areas can be found.
- Please pick up and properly dispose of debris left by people.

Regulations covering the collecting of marine animals may change from time to time. Consult the Oregon Department of Fish and Wildlife fishing synopsis for the most current information and regulations.

HABITATS

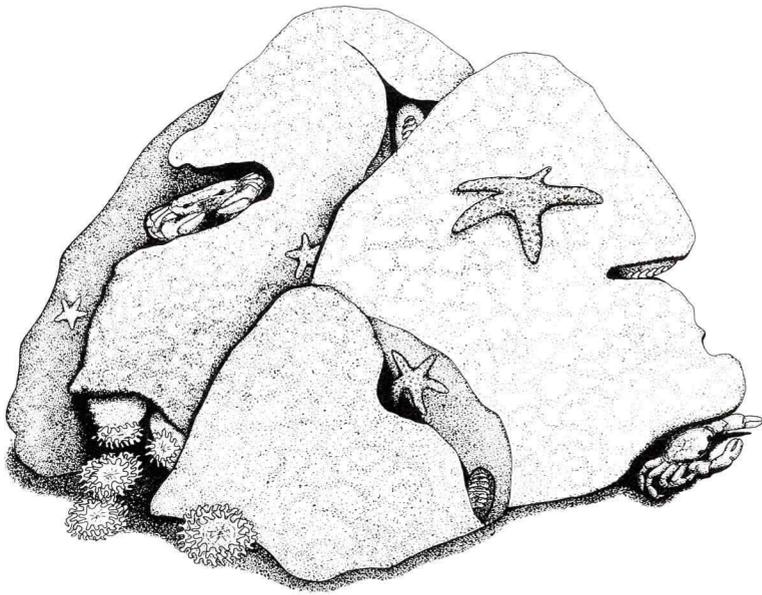
Within each zone, animals may be found in one or more specific habitats. Rock boulders, surge channels, cracks and crevices, seaweeds, and tidepools provide cover to protect animals from the elements and predators. Intertidal plants and animals have also developed many ways of dealing with the powerful forces of the waves that batter the shore. Some animals use powerful suction to cling to the rocks. Others permanently attach themselves to hard surfaces with elastic threads or massive anchoring systems. Some species protect themselves with thick shells or by growing in clusters. Others create protective depressions through abrasion, and some minimize the force of the waves by having flattened body shapes. Some individuals are able to move from one habitat to another or will seek protected areas, like nooks and crannies or the back side of rocks, away from the waves.



Among Seaweed or In Tidepools

The blades and holdfasts of sea grasses and algae provide food and shelter for many animals. Some seaweeds act as nurseries for young animals (kelp crabs, gunnells, snails, periwinkles). Tidepools are pockets of water left by the drop in water level. These pools provide shelter for animals that cannot tolerate exposure to air during low tide. Animals in pools may encounter other stresses, however. Small pools can become very warm in the sun, and the salt water can be diluted by rain or more concentrated by evaporation. Each pool can be its own small community, containing bottom dwellers, side dwellers, and free swimmers.

In Crevices or Under Rocks



Rock overhangs provide protection from wave action and shade from the sun to help retain much-needed moisture when the tide is low (anemones). Some animals are flat in shape to fit into small crevices (chitons). Many animals hide in the cracks during the day, and come out at night to look for food (crabs). Some animals have developed “break-away” arms and legs that grow back if caught under a rock or by a predator (sea stars).

On Rocks

Animals living on the tops and sides of rocks and ledges are exposed to the effects of waves and wind, so have developed specialized methods of attachments. Some species cement their shell to the rocks (barnacles), others are anchored with long elastic threads (mussels), and still others can create strong suction to grip the rocks (limpets). Algae have strong root-like holdfasts which secure them to the rocks.



INTERTIDAL ZONES



The intertidal area is unique in that the physical environment changes dramatically twice a day as the tide rises and falls. Twice a day the area is either covered by salt water or exposed to air, fresh water (rain), and the sun. The intertidal area can be divided into zones based on the amount of time zones are covered by water or exposed to the air. The effects of drying and temperature extremes are important in determining what animals live in each zone. Because the environment in the intertidal area is so variable, species have had to adapt in a variety of ways to survive. Some animals move to follow the level of the water as the tide moves out. Other animals retain water in their shells and bodies; still others seek shelter in shaded nooks and crannies, under seaweed, and in tidepools to prevent drying in the heat of the sun.

Spray

The spray zone is on the upper beach area. This zone is usually covered by water only with the highest storm waves and ocean spray. Animals in this area must be able to retain moisture, be tolerant to changes in salinity due to exposure to rain water, and tolerate extremes in temperatures. The spray zone supports fewer species than other zones; however, there are large numbers of animals.

High Tide

This zone is usually uncovered except during higher high tides. This area also experiences greater changes in temperature, salinity, and amount of water cover. Animals in this area depend on the tides and waves to carry their food to them. The high tide zone has more wave action than the spray zone, so the animals must attach themselves securely to the rocks. More species are present in this zone than the spray zone.

Middle Tide

The mid-tide zone is covered and uncovered by the tide twice a day. It experiences fewer changes in temperature and salinity because it has more time under water. This area contains a greater number of species than the higher zones.

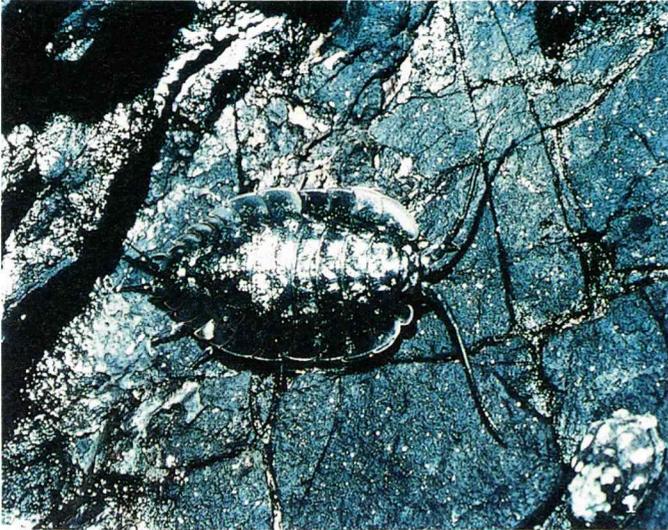
Low Tide

The low tide zone is always covered by water except during the very lowest tides. This area has fewer changes in temperature, exposure, and salinity than other zones. Most animals in this zone are unable to live in any of the upper zones since they need almost constant water cover. More species are found in this zone than any other.

COMMON INTERTIDAL ANIMALS AND PLANTS

<i>PHOTOGRAPH</i>	<i>PAGE</i>	<i>PHOTO CREDIT</i>	<i>PHOTOGRAPH</i>	<i>PAGE</i>	<i>PHOTO CREDIT</i>
SPRAY ZONE			LOW TIDE ZONE		
1. Rock Louse	9	ODFW	27. Calcareous Tube Worm ..	16	ODFW
2. Ribbed Limpet	9	ODFW	28. Ribbon Worm	16	N.A.M.E.
3. Rock Snail	9	ODFW	29. Blue Top Snail	16	OSU
4. Acorn Barnacle	9	ODFW	30. Foliate Thornmouth	16	OSU
HIGH TIDE ZONE			31. 24-Rayed Star	17	ODFW
5. Purple Shore Crab	10	OSU	32. Six-Rayed Star	17	Bob Kuhn
6. Porcelain Crabs	10	N.A.M.E.	33. Blood Star	17	N.A.M.E.
7. Black Tegulas	10	Patty Farthing	34. Leather Star	17	ODFW
8. Dire's Welk	11	Bob Kuhn	35. Slender-Rayed Star	17	Bob Kuhn
9. Rockweed	11	Patty Farthing	36. Hermissenda	18	ODFW
10. Sea Lettuce	11	Patty Farthing	37. Orange-Spotted	18	ODFW
11. Sea Moss	11	ODFW	Nudibranch		
MIDDLE TIDE ZONE			38. Monterey Sea Lemon	18	ODFW
12. Aggregating Anemones	12	ODFW	39. Ringed Doris	18	ODFW
13. Green Anemone	12	ODFW	40. Red Sea Cucumber	18	ODFW
14. Ascidian	13	Bob Kuhn	41. Mossy Chitons	19	N.A.M.E.
15. Sponges	13	ODFW	42. Red Sea Urchin	19	Bob Kuhn
16. Hermit Crab	13	ODFW	43. Giant Pacific Chiton	19	N.A.M.E.
17. Kelp Crab	13	OSU	44. Purple Sea Urchin	19	OSU
18. Black Katy (Chiton)	14	ODFW	45. Feather Boa	20	Patty Farthing
19. Lined Chiton	14	OSU	46. Sea Palm	20	Patty Farthing
20. Gooseneck Barnacle	14	OSU	47. Sea Sac	20	Patty Farthing
21. Rough Keyhole Limpet ..	14	OSU	48. Red Laver	20	Patty Farthing
22. California Mussels	14	ODFW	49. Seersucker	20	Patty Farthing
23. Common Sea Star	15	ODFW			
24. Surf Grass	15	Patty Farthing	ODFW:		Oregon Department of Fish and Wildlife
25. Coralline Algae	15	Patty Farthing	N.A.M.E.:		NW Association of Marine Educators
26. Sea Cabbage	15	Patty Farthing	OSU:		Oregon State University, Extension Sea Grant Program

SPRAY ZONE



1. Several kinds of isopods, or marine "pill bugs" live between the tides among rocks, algae, and surf grasses. The **rock louse**, *Ligia pallasii* can be found hiding in cracks in the rocks on the upper edges of the intertidal area.

2. The **ribbed limpet**, *Collisella digitalis*, or finger limpet, is also found in large numbers crowding into cracks and crevices. This small (1") limpet grazes on algae and is usually brown or grayish with dark zigzag markings.

3. The **rock snail**, *Nucella emarginata*, is a small snail of up to 1" long. Its shell color varies from a somber brown to orange with white stripes. It feeds on acorn barnacles.

4. Several species of **acorn barnacle** occur in large numbers along the Oregon coast, cementing their shells to the rocks to withstand the force of the waves. *Balanus Glandula* grow up to 3/4" in diameter and *B. Carious* may get as large as 2". Barnacles filter their food from the sea water.



HIGH TIDE ZONE



5. The **purple shore crab**, *Hemigrapsus nudus*, is one of the more common intertidal crabs. Small in size, up to 1 1/2" across the back, it remains in crevices during daylight low tides; at night it is a common sight scampering about on the rocks.



6. **Porcelain crabs**, *Petrolisthes cinctipes*, are also very common under rocks. They are readily separated from the purple shore crab by a flattened body and claws and smaller size of less than 1/2".

7. **Black tegulas**, *Tegula funebris*, or black turban snails, are perhaps the most common and obvious snails of the intertidal areas. They reach a diameter of 1 1/4". At low tide, they can be found in clusters in rock crevices.



8. An often unobserved predatory snail of the intertidal area is **Dire's welk**, *Searlesia dira*. At low tide it is often found half buried in the sand and shell fragments under rocks or within the leaves of surf grass. This snail grows to a length of 1 1/2".



9. The size and shape of bushy clumps of **rockweed** (*Fucus sp.*) will be affected by the habitat. Clumps will be up to 20" across, olive-green to yellowish, with tips swollen like air bladders.



10. The bright yellow-green **sea lettuce** (*Ulva sp.*) has thin, broad lettuce-like blades. This green algae, like other seaweeds, provides protection for animals from sunlight and drying.



11. **Sea moss**, *Endocladia muricata*, is abundant where the surf beats on the rocks. The tufts of this brownish-red algae grow to about 2" high.



MIDDLE TIDE ZONE

12. Small **aggregating anemones**, *Anthopleura elegantissima*, grow to about 1/2" in diameter. These animals can be found grouped together in large numbers, sometimes covering a rock. These anemones attract fish with its characteristic pink-tipped tentacles when open.

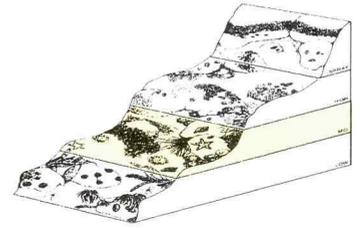


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13. The large **green anemone**, *Anthopleura xanthogrammica*, grows to a diameter of 6-10". It gets its color from small algae living within the tissues of the animal.

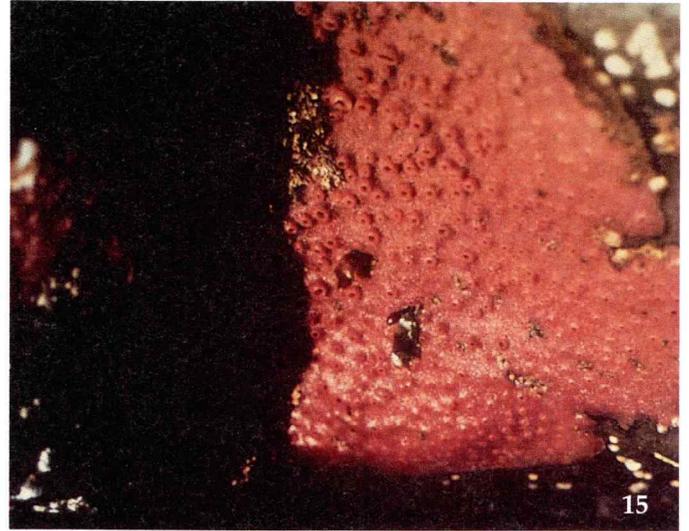


13



14

14. A common example of a solitary **ascidian** is *Styela montereyensis*. Looking somewhat like a slender, orange vase, it grows to a length of about 3 1/2".



15

15. Colonies of several species of **sponges** can be found on the protected sides of rocks and on the underside of moist ledges. These irregular shaped masses will be brightly colored (green, purple, gold, red, and gray) and can be distinguished from the coralline algae by their feel: sponges are soft and spongy, whereas coralline algae are rough and hard.



16

16. One of the most common, and perhaps interesting, crabs is the **hermit crab**, (*Pagurus sp.*). Its abdomen does not have a hard covering, so the crab protects itself by occupying the empty shell of a snail, carrying it around as a "house".

17. The sharp points on the shell and legs of the **kelp crab**, *Pugettia producta*, help the crab attach itself to the algae in which it lives. This crab reaches a size of up to 3 1/2" across the back and is endowed with sizable claws, as anyone carelessly sifting through kelp may discover.



17

MIDDLE TIDE ZONE

18. A large chiton growing up to 6" long is the **black katy** (leather chiton), *Katharina tunicata*. This species seeks out exposed, surf-swept rocks where it feeds on the algae that coat the rocks.



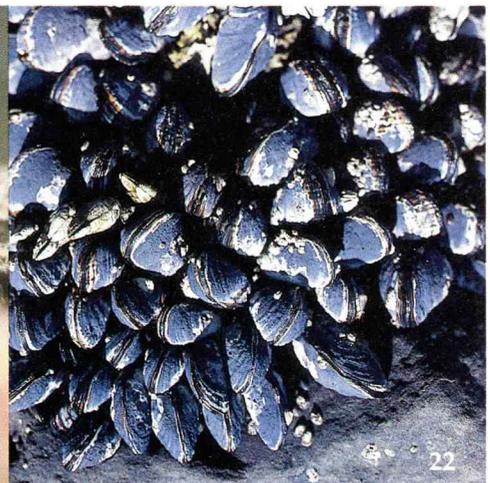
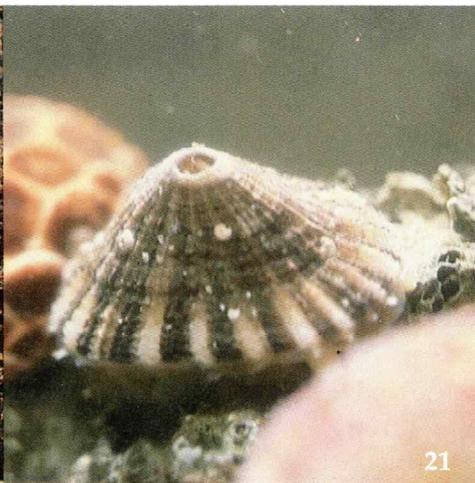
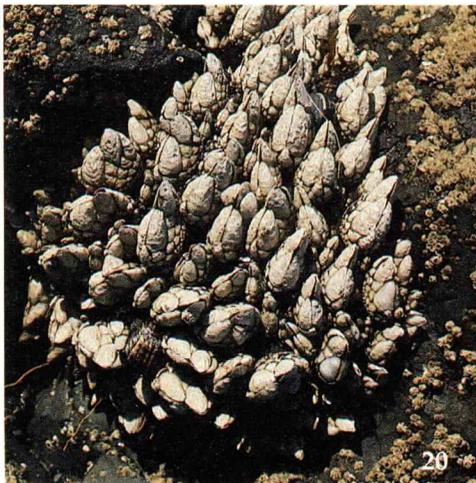
19. Probably the most handsome of the Oregon chitons is the **lined chiton**, *Tonicella lineata*. Its smooth, shiny surface has a zigzag pattern of brown lines over a light background. Although quite common, it is often unnoticed because of its secretive habits and small length of less than 1 1/2". Lined chitons feed on coralline algae.

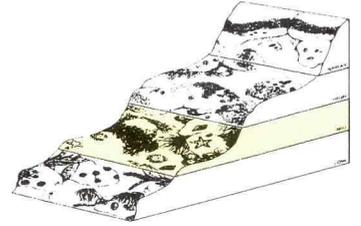


20. One of the largest barnacles, attaining 2-4" in length, is the **gooseneck barnacle**, *Pollicipes polymerus*. This animal thrives on the exposed faces of rocks and mussel beds. The gooseneck's flexible "stalk" helps it endure the force of waves.

21. The **rough keyhole limpet**, *Diodora aspera*, will reach a length of up to 2" and has a characteristic hole on the top of its shell. The white, tan, or gray shell is often covered with other small animals and seaweeds which make it hard to see.

22. **California mussels**, *Mytilus californianus*, are one of the most numerous animals of surf-swept rocks. They attach themselves to the rocks and to each other with long elastic "byssal threads" and filter water for food. The bright orange flesh is edible.





23. The most common intertidal sea star in Oregon is *Pisaster ochraceus*, appropriately called the **common sea star**. It grows to a diameter of 12", and is found in three color variations: purple, orange, and brown.



24. The bright green entangled mass of **surf grass**, *Phyllospadix scouleri*, can be found hanging down from rocks and lining tidepools. Surfgrass is not an algae; it is related to true grasses.



25. Feather-like **coralline algae** grow on rocks exposed to the surf and in tidepools. The pinkish branches are made of calcium and are brittle and hard, yet are segmented and flexible .

26. The smooth, narrow, deeply split blades of the **sea cabbage**, *Hedophyllum sessile*, offer little resistance to wave action. The olive-brown blades will reach up to 2 ft long.



LOW TIDE ZONE



27



28

27. A bright red nemertean worm, the **ribbon worm**, *Tubulanus polymorphus*, is a conspicuous member of a group of animals which often live concealed in mussel beds or underneath rocks. It can be a yard or more in length when fully stretched out.

28. The feathery tentacles of the **calcareous tube worm**, *Serpula vermicularis*, trap microscopic food from the water and pass it down to the mouth. The coiled, hard, white tubes protect the soft, 4" long, worm inside.

29. The **blue top snail**, *Calliostoma ligatum*, is a small snail (under 3/4"), which is found in pools and channels. The shell has alternating light and dark ridges with a blue sheen most obvious on the older shells.

30. The **foliate thornmouth**, *Ceratostoma foliatum*, (leafy hornmouth) is one of the largest intertidal snails in Oregon. Its highly sculptured shell of up to 3" long is a favorite among shell collectors. This carnivorous snail feeds on large barnacles and other snails.



30



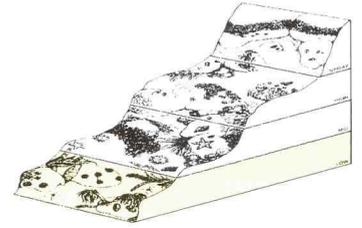
31



33



34



35

31. The giant as well as the speedster of the Oregon sea stars is the **24-rayed star**, *Pycnopodia helianthoides*. This species attains a diameter of 24", and the number of rays present will vary depending on age and losses due to injury. It is most common subtidally, but it does enter the lower intertidal zone.

32. A common intertidal species is the **six-rayed star**, *Leptasterias hexactis*, but because of its secretive habits and width of less than 3", it often goes unnoticed. Unlike most sea stars, the female retains her eggs and releases tiny sea stars in the early spring when they have developed enough to cling to the rocks.

33. A sea star less than 4" wide is the **blood star**, *Henricia leviuscula*, named for its bright red color. The young of this species will be sand colored or mottled. The blood star can be found on rocks or hiding in crevices.

34. The **leather star**, *Dermasterias imbricata*, takes its name from its soft, smooth surface. It reaches up to 10" in diameter and has a peculiar garlic smell.

35. At first glance, the **slender-rayed star**, *Evasterias troschellii*, looks much like the common star. It is the same size, but has more narrow rays, smoother texture, and lives further down in the intertidal area.

LOW TIDE ZONE



36. **Hermissenda**, *Hermissenda crassicornis*, (opalescent nudibranch), is a delicate-looking animal about 1" long, with numerous, slender projections on its back. It may sometimes be seen clinging upside down on the surface film.

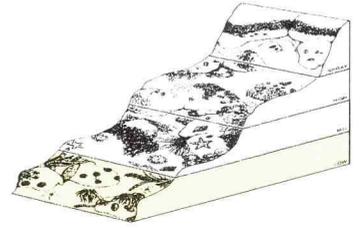
37. The brilliant colors of the **orange-spotted nudibranch**, (*Triopha sp.*), seem almost unreal. This animal reaches 3-4" in length and feeds on small colonial animals like bryozoans.

38. Perhaps the most common nudibranch in Oregon is the **Monterey sea lemon**, *Archidoris montereyensis*. This animal, which grows up to 5" long, prefers a diet of sponge.

39. The **ringed doris**, *Diaulua sandiegensis*, reaches a size of approximately 2". It lives under ledges, rocks, and seaweeds and feeds on sponges.

40. In the shallow intertidal pools, a bright red, feathery "plume" may be protruding out of a crack in the bedrock. This is the feeding and respiratory tree of the **red sea cucumber**, *Cucumaria miniata*. This species grows up to 10" long.





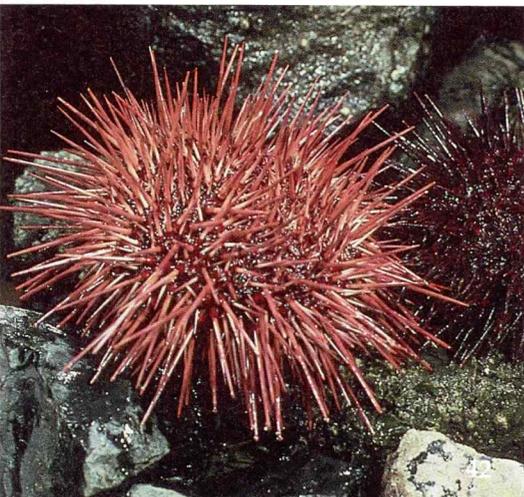
41. **Mossy chitons**, (*Mopalia sp.*), have bristles, or hairs, around the margin of the body. These chitons are fairly common but can be well hidden underneath rocks or buried in silt. They reach up to 2" long and feed on red and green algae.



43. The largest chiton in the world is the **giant Pacific chiton**, *Cryptochiton stelleri*, (gumboot chiton) reaching a length of 12". A rusty red girdle completely covers the eight back plates of this animal.

42. The **red sea urchin**, *Strongylocentrotus franciscanus*, is primarily a subtidal species, but a few enter the lower intertidal reaches. It may be either red or purple; however, its longer spines and generally larger diameter of up to 8" separates it from the purple urchin.

44. The **purple sea urchin**, *Strongylocentrotus purpuratus*, by far the more common of Oregon's two intertidal species, may completely line the sides of tidepools in favorable areas. Often this 3 1/2" wide animal lives in a shallow depression which several generations of urchins have hollowed out of the rock. It feeds on algae.



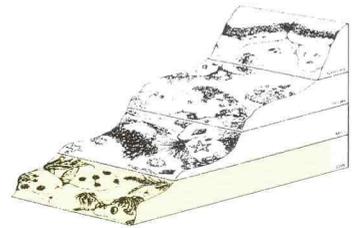
LOW TIDE ZONE



45. The long, olive-green, feathery blades with numerous small floats belong to the **feather boa**, *Egregia menziesii*. As with other seaweeds, this plant provides cover for many animals.

46. The appropriately named **sea palm**, *Postelsia palmaeformis*, resembles a small palm tree. It will be firmly attached to the rocks where its hollow, flexible stem allows for swaying back and forth in the strong wave action of heavy surf.

47. The clusters of olive-brown or yellowish, tubular sacs are the **sea sac**, *Halosaccion glandiforme*. Gas in the ends of the sacs make the seaweed buoyant.



48. **Red laver**, (*Porphyra sp.*), looks much like sea lettuce, but is an iridescent, purplish-black color. The large, thin blades feel like stretchy rubber.

49. Five ribs running the length of the blade of **seersucker**, *Costaria costata*, give it a puckered look on one side. The blades can be more than six feet in length.

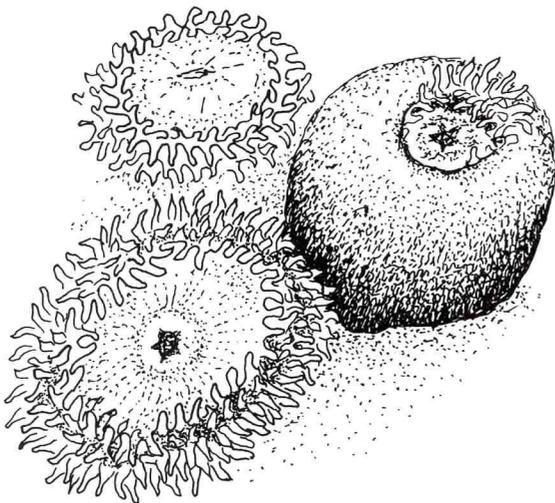
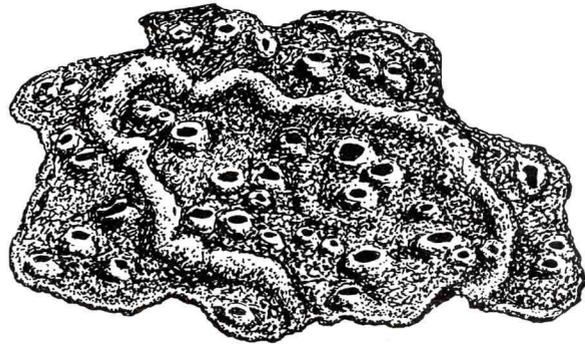


CLASSIFICATION OF ANIMALS AND PLANTS

Identifying intertidal animals and plants can be confusing. Many animals and plants have common descriptive names; however, these names may vary from location to location. Occasionally, different animals in different areas may have the same common name. There are some animals that don't have a common name. To sort out this confusion, scientists use a system called taxonomy which groups (classifies) animals with similar features and characteristics. Standardized names are assigned so that each animal has one accepted name. Each living organism is classified into groups according to the following order: Kingdom, Phylum, Class, Order, Family, Genus, Species. The latin names used with the photographs are genus and species names; they give an organism its unique name. Listed below are examples of the major groups (Phyla) of animals and plants living in the rocky intertidal areas.

PORIFERA - sponges

Most intertidal sponges occur as encrusting masses. Some are soft bodied, but most are firm or hard. Sponges are often brightly colored. They filter food particles from the water through a system of pores.

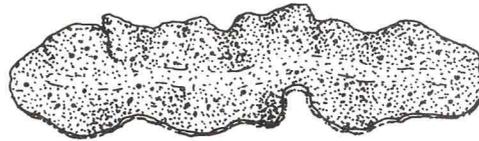


CNIDARIA (COELENTERATA) - anemones, jellyfish, corals

Many species are brightly colored. All are radially symmetrical (circular), do not have a distinct head, and have a crown of tentacles around the mouth. The tentacles contain special organs which are used to sting and kill their prey. All are carnivores (meat-eaters).

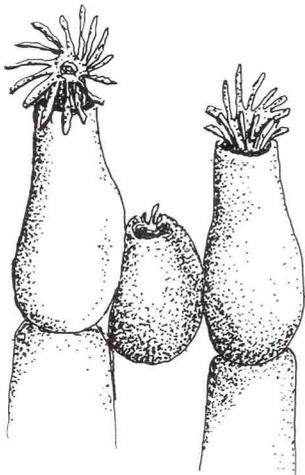
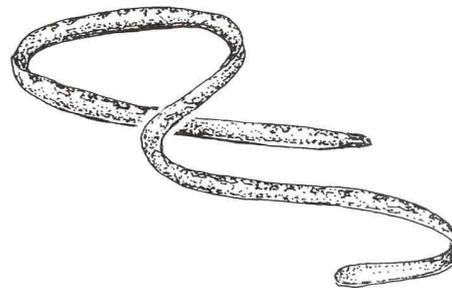
PLATYHELMINTHES - flatworms

Flatworms have very thin, leaf-like bodies and move with a gliding motion. They are most often found on the underside of rocks. Most are carnivores.



NEMERTEA - ribbon worms

Ribbon worms have soft, long, thin, non-segmented bodies. Their bodies sometimes have a flattened shape. Most live on the bottom, although some burrow in the mud and sand. Ribbon worms are carnivorous, feeding mainly at night.

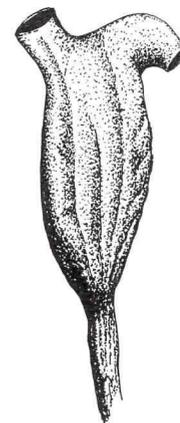


BRYOZOA - moss animals

Bryozoans are colonies of small individuals which permanently attach to hard surfaces. They may form thin, flat, encrusting sheets or upright colonies. Bryozoans feed on bacteria, phytoplankton, or other small organisms which are swept into the mouth by tentacles.

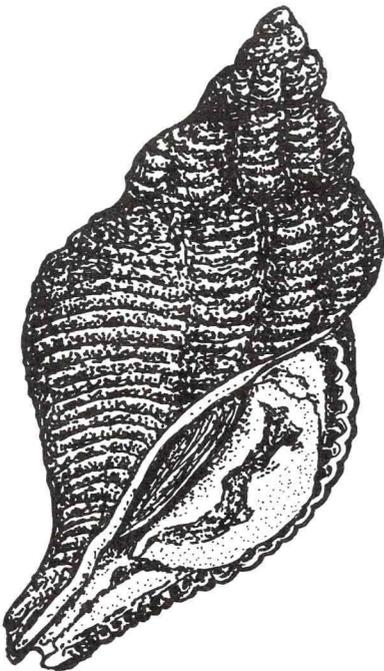
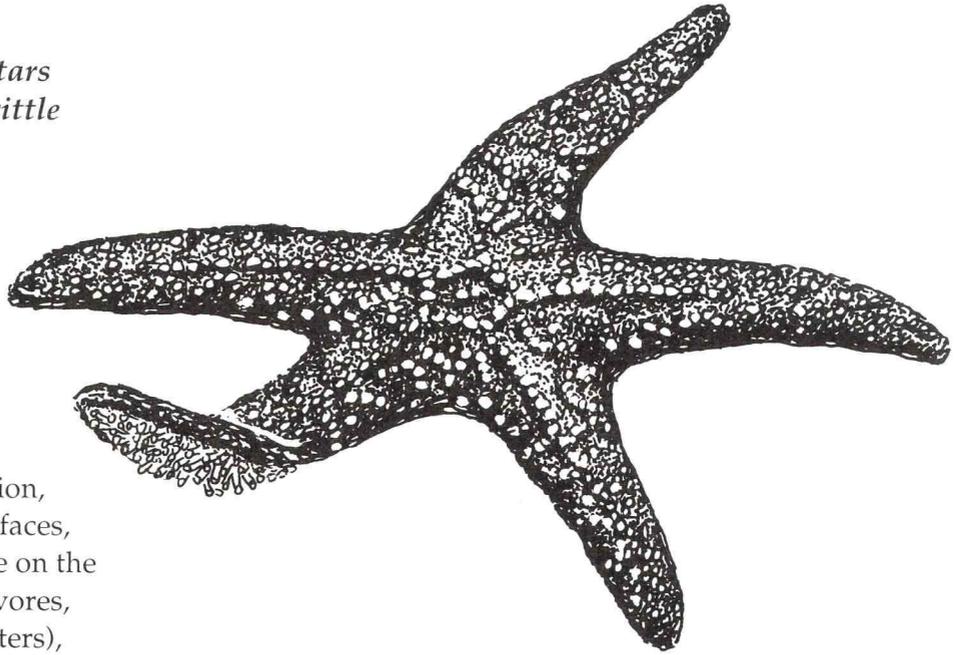
CHORDATA - tunicates (ascidians or sea squirts)

Chordates are considered a link between the vertebrates and invertebrates; they possess a nerve cord, with one end swollen to form a simple brain. Two types of ascidians, solitary and colonial, attach to solid surfaces in sheltered or protected areas. They feed by filtering organisms out of the water.



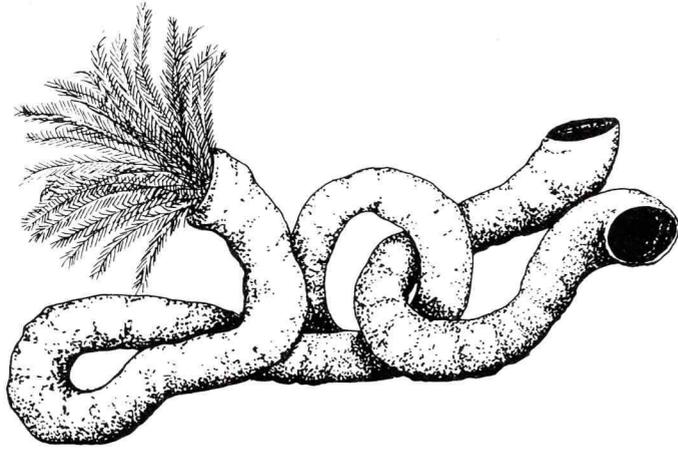
ECHINODERMATA - sea stars
(starfish), sea cucumbers, brittle
stars, sea urchins

Echinoderms have a hard and/or spiny outer surface. Their bodies are five-parted radially symmetrical (forms a circle which can be divided into five equal parts). They have water-filled tube feet which aid in locomotion, capturing food, clinging to surfaces, and respiration. Nearly all live on the ocean bottom. Some are carnivores, others are herbivores (plant eaters), and some are filter feeders.



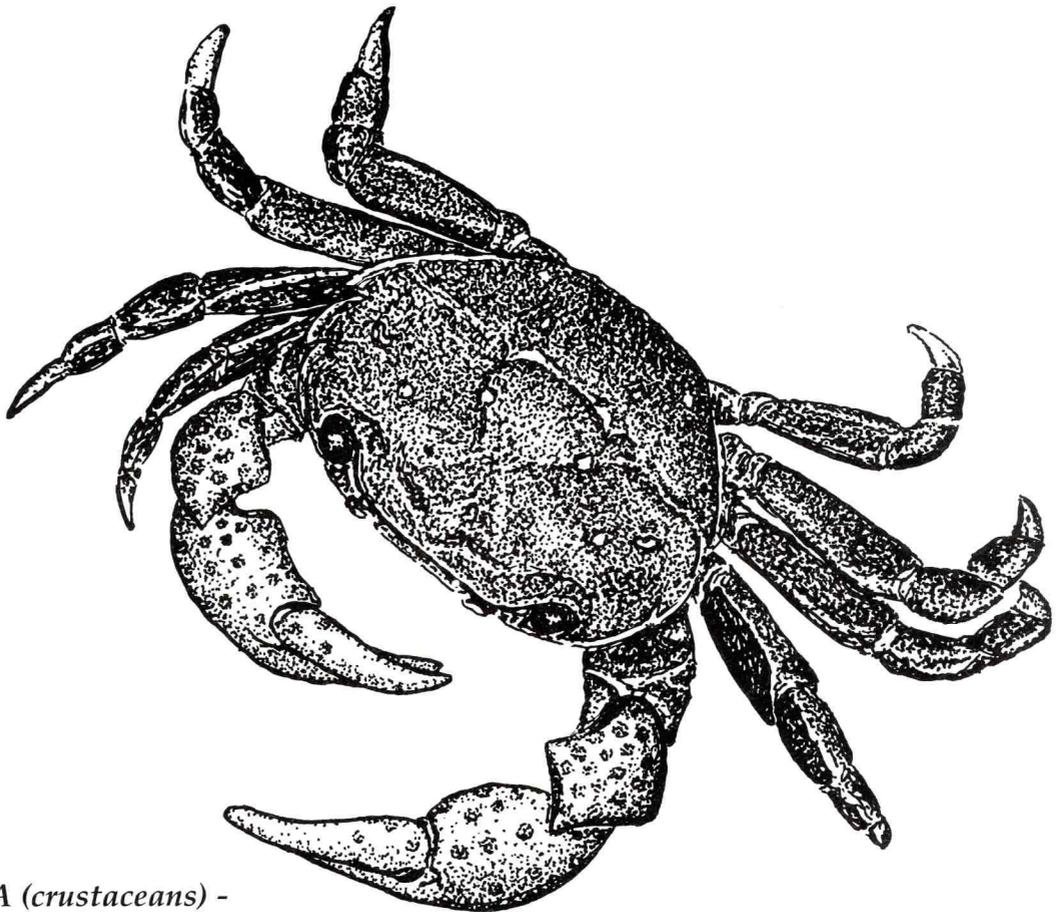
MOLLUSCA - clams, mussels, limpets,
snails, chitons, nudibranchs, octopuses

This is a very diverse group of animals. Characteristics common to all molluscs are a soft body, a shell, and a muscular foot used in locomotion. Their feeding methods vary as the group includes herbivores, carnivores, and omnivores (plant and animal eaters). They feed by grazing, browsing, boring, pursuing, scavenging, or filtering. They live by clinging, creeping, burrowing, or swimming.



*ANNELIDA - scale worms
and tube worms*

These worms have segmented (encircled with grooves), elongated bodies. Most dwell on the bottom, usually in areas protected from the surf. Many live in tubes. Some gather food from nearby sediments, while others filter the water.



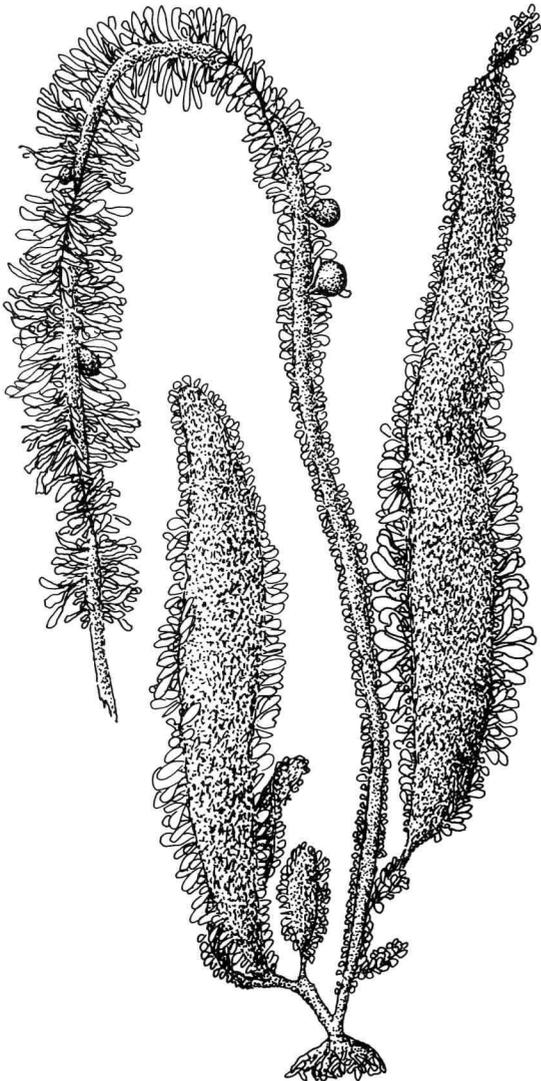
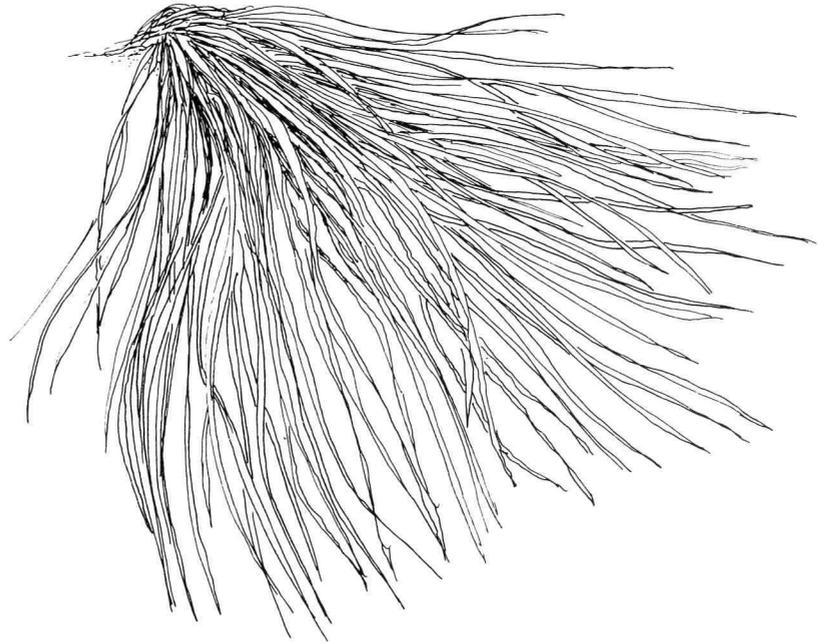
*ARTHROPODA (crustaceans) -
barnacles, shrimps, crabs, rock louse*

All crustaceans have a hard external shell with jointed (movable) limbs. This is another very diverse group in their feeding and other habits. Some are herbivores and carnivores while others are scavengers, filter feeders, and deposit feeders.

SEA GRASSES AND ALGAE

SEA GRASSES

Sea grasses are rooted vascular plants: nutrients are absorbed from the surrounding environment through the roots and are then transported to the leaves. Vascular plants reproduce by flowers and fruits.



ALGAE

Most marine “plants” are really algae: they have no true roots, leaves, or flowers. Some algae cement themselves to rocks. Others have holdfasts which are used to anchor them to rocks or other hard surfaces. Nutrients are absorbed directly from the surrounding water. Most algae reproduce by microscopic spores. Algae are classified into three main phyla according to their color (green, brown, and red) and other characteristics.

NORTH COAST

ECOLA POINT. Located two miles north of Cannon Beach, Ecola State Park has a large parking lot, restrooms, and a good trail to the beach and intertidal area, about 1/4 mile away. An alternate approach is to drive north to Indian Beach and walk 1/2 mile south along the beach. The road into the park is narrow and winding and may be difficult to manage for buses. The sandy beach is interrupted by a rocky headland with scattered boulders, some bedrock, and few tide pools.

HAYSTACK ROCK - CANNON BEACH (no collecting of marine invertebrates). This area is located within the Cannon Beach city limits. Because of its easy access, **NO COLLECTING** of marine invertebrates is permitted. Parking is on the beach or one block away from the beach. Although the variety of species found here is limited, it is ample for younger students. Haystack Rock is one of several federal bird refuges along the coast, offering good viewing of marine birds. Please take care not to disturb breeding birds. Do not climb on the refuge rocks.

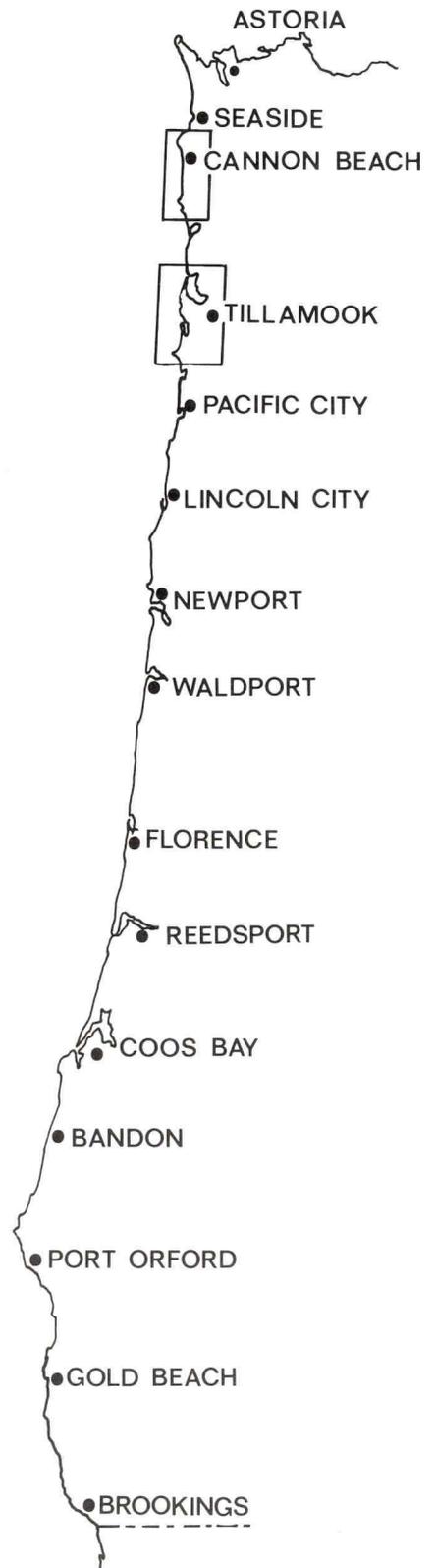
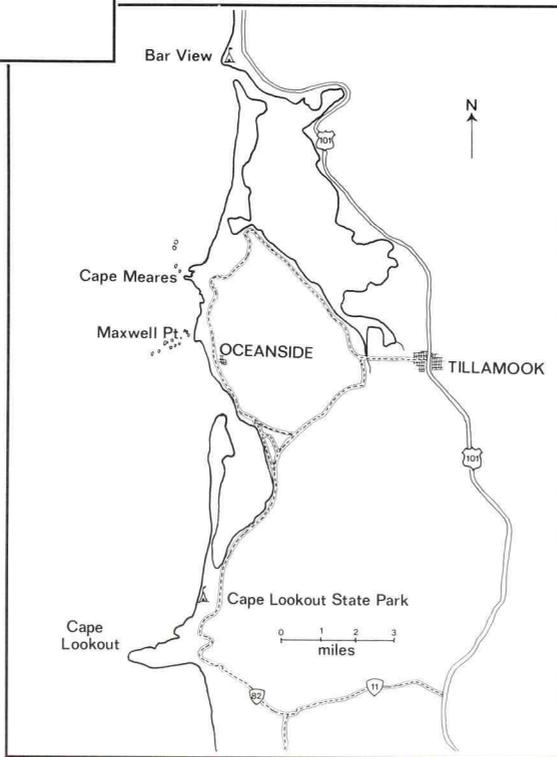
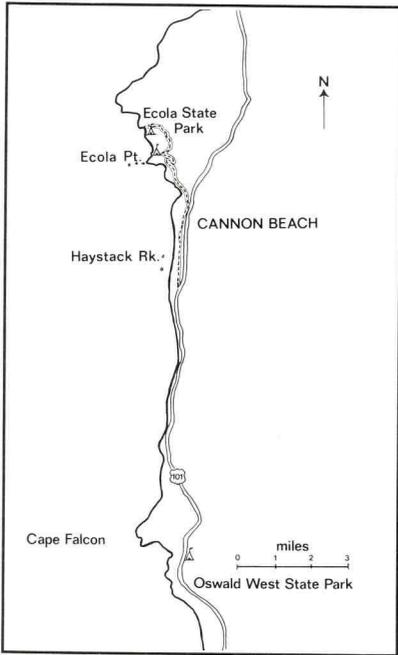
CAPE FALCON - NEAHKAHNIE MT. Two intertidal areas are located 5 miles north of Manzanita, within Oswald West State Park. Both areas can be reached by trails leading west from a large parking area along Hwy. 101. The 1/4 mile long trail goes through the camping area and ends in the picnic area at Short Sands beach. To the north 1/4 mile is the Cape Falcon area, and to the south 1/4 mile is the Neahkahnie Mt. area. Rocky headlands with boulders and offshore rocks make up both intertidal areas.

BARVIEW. This rocky area, close to the mouth of Tillamook Bay, is best used by smaller groups. The intertidal area is limited, but it offers large boulders which provide habitat for some of the more common intertidal species living just inside the mouth of a bay. Parking is limited.

CAPE MEARES. Located about 10 miles west of Tillamook, a rocky intertidal area is located on the south side of Cape Meares. Access and restrooms are located at Short Beach, one mile north of Oceanside. Parking and access to the beach is limited. From the road, a steep trail leads down to the beach and the rocky area, 1/2 mile north. The area is not suitable for large groups in buses. The intertidal area is a sandy beach with a large number of boulders scattered about. Closer to Cape Meares are a few larger out-croppings and caves.

MAXWELL POINT. This area is adjacent to the town of Oceanside, 9 miles west of Tillamook. From an ample parking lot, it is a short walk north to the point. Restrooms are available in the Community Hall near the beach parking lot. Basically a sandy beach, the area has large isolated rocks and vertical cliffs jutting out from the mainland.

CAPE LOOKOUT. This area is 18 miles south of Tillamook, on the south side of Cape Lookout. Access is from a trail starting at the Cape Lookout trailhead parking lot, 2.5 miles south of Cape Lookout State Park campground on Cape Lookout Road. The trail crosses private land and trespass is permitted only on the trail. This sandy beach, covered with a large area of boulders, 2 to 3 feet in diameter, is a good tidepool viewing area.



LEGEND

-  U.S. HIGHWAY
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CENTRAL COAST

BOILER BAY (collecting by permit only). This intertidal area lies northeast of the parking lot in Boiler Bay State Park (1 mile north of Depoe Bay, on Hwy. 101). There are restrooms and ample parking at the state park. A steep, unimproved trail leads down to the intertidal area from a small gravel parking lot 200 yards east of the state park. Any entry to the beach other than by this trail is dangerous! In this area, a steep headland has been partially broken down, leaving rocky ridges, isolated cliffs, and flat bedrock shelves with boulders and tide channels. This is a good area for any student.

OTTER ROCK - MARINE GARDENS (no collecting of marine invertebrates). Nine miles north of Newport, turn off Hwy. 101, towards the Devil's Punch Bowl State Park. Turn right on the last dead-end road before the state park. Restrooms and ample parking are available and a good trail leads down to the beach. This area is excellent for fieldtrips. The flat sandstone shelves that predominate the intertidal area are broken up by shelves and numerous tide pools.

YAQUINA HEAD - MARINE GARDENS (no collecting of marine invertebrates). To reach this area, located four miles north of Newport, turn west off Hwy. 101 at Lighthouse Road in Agate Beach. Parking is adequate and restrooms are available. The trail to the beach is good. This is one of the most heavily used intertidal areas in Oregon and is suitable for all levels of students. This area has rocky out-croppings, ranging from boulder size to isolated islands, and widespread shelves cut up by tide channels and pools. The U.S. Bureau of Land Management provides educational programs for school groups.

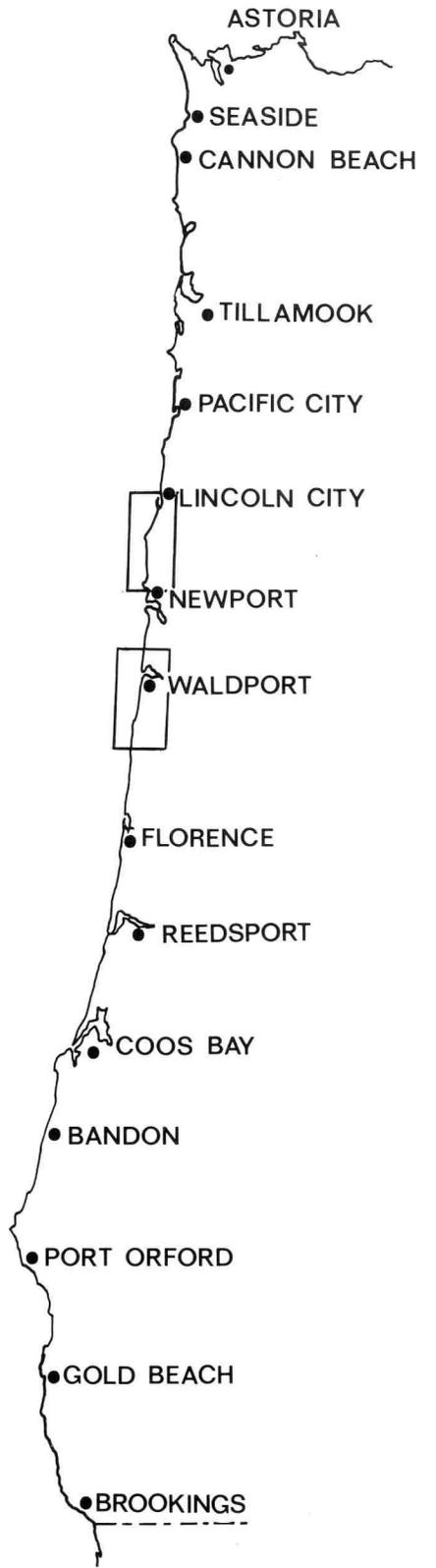
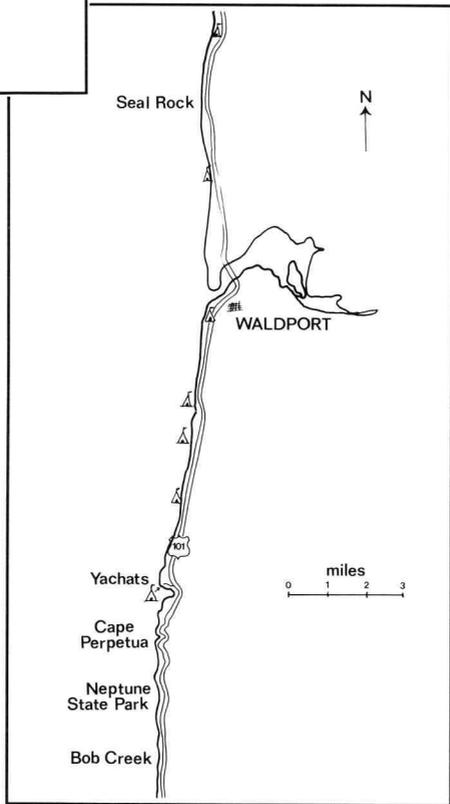
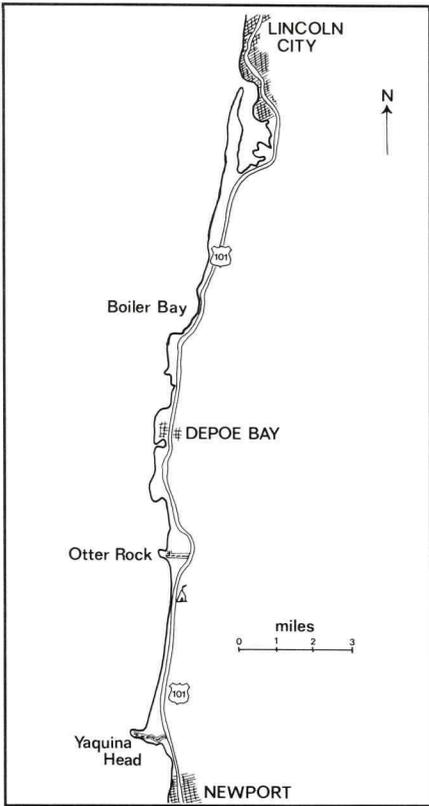
SEAL ROCK. This area is located 12 miles south of Newport, just off Hwy. 101. Access is from Seal Rock State Park on the north, or from two turn-offs just south of the main park area. The latter two points are better suited for bus parking. The trails range from good in the park, to poor at the turn-offs. The park has restrooms at the parking area. South of the state park, a headland, cliffs, bedrock, and boulder areas are found intertidally. A sandy beach is next to the land.

YACHATS STATE PARK. The state park is located north of the Yachats River. From Hwy. 101, turn west on 2nd St. or Ocean Dr., in Yachats. From the large parking lot in the state park, several trails lead down to the beach. The rocky area extends for about 1/2 mile north of the Yachats River and a smaller area is found south of the river. A basal shelf stretches down into the intertidal area. Channels, small caves, and tide pools are numerous. There is very little protection from waves in this area and caution should be used if heavy surf conditions exist.

CAPE PERPETUA - MARINE GARDENS (no collecting of marine invertebrates). Several turn-offs on Hwy. 101, 2 miles south of Yachats, lead to the bedrock shelves along the base of Cape Perpetua. The U.S. Forest Service has a visitor's center in this area and maintains a network of trails that lead to the intertidal areas and other points of interest. Write the U.S. Forest Service Visitor's Center, Yachats, OR 97498, for details on tours and special programs for school groups (Telephone 547-3289). Parking and restrooms are available at the visitor's center.

NEPTUNE STATE PARK (collecting by permit only). This park is located about 13 miles south of Waldport, on Hwy. 101. It forms the southern boundary of Cape Perpetua and has a varied and extensive intertidal area. The main picnic area has ample parking, restrooms, easy access to the beach, but a limited intertidal area because of steep rocks. The best intertidal area is reached from the Strawberry Hill parking lot, just south of the main picnic area. Basically bedrock with some sandy areas intermixed, this area has numerous tide pools, channels, and boulders.

BOB CREEK TO BRAY POINT. This area adjoins the southern boundary of Neptune State Park. Access and limited parking are available just south of Bob Creek. The basal shelf in this area is exposed to various degrees in the sand and is broken up by tide channels and some pools.



LEGEND

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SOUTH COAST

FOSSIL POINT (Coos Bay). This area is 3 miles south of the Empire district of Coos Bay. Limited parking is available off Beacon Street. Fossil Point is unique in that, although inside Coos Bay, it is close enough to the mouth of the bay to provide a habitat for some open coast organisms.

SUNSET BAY (collecting by permit only). Sunset Bay State Park, about nine miles south of Coos Bay, is a popular park with picnic, camping, and restroom facilities. There is a large parking lot and access is easy. The narrow shelf on the south side of the cove is a potential trouble spot during incoming tides.

CAPE ARAGO (collecting by permit only). Cape Arago State Park, 11 miles south of Coos Bay, is broken up by three coves and has abundant intertidal areas. Restrooms are found near the middle cove and parking is available in all three coves. The north cove is the largest of the three coves and the intertidal area is immense. The middle cove is the smallest and most exposed of the coves. Care should be taken to minimize disturbances to marine mammals in this area.

FIVE-MILE POINT (Whiskey Run Creek). This area is reached by turning off Hwy. 101 onto the Seven Devils Road, 13 miles south of Coos Bay. There is not parking for buses and there are no restrooms. The intertidal area is about 1/2 mile north of the parking area. Numerous cliffs push out of the sand with boulders and tide pools along the shore.

CAPE BLANCO. Approximately 10 miles northwest of Port Orford, this western-most point in Oregon has a large intertidal area that is relatively undisturbed. The intertidal area is best reached from the north side of the cape, before entering the Coast Guard station. Parking is limited along the road. Sheep trails lead down the gentle slope to the beach, 300 yards from the road. The intertidal area is a combination of a steep headland and expanses covered with boulders, bedrock, tide channels, and pools.

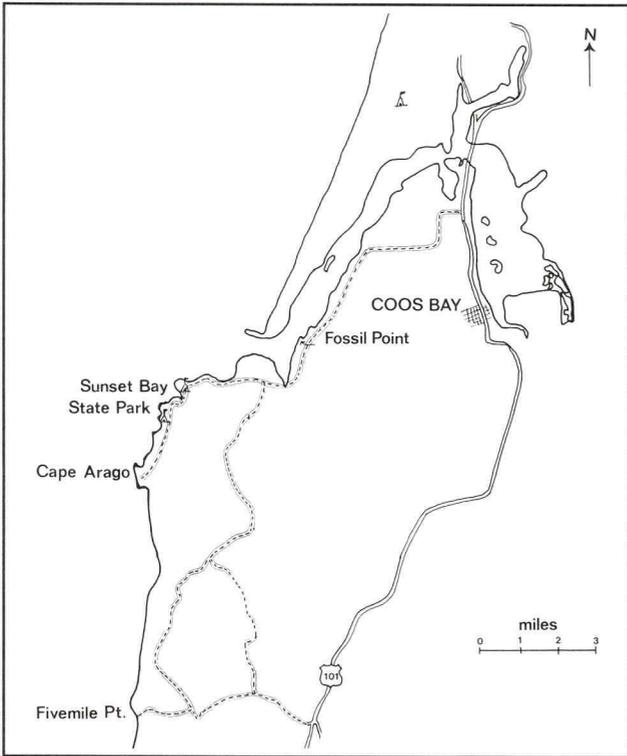
ROCKY POINT (North Humbug Mountain State Park). This area is about 3 miles south of Port Orford, just inside Humbug Mountain State Park. From a dirt road with limited parking, the beach is a 100 yard walk. This excellent intertidal area has boulders scattered about a gently sloping beach.

HUMBUG STATE PARK. This park is about 4 miles south of Port Orford. Along the north base of the mountain, a trail leads from the camping grounds to the intertidal area, about 300 yards away. The rocky area consists of several cliffs projecting seaward, with smaller boulders scattered at the base.

NORTH SAMUEL BOARDMAN STATE PARK. This area is located at the north boundary of Boardman State Park, 14 miles north of Brookings. From a gravel turn-off at the state park sign, a broad but unimproved trail leads to the shore. Rocks and lush vegetation form pools and crevices partly protected from the surf.

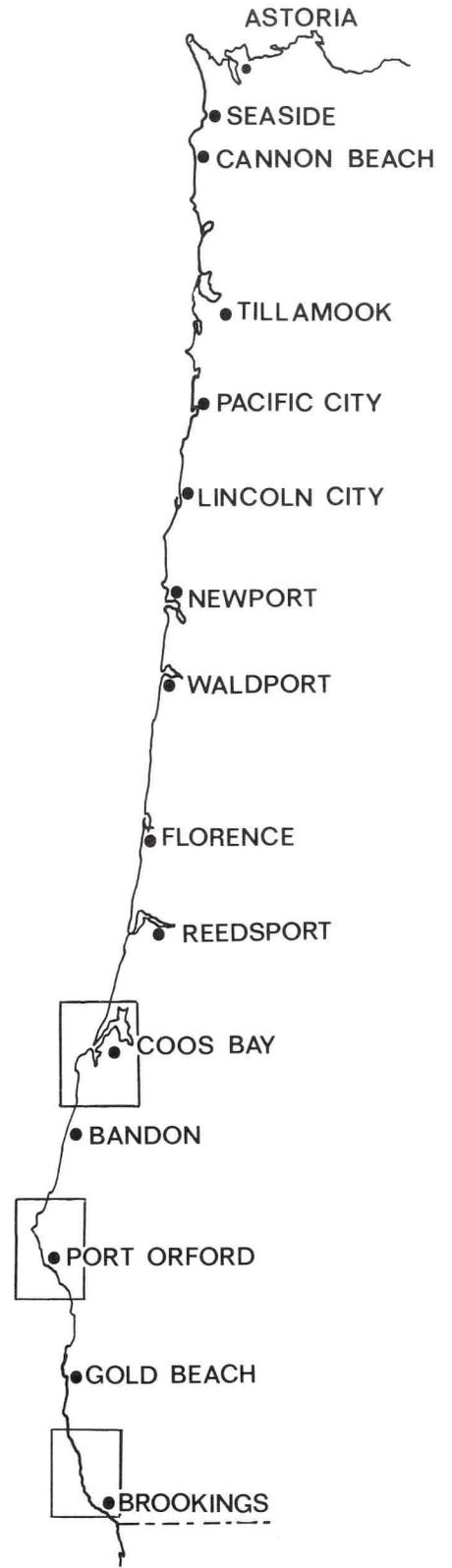
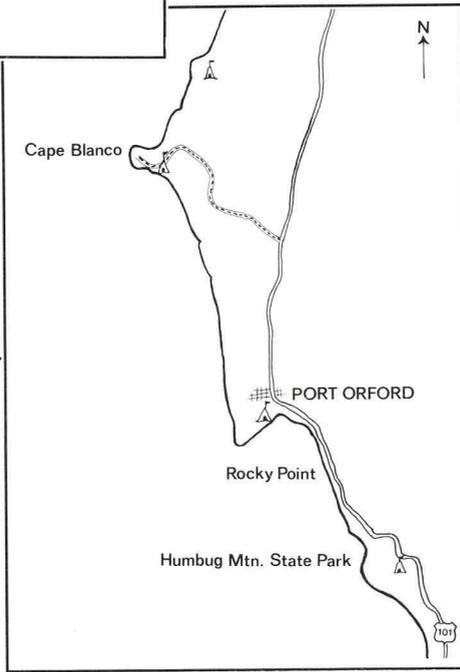
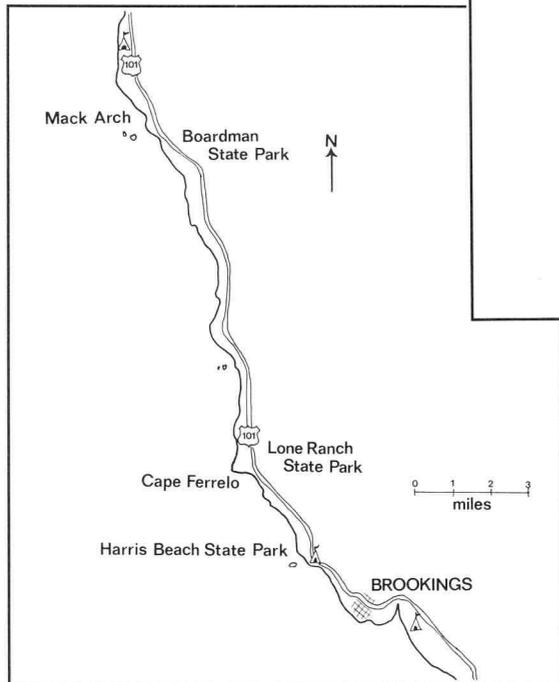
LONE RANCH STATE PARK (Cape Ferrelo). Located 5 miles north of Brookings, this area has ample parking, restrooms, and easy access to the beach. Large numbers of rocks of various sizes are scattered about the beach. There are few tide pools, but spaces among the rocks provide quiet areas.

HARRIS BEACH. This extensive area includes several rocky points and small sandy coves. Parking is available in all of the three main areas. Restrooms are available in the campground and picnic areas. The North Harris Beach area is about 100 yards north of the parking lot at the main picnic area. The main intertidal area is directly west of the campgrounds. It is accessible from the main parking lot by walking south, along the beach, or from a trail that leads down to the beach from the main park road. Mill Beach is the southernmost part of the Harris Beach permit area. Turn toward the ocean at Center Street in Brookings. Turn right at the plywood mill and park next to a small ball park. An unimproved road and several trails lead down to the beach. To reach the south side of Mill Beach Cove, take a trail that goes past the sewage treatment plant.



LEGEND

-  U.S. HIGHWAY
-  OTHER PAVED ROADS
-  CAMPGROUND
-  TOWNS



FURTHER READING

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Curricula and teaching materials may be obtained from Oregon State University Extension Sea Grant Program, Hatfield Marine Science Center, Newport, OR 97365.

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Cover Photo: Rick Starr

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