**Chapter 7, Aquatic Ecosystems: Section 1, Freshwater Ecosystems**

**Freshwater Ecosystems**

* The types of organisms in an aquatic ecosystem are mainly determined by the water’s **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* As a result, aquatic ecosystems are divided into **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** ecosystems.
* Freshwater ecosystems include ponds, lakes, streams, rivers, and wetlands.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are areas of land that are periodically under water or whose soil contains a great deal of moisture.

**Characteristics of Aquatic Ecosystems**

* Factors such as **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**determine which organisms live in which area of the water.
* Aquatic ecosystems contains several types of organisms that are grouped by their **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and by their **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* Three groups of aquatic organisms include **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

**Characteristics of Aquatic Ecosystems**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are the mass of mostly microscopic organisms that float or drift freely in the water, and can be microscopic animals called zooplankton or microscopic plants called phytoplankton.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are all organisms that swim actively in open water, independent of currents.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are bottom-dwelling organisms of the sea or ocean and are often attached to hard surfaces.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are also aquatic organisms.

**Lakes and Ponds**

* Lakes, ponds, and wetlands can form **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** where groundwater reaches the Earth’s surface.
* Humans intentionally create **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** by damming flowing rivers and streams to use them for power, irrigation, water storage, and recreation.
* The types of organisms present depend on the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** available.

**Life in a Lake**

* The **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**is a shallow zone in a freshwater habitat where light reaches the bottom and nurtures plants and aquatic life is diverse and abundant.
* Some plants are **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** underwater with their upper leaves and stems above water.
* Other plants have **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

**Life in a Lake**

* Some bodies of fresh water have areas so deep that there is too little light for photosynthesis.
* Bacteria lie in the deep areas of freshwater. Fish adapted to cooler, darker water also live there.
* Eventually, dead and decaying organisms reach the benthic zone.
* The **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is the region near the bottom of a pond, lake or ocean which is inhabited by decomposers, insect larvae, and clams.

**Life in a Lake**

* Animals that live in lakes and ponds have adaptations that help them obtain what they need to survive.
* For example, water beetles use the hairs under their bodies to trap surface air so that they can breathe during their dives for food.
* And, in regions where lakes partially freeze in the winter, amphibians burrow into the littoral mud to avoid freezing temperatures.

**How Nutrients Affect Lakes**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is an increase in the amount of nutrients, such as nitrates, in an aquatic ecosystem.
* As the amount of plants and algae grow, the number of bacteria feeding on the decaying organisms also grows.
* These bacteria use oxygen dissolved in the lake’s waters.
* Eventually the reduced amount of oxygen kills oxygen loving orgnisms.

**How Nutrients Affect Lakes**

* A lake that has large amounts of plant growth due to nutrients is known as a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**
* Lakes naturally become eutrophic over a long period of time.
* However, eutrophication can be accelerated by **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, such as rain, that can carry sewage, fertilizers, or animal wastes from land into bodies of water.

**Freshwater Wetlands**

* Freshwater wetlands are areas of land that are covered with **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** for part of the year.
* The two main types of freshwater wetlands are **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* Marshes contain **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, while swamps are dominated by **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* Located in the southeastern United States, with the largest in the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

**Freshwater Wetlands**

* Wetlands perform several important environmental functions.
* Wetlands **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** that absorb and remove pollutants from the water.
* They also **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** by absorbing extra water when rivers overflow.
* These areas **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** for native and migratory wildlife in addition to feeding and spawning for many freshwater game fish.

**Marshes**

* Freshwater marshes tend to occur on low, flat lands and have little water movement.
* In shallow waters, plants root themselves in the rich bottom sediments while their leaves stick out above the surface of the water year round.
* There are several kinds of marshes, each of which is characterized by its **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* Brackish marshes have **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**while salt marshes contain \_\_\_\_\_\_\_**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

**Marshes**

* The benthic zones of marshes are **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and contain plants, numerous types of decomposers, and scavengers.
* Water fowl, such as ducks, have flat bills adapted for sifting through the water for fish and insects.
* While water birds, such as herons, have spear-like beaks they use to grasp small fish and probe for frogs in the mud.
* Marshes also attract migratory birds from temperate and tropical habitats.

**Swamps**

* Swamps occur on **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, often near streams and are dominated by woody shrubs or water loving trees.
* Freshwater swamps are the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** for amphibians because of the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* Birds are also attracted to hollow trees near or over the water.
* Reptiles are the predators of the swamp, eating almost any organism that crosses their path.

**Human Impact on Wetlands**

* Wetlands were previously considered to be **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** that provide breeding grounds for insects.
* As a result, many have been drained, filled, and cleared for farms or residential and commercial development.
* The importance of wetlands is now recognized, as the law and the federal government protect many wetlands while most states now prohibit the destruction of certain wetlands.

**Rivers**

* At its headwaters, a river is usually cold and full of oxygen and runs swiftly through a shallow riverbed.
* As a river flows down a mountain, it may broaden, become warmer, wider, slower, and decrease in oxygen.
* A river changes with the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** through which it flows.

**Life in a River**

* In and near the headwater, mosses anchor themselves to rocks by using rootlike structures called ***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****.*
* Trout and minnows are adapted to the cold, oxygen rich waters.
* Farther downstream, plankton can float in the warmer, calmer waters.
* Plants here can set roots in the river’s rich sediment, and the plant’s leaves vary in shape according to the strength of the river’s current.
* Fish such as catfish and carp also live in these calmer waters.

**Rivers in Danger**

* Industries use river water in **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** for wastes.
* In addition, people have used rivers to dispose of their sewage and garbage.
* These practices have polluted rivers with toxins, which have killed river organisms and made river fish inedible.
* Today, runoff from the land puts pesticides and other poisons into rivers and coats riverbeds with toxic sediments.

**Chapter 7, Aquatic Ecosystems: Section 2, Marine Ecosystems**

**Marine Ecosystems**

* Marine ecosystems are located mainly in **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* Organisms that live in coastal areas adapt to changes in **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* Organisms that live in the open ocean adapt to changes in **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

**Coastal Wetlands**

* Coastal land areas that are covered by **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** for all or part of the time are known as coastal wetlands.
* Coastal wetlands provide **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** for many fish and wildlife.
* They also **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**which protects them from flooding, they **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and sediments, and they **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** for boating, fishing, and hunting.

**Estuaries**

* An **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is an area where fresh water from rivers mixes with salt water from the ocean.
* As the two bodies meet, currents form and cause mineral rich mud with many nutrients to fall to the bottom making them available to producers.
* Estuaries are very productive because they **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**while the surrounding land protects the estuaries from the harsh force of ocean waves.

**Plants and Animals of Estuaries**

* Estuaries support many marine organisms because they receive **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** for plants and animals.
* The light and nutrients support large populations of rooted plants as well as plankton.
* Plankton in turn provide food for fish, which can then be eaten by larger animals such as dolphins.
* Oysters and clams live anchored to rocks and feed by filtering plankton from the water.

**Plants and Animals of Estuaries**

* Organisms that live in estuaries are able to **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** in salinity because the salt content of the water varies as fresh water and salt water mix when tides go in and out.
* Estuaries also provide **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, access to the ocean, and connection to rivers.
* As a result, man of the largest ports have been built on estuaries.
* Six of the ten largest urban areas, including New York City, have been built on estuaries.

**Threats to Estuaries**

* Estuaries that exist in populated areas were often used as places to **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* Estuaries filled with waste could then be used as building sites.
* The pollutants that damage estuaries include sewage, pesticides, fertilizers, and toxic chemicals.
* Most of these pollutants break down over time, but estuaries cannot cope with the amounts produced by dense human populations.

**Salt Marshes**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are maritime habitats characterized by grasses, sedges, and other plants that have adapted to continual, periodic flooding and are found primarily throughout the temperate and subarctic regions.
* The salt marsh supports a community of clams, fish, aquatic birds, crabs, and shrimp.
* Salt marshes, like other wetlands, also **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** to help protect inland areas.

**Mangrove Swamps**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are tropical or subtropical marine swamps that are characterized by the abundance of low to tall mangrove trees.
* The swamps help **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** from storms.
* They also provide a home for about 2,000 animal species.
* Mangrove swamps have been filled with waste and destroyed in many parts of the world.

**Rocky and Sandy Shores**

* Rocky shores have many more plants and animals than sandy shores do because the rocks provide anchorage for seaweed that animals can live on.
* Sandy shores dry out when the tide goes out, and many organisms that live between sand grains eat the plankton left stranded on the sand.
* A **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is a long ridge of sand or narrow island that lies parallel to the shore and helps protect the mainland.

**Coral Reefs**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are limestone ridges found in tropical climates and composed of coral fragments that are deposited around organic remains.
* Thousands of species of plants and animals live in the cracks and crevices of coral reefs, which makes coral reefs among the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** ecosystems on Earth.
* Corals are predators that use stinging tentacles to capture small animals, such as zooplankton, that float or swim close to the reef.

**Coral Reefs**

* Corals live only in **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** where there is enough light for photosynthesis.

**Disappearing Coral Reefs**

* Coral reefs are productive ecosystems, but they are also **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* If the water surrounding a reef is too hot or too cold, or if fresh water drains into the water surrounding the coral, the coral may die.
* If the water is too muddy, polluted, or too high in nutrients, the algae that live within the corals will either die or grow out of control. If the algae grows out of control, it may kill the corals.

**Disappearing Coral Reefs**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** have also been linked to coral-reef destruction.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**can devastate fish populations, upsetting the balance of the reef’s ecosystem.
* A coral reef grows very slowly, and it may not be able to repair itself after chinks of coral are destroyed by careless divers, ships dropping anchor, fisheries, shipwrecks, and people breaking off pieces for decorative items or building materials.

**Oceans**

* Because water absorbs light, sunlight that is usable by plants for photosynthesis penetrates only about **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** into the ocean.
* As a result, much of the ocean’s life is concentrated in the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** where sunlight penetrates to the bottom and rivers wash nutrients from the land.
* Seaweed and algae grow anchored to rocks, and phytoplankton drift on the surface. Invertebrates and fish then feed on these plants.

**Plants and Animals of Oceans**

* In the open ocean, phytoplankton grow only in areas where there is enough light and nutrients, resulting in one of the least productive of all ecosystems.
* The sea’s smallest herbivores are **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, including jellyfish and tiny shrimp, which live near the surface with the phytoplankton they eat.
* Fish feed on the plankton as do marine mammals such as whales.
* Deep ocean waters contain mostly decomposers and scavengers.
* Overall, the types of organisms that may be found in the layers of the ocean at various depths is dependent on available sunlight.

**Threats to the Oceans**

* The oceans are steadily becoming more polluted.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** from fertilized fields and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** being discharged into rivers are major sources of ocean pollution.
* Overfishing and certain fishing methods are also destroying some fish populations. Marine mammals can get caught and drown in the nets.
* Although it is illegal, some ships discard fishing lines into the ocean where they can strangle and kill fish and seals.
* The Arctic Ocean is rich in nutrients from the surrounding landmasses and supports large populations of plankton, which feed a diversity of fish in the open water and under the ice.
* These fish are food for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Fish and seals then provide food for polar bears and people on land.
* The arctic ecosystems at the North and South Poles depend on marine ecosystems because nearly all the food comes from the ocean.
* The Antarctic is the only continent \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by humans.
* It is governed by an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and is used mainly for research.
* Even during the summer, only a few plants grow at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the continent.
* So, as in the Arctic, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ form the basis of the Antarctic food web, nourishing large numbers of fish, whales, and birds such as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.