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TYPES OF ECOSYSTEMS

BY

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Types of Ecosystems:

The ecosystems are classified into many types and are classified based on a number of factors. Therefore, it is also essential to know the different factors which differentiate the ecosystems from one another.

Ecosystems can generally be classified into two classes such as **natural** and **artificial**. **Artificial ecosystems** are natural regions affected by man's interferences. They are artificial lakes, reservoirs,



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townships, and cities. **Natural ecosystems** are basically classified into two major types. They are terrestrial ecosystem and aquatic ecosystem. An ecosystem is a self-contained unit of living things and their non-living environment. An ecosystem can be as small as an oasis in a desert, or as big as an ocean, spanning thousands of miles. The two main types of ecosystems are:

1. Terrestrial Ecosystem
2. Aquatic Ecosystem



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1. Terrestrial Ecosystems:

Terrestrial ecosystems are exclusively land-based ecosystems. There are different types of terrestrial ecosystems distributed around various geological zones. Terrestrial ecosystems are those ecosystems that exist on land. Water may be present in a terrestrial ecosystem but these ecosystems are primarily situated on land. These ecosystems are of different types such as forest ecosystem, desert ecosystem, grassland, and mountain ecosystems.



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Terrestrial ecosystems are distinguished from aquatic ecosystems by the lower availability of water and the consequent importance of water as a limiting factor. These are characterized by greater temperature fluctuations on both diurnal and seasonal basis, than in aquatic ecosystems in similar climates.








Availability of light is greater in terrestrial ecosystems than in aquatic ecosystems because the atmosphere is more transparent on land than in water. Differences in temperature and light in



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terrestrial ecosystems reflect a completely different flora and fauna.

They are as follows:

-  Forest Ecosystems
-  Rainforest Ecosystems
-  Grassland Ecosystems
-  Tundra Ecosystems
-  Desert Ecosystems
-  Savannas Ecosystems
-  Mountain Ecosystems



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Forest Ecosystem:

A forest ecosystem consists of several plants, animals and microorganisms that live in coordination with the abiotic factors of the environment. Forests help in maintaining the temperature of the earth and are the major carbon sink. In forest ecosystems, a massive number of organisms can live in fairly small space. These are ecosystems in which you find a lot of flora. It suffices to say that the density of living organisms in forest ecosystems is pretty high.



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A slight change in forest ecosystem can affect the entire balance, effectively killing the whole ecosystem. These ecosystems also feature a wide range of fauna. They can further be divided into Deciduous forests, Coniferous forests, Tropical evergreen forest, Tropical deciduous forest, temperate evergreen forest, temperate deciduous forest, and Taiga. Forests can support many life forms and complex ecosystems.



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Rainforest Ecosystem:

Rainforests usually have extremely dense ecosystems because there are so many different types of animals, all are living in a very small area. Rainforests are the kind of ecosystems that are extremely dense because of a variety of organisms living in a tiny area.

Grassland Ecosystem:

In a grassland ecosystem, the vegetation is dominated by grasses and herbs. Temperate grasslands, savanna grasslands are some of the examples of grassland ecosystems. Grassland ecosystems can be



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found in both the temperate and tropical regions across the globe, but with slight variations. These ecosystems mainly comprise grasses with a few trees and shrubs. Grasses are the main vegetation here, along with legumes, which belong to the composite family. Grassland ecosystem is also home to a variety of grazing animals, herbivores, and insectivores. This ecosystem is further divided into savanna and prairies ecosystems.



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Tundra Ecosystem:

Tundra is the kind of ecosystem that is a relatively simple ecosystem since only a few life forms can survive this ecosystem; especially because of its harsh conditions. Tundra ecosystems are devoid of trees and are found in cold climates or where rainfall is scarce. These are covered with snow for most of the year. The ecosystem in the Arctic or mountain tops is tundra type.



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Desert Ecosystem:

Deserts are found throughout the world. Desert ecosystems fall within regions that receive an annual rainfall not more than 25mm. The Earth is made of about 17 percent desert ecosystem. These ecosystems are characterized by intense sunlight, extremely high temperature, and low availability of water. These are regions with very little rainfall. The days are hot and the nights are cold. Deserts are opposite of tundras, yet they have extreme conditions. Animals prefer to live in extreme heat than extreme cold. Flora and fauna are not only rare but also poorly developed. The plants feature stems

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and leaves that are modified in a bid to conserve as much water as possible. For instance, some common desert plants have succulent stems to store water, such as the spiny-leafed cactus. Animals in this ecosystem are also adapted to various conditions that prevail in desert environments. The animals include reptiles, camels, birds, and insects.

Savannas Ecosystem:

These differ from deserts because of the amount of rain that they get each year. Whereas deserts get only a tiny amount of



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precipitation every year. Savannas tend to be a bit wetter, which is better for supporting more life.

Mountain Ecosystem:

Mountain land offers a dispersed and diverse range of habitats where various plants and animals can be found. The higher altitudes are characterized by harsh environmental conditions, which can only support the lives of treeless alpine vegetation. The animals found in this habitat have thick fur coats, which protect them from



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cold. At the lower slopes of the mountain environment, we mostly have coniferous forests.

2. Aquatic Ecosystem:

Aquatic ecosystems are ecosystems present in a body of water. An ecosystem which is located in a body of water is known as an aquatic ecosystem. An aquatic ecosystem includes a group of interacting organisms which are dependent on one another and their water environment for nutrients and shelter. Examples of aquatic ecosystem include oceans, lakes and rivers. The nature and



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characteristics of the communities of living or biotic organisms and non-living or abiotic factors which interact with and interrelate to one another are determined by the aquatic surroundings of their environment they are dependent upon.

An aquatic ecosystem includes freshwater habitats like lakes, ponds, rivers, oceans and streams, wetlands, swamp, etc. and marine habitats include oceans, intertidal zone, reefs, and seabed and so on. The aquatic ecosystem is the habitat for water-



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dependent living species including animals, plants, and microbes.

These can be further divided into two types, namely:

 Freshwater Ecosystem

 Marine Ecosystem

Freshwater Ecosystem:

The freshwater ecosystem includes lakes, ponds, rivers and streams, wetlands, swamp, bog and temporary pools. Lakes are large bodies of freshwater surrounded by land. These have no salt



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content in contrast with the marine ecosystem. They cover only a small portion of earth nearly 0.78-0.8% of the Earth's surface and inhabit 0.009% of its total water. They generate nearly 3% of its net primary production. Freshwater ecosystems contain 41% of the world's known fish species.

Plants and algae are important to freshwater ecosystem because they provide oxygen through photosynthesis and food for animals in this ecosystem. Estuaries house plant life with the unique adaptation of being able to survive in fresh and salty environments.

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Mangroves and pickle weed are examples of estuarine plants. Many animals live in freshwater ecosystem. Freshwater ecosystem is very important for people as they provide them water for drinking, energy and transportation, recreation, etc. They encompass freshwater environments and are divided into three basic categories:

- **Lotic Ecosystems:** They mainly refer to the rapidly flowing waters that move in a unidirectional way or the fast-moving waters including the rivers and streams. These environments



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harbour numerous species of insects such as beetles, mayflies, stoneflies, and several species of fishes including trout, eel, minnow, etc. Apart from these aquatic species, these ecosystems also include various mammals such as beavers, river dolphins, and otters.

- **Lentic Ecosystems:** They include all the standing, slow-moving or still water habitats such as lakes, ponds, and pools. Lakes and ponds are the main examples of Lentic Ecosystem. The word lentic mainly refers to stationary or relatively still



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water. These ecosystems are home to algae, crabs, shrimps, amphibians such as frogs and salamanders, for both rooted and floating-leaved plants and reptiles including alligators and other water snakes are also found here.

- **Wetlands:** Wetlands, which include environments where the soil is saturated with water for a considerable period of time. Wetlands are marshy areas and are sometimes covered in water, which has a wide diversity of plants and animals. Swamps, marshes, bogs, black spruce and water lilies are



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some examples in the plant species found in the wetlands. The animal life of this ecosystem consists of dragonflies and damselflies, birds such as Green Heron and fishes such as Northern Pike.

It is worth noting that freshwater ecosystems account for only 1.8 percent of the Earth's surface total, which makes it the smallest of the three main types of ecosystems. This ecosystem encompasses relatively small fish, amphibians, a variety of insects, as well as plants. Plankton is certainly the smallest living element of the food



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web in freshwater ecosystems. It is a tiny organism that is normally eaten by fish and other little creatures.

Marine Ecosystem:

Marine ecosystems, the largest of all ecosystems, cover approximately 71% of the Earth's surface and contain approximately 97% of the planet's water. They generate 32% of the world's net primary production. They are distinguished from freshwater ecosystems by the presence of dissolved compounds, especially salts, in the water. Approximately 85% of the dissolved



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materials in seawater are sodium and chlorine. Seawater has an average salinity of 35 parts per thousand of water. Actual salinity varies among different marine ecosystems.

Marine ecosystems can be divided into many zones depending upon water depth and shoreline features. The oceanic zone is the vast open part of the ocean where animals such as whales, sharks, and tuna live. The benthic zone consists of substrates below water where many invertebrates live. The intertidal zone is the area between high and low tides; it is termed the littoral zone. Other

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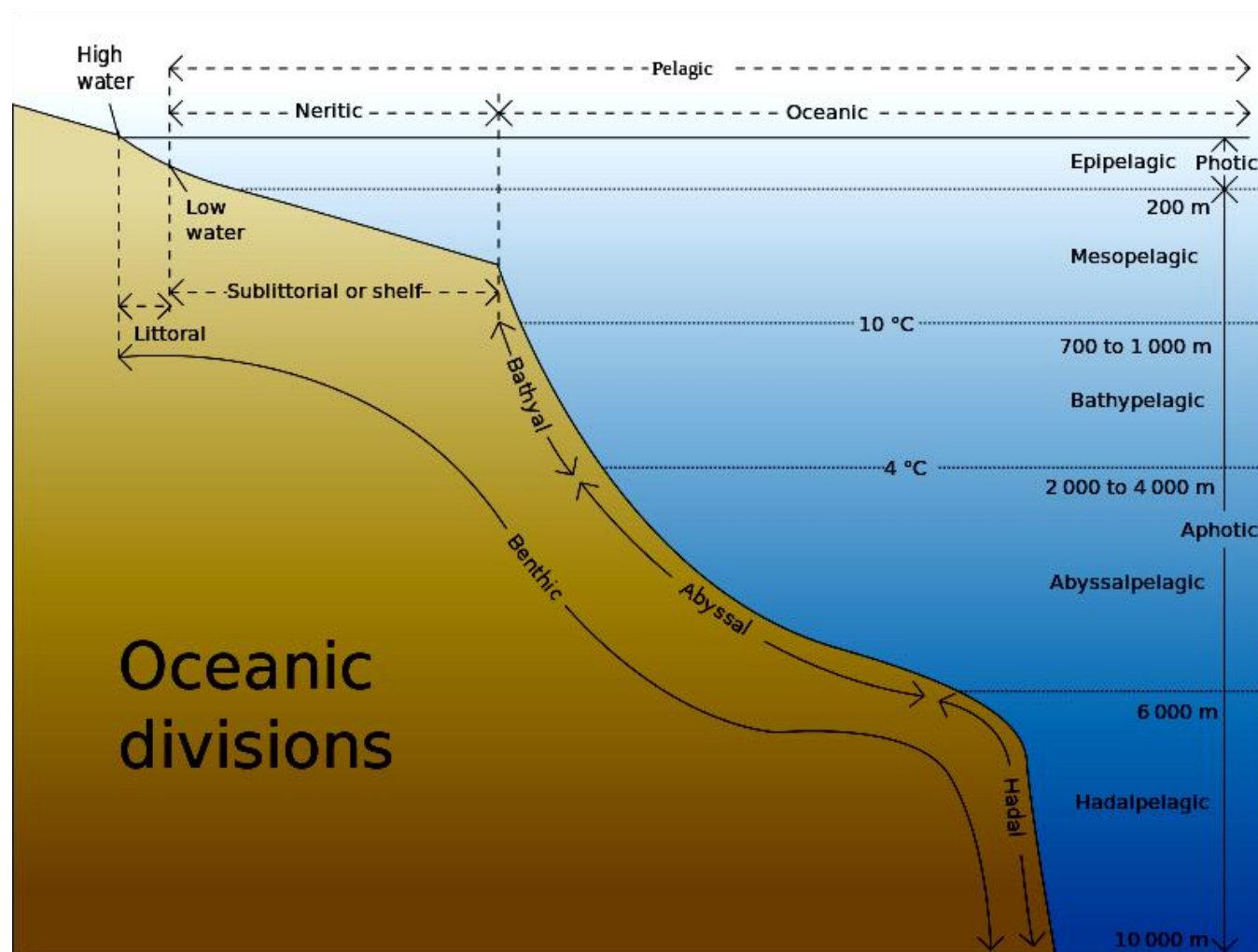


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near-shore (neritic) zones can include estuaries, salt marshes, coral reefs, lagoons and mangrove swamps. In the deep water, hydrothermal vents may occur where chemosynthetic sulfur bacteria form the base of the food web.

Classes of organisms found in marine ecosystems include brown algae, dinoflagellates, corals, cephalopods, echinoderms, and sharks. Fishes caught in marine ecosystems are the biggest source of commercial foods obtained from wild populations.

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A classification of marine habitats

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The marine ecosystem includes seas and oceans. These have a more substantial salt content and greater biodiversity in comparison to the freshwater ecosystem. These ecosystems are the biggest of all ecosystems as all oceans and their parts are included in them. They contain salt marshes, intertidal zones, estuaries, lagoons, mangroves, coral reefs, the deep sea, and the sea floor. Marine ecosystem has a unique flora and fauna, and supports a vast kingdom of species. These ecosystems are essential for the overall health of both marine and terrestrial environments.

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Marine ecosystem covers the largest surface area of the earth. Two third of earth is covered by water and they constitute of oceans, seas, intertidal zone, reefs, seabed, estuaries, hydrothermal vents and rock pools. Each life form is unique and native to its habitat. This is because they have adaptations according to their habitat. In the case of aquatic animals, they can't survive outside of water. Exceptional cases are still there which shows another example of adaptations (e.g. mudskippers). The marine ecosystem is more concentrated with salts which make it difficult for freshwater organisms to live in. Also, marine animals cannot survive in

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freshwater. Their body is adapted to live in saltwater; if they are placed in less salty water, their body will swell (osmosis).

Salt marshes, seagrass meadows, and mangrove forests are among the most productive ecosystems. Coral reef provides food and shelter to the highest number of marine inhabitants in the world. Marine ecosystem has a large biodiversity.

The main marine ecosystems are:



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Ocean Ecosystems:

Our planet earth is gifted with the five major oceans, namely Pacific, Indian, Arctic, and the Atlantic Ocean. Among all these five oceans, the Pacific and the Atlantic are the largest and deepest ocean. These oceans serve as a home to more than five lakh aquatic species. Few creatures of these ecosystems include shellfish, shark, tube worms, crab small and large ocean fishes, turtles, crustaceans, blue whale, reptiles, marine mammals, seabirds, plankton, corals and other ocean plants.

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Coastal Systems:

They are the open systems of land and water which are joined together to form the coastal ecosystems. The coastal ecosystems have a different structure, and diversity. A wide variety of species of aquatic plants and algae are found at the bottom of the coastal ecosystem. The fauna is diverse and it mainly consists of crabs, fish, insects, lobsters snails, shrimp, etc.



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Plants and animals in an aquatic ecosystem show a wide variety of adaptations which may involve life cycle, physiological, structural and behavioural adaptations. Majority of aquatic animals are streamlined which helps them to reduce friction and thus save energy. Fins and gills are the locomotors and respiratory organs respectively. Special features in freshwater organisms help them to drain excess water from the body. Aquatic plants have different types of roots which help them to survive in water. Some may have submerged roots; some have emergent roots or maybe floating plants like water hyacinths.

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This aquatic biome is further divided into smaller ecosystems:

Pond Ecosystems: Pond ecosystems are comparatively small and mostly include many kinds of amphibians and insects. At times one can also find fishes here but they aren't capable of moving as easily as the amphibians. These are usually relatively small and contained. Most of the time, they include various types of plants, amphibians and insects. Sometimes they include fish, but as these cannot move around as easily as amphibians and insects, it is less likely, and most



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of the time, fish are artificially introduced to these environments by humans.

Lake Ecosystems: A lake ecosystem or lacustrine ecosystem includes biotic (living) plants, animals and micro-organisms, as well as abiotic (non-living) physical and chemical interactions. Lake ecosystems can be divided into zones. One common system divides lakes into three zones. The first, the littoral zone, is the shallow zone near the shore. This is where rooted wetland plants occur. The offshore is divided into two further zones, an open water zone and a



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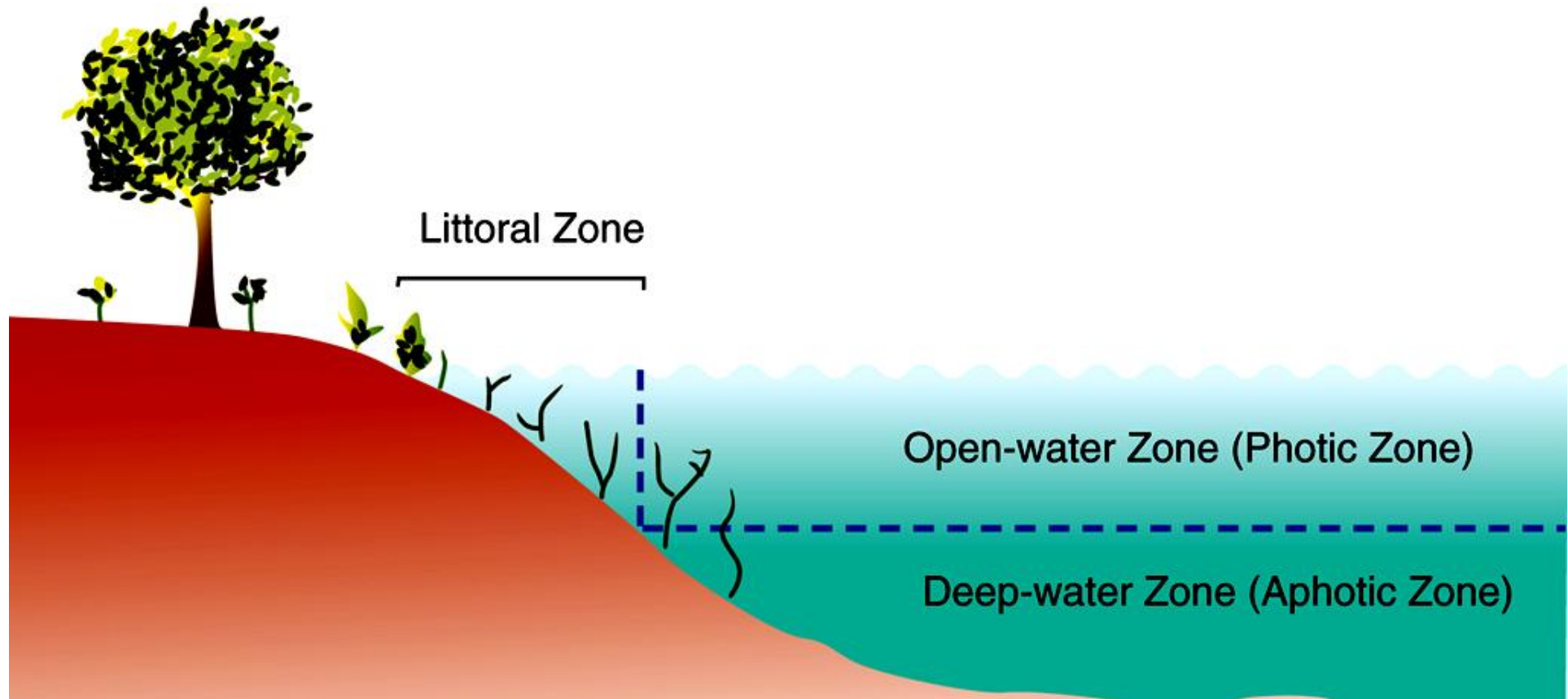
deep water zone. In the open water zone (or photic zone) sunlight supports photosynthetic algae, and the species that feed upon them. In the deep water zone, sunlight is not available and the food web is based on detritus entering from the littoral and photic zones. Some systems use other names. The off shore areas may be called the pelagic zone, the photic zone may be called the limnetic zone and the aphotic zone may be called the profundal zone. Inland from the littoral zone one can also frequently identify a riparian zone which has plants still affected by the presence of the lake—this can include effects from windfalls, spring flooding, and winter ice damage. The

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production of the lake as a whole is the result of production from plants growing in the littoral zone, combined with production from plankton growing in the open water.



The three primary zones of a lake



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Wetlands can be part of the lentic system, as they form naturally along most lake shores, the width of the wetland and littoral zone being dependent upon the slope of the shoreline and the amount of natural change in water levels, within and among years. Often dead trees accumulate in this zone, either from windfalls on the shore or logs transported to the site during floods. This woody debris provides important habitat for fish and nesting birds, as well as protecting shorelines from erosion.



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Two important subclasses of lakes are ponds, which typically are small lakes that intergrade with wetlands, and water reservoirs. Over long periods of time, lakes, or bays within them, may gradually become enriched by nutrients and slowly fill in with organic sediments, a process called succession. When humans use the watershed, the volumes of sediment entering the lake can accelerate this process. The addition of sediments and nutrients to a lake is known as eutrophication.



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River Ecosystems: This ecosystem consists of fishes along with plants, amphibians, and insects. One may also find birds that hunt in and around the water for its food (small fishes). Because rivers always link to the sea, they are more likely to contain fish alongside the usual plants, amphibians and insects.

Shallow water Ecosystem: Here one can only find tiny fishes and corals that live in shallow waters close to land.



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Deepwater Ecosystem: These are kind of ecosystem where one can find gigantic sea creatures that live at the deep bottom of the sea.

Functions of Aquatic Ecosystems:

Aquatic ecosystems perform many important environmental functions. They can:

- recycle nutrients,
- purify water,



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- attenuate floods,
- recharge ground water and
- provide habitats for wildlife.

Aquatic ecosystems are also used for human recreation, and are very important to the tourism industry, especially in coastal regions.



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