Life in Water

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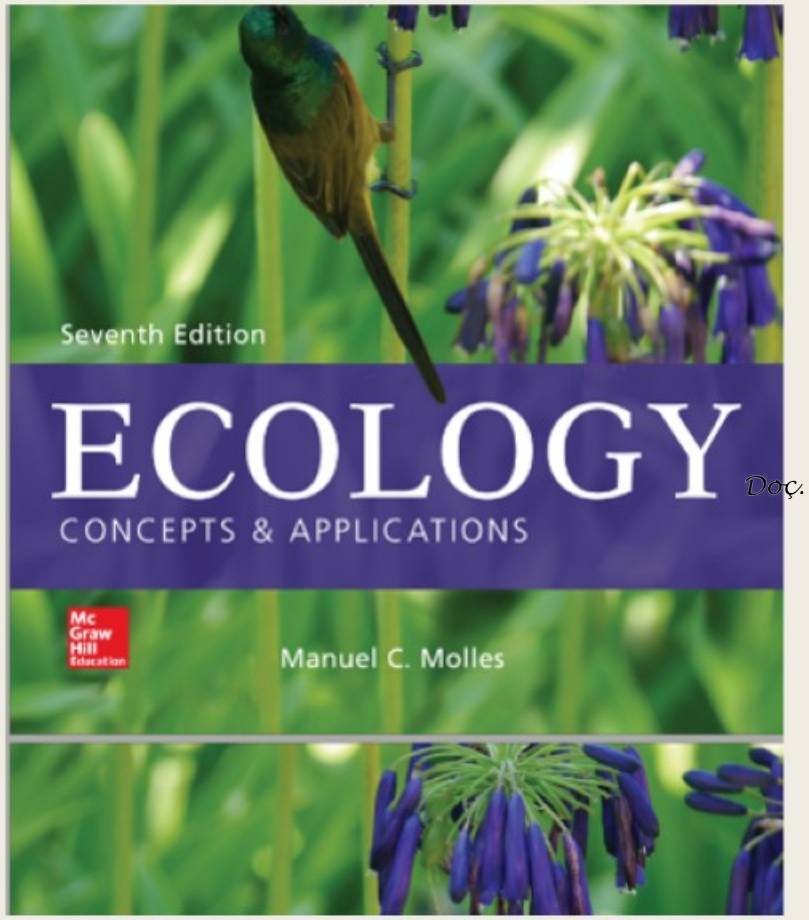

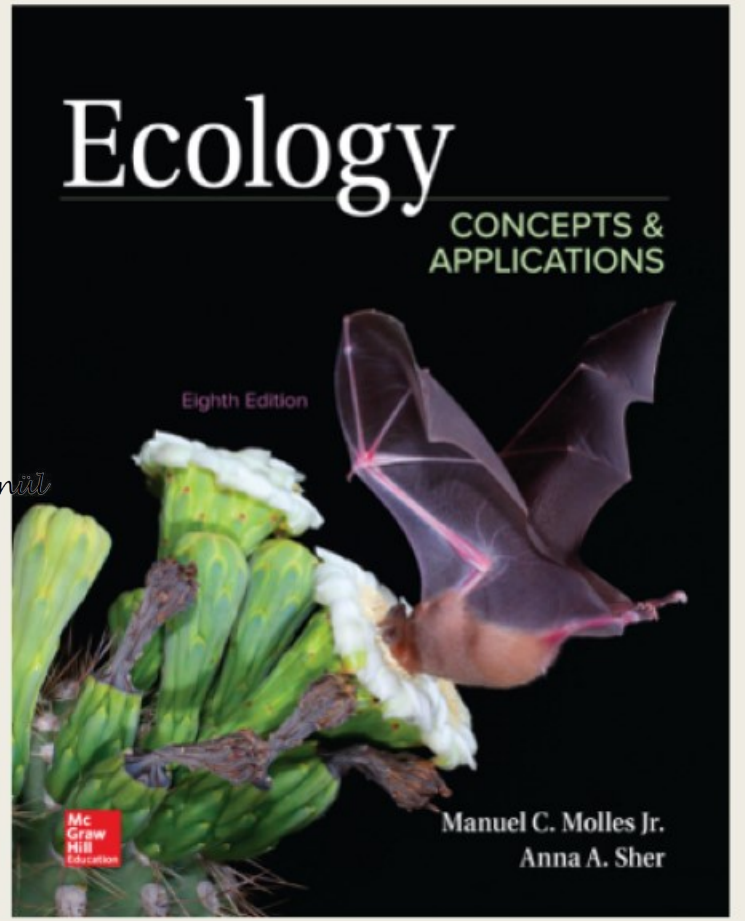

Some textbooks for Ecology

Overview

Life is originated in water but it is a challenging environment governed by unfamiliar rules from a terrestrial perspective.

It can also be hostile even for aquatic organisms in particular habitats.

In this chapter we will take a look at the water on earth, water cycyle and life in aquatic habitats; including freshwater and marine habitats.

Water on Earth

Approximately 71% of the earth's surface is covered with water. Most of the water in biosphere is stored in oceans (~97%). Approximately 70% of the remaining freshwaters is stored in glaciers and ice caps.

Lakes, rivers, oceans, even atmosphere or ice are called as «**reservoirs**»; places where water is stored for some period of time. But reservoirs also refer to man-made lakes (particularly dam lakes)

The water cycle; evaporation, movement of the clouds, precipitation etc. are all powered by the solar energy. The time required for the entire volume of a particular reservoir to be renewed (**turnover time**) mainly depends on the size of reservoir: in a river (12 to 20 days) or oceans (up to 3000 years).

The Oceanic Currents

An ocean current is a continuous, directed movement of sea water generated by a number of forces acting upon the water, **including wind, the Coriolis effect, breaking waves, cabbeling, and temperature and salinity differences**. Depth contours, shoreline configurations, and interactions with other currents influence a current's direction and strength. Ocean currents are primarily **horizontal** water movements.

Zonation in Oceans

The oceans can be divided into several **horizontal and vertical zones.** Since each zone has diferent physico-chemical conditions every zone has its own specific community.

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Basically there are 3 horizontal ocean zones:

- **intertidal zone**: (also called littoral zone) seashore that is wet/underwater during the high tide and exposed during low-tide.
- **neritic zone**: extends from the coast to the continental shelf where the depth is about 200 m.
- **oceanic zone**: refers to the water beyond the continental shelf.

Coral Reefs

Corals are related to sea anemones, and they all share the same simple structure, the polyp. The polyp is like a tin can open at just one end: the open end has a mouth surrounded by a ring of tentacles. The tentacles have stinging cells, that allow the coral polyp to capture small organisms that swim too close. Corals differ from sea anemones in their production of a **mineral skeleton**. Coral reefs are formed of colonies of coral polyps held together by calcium carbonate. Most coral reefs are built from stony corals, whose polyps cluster in groups.

Freshwaters: River and Lakes

A **lake** is a body of water that fills a depression on or under the surface. The water is essentially motionless, although there may be a barely perceptible current through the lake caused by water flowing into it from one or more sources and flowing out through the lowest end of the basin. If the lake has an outlet it is referred as an **open lake**; or else **closed lake**.

Since water does not remain in an open lake for a long period of time, open lakes are **usually fresh water**: dissolved solids do not accumulate. Open lakes form in areas where precipitation is greater than evaporation.

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In a closed lake, there is no outlet, and water which is not evaporated will remain in a closed lake indefinitely. This means that closed lakes are **usually saline**. But this salinity varies from 3 to 400 ppm (3 ppm Caspian Sea; 400 ppm for the Dead Sea (Jordan)). Closed lakes typically form in areas where evaporation is greater than rainfall.