

**Core Case Study: Why Should We Care about Coral Reefs?**

Where are coral reefs found?

How are coral reefs formed?

Explain how coral reefs represent mutualism.

Describe 2 ecological or economic services done by coral reefs.

Coral reefs are being destroyed by \_\_\_\_\_.  
 What is coral bleaching?

**8-1: What is the General Nature of Aquatic Systems?**

Saltwater covers \_\_\_\_% of the Earth’s surface and freshwater covers \_\_\_\_%.

The distribution of aquatic organisms is based on the water’s \_\_\_\_\_.

Aquatic life zones are classified into 2 major groups:

- 1.
- 2.

\*Estuaries are a mix of \_\_\_\_\_.

Saltwater and freshwater contain major types of organisms:

1. Plankton-
  - a. Phytoplankton-
  - b. Zooplankton-
  - c. Ultraplankton-
2. Nekton-
3. Benthos-
4. Decomposers

Key factors determining the types and numbers of organisms in each layer of aquatic zones:

- 1.
- 2.
- 3.
- 4.

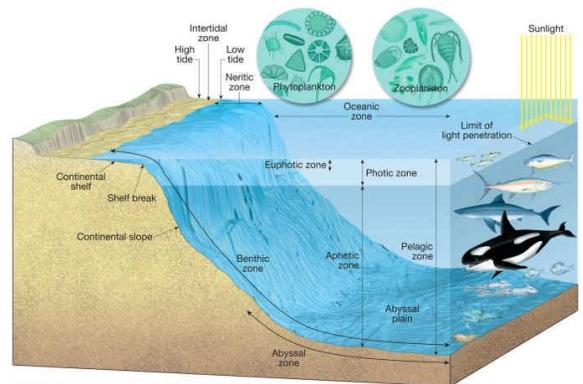
Why does photosynthesis take place in the euphotic zone?

Light penetration can be reduced by \_\_\_\_\_ aka: Turbidity which can occur due to \_\_\_\_\_.

**8-2: Why Are Marine Aquatic Systems Important?**

Marine Ecosystems-

Ecological Services	Economic Services

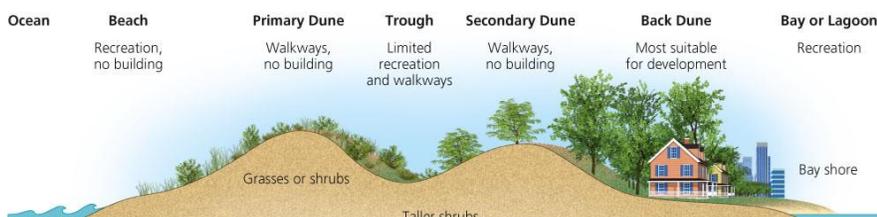
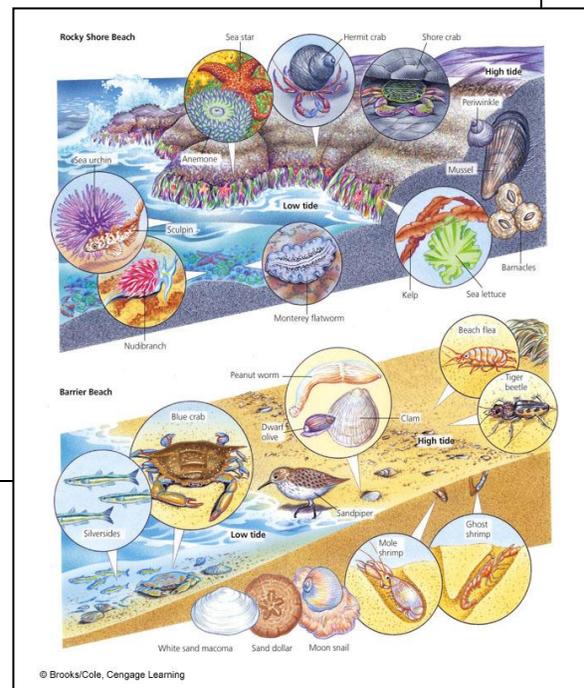


Marine life is found in 3 major life zones:

1. \_\_\_\_\_
2. Open Ocean
3. \_\_\_\_\_

<i>Coastal Zone</i>	
Description:	*warm, _____-rich, shallow water that extends from the high-tide mark on land to the gently, sloping shallow edge of the _____.

	<p>*makes up ____% of the ocean, but contains ____% of all marine species.</p> <p>*many areas have a high NPP because _____.</p>
Estuaries:	*where _____ water mixes with _____ water.
Coastal Wetlands:	<p>*coastal land covered with water all or part of the year includes _____ in temperate zones and _____ in tropical zones</p> <p>*Earth's most productive ecosystems because _____.</p> <p>*Seagrass beds are highly productive, help stabilize _____ and reduce _____.</p> <p>*Why is life hard in these coastal ecosystems?</p>
Mangrove Forests:	<p>*Found in _____ regions like Southeast Asia and South America</p> <p>*69 different tree species can grow in salt water where their roots can be seen _____ where they can obtain oxygen.</p> <p>*Describe 3 ecological or economic services provided by this aquatic system:</p> <p>*Loss of mangrove forests can lead to:</p>
Intertidal Zone:	<p>*area between _____.</p> <p>*What must organisms deal with that live in this zone?</p> <p>*Rocky Shores- lives in pools and other crevices</p> <p>*Barrier Beaches or Sandy Shores- burrow between the tides</p> <p>What is the importance of sand dunes?</p> <p>*both areas have lots of birds that feed on these creatures that are exposed in between tides</p>



<i>Open Ocean and Ocean Floor</i>	
Description:	<p>*sharp increase in _____ at the edge of the _____</p> <p>*based on the penetration of _____</p> <p>*Divided into 3 vertical zones:</p> <ol style="list-style-type: none"> <li>1. Euphotic Zone-</li> <li>2. Bathyal Zone-</li> <li>3. Abyssal Zone-</li> </ol> <p>*Marine Snow-</p> <p>*Deposit Feeders-</p> <p>*Filter Feeders-</p>

	*NPP is low in the open sea, but _____ bring nutrients from ocean bottom.
--	---

**8-3: How Have Human Activities Affected Marine Ecosystems?**

Major Threats to Marine Systems:

1. Coastal Development-
2. Overfishing-
3. Runoff of Nonpoint Pollution-
4. Point Source Pollution-
5. Habitat Destruction-
6. Rise in Sea Levels-
7. Climate Change by fossil fuels-

Name 3 Major Human Impacts on Coral Reefs:

- 1.
- 2.
- 3.

**Case Study: The Chesapeake Bay- an Estuary in Trouble**

How has population growth affected the Chesapeake Bay?

\_\_\_\_\_ and \_\_\_\_\_ levels have risen sharply which causes \_\_\_\_\_.

Point source pollution affecting Chesapeake Bay-

Nonpoint source pollution affecting Chesapeake Bay-

The native oyster population is nearly gone. What is the importance of oysters in the Chesapeake Bay?

Officials are thinking about introducing nonnative Asian oysters. Give one PRO and one CON to this idea.

**8-4: Why Are Freshwater Ecosystems Important?**

Freshwater life zones include standing (\_\_\_\_\_) bodies of water such as \_\_\_\_\_, and flowing (\_\_\_\_\_) bodies of water such as \_\_\_\_\_.

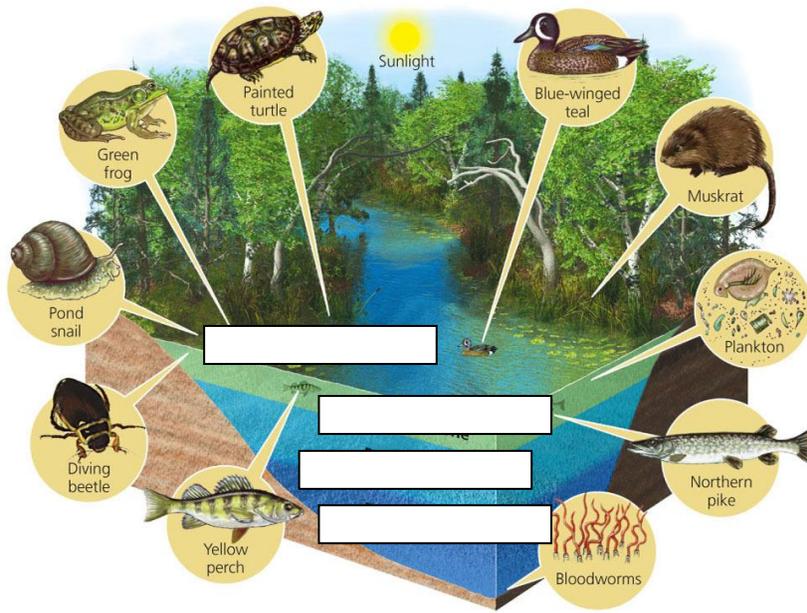
Lakes are formed when:

What can cause these depressions in the land?

Deep lakes consist of 4 distinct zones:

1. Littoral Zone-
2. Limnetic Zone-
3. Profundal Zone-
4. Benthic Zone-

Label the 4 zones of a lake:



© Brooks/Cole, Cengage Learning

Two main types of lakes based on nutrient content and primary productivity:

1. Oligotrophic Lakes-

2. Eutrophic Lakes-

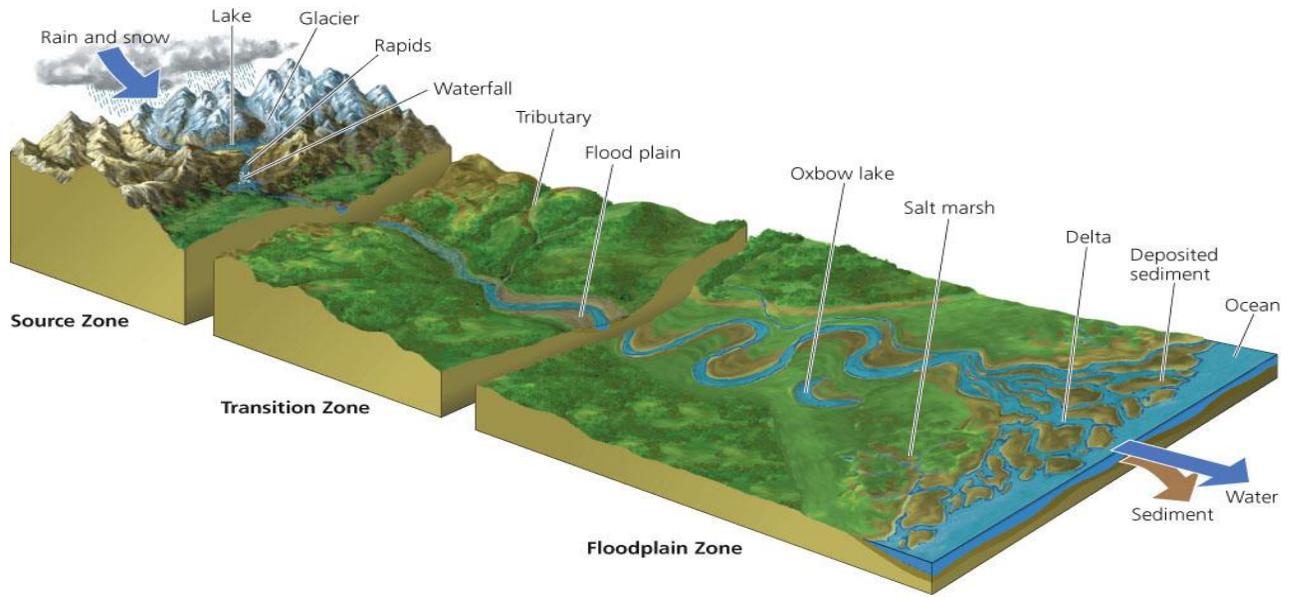
\*Cultural Eutrophication- acceleration of eutrophication of lakes caused by \_\_\_\_\_ which puts excessive \_\_\_\_\_ into lakes.

Many lakes fall somewhere between the two extremes of Oligotrophic and Hypertrophic and are called \_\_\_\_\_.

Precipitation that doesn't sink into the ground or evaporates becomes \_\_\_\_\_ and that becomes \_\_\_\_\_.

What is a watershed?

Streams often begin in mountainous or hilly areas and flows through 3 aquatic life zones to the sea:	
1. Source Zone	<ul style="list-style-type: none"> <li>* The waters here are usually _____.</li> <li>* As it flows it dissolves large amounts of _____ from the air.</li> <li>* Nutrients come mostly from _____.</li> <li>* Populated by _____ that need lots of _____.</li> <li>* Name 1 animal adaptation for this area:</li> <li>* Name 1 plant adaptation for this area:</li> </ul>
2. Transition Zone	<ul style="list-style-type: none"> <li>* Headwaters merge to form _____ that flow down gentler slopes with fewer obstacles</li> <li>* More turbid, _____ flowing, and have less dissolved _____.</li> <li>* Supports more _____ and fish that have with less O2 demand.</li> </ul>
3. Floodplain Zone	<ul style="list-style-type: none"> <li>* Streams join into _____ that flow across broad, flat _____.</li> <li>* Water in this zone has a higher _____ and less _____.</li> <li>* Supports a large population of _____ and aquatic plants.</li> <li>* Water in this zone is usually muddy and contains a high concentration of silt because _____.</li> <li>* At its mouth, the river may divide into many _____ as it flows through _____.</li> </ul>



© Brooks/Cole, Cengage Learning

Case Study: Dams, Deltas, Wetlands, Hurricanes, and New Orleans

Coastal deltas, mangrove forests, and coastal wetlands provide natural protection against \_\_\_\_\_.

Louisiana has lost more than \_\_\_\_\_ of its wetlands since 1950 due to:

What has been built in this area to reduce flooding along rivers and trap sediments?

This has caused the river delta's to \_\_\_\_\_ and no l...  
 What has caused New Orleans to now be 3 meters below sea level:



© Brooks/Cole, Cengage Learning

Why would building taller levees not really work for New Orleans?

What are inland wetlands?

Name 3 types of inland wetlands:

- 1.
- 2.
- 3.

Describe 3 ecological or economic services provided by inland wetlands.

- 1.
- 2.
- 3.

**8-5: How Have Human Activities Affected Freshwater Ecosystems?**

Humans are affecting freshwater ecosystems in 4 major ways:

- 1.
- 2.
- 3.
- 4.

Until the 1980's Lake Victoria, found in East \_\_\_\_\_ had about \_\_\_\_\_ species of fish, but since then about \_\_\_\_\_ of the lake's cichlid fish species have gone extinct.

Describe 2 reasons why this has happened:

- 1.
  
- 2.

**11-1: What Are the Major Threats to Aquatic Biodiversity?**

3 General Patterns about Marine Biodiversity:

1. Greatest marine biodiversity is found in \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
2. Biodiversity is higher near \_\_\_\_\_ than \_\_\_\_\_ because of the greater variety of \_\_\_\_\_ and \_\_\_\_\_.
3. Biodiversity is higher in the bottom region of the ocean because \_\_\_\_\_.

Major HIPPCO Threats to Aquatic Biodiversity		
	Explanation	What is happening? (examples)
H		
I		
P P		
C		
O		

Case Study: Industrial Fish Harvesting Methods

Define- Commercial Extinction (pg 254):

Define- Bycatch (pg 255):

Name 2 species that declined with the cod fishery: \_\_\_\_\_ & \_\_\_\_\_

Major Types of Commercial Fishing			
Fishing Type	Types of Fish Targeted	Specific Fish Caught (ex)	Disadvantages
Trawlers			
Purse Seine			
Long Line			
Drift Net "gill net"			

**11-2: How Can We Protect and Sustain Marine Biodiversity?**

Describe one reason why protecting marine biodiversity is difficult and makes the ocean vulnerable to overexploitation.

National and International Laws and Treaties that protect marine species:

- 
- 
- 
- 
- 

Case Study: Protecting Whales

Examples of cetaceans:

Why are whales fairly easy to kill?

What is going on with Blue Whales?

1946 The IWC- ( \_\_\_\_\_ )  
Mission was to regulate whaling by setting \_\_\_\_\_, but the problem was

\_\_\_\_\_.

1970 The US stopped all commercial whaling and banned \_\_\_\_\_.

Name 2 countries that continue to hunt whales:

Case Study: Holding Out Hope for Marine Turtles

\_\_\_\_ out of 7 marine species of turtles are endangered.

The leatherback sea turtle survived a giant asteroid, but may not survive human impacts. Describe two ways humans are contributing to the death of sea turtles:

What is being done to help sea turtles recover?

What is the problem with high seas?

Instead of focusing on saving individual species, scientists and policy makers are now focusing on an \_\_\_\_\_ approach.

We must establish a global network of marine reserves. What will these reserves do?

What are some things individuals and communities can do to continue to protect marine biodiversity?

### 11-3: How Should We Manage and Sustain Marine Fisheries?

The first step to protecting and sustaining fisheries is to estimate fish populations.

Define: Maximum Sustainable Yield-

Define: Optimum Sustainable Yield-

Comanagement- when coastal communities and the \_\_\_\_\_ work together.

The government sets \_\_\_\_\_ and divides it out among communities.

Limit fishing \_\_\_\_\_ and regulates types of fishing gear to be used.

Community then allocates quota among its members.

Government Subsidies help fishers buy things like \_\_\_\_\_ to help keep their business running; the rest goes towards \_\_\_\_\_

\_\_\_\_\_. Some scientists argue that these subsidies actually encourage \_\_\_\_\_.

Some countries use ITRs ( \_\_\_\_\_ ) in which each vessel owner gets a percentage of the \_\_\_\_\_.

Problems with ITR:

- 1.
- 2.
- 3.

Consumers can demand \_\_\_\_\_ seafood which encourages more responsible fishing practices. Seafood should be labeled to inform consumers how and where fish are caught.

**11-4: How Should We Protect and Sustain Wetlands?**

Why have countries such as New Zealand and Italy lost almost all of their wetlands?

A policy known as \_\_\_\_\_ banking allows destruction of existing wetland as long as \_\_\_\_\_ . The problem with this is \_\_\_\_\_ .

Describe how private investors are making money off of this policy:

Case Study: Can We Restore the Florida Everglades?

What has caused much of the Everglades to “disappear”?

What has been done to restore the everglades?

What are the problems with the Everglades Restoration Plan?

**11-5: How can We Protect and Sustain Freshwater Lakes, Rivers, and Fisheries?**

Case Study: Can the Great Lakes Survive Repeated Invasions by Alien Species?

One of the biggest threats to the Great Lakes is the \_\_\_\_\_, which attaches itself to any kind of fish and \_\_\_\_\_. The US and Canada have controlled lamprey population by \_\_\_\_\_ .

\_\_\_\_\_ arrived in the Great Lakes from the ballast water of European ship. It has no known predators in the Great Lakes and has affected the area by \_\_\_\_\_. What is a positive effect the zebra mussels have had?

What problems have the Columbia River dams caused to certain species?

To protect our lakes and streams from inputs of excess nutrients and pollution, we must protect its \_\_\_\_\_ .

What has been done to protect freshwater fisheries?

**11-6: What Should Be Our Priorities for Sustaining Biodiversity and Ecosystem Services?**

Edward O. Wilson proposed priorities for protecting world’s remaining ecosystems and species: (Describe 3 of these)