

# CHAPTER 8--AQUATIC BIODIVERSITY

Student: \_\_\_\_\_

1. Although only a small percentage of the ocean floor, coral reefs provide all the following benefits *except*
  - A. providing significant free oxygen
  - B. removing CO<sub>2</sub> from the atmosphere
  - C. protecting coastlines from erosion
  - D. providing habitats for one-quarter of all marine organisms
  - E. providing one-fourth of fish catches in developing countries
2. Coral reefs are being damaged or destroyed by all of the following *except*
  - A. pollution
  - B. warmer ocean temperatures
  - C. increasing ocean acidity
  - D. coastal development
  - E. underfishing
3. In a 2008 study, researchers estimated what percentage of the world's coral reefs had already been destroyed?
  - A. 50
  - B. 35
  - C. 22
  - D. 19
  - E. 10
4. The single ocean on earth is divided into 4 parts by the continents. Which of the following is *not* one of those parts?
  - A. Atlantic
  - B. Arctic
  - C. Baltic
  - D. Indian
  - E. Pacific
5. All of the following are part of the saltwater or marine aquatic life zones, *except*
  - A. oceans
  - B. estuaries
  - C. inland wetlands
  - D. coastal wetlands
  - E. mangrove forests

6. All of the following are part of the freshwater aquatic life zones, *except*
- A. lakes
  - B. mangrove forests
  - C. inland wetlands
  - D. streams
  - E. rivers
7. If you find a new species of algae floating on the surface of a coastal zone, you would likely consider it a type of
- A. benthos
  - B. zooplankton
  - C. nekton
  - D. phytoplankton
  - E. ultraplankton
8. Ultraplankton, photosynthetic bacteria, may be responsible for how much of the primary productivity near the ocean's surface?
- A. 100%
  - B. 85%
  - C. 70%
  - D. 40%
  - E. none
9. A jellyfish would be considered a type of which of the following?
- A. benthos
  - B. zooplankton
  - C. nekton
  - D. phytoplankton
  - E. ultraplankton
10. Oysters, clams, and lobsters would be part of which of the following?
- A. phytoplankton
  - B. zooplankton
  - C. nekton
  - D. benthos
  - E. decomposers
11. Strongly swimming consumers would be part of which of the following?
- A. phytoplankton
  - B. zooplankton
  - C. nekton
  - D. benthos
  - E. decomposers

12. On a fishing boat, someone catches a swordfish. As a biologist, you would consider this organism a type of
- A. phytoplankton
  - B. zooplankton
  - C. nekton
  - D. benthos
  - E. decomposer
13. The key factors determining the types and numbers of organisms found in the various layers of both freshwater and marine systems include all of the following, *except*
- A. parasitism
  - B. availability of nutrients
  - C. temperature
  - D. dissolved oxygen levels
  - E. availability of food
14. The ocean zone that covers the continental shelf is the
- A. bathyal zone
  - B. coastal zone
  - C. littoral zone
  - D. benthic zone
  - E. abyssal zone
15. The ocean zone that makes up less than 10% of the world's ocean area, yet contains 90% of all the marine species, is the
- A. abyssal zone
  - B. bathyal zone
  - C. benthic zone
  - D. coastal zone
  - E. littoral zone
16. Which of the following is *not* part of the coastal zone?
- A. estuaries
  - B. coastal wetlands
  - C. bathyal zone
  - D. intertidal zone
  - E. coral reefs

17. Coastal marine ecosystem consisting of at least 60 species of plants that grow underwater in shallow marine and estuarine areas along most continental coastlines, are
- A. salt marshes
  - B. sea grass beds
  - C. intertidal zones
  - D. mangrove forests
  - E. coral reefs
18. Found along some 70% of gently sloping sandy and silty coastlines in tropical and subtropical regions, and consisting of some 69 species of trees, are the
- A. seagrass beds
  - B. barrier beaches
  - C. barrier islands
  - D. coral reefs
  - E. mangrove forests
19. Estuaries and their associated coastal wetlands, which are coastal land areas covered with water all or part of the year, and include all of the following *except*
- A. euphotic zone
  - B. river mouths
  - C. inlets
  - D. bays
  - E. coastal marshes
20. Researchers have estimated more than \_\_\_\_ of the world's mangrove forests have been destroyed by human activities.
- A. one-fourth
  - B. one-fifth
  - C. one-half
  - D. two-thirds
  - E. three-fourths
21. Organisms in this area must be able to avoid being swept away, crushed by waves, or being left high and dry at low tides, and must survive daily or seasonal salinity and temperature changes.
- A. estuaries
  - B. coastal wetlands
  - C. bathyal zone
  - D. intertidal zone
  - E. coral reefs

22. The deepest part of the ocean is the
- A. abyssal zone
  - B. euphotic zone
  - C. estuary zone
  - D. bathyal zone
  - E. benthic zone
23. Most photosynthesis in the open ocean occurs in the
- A. abyssal zone
  - B. euphotic zone
  - C. estuary zone
  - D. bathyal zone
  - E. benthic zone
24. The dimly lit zone in which zooplankton and smaller fishes predominate is the
- A. abyssal zone
  - B. euphotic zone
  - C. estuary zone
  - D. bathyal zone
  - E. benthic zone
25. In certain open sea areas winds, ocean currents, and other factors cause water to come up from the depths to the surface bringing nutrient from the ocean bottom. This process is called a(n)
- A. downdraft
  - B. updraft
  - C. El Niño
  - D. La Niña
  - E. upwelling
26. What percentage of the world's photosynthetic activity is accomplished by phytoplankton in the euphotic zone?
- A. 70
  - B. 60
  - C. 50
  - D. 40
  - E. 30

27. The zone in which you would expect to find deposit feeders along with oysters, clams, and sponges is the
- A. euphotic zone
  - B. abyssal zone
  - C. coastal zone
  - D. intertidal zone
  - E. bathyal zone
28. How much of the world's ocean area has been heavily affected by human activity?
- A. 11%
  - B. 21%
  - C. 31%
  - D. 41%
  - E. 51%
29. How much of the population of the United States lives at or near a coast?
- A. more than 95%
  - B. more than 82%
  - C. more than 75%
  - D. more than 66%
  - E. more than 50%
30. Four of the following are major threats to marine systems; one is not. Choose the one that is not.
- A. overfishing
  - B. sinking of ships to create artificial reefs
  - C. runoff of nonpoint source pollution
  - D. invasive species introduced by humans
  - E. habitat destruction from coastal development
31. In large lakes there are four distinct zones. Which of the following is *not* one of those zones?
- A. benthic
  - B. littoral
  - C. bathyal
  - D. limnetic
  - E. profundal
32. The open, sunlit surface area away from the shore is which zone?
- A. benthic
  - B. littoral
  - C. bathyal
  - D. limnetic
  - E. profundal

33. In lakes, the nutrient-rich water near the shore is part of the
- A. limnetic zone
  - B. benthic zone
  - C. littoral zone
  - D. profundal zone
  - E. abyssal zone
34. Fish adapted to cool, dark waters in lakes are found in the zone called
- A. limnetic zone
  - B. benthic zone
  - C. littoral zone
  - D. profundal zone
  - E. abyssal zone
35. Which of the following would be characteristic of the profundal zone?
- A. rooted plants
  - B. low oxygen levels
  - C. nourished by dead matter
  - D. main photosynthetic layer
  - E. turtles, frogs, crayfish, perch
36. Deep lakes with steep banks that have a small supply of plant nutrients are
- A. oligotrophic lakes
  - B. eutrophic lakes
  - C. culturally eutrophic lakes
  - D. hypereutrophic lakes
  - E. mesotrophic lakes
37. Which of the following would be characteristic of a eutrophic lake?
- A. nutrient overload from human activities
  - B. nutrient levels between the extremes of too much and too little
  - C. small supply of plant nutrients
  - D. well-supplied with nutrients for producers
  - E. excessive nutrients
38. In lakes, large numbers of decomposers are found in the
- A. limnetic zone
  - B. benthic zone
  - C. littoral zone
  - D. profundal zone
  - E. abyssal zone

39. If you fish for trout, you would be most likely to seek out which part of a stream?
- A. source zone
  - B. benthic zone
  - C. transition zone
  - D. floodplain zone
  - E. profundal zone
40. If you fish for carp or catfish, you would likely need to fish in which part of a stream?
- A. source zone
  - B. benthic zone
  - C. transition zone
  - D. floodplain zone
  - E. profundal zone
41. Wide, slow-moving rivers containing lots of particulate matter (silt) would be typical of what aquatic life zone?
- A. source zone
  - B. benthic zone
  - C. transition zone
  - D. floodplain zone
  - E. profundal zone
42. Four of the following are ecological and economic services provided by inland wetlands; one is not. Choose the one that is not.
- A. filtering and degrading toxic wastes and pollutants
  - B. stopping the recharge of groundwater aquifers
  - C. reducing flooding and erosion caused by storms
  - D. helping to replenish stream flow during dry periods
  - E. helping to maintain biodiversity by providing habitats
43. Most of the wetlands that are lost are used for
- A. mining
  - B. urban development
  - C. agriculture
  - D. forestry
  - E. recreation
44. Which of the following is *not* a type of inland wetland?
- A. marshes
  - B. littoral
  - C. swamps
  - D. prairie potholes
  - E. Arctic tundra



45. Four of the following are major human activities that disrupt and degrade freshwater systems; one is not. Choose the one that is *not*.
- A. Elimination of entire river systems.
  - B. Dams and canals fragment habitats.
  - C. Flood control levees and dikes disconnect rivers from floodplains.
  - D. Cities and farms add excess nutrients and pollution.
  - E. Draining inland wetlands to grow crops.
46. By 2050 more than 50% of all coral reefs could be gone.
- True False
47. Coral bleaching occurs when algae, the food of the corals, die off because of stresses such as increased ocean temperatures.
- True False
48. The largest ocean is the Atlantic, which contains more than one-half of the earth's water.
- True False
49. The distribution of many aquatic organisms is determined largely by salinity.
- True False
50. The saltwater of the earth is a single and continuous body of water.
- True False
51. In most shallow systems, such as lake edges, nutrients are often in short supply, limiting the net primary productivity (NPP).
- True False
52. The amount of goods and services provided by marine coastal ecosystems is nearly equal to the annual U.S. gross domestic product (GDP).
- True False
53. Forty percent of the world's photosynthetic activity is conducted in the euphotic zone of the oceans.
- True False
54. Barrier beaches and their accompanying sand dunes are the first line of defense against the ravages of the sea.
- True False

55. Some parts of the deepest ocean remain completely untouched by human activity.
- True False
56. A recent study indicates we need to take action quickly on reducing carbon dioxide emissions or the oceans may be too acidic and too warm to support coral reefs.
- True False
57. Chesapeake Bay is the largest estuary in the United States.
- True False
58. The population living in the Chesapeake Bay area, between 1940 and 2007, grew from 1.5 million to 3.7 million and may reach 5 million by 2020.
- True False
59. Oysters in Chesapeake Bay were once so abundant that they filtered and cleaned the water of the entire Bay every 3 days.
- True False
60. The Chesapeake Bay Program is an example of the good things that can be accomplished when a coordinated effort is made to accomplish something.
- True False
61. Officials of Maryland and Virginia are considering trying to rebuild the Chesapeake Bay's oyster population by introducing a foreign species of oyster.
- True False
62. Standing freshwater is called a lotic system.
- True False
63. Most lakes are hypereutrophic when considering the level of nutrients.
- True False
64. A watershed is the land area that delivers runoff, sediment, and dissolved substances to a stream.
- True False
65. Water in the floodplain zone usually has higher temperatures and less dissolved oxygen than that in the other zones.
- True False

66. The many dams, levees, and canals on the Mississippi River have made the effects of hurricanes much worse on a city such as New Orleans.

True False

67. Redirecting Mississippi River sediments through the wetlands and into the Gulf of Mexico, instead of into the Mississippi Delta, has caused the Delta to subside (sink).

True False

68. More than one half of the inland wetlands estimated to have existed in the continental United States during the 1600s no longer exist.

True False

69. Only about 20 percent of all inland wetlands in Germany and France have been destroyed.

True False

70. The majority of the wetlands that have been lost since the 1600s have been lost to development of cities.

True False

71. Coral reefs form in clear, warm coastal waters of the \_\_\_\_\_ and \_\_\_\_\_.

\_\_\_\_\_

72. In terms of biodiversity, coral reefs are the marine equivalent of \_\_\_\_\_.

\_\_\_\_\_

73. The \_\_\_\_\_ is the largest of the four oceans, which contains more than \_\_\_\_\_ of the earth's water.

\_\_\_\_\_

74. The aquatic equivalent of terrestrial biomes are called \_\_\_\_\_.

\_\_\_\_\_

75. The distribution of many aquatic organisms is determined largely by the water's \_\_\_\_\_.

\_\_\_\_\_

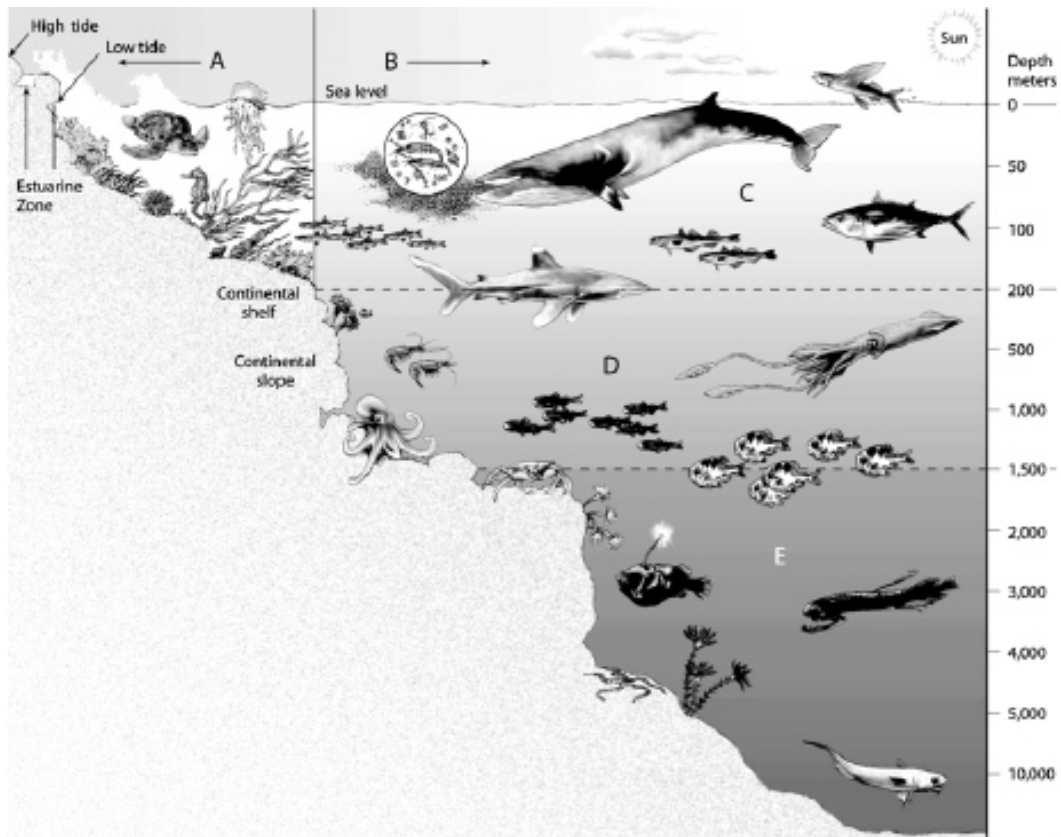
76. In deep aquatic systems the photosynthetic zone is called the \_\_\_\_\_ zone.

\_\_\_\_\_

77. Algal blooms can result in a cloudiness called \_\_\_\_\_, which can reduce the penetration of sunlight.
- \_\_\_\_\_
78. \_\_\_\_\_ are where rivers meet the sea.
- \_\_\_\_\_
79. The vertical zones of the open sea (euphotic, bathyal, and abyssal) are based primarily on \_\_\_\_\_.
- \_\_\_\_\_
80. Once past the coastal zone, beyond the continental shelf, the ocean is called the \_\_\_\_\_.
- \_\_\_\_\_
81. In the deepest ocean zone, the abyssal zone, most organisms get their food from dead and decaying organisms drifting down from upper, lighted levels, a phenomenon called \_\_\_\_\_.
- \_\_\_\_\_
82. \_\_\_\_\_ is threatening marine ecosystems by warming the oceans and making them more acidic.
- \_\_\_\_\_
83. In 2010 about \_\_\_\_\_ percent of the world's people are expected to be living on or near the coastal zone.
- \_\_\_\_\_
84. A lake is a(n) \_\_\_\_\_ body of freshwater, which also includes ponds and inland wetlands.
- \_\_\_\_\_
85. Lakes that fall between the extremes of nutrient rich eutrophic lakes and nutrient poor oligotrophic lakes are called \_\_\_\_\_ lakes.
- \_\_\_\_\_
86. Precipitation that does not sink into the ground or evaporate is \_\_\_\_\_.
- \_\_\_\_\_

87. Surface water becomes \_\_\_\_\_ when it flows into streams.
- \_\_\_\_\_
88. \_\_\_\_\_ lakes are typically shallow, have murky brown or green water, and have high turbidity.
- \_\_\_\_\_
89. Headwater streams, in the \_\_\_\_\_ zone, merge to form wider, deeper, and warmer streams that flow down gentler slopes with fewer obstacles.
- \_\_\_\_\_
90. Global sea levels have risen almost \_\_\_\_\_ meters since 1900 and are expected to rise another \_\_\_\_\_ meters before 2100.
- \_\_\_\_\_
91. Some wetlands are covered with water all year; others remain under water or soggy for a short time each year and are called \_\_\_\_\_ wetlands.
- \_\_\_\_\_
92. About 80% of lost wetlands in the U.S. have been destroyed to \_\_\_\_\_.
- \_\_\_\_\_

93.

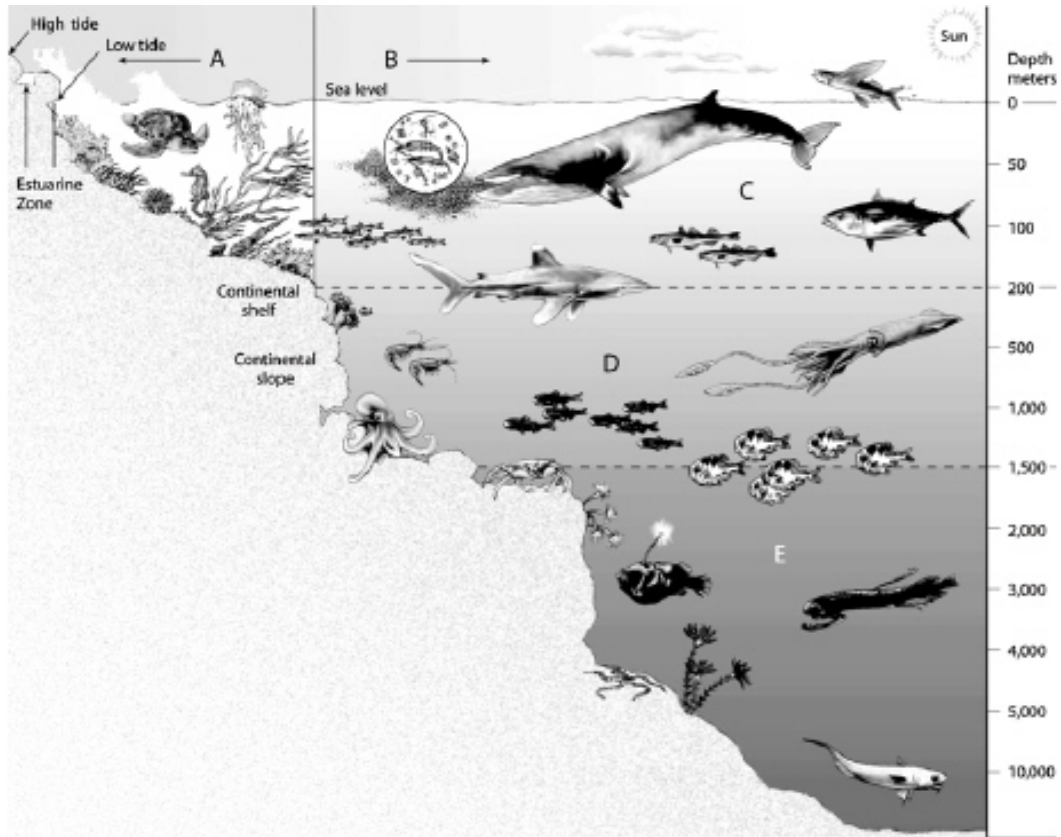


#### Major Life Zones and Vertical Zones

Use the Figure above to answer the following question(s).

Choose the zone in which most organisms are blind or have poor eyesight.

94.

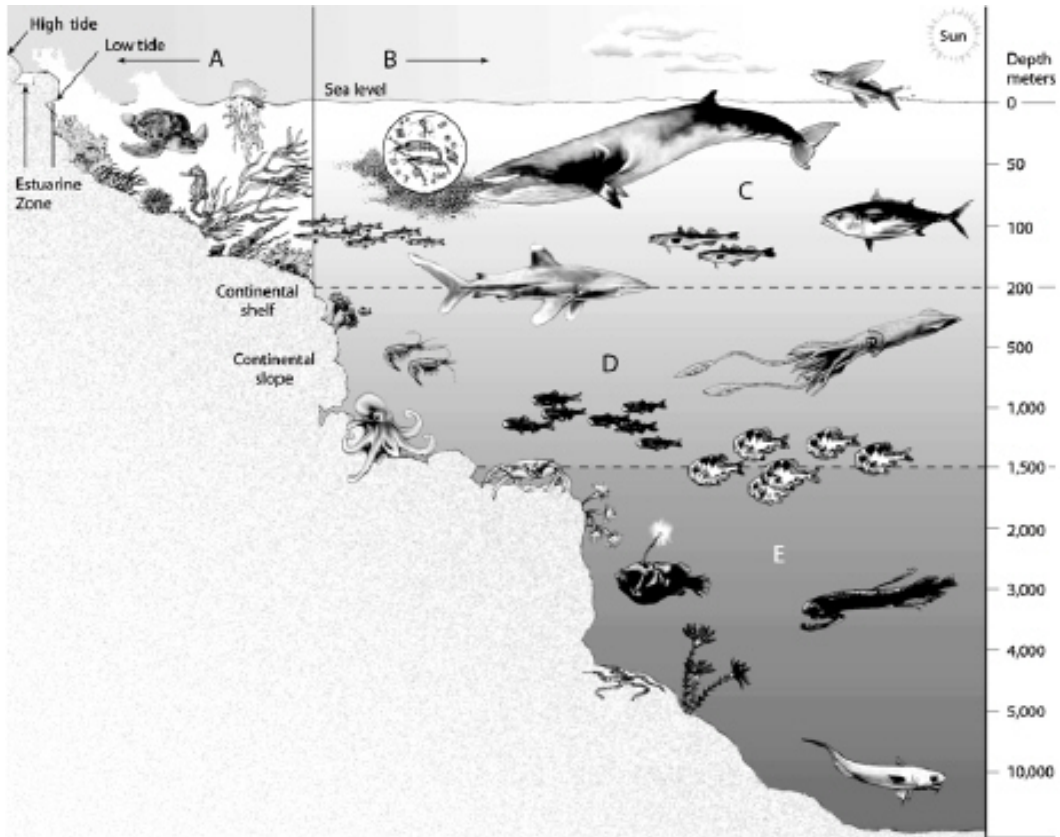


#### Major Life Zones and Vertical Zones

Use the Figure above to answer the following question(s).

Choose the zone that contains the majority of all marine species.

95.



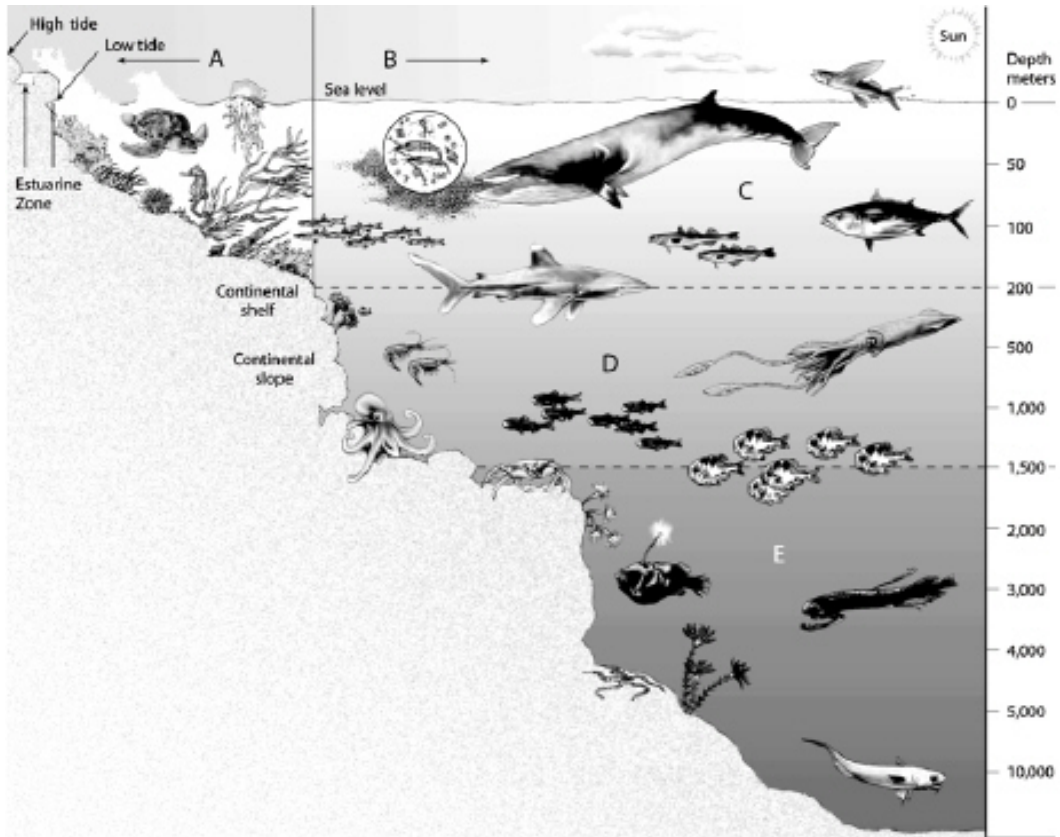
#### Major Life Zones and Vertical Zones

Use the Figure above to answer the following question(s).

Choose the zone that receives enough sunlight for photosynthesis.



96.

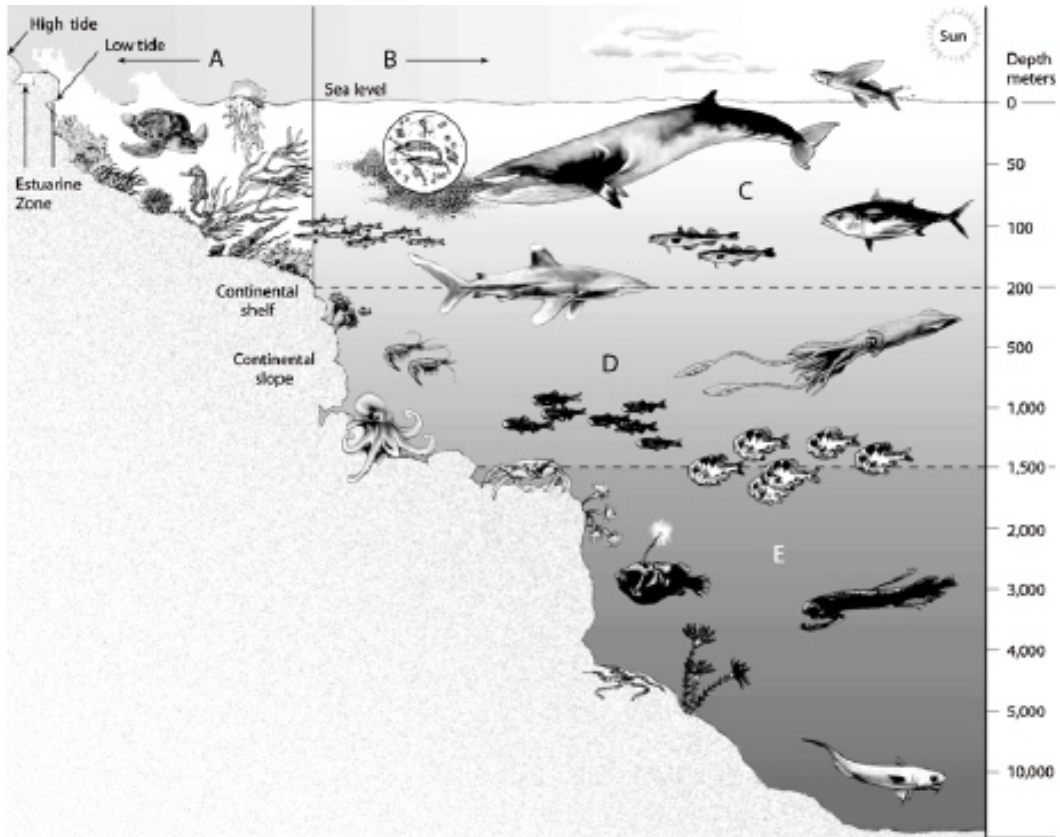


#### Major Life Zones and Vertical Zones

Use the Figure above to answer the following question(s).

Choose the zone that is otherwise known as the twilight zone.

97.

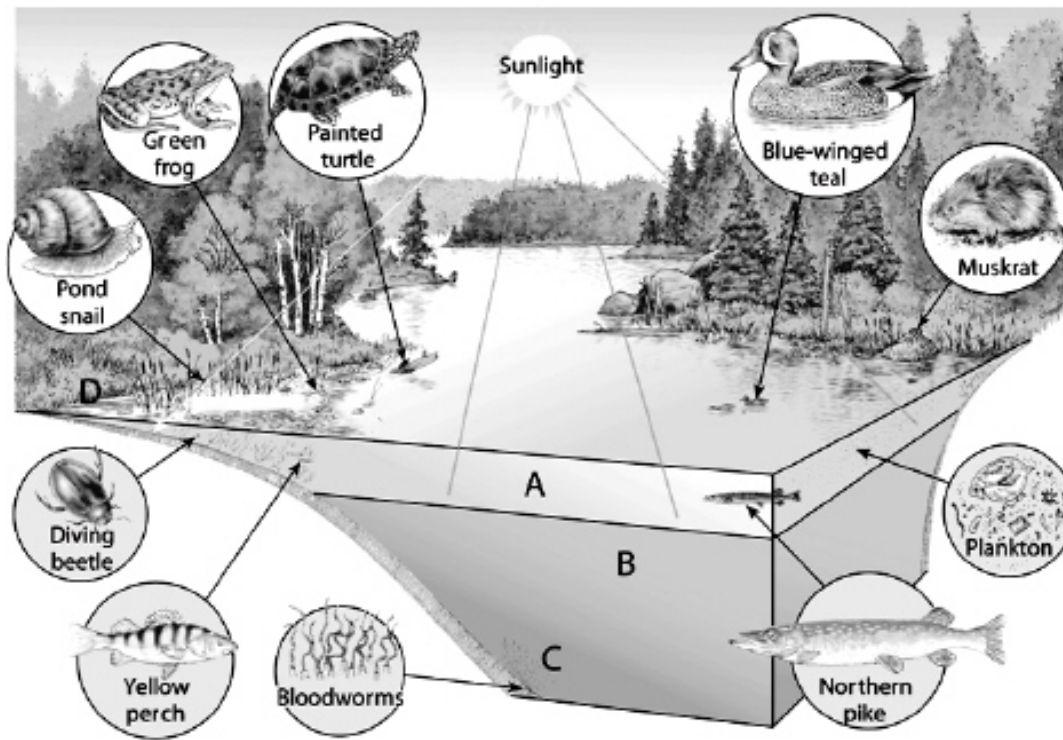


#### Major Life Zones and Vertical Zones

Use the Figure above to answer the following question(s).

Choose the zone that is divided based on sunlight.

98.

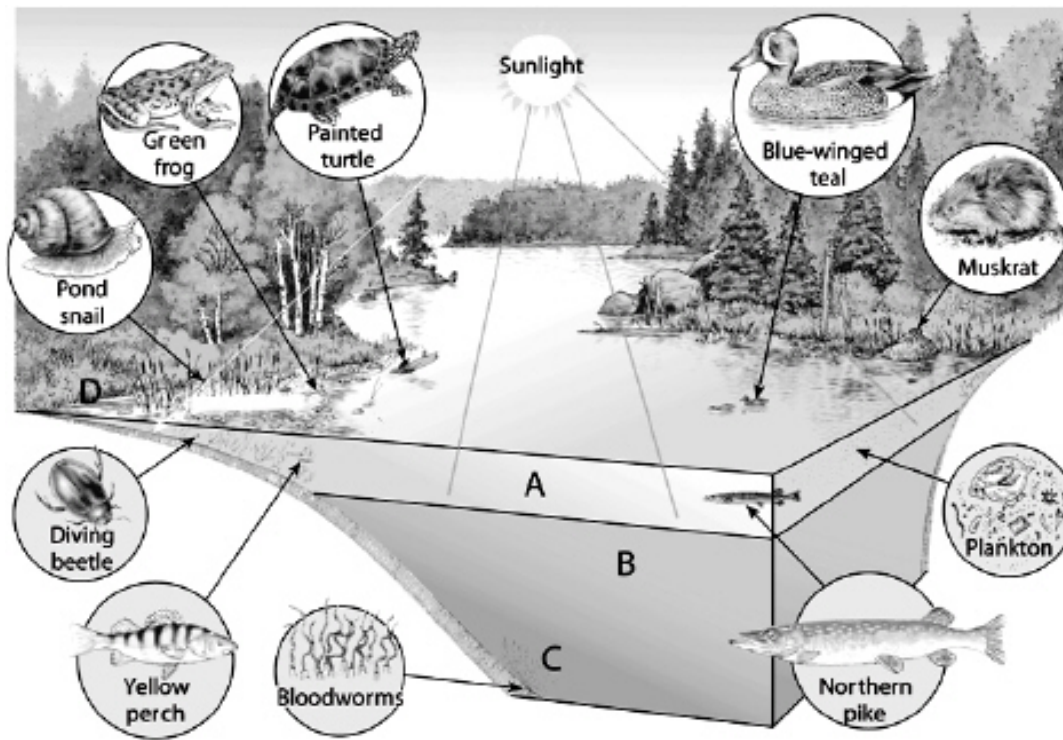


#### Temperate-Zone Lake Life Zones

Use the Figure above to answer the following question(s).

Choose the zone close to shore in which light reaches all the way to the bottom.

99.

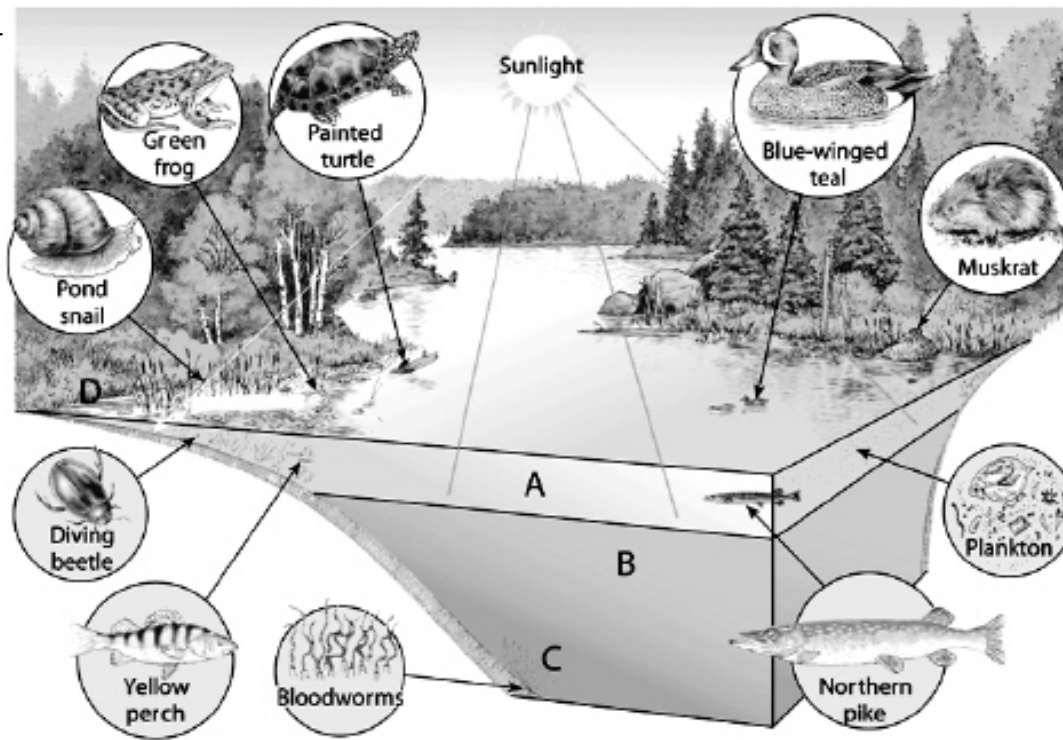


#### Temperate-Zone Lake Life Zones

Use the Figure above to answer the following question(s).

Choose the zone primarily inhabited by invertebrates, such as decomposers, that can live in the low oxygen.

100.



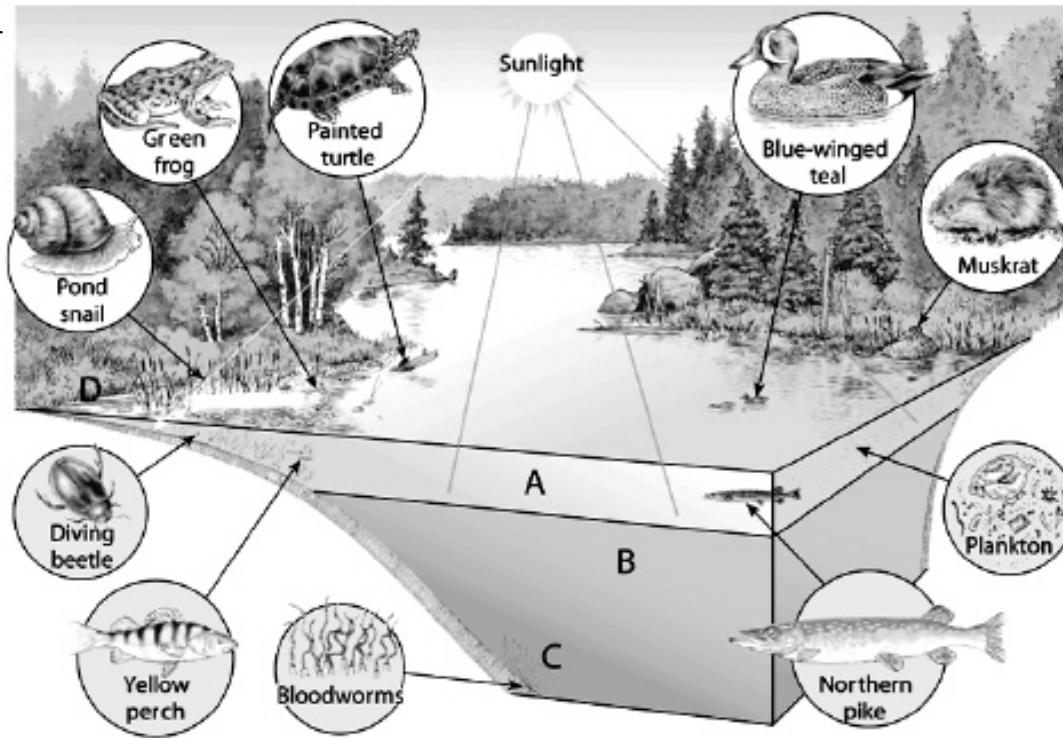
#### Temperate-Zone Lake Life Zones

Use the Figure above to answer the following question(s).

Choose the zone of open water where photosynthesis can occur.



101.

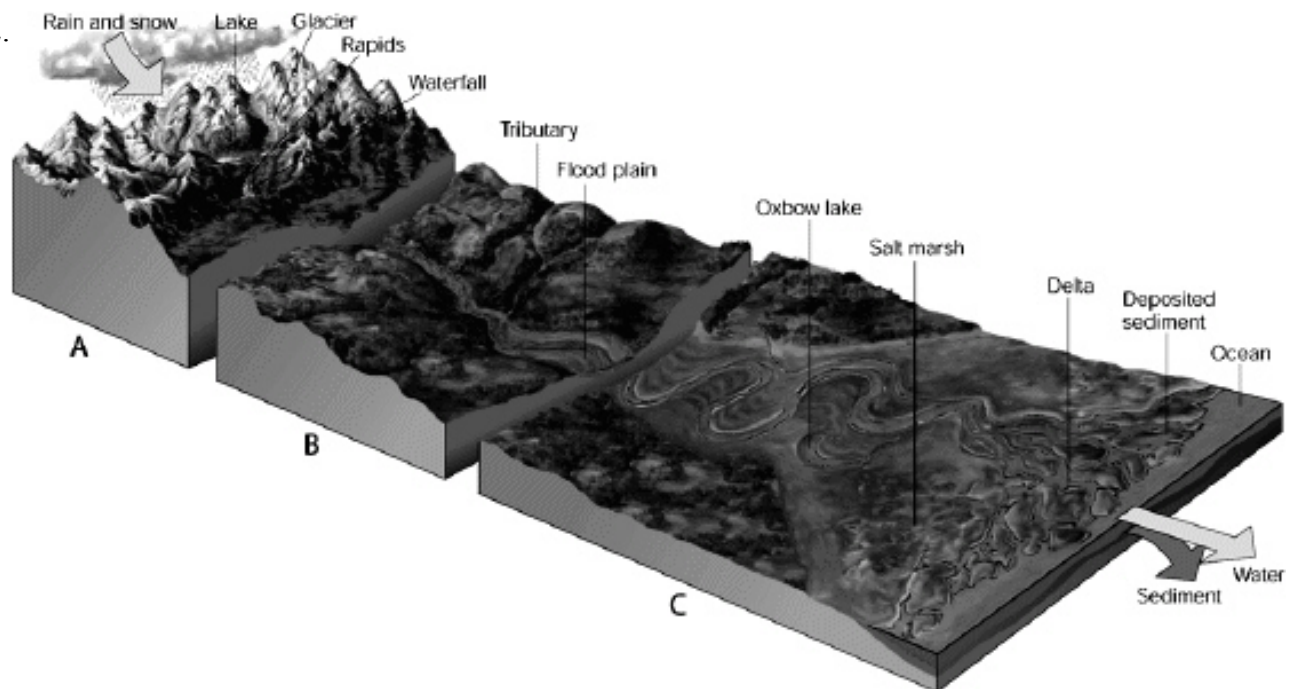


#### Temperate-Zone Lake Life Zones

Use the Figure above to answer the following question(s).

Choose the zone that is usually cold and barely penetrated by sunlight.

102.

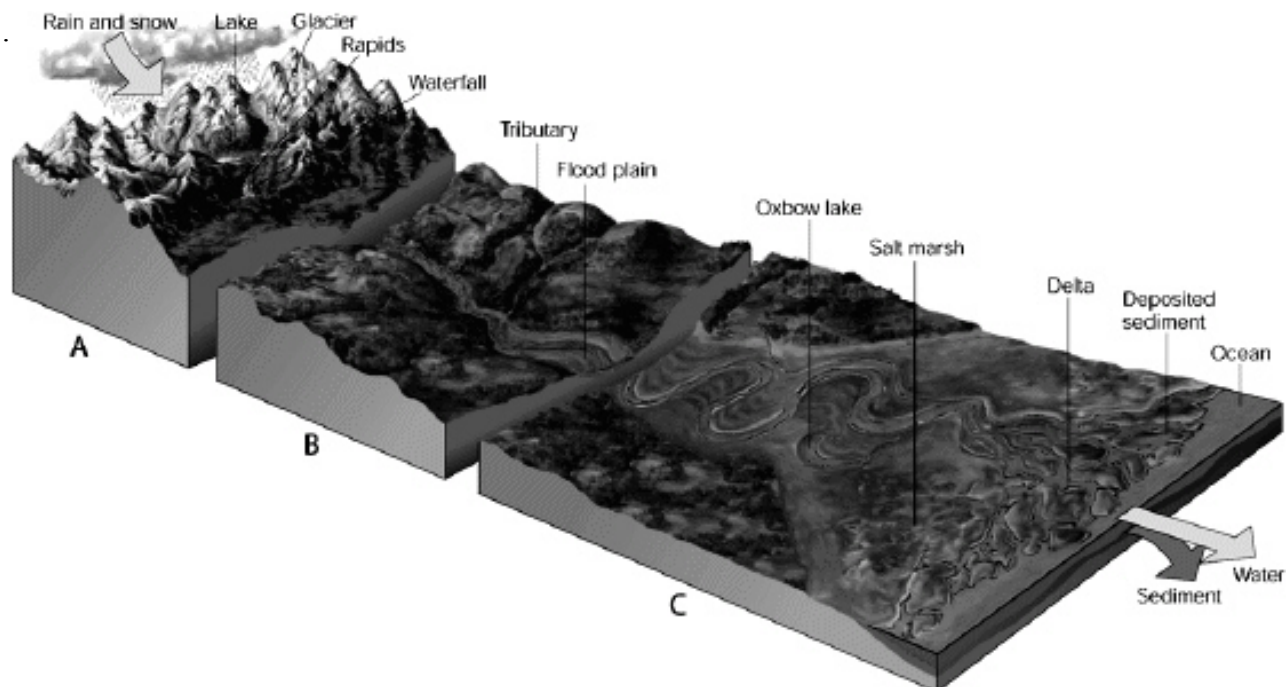


#### Downhill Flow of Water

Use the Figure above to answer the following question(s).

Choose the zone containing wider, lower elevation streams.

103.



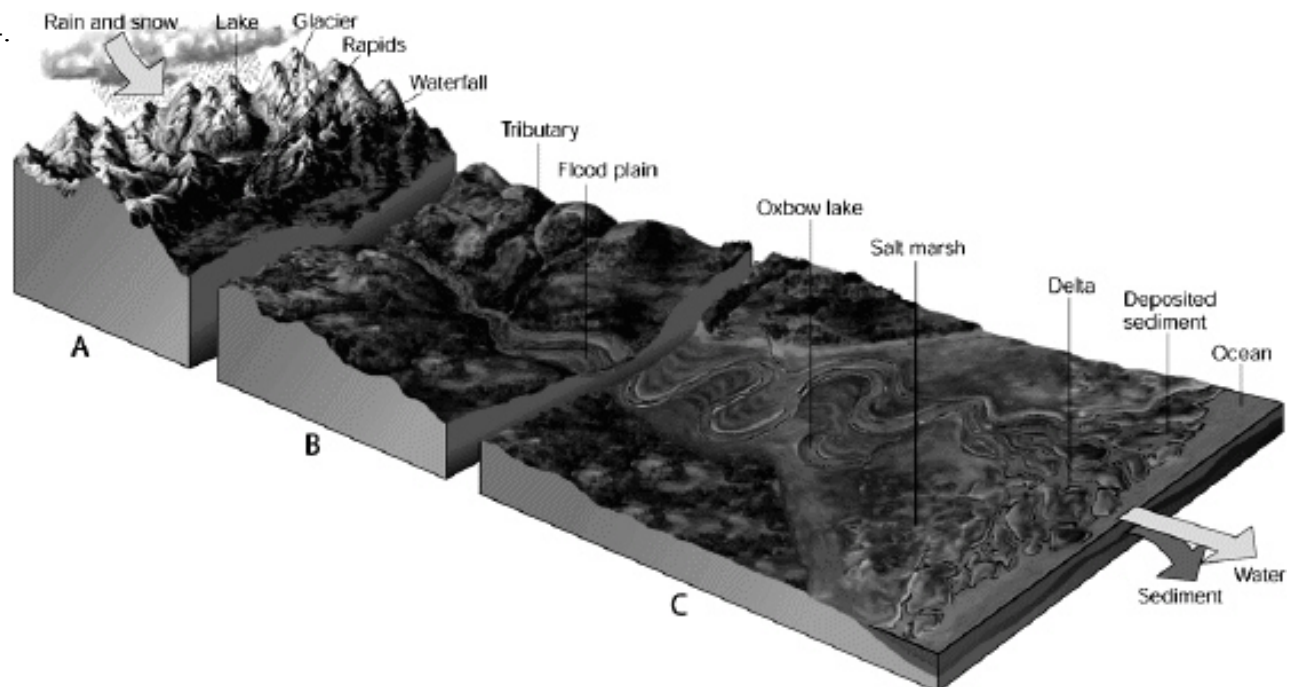
#### Downhill Flow of Water

Use the Figure above to answer the following question(s).

Choose the zone containing mountain headwater streams.



104.



#### Downhill Flow of Water

Use the Figure above to answer the following question(s).

Choose the zone containing rivers that empty into the ocean.

105. Briefly explain the major types of organisms in aquatic life zones, giving an example of each.

106. Briefly explain why estuaries and coastal wetlands exhibit high productivity.

107. Compare and contrast estuaries and intertidal pools in terms of biodiversity.

108.Explain how the open sea can be both an area of low average primary productivity and the largest contributor to the earth's overall net primary productivity.

109.Consider why global warming is likely to cause a lessening of the amount of available freshwater and how that would likely cause changes throughout the downhill flow of freshwater.

## CHAPTER 8--AQUATIC BIODIVERSITY Key

1. A
2. E
3. D
4. C
5. C
6. B
7. D
8. C
9. B
10. D
11. C
12. C
13. A
14. B
15. D
16. C
17. B
18. E
19. A
20. B
21. D
22. A
23. B
24. D
25. E
26. D
27. B
28. D
29. E
30. B

- 31. C
- 32. D
- 33. C
- 34. D
- 35. B
- 36. A
- 37. D
- 38. B
- 39. A
- 40. D
- 41. D
- 42. B
- 43. C
- 44. B
- 45. A
- 46. TRUE
- 47. TRUE
- 48. FALSE
- 49. TRUE
- 50. TRUE
- 51. FALSE
- 52. TRUE
- 53. TRUE
- 54. TRUE
- 55. FALSE
- 56. TRUE
- 57. TRUE
- 58. FALSE
- 59. TRUE
- 60. TRUE
- 61. TRUE
- 62. FALSE
- 63. FALSE
- 64. TRUE

65. TRUE
66. TRUE
67. TRUE
68. TRUE
69. FALSE
70. FALSE
71. tropics; subtropics *or* subtropics; tropics
72. tropical rain forests
73. Pacific; one-half
74. aquatic life zones
75. salinity
76. euphotic *or* photic
77. turbidity
78. Estuaries
79. penetration of sunlight
80. open sea
81. marine snow
82. Climate change
83. 45
84. lentic *or* standing
85. mesotrophic
86. surface water
87. runoff
88. Eutrophic
89. transition
90. 0.3; 0.3-0.9
91. seasonal
92. grow crops
93. E
94. A
95. C
96. D
97. B
98. D

99. C

100. A

101. B

102. B

103. A

104. C

105. plankton - phyto (algae), zoo (jellyfish, protistans), ultra (photosynthetic bacteria)  
nekton - fish, turtles, whales  
benthos - oysters, clams, worms, lobsters, crabs  
decomposers - bacteria

106. Estuaries and their accompanying coastal wetlands are where freshwater and saltwater meet and mix. This means that both salt water and freshwater organisms are present, as well as those that can tolerate both fresh and salt water. In addition, the freshwater brings with it nutrients from the land. These nutrients are thoroughly mixed by the tidal movements. Sunlight is readily available for photosynthetic activities since the waters are shallow.

107. Estuaries and coastal wetlands have a wide range of niches available since there are opportunities for fresh water and salt water organisms to make a living. Some organisms are also able to exist in the presence of a mixture of fresh and salt water. Intertidal zones have niches for organisms that must be able to live while covered with salt water and when exposed to the air. Organisms must also be able to withstand reduced salinity when heavy rains dilute the salt water. The intertidal zone organisms must withstand a substantial physical pounding caused by waves and currents. This is normally not an issue with estuaries and wetlands.

108. Average NPP and per unit NPP are low, but the size of the ocean means it contributes a very large amount of the earth's overall NPP. In addition, the NPP can be much higher in certain areas because of upwellings that bring nutrients from the depths to the surface. These nutrients are used by producers to increase the NPP.

109. (page 176) The increase of air temperatures is causing the reduction of glaciers around the world. Glaciers are storehouses for freshwater. The release of this water will reduce the amount of freshwater available to the population of humans and other organisms that are dependent on this resource downstream. In addition, the storage of freshwater in the glaciers regulates the release of the water over an extended period, instead of all at once. If the downstream regions receive their water as a result of precipitation at the source zone and not as a result of melting ice, the water may be sporadically available. Because the total freshwater on earth is less than 3% of the total water, release of the stored freshwater held in glaciers into the oceans both reduces the salinity of the oceans and the total amount of freshwater.