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SIXTH EDITION

Invitation to Oceanography

Chapter 13

Ocean Habitats and their Biota

Nekton

- have the ability to swim against currents .
  - They can actively search for a hospitable environment.
  - Many fish **school**, or group in clumps and swim together, which is another form of patchiness.

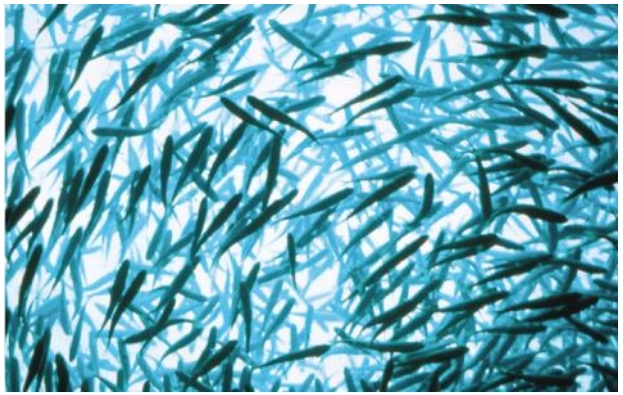

Figure 13.03a: This is a wide-angle photograph of a school of glassy sweepers in the Red Sea.

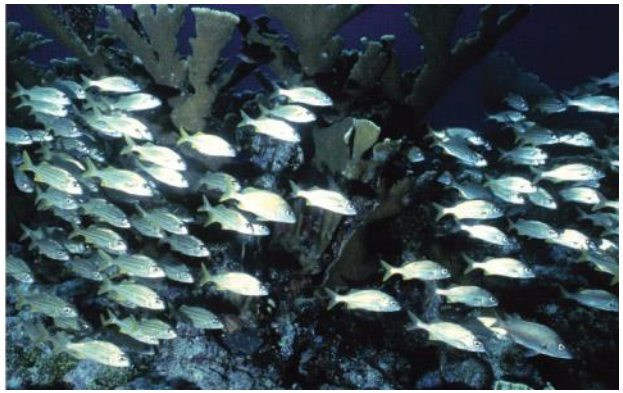

Figure 13.03b: Individuals within a school maintain a regular three-dimensional spacing, as shown here by schooling grunts in the Caribbean Sea.

Schools and Predators

- Schooling can protect fish from visual predators, such as seabirds.
- Seabirds use several strategies for hunting food.
  - Chasing, Diving, Plunging, Skimming, Dipping

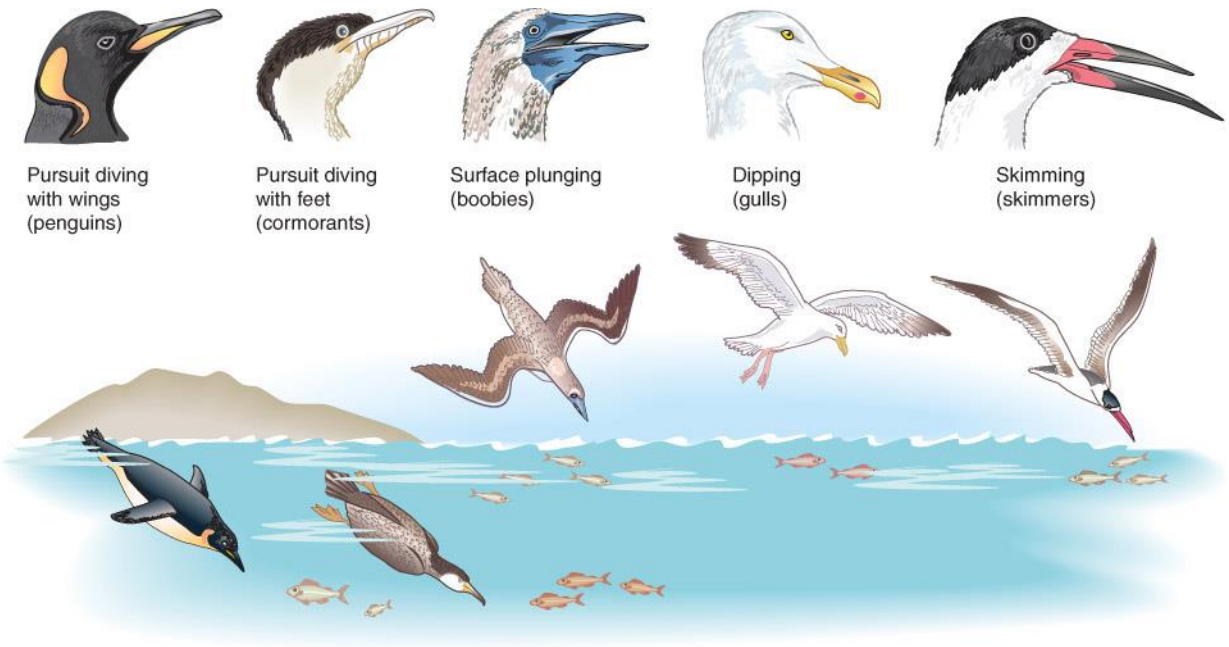

Figure 13.04a: Birds that hunt fish at sea have a variety of bill shapes and hunting strategies.

Top predators in the open ocean are:

- Mackerel
- Squid
- Jellyfish
- Tuna
- Porpoise
- Shark
- Humans

Figure 13.09a: Squid

Figure 13.09b: Tuna

Figure 13.09d: Shark

Figure 13.09c: Jellyfish

Seasonal Effects on Zones

- In the **dysphotic zone**, seasonal effects are minimal – conditions tend to be uniform most of the year.

- The **aphotic zone** is permanently dark and cold.
  - It contains many unique midwater fishes.
  - It is an extremely stable (if harsh) environment.

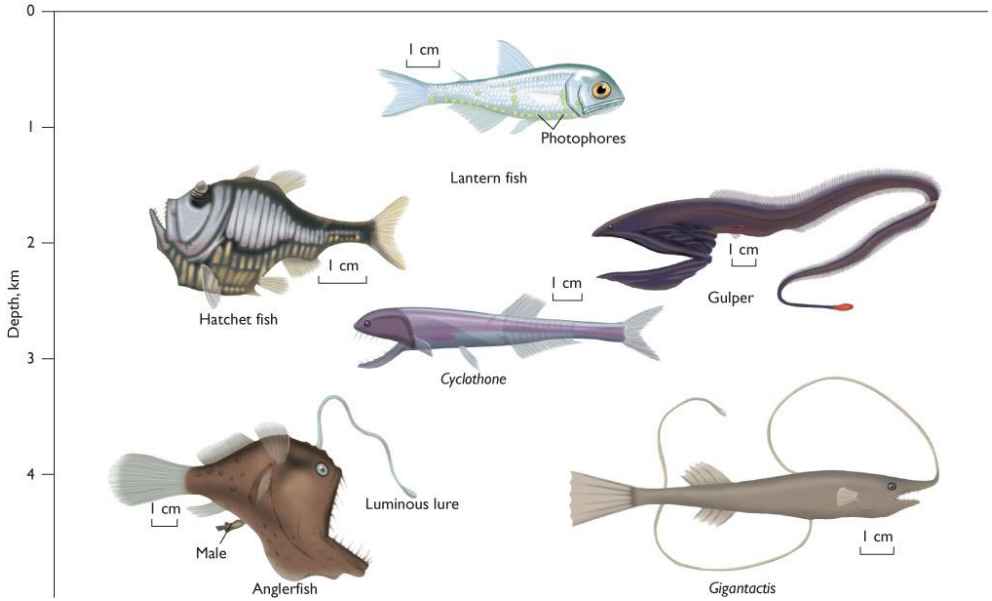

Figure 13.10: Shown here is a sample of the many bizarre-looking fish that are superbly adapted to living in the dark waters of the aphotic zone.

Feeding on the Sea Floor

- The biomass on the sea floor decreases with water depth faster than with distance from shore.
  - Many scavengers and detrital feeders between ocean surface and ocean floor: Deeper = less food
- The benthic food chains depend upon food from the surface that reaches the bottom.

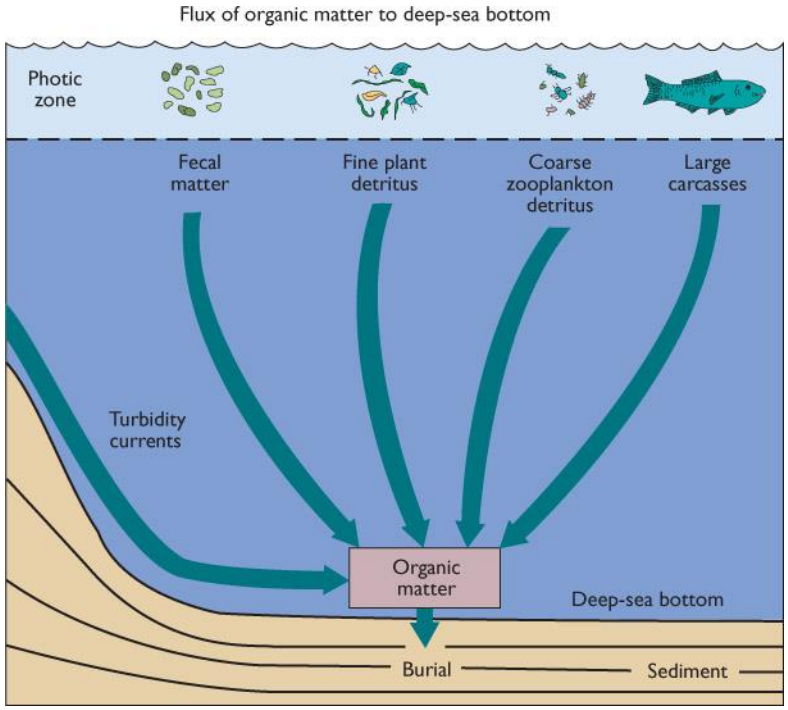

Figure 13.11: Abyssal organisms depend on the fallout of food from high above in the photic zone.

- Four traits common to all abyssal depths are:
  - perpetual darkness
  - low temperature
  - high hydrostatic pressure
  - sparse food supply

- Rate of bacterial decay is greatly reduced under high hydrostatic pressure.
  - Organic material that settles onto the sea floor remains for a long time before it decays.
  - It is thus more likely to be consumed by large scavengers.

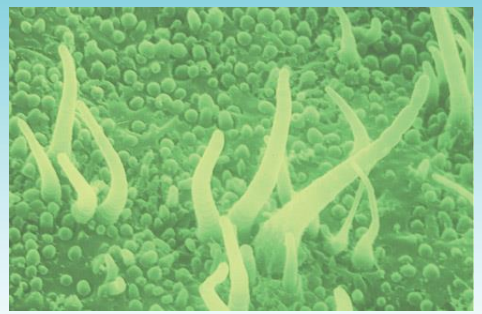

Figure 13.13a: This scanning electron micrograph shows a bacterial mat living on the shell of a mussel living on the deep-sea bottom.

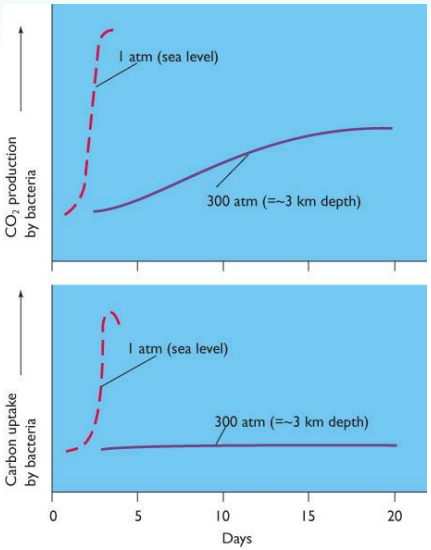

Figure 13.13b: Experiments indicated that the rates of CO2 production and carbon uptake by bacteria are reduced dramatically by high hydrostatic pressure.

Figure 13.12: This person is holding a specimen of a giant amphipod sampled from the deep-sea bottom.

Hydrothermal vents along the mid-ocean ridges

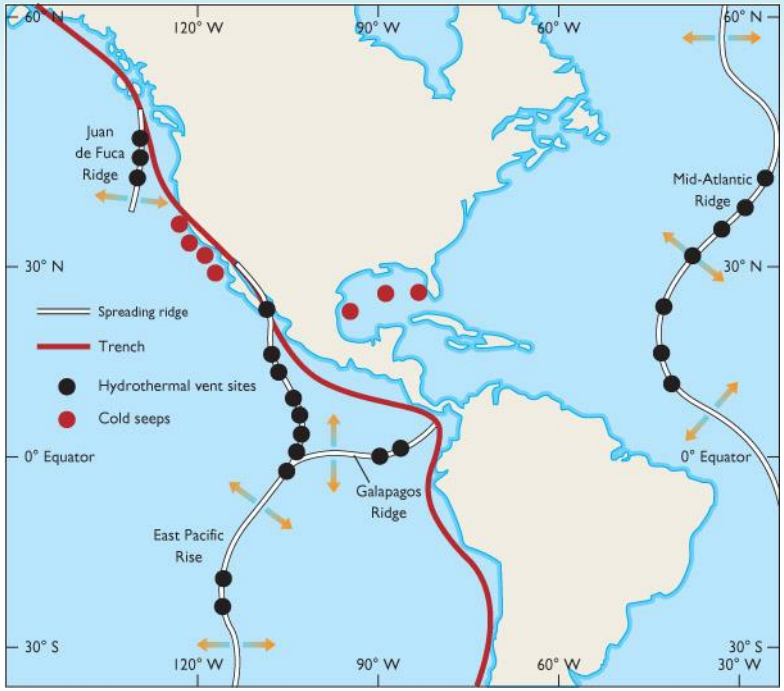

Figure 13.14a: Vent sites have been located in both the Pacific and Atlantic Oceans.

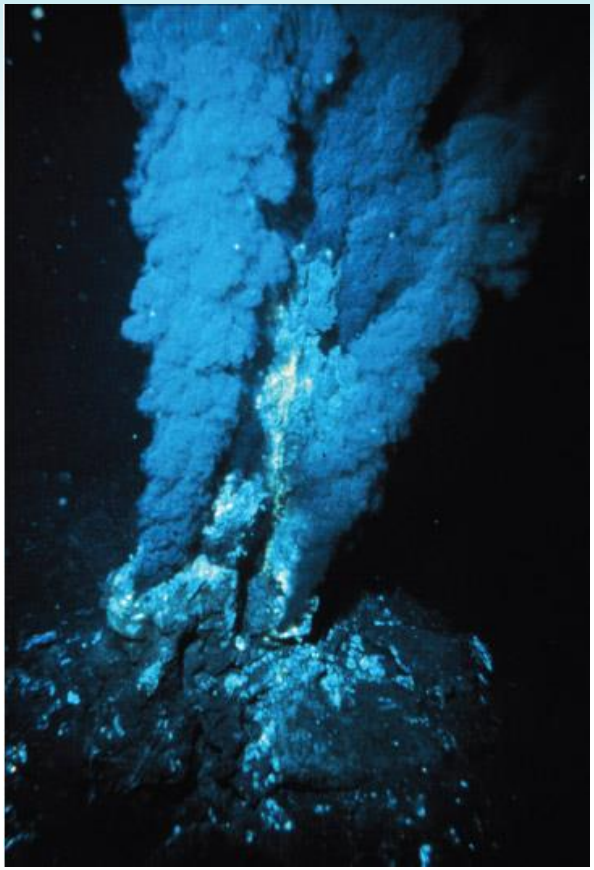

Figure 13.14b: The sulfides spewing out of this vent discolor the water and give the "black smoker" its name.