

by a seal or sea lion, the diver should consult a physician because of the potential for unusual wound infections.

Common sense dictates that divers avoid large whales underwater. The killer whale can generate enough crushing power to bite a seal or porpoise in half with a single bite. Usually, whales stay clear of divers, so most incidents occur when divers put themselves in jeopardy by provoking the whales. A whale may be startled when a diver approaches too close and may strike a diver accidentally in a sudden surge of evasive action.

Muskrats are potential hazards in freshwater. Usually they attack only if they believe they are being threatened and their bites produce only minor wounds. There is a danger that rabies can be contracted from a muskrat bite, however, so in addition to seeking immediate medical advice, a diver who is bitten should make every effort to capture or kill the animal for examination.

The hippopotamus is a frequent killer in Africa. Unpredictable and bad-tempered, hippos have attacked boats and people in the water.

19.5 ANIMALS THAT SHOCK

The electric ray can be found in the temperate and tropical oceans of the world. The torpedo ray of California can grow to 6 ft. in length and weigh up to 100 pounds (see Figure 19.30). This ray is shaped somewhat like a stingray, except its "wings" are thick and the tail is flattened for swimming. Electric rays are slow-moving animals; alert divers should have no trouble avoiding them. As is true of so many undersea hazards, these animals threaten only those divers who molest them. The electric ray's shock dose, which can be as high as 200 volts, is generated by modified muscles in the forward part of the animal's disc-shaped body. Generally, the ventral side of the ray is negative and the dorsal side is positive. The shock, enough to electrocute a large fish, can stun a diver and induce drowning.

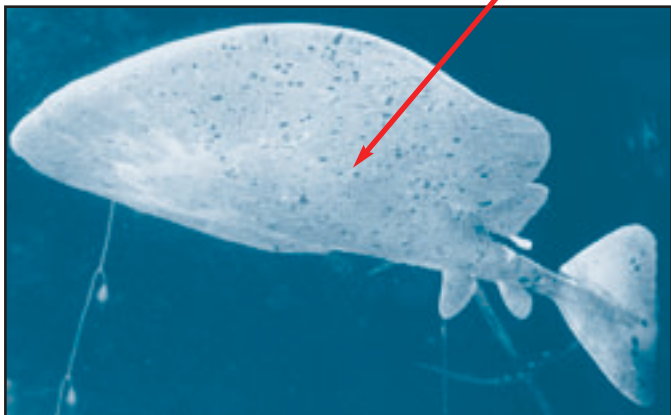


FIGURE 19.30
Torpedo Ray

19.6 ANIMALS THAT ARE POISONOUS TO EAT

Most seafoods are edible and nourishing; however, several of the most toxic substances known are sometimes found in marine organisms. Mollusk shellfish, such as clams, mussels, and oysters are sometimes poisonous to eat when exposed to red tide blooms. These shellfish become poisonous because they feed on toxic dinoflagellates, which are microscopic plankton. Most of these episodes of poisoning have occurred along the Pacific coast from California to Alaska; the northeast coast from Massachusetts to Nova Scotia, New Brunswick and Quebec; and in the North Sea countries of Britain and West Germany. It is advisable to check with local authorities to determine what periods of the year are safe for eating mollusk shellfish. Violent intoxications and fatalities have also been reported from eating tropical reef crabs; these should not be eaten without first checking with the local inhabitants. Numerous species of tropical reef fishes are known to be poisonous to eat because they cause a disease known as ciguatera. An edible fish in one locality may be deadly in another. In addition, most pufferfish contain a deadly poison known as tetrodotoxin; puffers and related species should not be eaten. Improperly preserved fish, such as tuna, can generate histamine and become scombrototoxic, causing an allergic-type reaction in someone who ingests the toxic seafood.

Note:
Photo shown upside down.

used by eating fish containing products of certain species of algae. Ciguatera fish are rarely identified out of the reef zone identified by 35 north and south latitudes. About 800 species of fish have been known to carry ciguatera; the most common types being predaceous species; barracudas, groupers, snappers, jacks, wrasses, parrotfishes, and surgeonfishes. Currently it is impossible to distinguish toxic fish from harmless fish except by laboratory analysis or by feeding the suspected fish to animals and watching for a reaction. The occurrence of fish containing ciguatoxin is unpredictable and can occur in a fish species that was harmless the day before. The toxins are not destroyed by cooking. Because the concentration of toxins builds up over time, oversized fish of a given species are more likely to be toxic than smaller ones. The internal organs and roe of afflicted fish are particularly toxic. Severe ciguatera poisoning may cause severe disability or even death in humans.

Signs and Symptoms: (reported in over 150 cases) include:

- Numbness and tingling of the lips, tongue, and throat
- Abdominal cramps
- Nausea and vomiting