

Human Impact on the Sea Chapter Eleven

Fisheries

- The major fisheries are concentrated in the waters overlying the continental shelves around the world. This occurs for several reasons:
 - _____ waters have much higher productivity
 - shallow waters are more accessible to humans
 - deep waters cannot sustain large fish populations
- The largest catches of fishes occur on the continental shelves of northwest Europe, western South America and _____.

Fishing Techniques

Trawl Nets

- _____ make up 1% of the global fleet, employ 2% of the world's total crew, and harvest 50% of the world's total catch. The largest trawlers have openings 40 ft high and 200 ft wide – large enough for a 747 jet to fit through.

Major Commercial Species

- Among the thousands of species of marine fishes, only a very few make up the majority of catches in fisheries throughout the world.
- The herrings, sardines, and anchovies account for the largest tonnage of fishes, accounting for almost half the catch. Why?

Maximum Sustainable Yield

- The maximum sustainable yield is the largest number of fishes that can be harvested year after year without diminishing the _____. Currently, 70% of the world's fisheries are overexploited and the global fishing fleet is 250% larger than needed to catch what the oceans can sustainably produce.

Magnuson-Stevens

- U.S. fisheries are governed by the Magnuson-Stevens Fishery Conservation and Management Act of _____. It states that "Conservation and management measures shall prevent over fishing while delivering optimum yield from each fishery on a continuing basis. _____ in the maximum sustainable yield modified by any relevant economic, social or ecological factors."

Overexploitation

- In recent years, there have been abundant examples of the decline of fish stocks of all types in all areas of the world.
- The top 25 ocean predator populations have decreased _____%.
- Global catch has been decreasing every year since 1988 even though fishing technologies have improved.

Ecosystem Changes

- _____ may also result in changes in the larger ecosystems or communities in which the target fish reside.
- For example, the demise of the North Atlantic cod and haddock fishery resulted in the increase of dogfish and skates that now fill that niche.

Bycatch

- Another source of destruction in fisheries is the bycatch. Bycatch refers to _____ organisms and undersized target organisms that are captured by the fishing gear.
- In the shrimp industry, up to 10 pounds of bycatch are discarded for every pound of shrimp caught.

Ghost Fishing

- A largely overlooked problem that contributes to the death of huge numbers of marine organisms is lost fishing gear. Lost _____ or _____ may continue to capture in what is termed ghost fishing. As an example, in the North Pacific, some 30,000 to 40,000 km (~20,000 mi.) of nets are set per day with a daily loss rate of 20%.

Mariculture

- Aquaculture is the rearing of selected aquatic plants and animals under controlled conditions to increase the amount of food available to humans. The term for marine aquaculture is _____.
 - Fish farming involves cultivating fish in a controlled environment
 - Fish ranching involves holding _____ species (live part of their lives in fresh water and part in salt water) in captivity for the first few years, releasing them, and then harvesting them as adults
- While mariculture provides a significant food supply for humans, there are three major reasons it is not more widespread:
 - it is difficult to maintain proper conditions in ponds or tanks
 - many marine species go through different life _____ that require different conditions
 - _____ and parasites proliferate under captive or crowded conditions

Invasive Species

- Invasive Species (ie. _____ species, introduced species, _____ species) are species that are deliberately or accidentally introduced into an ecosystem by humans.
- Important examples of invasive species include the zebra mussel (Great Lakes), the lionfish (Atlantic, Caribbean & Mediterranean), the burmese python (_____) and the northern snakehead (Chesapeake).

Sources of Pollution: Chemicals

- Various toxic chemicals produced by the industrialized nations find their way into the oceans' ecosystems. These chemicals are transferred through food chains, becoming more concentrated through the process of biological _____. This not only harms the marine organisms, but also renders some fish inedible by humans.

Sources of Pollution: Nutrients

- The runoff of excess fertilizers and sewage into coastal waters can lead to _____ (resulting in low dissolved oxygen). In North Carolina, livestock sewage is of concern, leading to degraded ecosystems and the emergence of *Pfiesteria piscicida*. *Pfiesteria* is a toxic _____ responsible for immense fish kills in NC estuaries.

Sources of Pollution: Oil

- Oil pollution in the seas results primarily from _____ runoff. However, the most preventable sources may be the spillage of crude oil from offshore drilling platforms or accidents involving tankers.

Exxon Valdez

- Until 2010, the largest offshore oil spill in U.S. history occurred in _____, when the *Exxon Valdez* tanker ran aground in Prince William Sound, Alaska. The spill of almost 11 million gallons affected the Alaskan coastline equivalent of New York City to Miami.

Gulf Oil Spill of 2010

- On April 20, 2010, BP's Deepwater Horizon oil rig sank off the coast of Louisiana after an explosion. The aftermath left broken wellheads one mile deep that leaked for _____ days. The total numbers make it the largest offshore oil spill in U.S. history.
 - 206 million gallons of oil
 - 1.84 million gallons of dispersant (_____ 9500)
- 33% of the oil was recovered (skimming), burned, or dispersed
- 25% evaporated or dissolved
- 16% biodegraded
- 26% (42 million gallons) was never recovered (on shore or below the surface)

Climate Change

- Climate Change has influenced oceans in two major ways
 - Warming temperatures have led to coral _____, melting of the ice caps, and a changing in the patterns of deep water upwelling.
 - Ocean _____, caused by absorbed CO₂ in the ocean converting to carbonic acid, has led to decreased shell forming and the dissolving of coral reefs.