

Unit Ten: Human Impact on the Sea

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. _____ is the maximum sustainable yield modified by any relevant economic, social or ecological factors."

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.

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.