

Oceanography Chapter 18: Environmental Concerns

Easter Island – Faces – 64 miles²

- First 350 AD – Paradise Island
- Palms, lots of good vegetation
- 1400 AD- 10K-15K people
overdid all – fish, agriculture
erect statues for Gods
- 1550 AD – Palms gone(no ships) – forests gone only food- each other
- By 1700 – less than 200 people
European Explorers 17th Century – only people left were found in Caves
- Couldn't leave island
- Mismanagement of Resources: Concept of Scale?

Marine Pollution

- Have long used ocean as a dump
- Pollution is the introduction into the ocean by humans of substances or energy that changes the quality of the water or affects the physical, chemical, or biological environment
 1. Natural
 2. Human- Generated

Characteristics of a Pollutant

Pollutant – causes damage by interfering directly or indirectly with the biochemical processes of an organism

Quantity and Toxicity

Sources Fig 18.1

Many pollutants are biodegradable

- Able to be broken down by natural processes into simpler compounds
- Some are more persistent

Oil

- Spills occur both naturally and by us
- 6 million metric tons in ocean
(10% natural seeps) – Fig 18.2
- Biggest ones – Tanker mishaps – Table 18.1
- Between 150k to 450k are killed – birds
- 900 million liters (22x Valdez) engine oil
- Crude is biodegradable
- Refined oil is more disruptive
- Exxon – biggest lesson

Heavy metals

- Hg, Pb, Cu, Tributyl Tin
- Minamata Disease

Synthetic Organic Chemicals

- Table 18.2
- Rachel Carson – 1962 - Silent Spring
- Generally Low- but biological amplification exists
DDT- Chlorinated hydrocarbon
Pelicans/Osprey
(Still can't eat local fish in NYC)

PCBS – Poly Chlorinated biphenyls

- Affect immune systems
- Amplified – 6900 ppm
(acceptable – human-5ppm, 50 for critters)

Drug traffickers – using cyanide

Eutrophication: Excessive nutrients are released into the water (creates in balance)

- Occurs at the mouths of almost all rivers
- Plankton blooms- red tides, yellow foams, green slimes
- HABs- few before 1930, since 1920s - One every year → China too

Solid Waste

- Plastic six pack holders - 400 years
- Figure 18.13
- Nets too
- NIMBY

Recycling

- Japan – 50%
- Ma, CA, - goal of 25%

Sediment

- Runoff carries dirt

Sewage

Waste Heat

Introduced Species

- Chinese Mitten Crab (Fig 18.16)
- Aquarium Seaweed

Costs of Pollution ⇒ \$220 billion, \$800.00 per person

Habitat Destruction

1. Bay/Estuaries – hardest hit
 - Metals in SF
 - Seattle
2. Coral Reefs
3. Other

Marine Sanctuaries

- Began 1972 – fig 18.17

Global Changes

Ozone layer

- CFCs Fig 18.22
- May have topped out in 1994

Global Warming

Greenhouse Gases – CO₂, CH₄, H₂O, CFCs
Figure 18.26