

Oceanography Chapter 17: Marine Resources

Marine Resources

1. Physical Resources – result from the deposition, precipitation, or accumulation of useful substances in the ocean or seabed
 - a. Hydrocarbons – Petroleum, Natural Gas, Methane Hydrate
 - 1) Petroleum- 35% crude, 26% natural gas
Figure 17.1 - Platforms- Stat fjord - B – North Sea
Figure 17.2 Ursa – CA
 - 2) Methane Hydrate – methane-laced ice crystals in the continental slope
 - Worry about it escaping – powerful green house gas
 - b. Mineral Deposits
 1. Sand and Gravel
 - Second to oil/natural gas
 - Aragonite Sands of Bahamas
 - Portland cement
 2. Mg and Mg compounds
 - Third most abundant
 3. Salts – NaCl, CaSO₄, CaCO₃
 - ↓
 - 78%
 4. Mn Nodules – still too expensive
 5. Phosphate
 6. Metallic Sulfides and muds – hydrothermal
 7. Freshwater – Figure 17.5 – desalinization
2. Marine Energy
 - a. Wind – Denmark wind farm figure 17.6
 - b. Waves and Currents – Figure 17.7
 - c. Thermal Gradient – warm surface is cold, deep
OTEC – Ocean Thermal Energy Conversion
(Figure 17.8)
 - Still too costly
3. Biological Resources
 - a. Fish, Crustaceans, Mollusks
Figure 17.9, 17.10, Table 17.1
 - High Tech fishing: Figure 17.11, 17.12
 - Since 1950 – fishing too much
(commercial fish catch increased five fold)

Maximum Sustainable yield – (110-150 million metric tons)

- 100-135 tons Table 17.1
- over fished

Commercial Extinction – depletion of a resource species to a point where it is no longer profitable to harvest.

- Orange Roughy → Chilean Sea Bass

By kill – animals unintentionally killed (27 -30 million metric tons)

Drift Net Fishing – catch everything Figure 17.16

- Lost nets - Fig 17.17

“Mad House Economics”

- Spend \$124 billion to catch \$70 Billion
- Deficit is made up by gov’t grants
- Fisherman – preserve jobs

Whaling

- Since 1880’s
- Provide meat for humans, animals, oil, illumination, industrial products, cosmetic, margarine, fertilizers, and baleen for corset stays
 - 1900 – 4.4 million
 - Today – 1 million
- Substitutes for all whale products exist, but harvest did not stop until it became unproductive and uneconomical.
- 1986 International Whaling Commission – Moretorum
 - Japan- “ Scientific purposes” only
 - Since begun again – 1993 – Norway, Japan never did stop (Figure 17.19 – 17.20)
 - Dolphins, hang out with Yellowfin Tuna

Fur Bearing Mammals

- 300 k to 450 k seals, sea lions
 - Harp Seal

Botanical Resources

Algin – mucus that slickens seaweeds

- Stiffen fabrics
- Form emulsions such as salad dressing, paint printers ink
- Prevents large crystals in ice cream
- Clarify beer and wine
- US - \$220 million each year

- Seaweeds can be eaten directly (Nori – Japan)

Aquaculture and Mariculture

Aguaculture – growing or farming of plants and animals in any water environment under controlled conditions

- Fish in Asia (freshwater)

Mariculture – farming of marine critters, usually in estuaries, bays, or near shore environments or in specially designed structures using circulated seawater.

- Fish, shrimp (6 billion 1998)
- Pearls too
- Japan leads in mariculture
- Ranching – Salmon
- “Trash Fish”

Drugs

- Earliest – emperor Shen Nung of China – 2200 BC (Materia Medica)
 - Acyclovir- from Caribbean Sponge – Viral Herpes – 1985
 - Pseudopterosins – anti – inflammatory – U.C.
 - Bryozoan – anticancer
 - Tunicates – antiviral, antitumor
(Didemnin – B) – Melanoma
 - Estanascidin – cancers – skin, breast, lung
 - Aplidine – cancers – pancreas, stomach, bladder, prostate

Others

- Cyanobacteria – AIDS
- Vidabarin (from Sponge) – anti Aids
- Padan – from annelid – insecticides

Non Extractive Resources

- Transportation and Recreation



Mostly Cargo

Oil – Largest – 430 cm (1300 feet) long
(Murex)

Transit volume – Shanghai – most
Largest – Hong Kong
US- Long Beach

Real Estate!! Expensive near water

The Law of the Sea

Mare Liberum- “A free Ocean” from 1604
Hugo Grotius (Dutch)

Seaward boundary - 3 miles – stood until 1945

UN and International Law of the Sea (1982)

- Territorial Waters – 12 miles from shore
(straits excluded)
- EEZ – Exclusive Economic Zone – 370 km, 200 miles from coast
 - All areas outside {EEZ or high seas } – common
 - Protect ocean, prevent marine pollution
 - Freedom of scientific research

US Exclusive Economic Zone

- Reign 200 miles from coast, but no sharing of high seas