

- 1  **Aquatic Diversity**  
Sustaining Aquatic populations
- 2  **25K fish species most in ocean**
- 3
- 4  **Most diverse habitats**
  - Coral reefs
  - Estuaries
  - Deep-ocean floor
  - Needs structure to be diverse
- 5  **Trophic relationships more complex in marine environments**
  - Key stone predators trophic cascades
  - Top down food web dynamics
- 6  **Human consumption**
  - 6% of total protein from fish
  - 7% of total food from ocean
  - 16% of annual protein consumption in most countries; 17% of all food is from rangelands (your book's figures are not totally consonant!)
- 7  **Marine Ecological Services**
  - **Climate moderation**
  - C02 absorption**
  - Nutrient cycling**
  - Waste treatment and dilution**
  - Reduced storm impact (mangrove, barrier islands, coastal wetlands)**
  - Habitats and nursery areas for marine and terrestrial species**
  - Genetic resources and biodiversity**
  - Scientific information**
- 8  **Marine Economic Services**
  - **Food**
  - Animal and pet feed (fish meal)**
  - Pharmaceuticals (antibiotics, anticancers, bone reconstruction...)**
  - Harbors and transportation routes**
  - Coastal habitats for humans**
  - Recreation**
  - Employment**
  - Offshore oil and natural gas**
  - Minerals**
  - Building materials**

9  **Freshwater Ecological Services**

- Climate moderation
- Nutrient cycling
- Waste treatment and dilution
- Flood control
- Groundwater recharge
- Habitats for aquatic and terrestrial species
- Genetic resources and biodiversity
- Scientific information

10  **Freshwater Economic Services**

- Food
- Drinking water
- Irrigation water
- Hydroelectricity
- Transportation corridors
- Recreation
- Employment

11  **Human Impacts**

- Degradation of aquatic ecosystems
- Premature extinction of aquatic wildlife species
- Caused by: overfishing, habitat destruction, pollution

12  **Freshwater Species at risk**

13  **Marine Habitat Loss and degradation**

- 50% of world's wetlands and 53% of US wetlands have been lost
- 58% of coral reefs threatened
- 66% of estuaries and bays threatened by pollution
- 35% of mangroves lost
- 70% of beaches eroded
- Benthic habitats declining
- Deep sea mining destroy benthic communities directly and by dumping sediment on them

14  **Freshwater Habitat loss**

- 53% inland wetlands lost (seasonal especially)
- 60% of world's rivers fragmented
- Dams and levees

15  **Overfishing**

- 75% of commercial fisheries overfished or fished to the limit
- Commercial extinction
- Cascade effect
- sea turtles, dolphin, and other marine species caught as bycatch

16  **Global freshwater fish catch**

17  **Global Marine Fish Catch**

18  **Nonnative species**

- Hundreds deliberately or accidentally introduced
- Blue catfish in James River
- Zebra mussels
- Rapa whelk
- Lampreys
- Snake fish
- 68% of extinctions of native species due to invasive alien species

19  **Snake Fish or Asian Swamp Eel**

- Eats anything fish or arthropods
- Burrows into mudbanks and avoids cold weather, fires, drought, and predators
- Resistant to waterborne poisons-breathes air
- Wriggle across dry land to populate other water ways
- Anticipated range is from FL to VA

20  **Purple loosestrife**

21  **Pollution Threats to Aquatic Ecosystems**

- Oil
- Acid deposition
- Excess plant nutrition and oxygen demanding wastes (eutrophication)
- Toxic chemicals (cyanide used to capture reef fishes)
- Coastal development
- Sedimentation from soil erosion
- Most in ocean due to run off, aeolian, shipping and offshore mining/rigs, & dumping

22  **Global warming**

- Alter topography
- Alter ocean temperatures
- Alter migration and feeding patterns

23  **Difficult to protect marine diversity**

- Damage is invisible (because we don't look!)
- We don't care-going to develop it anyway
- Whose is it? (tragedy of the commons and laws only affect that area)
- No effective international agreements
- No monitoring or enforcing of any regs

24  **Ways to protect**

- Laws to protect endangered and threatened species
- Establishing protected areas

- Using integrated coastal management
- Regulating PREVENTING ocean pollution
- Multispecies management of marine fisheries

25  **Turtles are threatened**

- Loss and degradation of habitat
- Harvesting of eggs
- Harvesting for food, medicine, jewelry, leathersgoods
- Unintentional capture/drowning by drift nets, trawls, long lines, dredging

26  **CITES**

- Convention on International Trade in Endangered Species
- 1975
- Signed by 152 countries
- Lists 900 species
- Cannot be commercially traded live or dead or as products
- Restricts trade on 29,000 other species which are threatened

27  **ESA**

- Endangered Species Act
- 1973 amended in 1982 and 1988
- Illegal for American to import to trade in any product made from an endangered or threatened species unless it is used for an approved scientific purpose or to enhance the survival of the species
- NMFS and USFWS identify and list endangered and threatened species
- Species cannot be hunted, killed, collected, or injured in the US
- Decisions based solely on biological reasons, not political or economic reasons
- Protecting habitat can be based on socioeconomic reasons

28  **MMPA**

- Marine Mammal Protection Act 1972
- certain species and population stocks of marine mammals are, or may be, in danger of extinction or depletion as a result of man's activities;
- such species and population stocks should not be permitted to diminish beyond the point at which they cease to be a significant functioning element in the ecosystem of which they are a part, and, consistent with this major objective, they should not be permitted to diminish below their optimum sustainable population level;
- measures should be taken immediately to replenish any species or population stock which has diminished below its optimum sustainable level;

29  **MMPA**

- there is inadequate knowledge of the ecology and population dynamics of such marine mammals and of the factors which bear upon their ability to reproduce themselves successfully; and
- marine mammals have proven themselves to be resources of great international significance, aesthetic and recreational as well as economic.
- The MMPA established a moratorium, with certain exceptions, on the taking of marine mammals in U.S. waters and by U.S. citizens on the high seas, and on the importing of

marine mammals and marine mammal products into the United States.

30  **MMPA**

- AND NO HARRASSING THEM EITHER!
- 1.Level A Harassment-** has the potential to injure a marine mammal or marine mammal stock in the wild; or
- 2.Level B Harassment-** has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption or behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

31  **1979 Global Treaty on Migratory Species**

- **AWARE** that each generation of man holds the resources of the earth for future generations and has an obligation to ensure that this legacy is conserved and, where utilized, is used wisely;
- **CONSCIOUS** of the ever-growing value of wild animals from environmental, ecological, genetic, scientific, aesthetic, recreational, cultural, educational, social and economic points of view;
- **CONCERNED** particularly with those species of wild animals that migrate across or outside national jurisdictional boundaries;
- **RECOGNIZING** that the States are and must be the protectors of the migratory species of wild animals that live within or pass through their national jurisdictional boundaries;
- **CONVINCED** that conservation and effective management of migratory species of wild animals require the concerted action of all States within the national jurisdictional boundaries of which such species spend any part of their life cycle;
- **RECALLING** Recommendation 32 of the Action Plan adopted by the United Nations Conference on the Human Environment (Stockholm, 1972) and noted with satisfaction at the Twenty-seventh Session of the General Assembly of the United Nations,

32  **1979 Global Treaty on Migratory Species**

- co-ordinated conservation and management plans;
- (c) research into the ecology and population dynamics of the migratory species concerned, with special regard to migration;
- (d) the exchange of information on the migratory species concerned, special regard being paid to the exchange of the results of research and of relevant statistics;
- (e) conservation and, where required and feasible, restoration of the habitats of importance in maintaining a favourable conservation status, and protection of such habitats from disturbances, including strict control of the introduction of, or control of already introduced, exotic species detrimental to the migratory species;
- (f) maintenance of a network of suitable habitats appropriately disposed in relation to the migration routes;

33  **1979 Global Treaty on Migratory Species**

- (g) where it appears desirable, the provision of new habitats favourable to the migratory species or reintroduction of the migratory species into favourable habitats;
- (h) elimination of, to the maximum extent possible, or compensation for activities and obstacles which hinder or impede migration;
- (i) prevention, reduction or control of the release into the habitat of the migratory species of substances harmful to that migratory species;
- (j) measures based on sound ecological principles to control and manage the taking of the migratory species;
- (k) procedures for co-ordinating action to suppress illegal taking;
- (l) exchange of information on substantial threats to the migratory species;

34  **1979 Global Treaty on Migratory Species**

- (m) emergency procedures whereby conservation action would be considerably and rapidly strengthened when the conservation status of the migratory species is seriously affected; and
- (n) making the general public aware of the contents and aims of the AGREEMENT.

35  **Endangered favorites**

36  **Major species of sea turtles**

37  **TED**

38  **Commercial Whaling**

- Odontocetae and Mysticetae
- Easy to harvest (have to surface)
- Overharvested – not commercial extinction, BIOLOGICAL extinction
- IWC international whaling convention
- 1946 International Convention for the regulation of whaling
- Japan, Norway, Iceland, Russia no regs and no CITES

39  **Pro Whaling**

- Minke, pilot, and sperm whales have enough numbers (Bryde's and grey)
- DNA test to detect illegal species harvested
- All arguments against are emotional not scientific

40  **Against Whaling**

- Protected for ethical reasons (intelligent)
- Estimates are not accurate
- Open door too many whalers
- DNA test will never happen w all harvested meat
- Easy to hide illegal species

41

42

43

44

45

46

47

48

49

50