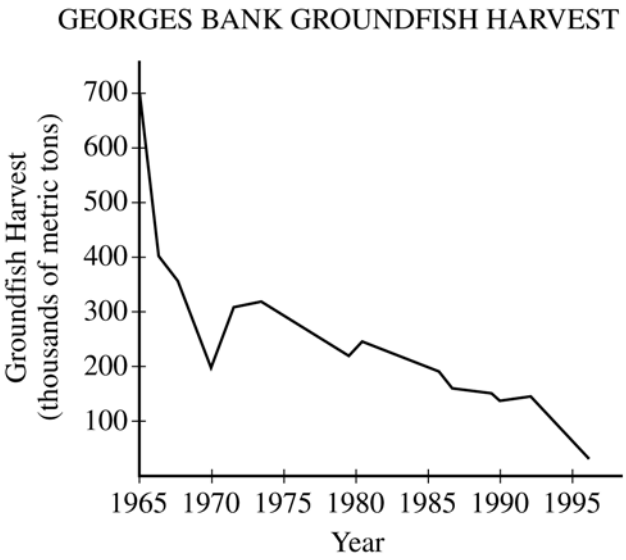

4. The graph above shows the decline in the catch of groundfish (such as cod, haddock, and flounder) from Georges Bank from 1965 to 1995. This decline in the fish harvest resulted in the closure of large portions of the fishery.

   (a) Identify the five-year period during which the greatest rate of decline in the fish harvest took place. For that five-year period, calculate the rate of decline in the fish harvest, in metric tons per year. Show clearly how you determined your answer.

   (b) Choose any TWO commercial fishing practices from the list below. For each of your choices, describe the practice and explain the role it plays in the depletion of marine organisms.

   - Bottom trawling
   - Long-line fishing
   - Using drift nets/gill nets/purse seines
   - Using sonar

   (c) Identify one international regulation or United States federal law that applies to the harvesting of marine food resources and explain how that regulation or law helps to manage marine species.

   (d) The oceans of the world are often referred to as a commons. Give an example of one other such commons, explain how human activities affect that commons, and suggest one practical method for managing that commons.

STOP

END OF EXAM

Question 4

(a) Identify the five-year period during which the greatest rate of decline in the fish harvest took place. For that five-year period, calculate the rate of decline in the fish harvest, in metric tons per year. Show clearly how you determined your answer.

(2 points possible)

One point is earned for correctly identifying the time period, and 1 point is earned for showing the calculation. The student may earn the second point by describing in words how he or she arrived at the final answer.

Time period of greatest decline: 1965–1970

$(700 \times 10^3$ metric tons $- 200 \times 10^3$ metric tons) / 5 years = 100,000 metric tons/year

Acceptable range: 100,000–102,000 metric tons/year (no credit earned for 1970 value $< 190 \times 10^3$ metric tons)

(b) Choose any TWO commercial fishing practices from the list below. For each of your choices, describe the practice and explain the role it plays in the depletion of marine organisms.

(4 points possible)

One point is earned for each description, and 1 point is earned for a brief explanation of how the practice contributes to depletion. Each bulleted contribution in the table below is an acceptable answer.

Question 4 (continued)

Method	Description of Practice	Contribution to Depletion
Bottom trawling	Drag a net along ocean bottom ***OR*** Drag a line with hooks along bottom	• Catches many nontarget species* (bycatch) • Benthic habitat destruction
Long-line fishing	Fishing line with many hooks, extending for long distances and allowed to drift ("towed" not credited)	• Catches many nontarget species (bycatch) • Ghost fishing (continue to catch even when untended)
Nets -Drift nets/Gill nets OR---------- -Purse seines	Large nets, stretching for miles and set out and allowed to drift ("towed" not credited) ---------- Large nets are drawn up like a drawstring purse to capture fish in large schools near the ocean surface ("towed" not credited)	• Mesh size may selectively deplete certain size/age class • Catches many nontarget species (bycatch) • Ghost fishing (continue to catch in untended net) ---------- • Catches large quantities of fish (whole schools) • Catches many nontarget species (bycatch)
Sonar	Sound waves used to locate fish or to "see" the bottom	• Allows ships to locate large schools relatively quickly • Targets specific species

* *Nontarget species* include noncommercial species;
individuals of illegal size or age; species caught out of season

Question 4 (continued)

(c) Identify one international regulation or United States federal law that applies to the harvesting of marine food resources and explain how that regulation or law helps to manage marine species.

(1 point)

Point can be earned for naming a specific, relevant international regulation or federal law and for a brief explanation of how it helps manage marine species.

A number of specific international regulations and federal laws are acceptable if the law cited relates to the harvesting of marine resource. The student must provide a correct explanation of how the regulation or law helps manage marine species. The most common answers are given below.

Note*: Abbreviations alone are acceptable only for the Endangered Species Act (ESA) and the Convention on International Trade in Endangered Species (CITES).*

Endangered Species Act/ESA—prohibits the harm or harvesting of endangered species; protects habitats

Marine Mammal Protection Act—protection and conservation of marine mammals

Convention on International Trade in Endangered Species/CITES—prevents trade of threatened or endangered marine species

Magnuson-Stevens Fisheries Management and Conservation Act (Magnuson Act)—establishes Regional Fisheries Management Councils that set quotas, size limits, and seasons; establishes 200-mile fishing area; protects essential habitat; rebuilds overfished stocks; minimizes bycatch

UN Law of the Seas—individual countries have jurisdiction over Exclusive Economic Zones (200 miles off shore) and sovereignty over the sea bed 12 miles offshore; allows for Individual Transferable Quotas (ITQs) in which allocated quotas can be sold to others

International Whaling Commission/International Convention for the Regulation of Whaling—regulates the species that can be harvested and sets quotas on the number of cetaceans that can be harvested

Other U.S. and International Laws and Regulations Accepted:

The Oceans Act of 2000—establishes a presidential commission to examine federal ocean policies and programs; promotes protection of marine environment and prevention of marine pollution

U.S. Whale Conservation and Protection Act—prohibits the harvesting of whales in U.S. waters

Marine Sanctuaries Act—protects the habitat for marine organisms and protects the animals from being harvested in that area

Question 4 (continued)

Fur Seal Act of 1966—prohibits taking of fur seals or use of U.S. ports and harbors for vessels illegally taking fur seals; allows for subsistence hunting by native people; manage fur seal rookeries in the Pribilof Islands

Lacey Act of 1900—prohibits sale of illegally harvested species; forces fisherman to harvest legally

(d) The oceans of the world are often referred to as a commons. Give an example of one other such commons, explain how human activities affect that commons, and suggest one practical method for managing that commons.

(3 points possible)

One point can be earned for correctly identifying a commons. One point can be earned for briefly explaining how a human activity affects the specific commons. The student can earn 1 point for citing a practical method of management linked to the identified commons.

ACCEPTABLE COMMONS: ***1 point***

- Atmosphere/Air
- Groundwater/Aquifers
- National Forests/National Parks
- Antarctica
- Estuaries
- Great Lakes
- Rivers and Streams
- A variety of other resources may be accepted as a commons ***IF*** the student clearly demonstrates that it is a public resource being used privately

HUMAN ACTIVITIES: ***1 point—must be linked to the chosen commons***

- A human activity and brief explanation of how that activity degrades the selected commons can be accepted (e.g., fossil-fuel combustion increases greenhouse gases in the atmosphere).

PRACTICAL MANAGEMENT METHODS: ***1 point—must be linked to the chosen commons***

- Any specific management suggestion that is practical and linked to the chosen commons can be accepted.

Some answers that may apply to many commons:

- Education of the public—must relate to a specific problem (e.g., teaching about forest fire prevention).

- Regulations, enforcement, agencies—must be directed at a specific problem.