

Contents

1 The changed world

2 Population growth

- 2.1 Models of population growth
- 2.2 The value of a model
- 2.3 Conclusions

3 Population regulation

- 3.1 Competition for resources
- 3.2 Model of logistic growth
- 3.3 Fluctuations of population size in nature
- 3.4 Maximum sustainable yields
- 3.5 Conclusions

4 Interactions between species: Competition

- 4.1 Interactions between species
- 4.2 Competition
- 4.3 Competition and co-existence
- 4.4 Competition and evolution
- 4.5 Conclusions

5 Predation and food webs

- 5.1 Food chains
- 5.2 Food webs
- 5.3 Communities
- 5.4 Conclusions

6 Parasites and pathogens

- 6.1 Parasites
- 6.2 Parasite effects on host populations
- 6.3 Parasites and communities
- 6.4 Infectious diseases in humans
- 6.5 Immunity and vaccination
- 6.6 Model of disease dynamics
- 6.7 Conclusions

7 Evolution and disease

- 7.1 Evolution of drug resistance
- 7.2 The immune system as a defense against parasites
- 7.3 Evolution of virulence
- 7.4 Virulence of human diseases
- 7.5 Conclusions

8 The human food supply: competition, predation and parasitism

- 8.1 Plant competitors
- 8.2 Plant diseases
- 8.3 Pests
- 8.4 Conclusions

9 Food security

- 9.1 Potential routes to increase the number of consumed calories
- 9.2 Genetic improvement
- 9.3 Genetic modification
- 9.4 Conclusions

10 Prediction

- 10.1 Uncertainty in prediction
- 10.2 Examples
- 10.3 Planning for the future
- 10.4 Conclusions

11 Human population growth

- 11.1 History of human population growth
- 11.2 The demographic transition to low birth rate
- 11.3 Population size projections
- 11.4 Conclusions

12 Growth of Wealth and Urbanization

- 12.1 Income
- 12.2 Growth of income
- 12.3 Impacts reduced by technology
- 12.4 Urbanization
- 12.5 Conclusions

13 Habitat conversion

- 13.1 Appropriation of plant productivity
- 13.2 Appropriation of land
- 13.3 Impacts on habitats
- 13.4 Conclusions

14 Economics of habitat conversion

- 14.1 New York City's water supply
- 14.2 Value for tourists
- 14.3 Discounting: sustainable harvesting in the Amazon region
- 14.4 Externalities: shrimp farming in Thailand
- 14.5 Conservation
- 14.6 Conclusions

15: Climate Crisis: History

- 15.1 History of climate
- 15.2 Greenhouse gases
- 15.3 Present day effects
- 15.4 Conclusions

16 Predictions of future climate and its effects

- 16.1 Consequences of climate change: one, two and three degrees
- 16.2 Species responses
- 16.3 Limiting CO₂ build-up
- 16.4 Conclusions

17 Pollution

- 17.1 Pollution by fertilizers
- 17.2 Air pollution and acid rain
- 17.3 Herbicides and pesticides
- 17.4 Biomagnification
- 17.5 Remedial action
- 17.6 Conclusions

18 Invasive species

- 18.1 Transport and release
- 18.2 Establishment: becoming alien
- 18.3 Invasive pests and predators
- 18.4 Costs
- 18.5 Conclusions

19 Introduced Disease

- 19.1 undefended hosts
- 19.2 Reservoirs
- 19.3 Multiple factors
- 19.4 Fungal diseases in crops
- 19.5 Common species may decline to low levels more easily than rare ones
- 19.6 Ramifying effects on the food web
- 19.7 Conclusions

20 Harvesting on land

- 20.1 Patterns of exploitation
- 20.2 Effects on species
- 20.3 Economics
- 20.4 Effects on the food web
- 20.5 Conclusions

21 Harvesting in the ocean

- 21.1 Assessment of abundances of marine species
- 21.2 Effects of fishing beyond the target species
- 21.3 Present state of fisheries

21.4 Conclusions

22 Harvesting: prospects

22.1 Overharvesting

22.2 Incentives to conserve

22.3 Legislation and quotas

22.4 Reserves

22.5 Technology

22.6 Conclusions

23 Species

23.1 What is a species?

23.2 Classification and phylogeny

23.3 Number of species

23.4 Conclusions

24 Population declines

24.1 Land use

24.2 North American Breeding Bird Survey

24.3 Global species assessments

24.4 Conclusions

25 Extinction

25.1 Extinctions in earth's history

25.2 Human impacts

25.3 Are we in the 6th mass extinction?

25.4 Conclusions

26 Species across space

26.1 Why are more species present in one place than another?

26.2 Rarity, small ranges and distinctiveness in the tropics

26.3 Biodiversity hotspots

26.4 Conclusions

27 Island biogeography and reserve design

27.1 Island biogeography

27.2 Loss of species from habitat fragments in southern California

27.3 Mechanisms of species loss from small areas

27.4 Reserve design

27.5 Conclusions

28 Value of species

28.1 Ecosystem functions affected by loss of biodiversity

28.2 Ecosystem functions affected by loss of single species

28.3 Direct value of species

28.4 Prospects