1. The major questions of historical ecology: what can we learn about modern ecosystems from the past, and vice versa? How do ancient ecosystems inform conservation strategies?

2. Brief summary of modern processes and principles of ecology: competition, predation, trophic levels, production, consumption, mutualism, feedbacks.

3. The nature of the fossil record: stratigraphic and preservational biases, sampling artifacts, time-averaging, completeness of the record

4. A deep-time perspective
   a. Herbivory on land and in the sea, as seen from herbivores' and plants' viewpoints
   b. Bioturbation
   c. Bioerosion
   d. Predation
   e. Production
   f. The plankton and the benthos
   g. Land and sea
   h. Nutrient cycles, including effects of biomineralization and effects of life on geological processes
   i. Oxygen and carbon dioxide: history and consequences of change

5. The history and effects of climatic change: temperature, diversity, productivity, the control of climate by life.

6. The history, causes, and consequences of extinction
   a. Measuring extinction
   b. Patterns of extinction
   c. Selectivity of extinction
   d. Bottom-up and top-down causes
   e. Consequences of extinction
   f. Recovery

7. Causes and consequences of invasion: incumbency and the ecology of habitat size
   a. Islands, continents, and competition
   b. Examples of biotic interchange
   c. How barriers come and go

8. Current problems in the light of history
   a. Ocean acidification
   b. Climatic warming
   c. Habitat fragmentation
d. Globalization of ecosystems

9. Major ecological trends
   a. Increased diversity, especially on land
   b. Increased three-dimensional complexity
   c. Increased interdependence among, and regulation of, communities
   d. Decreasing vulnerability to rare events

10. The emergence and place of the human species as apex organism