CONSERVATION ECOLOGY 1-2-3087 4 credits

Description

As an applied science, conservation biology is based on two working approaches. The first and traditional approach is the individual species/population approach (also termed fine filter conservation). The approach is advantageous in that species and populations are entities that are easily defined and quantified and therefore it is easy to model them and provide predictions. However, because so many species are endangered and in light of limited resources it is not possible to address all the problems and any effort to conserve one species will be on the account of some other species. In recent years a new approach has emerged that deals with conservation at the higher orders of ecology, i.e. the community, ecosystem, and landscape. This approach is termed coarse-filter conservation. Both approaches have had success and failures and the approach selected should be based on existing conditions. This course will cover both approaches.
In addition, the course will put emphasis on the inter-disciplinarily nature of conservation, both within the life sciences and beyond them.

Structure

Course structure: 3 hrs/week lecture and 2 hours/week exercise.

Exercise is 40% of grade. Exercise is to be handed in within one week.

At the end of the course a single exam accounting for 60% of the grade.

Course plan

CONSERVATION AS AN APPLIED SCIENCE

1. Conservation translocation of the Persian fallow deer – a case study.

2. Nature and Conservation
    - 2.1 What is Nature and what is Nature Conservation
    - 2.2 Why conserve Nature?
    - 2.3 History of Nature Conservation.

3. Nature conservation: what do we conserve?
    - 3.1 What is Biodiversity
    - 3.2 Species diversity
        - Types of rareness
        - What is a species and its role in conservation.
        - Extinctions.
    - 3.3 Ecosystem diversity
    - 3.4 Genetic diversity

4. Conservation biology as an applied science of a crisis discipline.

The Crisis
The levels that we do conservation;
Fine-filter vs. course-filter conservation.
Tools for conservation
Conservation and policy

FINE FILTER

5. Small population paradigm
    - 5.1 Allee processes.
    - 5.2 Stochastic processes.
        - Demographic stochasticity
        - Genetic stochasticity
            - Drifts and bottle necks
            - Inbreeding
        - Environmental stochasticity and catastrophes.
    - 5.3 Effective population size, breeding cores.
    - 5.4 Statistical distributions.

6. Declining population paradigm
    - 6.1 Habitat loss and fragmentation
    - 6.2 Overharvesting
    - 6.3 invasive species
    - 6.4 Climate change and pollution

7. Population management
    - 7.1 Why are some species more sensitive to extinction
    - 7.2 Risk assessment (PHVA) and minimal viable populations (MVP).
    - 7.3 Risk management
    - 7.4 Adaptive management
    - 7.5 Reintroductions
    - 7.6 Managing two species systems.
    - 7.7 Reserve planning for a single species.
    - 7.8 Pest management
    - 7.9 Disease management.

COARSE FILTER

8. Conservation at the ecosystem and landscape levels vs. populations level. The importance of species in the community, direct and indirect species interactions, cascading.
9. Disturbance, complexity, flexibility, and stability. The relationship between systems characteristics and their ability to withstand disturbance.
10. Systems collapse: deserts, forests, overgrazing, and water pollution.
11. The search for focal species.
12. Planning reserves.
13. Managing non-protected open lands.
14. Barriers, roads, corridors and passages.
15. Reclamation and rehabilitation.
16. Global changes and conservation

Exercises

40% of the grade

The goal of the exercise is to discuss some of the most seminal papers on conservation biology as well as to recognize the true interdisciplinary nature of the field.
From the third week, each student will be assigned a paper by me. The student in charge of the paper will need to prepare a short presentation (10-20 minutes) summing up the paper, and then lead a discussion (in which everyone are expected to participate in). All other students will need to submit by the end of that week a short report (up to half a page) that sums up the implications or possible impacts of this paper.

Final exam

60% of the grade

Consists of 2 parts: The first 15 short questions (from a question bank that you will have access to) of which you have to answer 12 (5 points each). These are regurgitation questions. The second has 2 large questions of which you chose 1. Here you must show you ability to integrate, think and provide a well-structured answer.