Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

SLUkurs

Syllabus

PFS0182 Monitoring Biodiversity for Science and Conservation, 3.0 credits

Syllabus approved

2022-05-19

Subjects

Biology

Education cycle

Third cycle

Grading scale

Pass / Failed
The requirements for attaining different grades are described in the course assessment criteria which are contained in a supplement to the course syllabus. Current information on assessment criteria shall be made available at the start of the course.

Language

English

Prior knowledge

Master in Biology/Ecology, Knowledge of basic statistics and R

Objective, including learning outcomes

The student after taking the course should be able to:
1. Understand and critically evaluate the design of a monitoring

programme (census and sampling) of species, populations, communities and ecosystems.
2. Identify and formulate questions, and select methods based on scales of monitoring.
3. Critically evaluate the advantages, disadvantages and limitations of various monitoring/census methods.
4. Explore the collected data, and identify the right analyses.
5. Import and explore the collected data into R program, and undertake descriptive statistics on it.
6. Interpret the results from a census and evaluate the accuracy and precision of the variables estimated and obtained from the data.
7. Design a census for a given question and species in a habitat along with the resources needed and the time plan.

Content

Monitoring is a crucial part of every scientific research project and study. It is important that the monitoring/data collection is well designed, structured, planned and executed so that it fulfills the goals of the project or the study. This involves knowledge of various theoretical and practical aspects that are to be considered when collecting scientific data at different scales. Appropriate study design, sampling theory, effort, scale, bias, precision and accuracy, choosing the right metric, and replication are among the crucial theoretical aspects that are necessary for monitoring. The extent and strength of the inferences drawn will therefore vary, depending on the study design used in monitoring. Moreover, the use and the analyses of already collected monitoring data also requires skill and knowledge to be able to identify the biases and errors.

Many existing monitoring programmes suffer from various design deficiencies. Specifically, many programmes appear to be developed without paying adequate attention to three basic questions: (1) Why monitor? (2) What should be monitored? and (3) How should monitoring be carried out?

This course is targeted towards providing basic knowledge about census methods for monitoring the state of species, communities, populations and ecosystems as well as their attributes in space and time. Secondly, we will discuss how the biodiversity monitoring information is used at various law and policy levels and what are the challenges encountered by the stakeholders in monitoring and conservation of biodiversity.

1. Basics of census methods and sampling theory, biases and errors
2. Planning a census and experimental design (R power analyses)
3. Monitoring species, communities and ecosystems
4. Population Density methods, animal biotelemetry and removal methods
(R distance analyses, movement analyses, electrofishing)
5. Camera trapping, Mark recapture methods, including Genetic MRM (R lab)
6. Citizen science and Indexes – Catch Per Unit Effort (R lab)
7. Comparing census methods (R lab)
8. Remote sensing methods for monitoring biodiversity and spatial data (R lab)
9. Monitoring biodiversity – global conservation and policy perspective
10. Business and Biodiversity – offsets, standards, banking and methodologies

Requirements for examination

Examination will be in the form of an assignment

Additional information

Pedagogical form:
Onsite Lectures in the morning and computer lab exercises in the afternoon.

Responsible department

Department of Wildlife, Fish, and Environmental Studies