

Institute of Biodiversity
Prof. Dr. Aletta Bonn
Ökosystemleistungen

We offer opportunities for B.Sc./MSc or BSc theses and internships within the Ecosystem Service Lab on the following topics in biodiversity and ecosystem service research. If you are interested please send us an email with your interest, a short cv and your envisaged timescales.

MSc thesis: Environmental change at the hotspots of dragonfly species in Germany

Dragonflies are a charismatic feature of the German landscape. In fact, Germany is a species richness hotspot for dragonflies in Europe, because of the availability of different regional climates. Dragonflies are affected by many human activities, including water pollution. There is also evidence that climate change is affecting some species. However, it is unclear how much predicted future climate and land-use change are likely to affect the dragonfly hotspots of Germany. This project would be a statistical project bringing together data on dragonfly species' distributions, climate change and land-use change to understand the possible interactive effects and make projections about species at risk.

MSc or BSc thesis: Evidence for the regulation of bird populations by their food supply

Many species of birds are declining across Europe but the underlying drivers are unclear. Many different factors are known to affect the population abundances of birds. The role of weather is relatively well-studied, with climatic conditions during winter and spring both important. Less clear is how much bird abundances are regulated by the availability of their food supply. Recent studies in Germany and elsewhere in Europe have suggested that insect populations are declining. Similarly, recent work indicates that insectivorous birds have been declining, but whether this is linked to insect declines is unknown. This project would involve reviewing the evidence in scientific papers for a link between bird population size and food availability. If there is sufficient data, a quantitative synthesis (meta-analysis) would also be possible to determine the role of diet and habitat preference.

MSc thesis: Israeli Butterfly Monitoring Scheme- Analysis of species spatio-temporal trends and drivers of change

The Israeli Butterfly Monitoring Scheme (BMS-IL) is Israel's leading citizen science project. Established in 2009, BMS-IL involves tens of volunteers collecting data on butterflies from across the country. The project divides into different types of observations, and contains tens of thousands of records. We invite interested students to explore our data and jointly learn about spatial and temporal trends in species' abundance and distributions. Particularly, we are interested in exploring a) butterfly distributions with relation to habitat, and b) studying changes in the abundance of several rare and endangered species. Skills required include a background in biology (including courses in ecology), and experience with GIS.

MSc or BSc thesis: Scaling ecosystem services

The number of studies investigating ecosystem services across the world has dramatically increased over the last 10 years. However, comparative analyses are hindered by the different methods employed in individual assessments and by the lack of knowledge regarding the absolute maximum and minimum values that a particular ecosystem service can reach. This project aims at investigating global ranges of a set of ecosystem services using literature review and meta-analyses techniques. Previous knowledge on these techniques is not required, but beneficial. Candidates should have experience using the software R and a basic

understanding of the concept ecosystem services. These results will contribute to a scientific publication in which the applicant can be a co-author.

MSc or BSc thesis: Mapping ecosystem services

Mapping ecosystem services can reveal important trends and patterns relevant for land management. There are several techniques to map ecosystem services, most commonly, remote sensing products and field data. We offer two projects to develop the use of these techniques. The first project will use remote sensing data to map potential ecosystem service supply of the Bavarian National Park. The second project will use forest inventories to map temperate forest ecosystem services. Both projects are part of international collaborative projects, and the results obtained will contribute to scientific publications in which the applicants can be a co-author. Candidates should have experience in GIS and be familiar with the concept of ecosystem services.

MSc or BSc thesis: Using ecosystem services to assess ecological restoration

The ecosystem services concept has recently been suggested as the new paradigm in ecological restoration. To test to which extent this concept is being applied, this project will contribute to review the literature in search of existing studies that have used ecosystem services to assess the success of ecological restoration. These results will contribute to an international scientific publication in which the applicant will be a co-author. Candidates should have a clear understanding of the cascade framework of ecosystem services, and be able to distinguish between ecosystem processes, function, services and benefits.

MSc or BSc thesis: Contribution of ecological restoration to enhance ecosystem services

Assessing the success of ecological restoration is a challenge that currently needs the integration of different techniques and perspectives. Ecosystem services have been suggested to be an appropriate tool to quantify this success, however, few studies have put this into practice. This study will assess the change in ecosystem service supply after 10 years of the restoration of the River Piedra (Spain) and assess the changes occurred in this time. Candidates should be able to perform fieldwork and assist in the laboratory. Fieldwork activities involve plant relevés, collection of water and soil samples. Basic experience with statistical analyses using the software R is required. Knowledge of Spanish is not required but beneficial.

MSc or BSc thesis: The social perception of ecological restoration

The social perception of ecological restoration is prone to change through time. However, few studies have related social perceptions to the change in ecosystem services supply. In collaboration with the project above, this project will perform interviews to a variety of stakeholders regarding the ecological restoration of the River Piedra (Spain) and will compare it with the perception of people at the beginning of the works 10 years ago. Basic experience with statistical analyses is required. Previous experience in performing interviews is not required but beneficial. Excellent knowledge of Spanish is necessary.

MSc or BSc thesis: Ten principles of citizen science

Citizen science, the joint working of volunteer and academic scientists, is a budding field and holds many promises with regards to scientific innovation, enhanced learning and civic participation in research. Recently we developed the Ten Principles of Citizen Science within a

working group of the European Citizen Science Association. This project will evaluate a range of existing citizen science projects to see how they align with the ten principles and develop recommendations for best practice. Previous experience in performing interviews is not required but beneficial.

MSc or BSc thesis: InsektenMobil

Insects have been reported to decline dramatically in agricultural landscapes. Insektenmobil is a scoping study for a mobile citizen science observatory using car nets to sample insects. Samples will be analysed for biomass, species abundance and broad allocation to insect families using both standard sorting as well as image classification. The aim of this project is to compare the car net methodology with standard malaise traps along specified routes and to assess the influence of street trees on insect catches. Previous experience in insect identification advantageous. A drivers licence and access to a car is needed.