

10 Research Unit Biodiversity and Conservation Biology

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Position of the RU / Programme / Centre / Initiative at WSL with respect to Swiss AIM and its starting vision.

The biodiversity of forests, at all levels of biodiversity including habitats, species, genes, interactions and traits, and diverse groups of organisms, such as vertebrates, especially birds, bats, insects, trees and vascular plants, bryophytes, fungi with mycorrhiza and lichens, is a key topic of the RU Biodiversity and Conservation Biology. Our goal is the development and preservation of forest biodiversity by testing theories, understanding drivers, coming up with management implications and giving advice to practitioners/stakeholders.

Key scientific questions: current and foreseen for the medium (5–10 yrs) and long term (>10–50 yrs).

- Scientific questions
 - How do biotic and abiotic variables affect forest biodiversity and functional traits? (making better use of existing data from NFI, WSL and beyond).
 - What are the genomic adaptations of forest trees and functional reactions of mycorrhiza to environmental changes, such as climate change and drought?
- Applied questions:
 - How do different types of forest management affect forest biodiversity and forest structure?
 - How does biodiversity develop and how is it represented in common and special forests (Naturwald- und Sonderwaldreservate, rare forest types), the latter being under-represented in current monitorings.

Scales of interest (spatial, temporal, ecological, environmental) and/or statistical inference.

We are mainly interested in the scale of Switzerland, biogeographic regions and different elevations.

Statistical requirements (if any) in terms of precision of status and change estimates.

We are mainly interested in longer-term change. Hence, annual measurements are not necessary. However, after extreme events annual measurements on diverse groups of organisms (not only trees) would be important. Annual monitoring would also ask for in-situ measurements of environmental data (i.e. equipment on LFI-plots) in order to make full use of annual data.

Related data needs: attributes to be measured, plots, instruments, trees, destructive sampling.

More biodiversity measurements on organismal groups other than trees are needed. If proxies for biodiversity are used, a strong correlation between the proxies and real biodiversity data has to be proven under a range of environmental conditions (validation). Better representation of environmental space is needed.

Support and resource availability.

We offer:

- Distribution data from the data centres Swiss Fungi and Swiss Lichens.
- A significant number of plots for Red List assessments of the data centres are next to NFI plots.
- The programme “Monitoring of Nationally Important Habitats WBS” contains 800 plots from riparian forests (including Auenwald).
- Insect database (784,000 datasets, 8900 taxa)
- Species specialists for mammals, bats, birds, insects, vascular plants, bryophytes, fungi, mycorrhiza and lichens.
- Experience with forest biodiversity monitoring (including environmental DNA).
- Knowledge on relationships between forest structure and biodiversity (including LiDAR).
- Adaptive genomics of trees.
- Biodiversity modelling.
- Knowledge on conservation biology and implementation in forests.