Abstract template for the conference "A century of national forest inventories – informing past, present and future decisions"

Dear author. This is a two-page template that in the first page will ask for information on presenter name, topic, and preferred presentation form.

On page two, you are asked to fill in your abstract in the format and font size indicated. Please remember to include authors affiliation information in the footer section of page two. The length of the abstract may not be more than one page including references.

Abstract title:		Effects of different Swiss NFI sampling designs regarding tree regeneration on assessing ungulate browsing
Take-home message:		If the sampling method has to be changed, it should be considered that a comparison with older data is possible to calculate temporal evolution of features, since small differences can have a big impact on some features like on the browsing intensity.
Presenter name:		Andrea D. Kupferschmid
Presenter contact info:		Swiss Federal Research Institute WSL, Forest Resources and Management, Zürcherstrasse 111, 8903 Birmensdorf, Switzerland andrea.kupferschmid@wsl.ch
General topic, see website: (please double click on the check box and activate the relevant one)	☐	Improving future NFIs by learning from the past
	☒	NFIs today and in the future
	☐	Cutting edge and futuristic inventory techniques and technologies
Preferred presentation form:	☒	Oral presentation
	☐	Poster
Abstracts will be reviewed by members of our scientific committee and you will be given information on decisions in due time after the submission deadline has passed.		

Effects of different Swiss NFI sampling designs regarding tree regeneration on assessing ungulate browsing

Andrea Doris Kupferschmid, Christoph Düggelin, Urs-Beat Brändli

Introduction: Tree regeneration is a complex process that is strongly influenced by abiotic and biotic factors, such as browsing by wild ungulates. In recent years, ungulates have spread in different numerical and spatial terms in Switzerland. Using the data of the Swiss National Forest Inventory (NFI) this project aims to provide information on the temporal evolution of the influence of wild ungulates such as deer, chamois and red deer on the structure of the tree regeneration in Swiss forests.

Materials and methods: Tree regeneration has been assessed since the first Swiss NFI in 1981/83. Thereby the sampling method regarding tree regeneration has been changed from one inventory to another. First, advantages and disadvantages of these methods will be presented. Second, a detailed analytical and simulation-based method comparison of the four NFI surveys was carried out. Such a comparison was enabled due to a double assessment of the tree regeneration in the fourth Swiss NFI, where all trees in subplots and the nearest tree to subplot centre had been judged.

Results: We will present the consequences of some of the changes in these tree regeneration surveys. In particular, we aim to investigate differences originating from:

- assessing all trees within a subplot (NFI 2 and 4) vs cutting the sampling after 30 trees (NFI 1) vs assessing only the nearest tree to the subplot centre (NFI 3 and 4),
- shifts in the size of the sampling area and fixed (NFI 2 and 4) vs. variable radii depending on tree density (NFI 3),
- the selection of leader shoot(s) to be assessed for browsing, i.e. this year's (NFI1 and 3), last year's (NFI 4 and 3) or several annual shoot increments (NFI 2 and 3),
- the amount of separately recorded damages (browsing, fraying, rupture, dead, etc.) or the hierarchy of damages when assessed in one feature,
- varying divisions in height categories, e.g. 30-130 cm tree height in NFI 1 to 10-40 cm and 40-130 cm in NFI 2-4).

Conclusion: The NFI is the only nationwide unified dataset about tree regeneration and ungulate browsing in Switzerland. Thus, a correct method-adjusted data preparation is very important for assessing temporal effects; such as the temporal variations in the densities of wild ungulates, the spread of the red deer and the reintroduction of large carnivores (lynx and wolf). Thus, estimations of tree regeneration features in Swiss forests have a high relevance in forest policy.

1. Swiss Federal Research Institute WSL, Forest Resources and Management, Zürcherstrasse 111, 8903 Birmensdorf, Switzerland. *andrea.kupferschmid@wsl.ch*