

INNOVATIVE TOOLS IN PROTECTION FOREST MANAGEMENT MODELLING OF FOREST TYPES

WALDTYPISIERUNG TIROL

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THE PROJECT

In the framework of Interreg IIIb - Project “:nab – natural space analysis for alpine mountain areas” module 3 deals with basic principles for a efficient protection forest restructuring. The purpose of the module was to create a forest typology and forest type map for alpine regions as a further basis for protection forest management. Targeted working also requires adequate knowledge of the potential natural forest types, especially in connection with natural hazards. At present, data on potential natural forest types is only available for a few hot spots, a complete overview of the forest types (e.g. North Tyrol) is lacking. In the past, the retirement of long-serving forestry workers has automatically entailed the loss of their great experience in the field. A forest typology will be a valuable tool for preserving the extensive know-how of our forestry personnel concerning the practical management of protection forest.

THE OBJECTIVES

- Identification of potential forest types and cartographic representation in the forest type map
- Ecological, silvicultural and functional description of the various forest types
- Standardised silvicultural recommendations also in the view of natural hazards for practical work on forest types.

The forest type map will provide a convenient overview of site hazards and forest potential for all decision-makers including the non-expert (local mayors, etc.). This will also improve the quality of advice made available to forest owners.

THE PROCEDURE

The procedure will be a combination of GIS-based modelling and sampling in the field. After having studied the existing literature, in the second phase, the forest types will be defined with the help of a stratification model. Thirdly, field studies will be performed to verify the forest types in two steps, namely site inspections involving site, vegetation and community mapping, and calibration routes to verify the accuracy of the forest type map. Finally, evaluation of the captured data will be employed to provide a full ecological and silvicultural description of the forest types.

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STRATIFICATION MODEL

The modelled forest site units will be defined through a logical systematic combination of the following geoparameters: gradient, exposition, terrain shape and insolation as derived from the DTM (20x20 or 10x10), substrate groups of pedogenetic parent rock as derived from the 1:25,000 geological map, and stage. The advantages of the stratification model over conventional site mapping relate to savings in time and costs, and the ability to cover large areas with adequate precision (1:25,000).

FOREST TYPE MAP

The forest type map will be the first standardised large-area cartographic representation of potential forest types. It will be produced on a scale of 1:25.000. To facilitate orientation, orthophotos and/or the official Austrian ÖK map will be incorporated as the underlying map. The forest type map will also show the limits of the climate and plant community stages (colline, submontane, montane, upper montane and upper subalpine), the geological substrate groups, the contour lines, a number of significant geographic points, and local community boundaries. From experience with earlier projects, the forest type map can be expected to have an accuracy of about 80 % (+/- 5 %) compared with conventional site maps.

HANDBOOK OF THE FOREST TYPES

Each forest type is described and illustrated separately. The first page provides an overview of the site characteristics (terrain shape, exposition, gradient, stage, substrate, soil type with typical soil profile, humus form and skeleton content) and site factors (nutrients and water balance). The second page offers a verbal description of the physiognomy (natural forest) and the main plant species of the soil layer (listed by dominance). The section includes primary and secondary species, maximum tree height, productivity and structure, (stratification and composition). The next two pages offers adapted silvicultural management plans for every forest type. The main tree species and the main silvicultural measure available are presented in graphic form. There are especially silvicultural guidelines for natural hazards such as erosions, rock falls and avalanches.. The recommended silvicultural measures have been drawn up in collaboration with the Department of Silviculture at the Vienna University of Soil Science.

PRESENT PROJECT STATUS AND APPLICATIONS

Field work in the four selected project areas was successfully accomplished. In Tirol over approximately 180.000 hectares of forest area all various forest types could be identified and cartographically represented. In total, 75 different forest types were ecologically and silviculturally described. And for 29 forest types, silvicultural managing recommendations could be made. The results will provide the foundations and decision-making tools for the often extremely difficult task of protection forest management. The Regional Forestry Commission will incorporate them into the new protection forest blueprint for Tyrol. Above all, the results of the project will support local forestry personnel in their daily work in the field.

Keywords: forest type classification, GIS, forest type map