

Research Case Study

Restoration of the functioning forest ecosystems of the Ore Mountains

1. Overview of the research study

The research aim is to be locally and regionally specific, despite of general ecological aspects and forestry science dimensions of main problems connected with restoration of forest ecosystems as well as the Ore Mountains landscape. Particular aims of the research can be assumed as:

- ✓ Summarization of the data disposable both from the research as well as practical sphere, dealing with the forest management, stability, vitality and changes in forest ecosystems. Primary focus - forest regeneration and management.
- ✓ Re-establishment of research plots, founded in the past and abandoned at present, if reasonable. There is a possibility to use old research plots established with the aim to study dynamics of stands of preparatory tree species, different soil preparation techniques and amelioration treatments.
- ✓ Establishment of research plots for problems solution, which have been so far outside of the research interest:
 - (a) in the preparatory species stands,
 - (b) in hardwood stands on slopes, outside of research interest up to date,
 - (c) in xerophytic stands on slope bottoms.

(these plots will serve as the research basis for the next research, for the proposed project as well as for the next ones)

- ✓ Data sampling on research plots and their combination with former knowledge .
- ✓ Conclusions formulation for the forestry practice:
 - 1) description of the up to date ecosystem development,
 - 2) prognoses of the next development,
 - 3) treatment evaluation and proposal to increase vitality, stability and function potential of forest stands of the Ore Mountains including their technical and economical parameters.

Research activities are split in 5 part projects:

- (5) Anthropogenic changes in forest ecosystems of the Ore Mountains, their dynamics and indication,
- (5) Ecological effectiveness of revitalization treatments in the forest ecosystems of the Ore Mountains,
- (5) Topical and potential harmful factors in forest ecosystems of the Ore Mountains,
- (5) Economical parameters of treatments of the forest regeneration in the Ore Mountains,
- (5) Possibilities of the sustainable and close-to-nature forestry in the Ore Mountains region.

2. Description of forest management practices

The forest management practices were heavily influenced by air pollution loads. The air pollution forced to change not only

actual management of forest but all others activities as well including species composition.

The project target is represented by the evaluation of up to date forest dynamics in particular site condition and under differently high anthropogenic load (changes) and by the proposal and evaluation of treatments (ecological, economic). These aims are realistic in the next 5 years, further, the long-term aims will be revitalization. On the monitoring level, this is represented by the evaluation of ecosystem changes, on the technical level by the evaluation of economic and technologic trends.

From the forest management point of view, the regeneration processes have to be evaluated for 20 - 30 years horizon, as well as the development and growth of forest stands. These aspects can not be assured by any other research study.

3. Presentation of the study

The main reason, why the transfer of foreign knowledge in this area is not possible, with the exception of the most general one and with exception of the general hypotheses formulations. The same reasons disable the use of research results gained in other immission areas of the Czech Republic. The research started in the so called region of the "Black Triangle", but also in this case the activities do not cover the whole problem complex. Activities performed by the forest practice reach considerable amount, as well as the financial support of them. Despite this, the absence of relevant research knowledge and scientifically based conclusions are documented by stable failure in the forest restoration, as a dominant and determining ecosystem type.

According the newest reports of forest practice, new decline includes also the birch stands, being the most stable up to now.

On the contrary, the forest practice is dealing with the forest restoration several decades, being pressed by the forestry legislation (necessity of reforestation) as well as by the economic relationships and interests. Many procedures and technologies were tested, but their evaluation did not exceed the "visual" testing and the forests were managed on the basis of personal experience, often randomly and without reflection. Several studies of the type "Basics of the forest restoration in the Ore Mountains" were formulated consequently, but they deal mostly with the forest decline description and with the use proposal of technically possible treatments. They do not include ecological and economic analyses, despite they exploit modern technologies and represent considerable financial expenses.

4. Assessment of applied approach

Decreasing financial sources demand qualified studies on the other hand, when the cost are relevant. The lack of finances are connected with other impacts on the science and research management - lowering of the financial support of the basic as well as applied research, increasing administration (time and financial) costs, decline of the personnel situation and negative situation in the publication, especially in the so called academic sphere. The publication in the so called "impact" journals and in the research reports are not relevant for the forest and nature conservation practice.

5. Lessons learnt

It is necessary to use all this knowledge and, for the holistically based management, to complex it in the top part of the Ore Mountains by:

- ✓ forest soils revitalization projects - i.e. by the description of their degradation, state, development trends and technologic parameters including optimization procedures,
- ✓ the determination of genetic sources for forest re-establishment,
- ✓ the evaluation and prediction of dynamics of other ecosystem compartments,
- ✓ start with the management of slope stands, ageing to the decay stage with the absence of natural regeneration.

The topics will be very hot in the next decades. Also the piedmont (slope-base) position stands have to be focused by our interest i.e. those growing in considerably hot and dry conditions.

Treatments should be found and formulated aiming the increase of their economic as well as ecological value on one side and of their stability and vitality on the other. The complex research project has (by our opinion) the best conditions for its running and optimal use of results: the region is close to Prague, skills in the topics of interest, specialists for particular research goals and workers being able to formulate broad syntheses, international contacts, good technical assistance and equipment. Last but not least it is the ability not only to make particular researches, but also to have close contacts with the forestry practice in all the parts of the forest production and management.