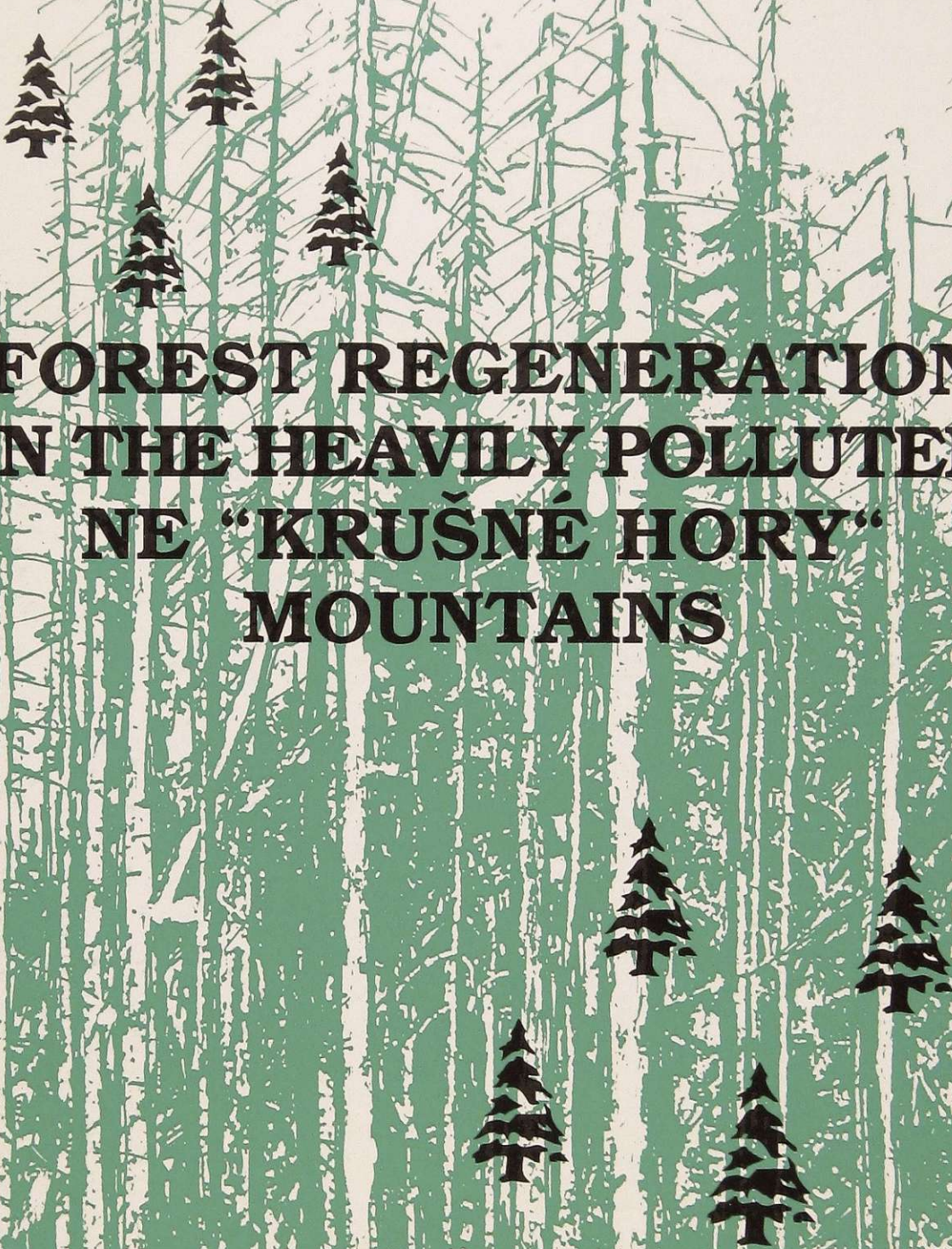


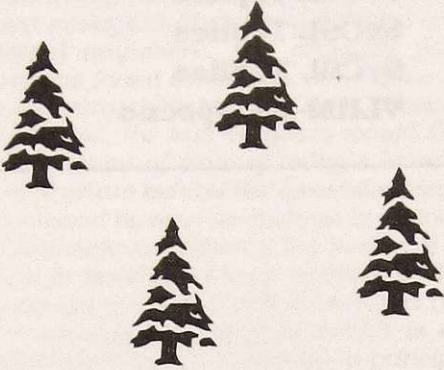
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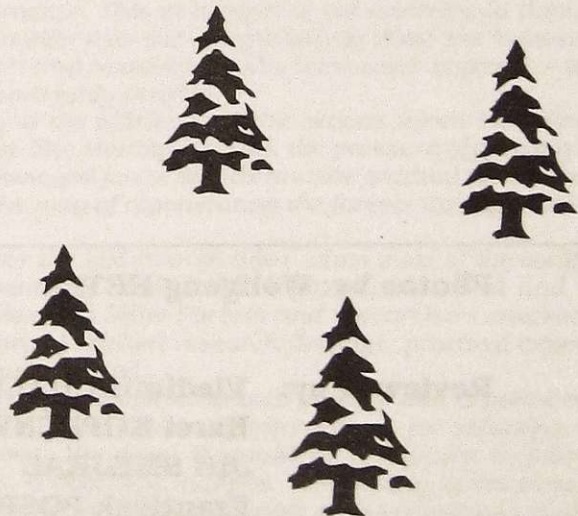
**FOREST REGENERATION
IN THE HEAVILY POLLUTED
NE "KRUŠNÉ HORY"
MOUNTAINS**

Prague 1993

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Introduction

The north-eastern part of the Forest Region No. 1 - the Krušné Hory Mountains has been the very first area of both the country and the Mid-European Region where the consequences of human activities caused ecological disaster of forest ecosystems whose character, extent and duration are hardly to be found anywhere. The principal factor that produced the collapse and the disintegration of continuous forest complexes are, above all, industrial emissions. Although their effects are difficult to define accurately in terms of time, because they are associated with gradual development of industry in the region, the last 40 years would be a good estimate for the period responsible for the disaster. From the point of view of today's knowledge it is comparatively complex to determine the decisive factors that are behind the forest devastation. The forest stands in the area of these mountains started to be shaped by man as early as in historic times by farming and, above all, industrial activities. These activities definitely altered the nature of the stands - the original tree species structure of mixed forest (spruce-fir-beech) has been replaced with stands having almost a uniform composition structure of the Norway spruce. It is a well-known fact that monocultures of any tree species are an unstable element where ecology is concerned which is easy to affect by external impacts. All this has been also contributed to by not adhering to principles of genetics, since during the 19th century, when spruce stands were established on a large scale, seed of various origin was used to regenerate the forests. Besides local collection the seed was obtained primarily by purchase from various trading companies.

A feature of the Krušné Hory Mountains is the specific climate affected by the orography of the mountain range. It is the steep landscape drop (the Krušné Hory Fault) that plays its unfavourable role here: the landscape gradually rises on the Saxon side to steeply drop down into the Podkrušnohorská Basin on the Bohemian side. This configuration affects the temperature and precipitation conditions and is, above all, a cause of fog frequently occurring throughout the year. The gradually developing industrial agglomeration in the Podkrušnohorská Basin, which is the major producer of emission, has been affecting the air with various pollutants proportionally to its growth. The pollutants contained in fog fully altered the quality of horizontal precipitation giving rise to mineral acids of various concentration which adversely affect the vegetation and soil environment.

The study does not intend to describe the effects of the emissions on the environment because new findings are still revealed and these may be more weighty than what has been found out so far. It will be a challenge for research to collect these findings and evaluate them as a whole. What is substantial, however, is the fact that at the times when the region saw the beginning of critical damage to forest stands, comparatively little was known about the effect of emission so as to show an optimum way to deal with the negative impact. The region was the first in Europe to have been mass damaged and there were neither findings nor practical experience to draw on. The symptoms of emission impacts were showing themselves in an uninterrupted sequence on a large area of the territory. The process of devastation resulting in accelerated forest decline in combination with the increasing failure in reforestation did not permit to solve the situation step by step as the research provided its results and it was necessary to search and experiment in practice. This statement is not intended to throw any doubts on the role of research. A valuable contribution was the comparatively close link between the research and practice as demonstrated by the fact that research results were used in practice to help solve operation problems without having been thoroughly verified.

Looking back at the work done and especially at the efficiency of the actions taken indicates that there were also other ways of solving the situation. The shortage of time, the pressure of growing tasks to have been dealt with especially in the area of damaged forest stands and the gradual understanding and development of the damage - all this led to the way of regenerating the forests through substitute tree species stands.

This book contains the results of work done over the last two decades when most of the coniferous stands on the plateau of the Krušné Hory Mountains died due to high pollution load and when combined efforts of the foresters of the North-Bohemian State Forests and researchers succeeded in recovering the forest. These results are a summary of applied research findings, practical experience and facts learned when the regeneration was implemented.

The objective of this publication is to pass unbiased judgement on both positive and negative results as well as to derive optimum procedures as one of a number of alternatives for solutions to the regeneration of forests in pollution affected areas. However, it would be a mistake to follow the recommendations and summarized directions in a dogmatic manner. The variety of environmental conditions calls for flexible thinking and creative adaptation of a solution to the conditions given.

In spite of this fact there is a number of common problems which can be dealt with while drawing on the facts learned and which frequently require a universal procedure. Utilization of the facts described may save both time and costs necessary to revitalize a damaged area.