From Forest Nursery Notes, Summer 2007

28. © Science, art, or application -- the "karma" of restoration ecology. Halle, S. Restoration Ecology 15(2):358-361. 2007.

Science, Art, or Application—the "Karma" of Restoration Ecology

Stefan Halle[1,2]

Abstract

The present state of restoration ecology is far away from Bradshaw's "acid test for ecology." The conclusions drawn from the series of papers in this issue and from the Jena workshop suggest some directions in which the field may progress. More attention must be paid to the degraded state, which should be evaluated by its specific features and carefully analyzed before any restoration plan is laid down. Restoration goals have to be realistic, which includes the appreciation of globally changing conditions, resulting in a paradigm-shift toward "forward-restoration." Basically, the transition from the degraded state conditions to the target state is a kind of succession that is manipulated by the application of goal-orientated and system-specific disturbances. Whenever possible, restorationists should step back and make use of naturally occurring succession, which requires a sophisticated restoration strategy, involving flexible management responses, multiple alternative target states, robust measurements for the restoration progress, and careful long-term monitoring. The unique feature of restoration ecology is the involvement of socioeconomic decisions, and conceptual frameworks for ecological restoration have to implement the specific links to natural succession. To bridge the gap between ecological theory and on the ground restoration, it is essential that restoration practice is translated into the vocabulary and thinking of basic ecology. If all these aspects are integrated, ecological restoration as an application—and restoration ecology as an applied science—may develop into an acid test for our understanding of interactions between people and their environment, rather than for pure ecology.

Key words: conceptual frameworks, degraded state, forward-restoration, natural succession, restoration goals, socioeconomic decisions.

Introduction

When Bradshaw (1987) coined ecological restoration with the catchword "acid test for ecology," he framed an argument that hardly can be disputed: nowhere else can the depth of ecological understanding be proved better than when applying the theoretical knowledge to the task of establishing self-sustaining ecosystems from a remnant that has lost many of its natural properties due to degradation. However, when looking at the present state of the field, it is quite obvious that it hardly meets the demands (particularly stressed in the two papers by Weiher and Choi in this volume, cf, Halle & Fattorini 2004), and that a long way from "ecological gardening" to a stringent scientific discipline still has to be covered.

The collection of papers on the present state and future perspectives of restoration ecology presented in this volume is indeed a conglomeration of personal views, as diverse as the background of the contributors. Statements and conclusions are also anything but unanimous, which not only reflects the discussions at our workshop properly, but also actually mirrors the state of affairs in the field of restoration ecology as a whole. However, when all the contributions are scrutinized for recurring themes and single statements are linked together, a surprisingly clear scheme emerges of how restoration ecology as a branch of ecological disciplines may progress. In the following, I will sum up the essentials from the presented papers and the discussion during the Jena workshop to extract the general traits.

Identifying the Degraded State

To classify a system as evidently degraded is in most cases straightforward, but this is not enough to develop a strategy for its restoration. For this task, it is precarious and misleading to rely on casual and aesthetical features alone; rather it is necessary to identify the system in depth, because what is left with respect to species composition, trophic interactions, and ecosystem functions are the basis from which any transition process to a more desirable state has to develop. Ultimately, degradation will often manifest itself in a deterioration of energy and organic matter fluxes, which implies the consideration of microbial activity and a thorough ecosystem analysis. So in general, "degraded ecosystems" should not predominantly be approached as "degraded," but rather as "ecosystems"—although with peculiar features—that have to be fully understood before being manipulated. The database for

[1] Institute of Ecology, Friedrich Schiller University Jena, Dornburger Strasse 159, D-07743 Jena, Germany
[2] Address correspondence to S. Halle, email stefan.halle@uni-jena.de