

Restoring Forests: Advances in Techniques and Theory

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The IUFRO restoration conference held from 27-29 September 2011 in Madrid, Spain, was designed to highlight recent scientific advancement in forest restoration with focus on dynamic principles, management practices, and policy. Scientists and practitioners have addressed the new challenges associated with forest restoration under stressful site conditions. The necessity to appraise benefits of new techniques in relation to the entire restoration process was emphasized. New techniques for production of plant materials and site preparation adapted to emerging new purposes and heterogenic environmental conditions were presented.



Group photo provided by John Stanturf

Forest restoration is a multi-step process that can be complex and difficult. During the past decades, a pronounced evolution has occurred in both the characteristics of the restoration areas and the objectives of restoration programs. Much of the past science of forest regeneration emphasized reforestation following timber harvest for industrial purposes. This research fostered groundbreaking advances in our field. But the focal point of today's forest regeneration scientists has shifted prominently toward restoration of harsh, degraded environments.

Increasing public concern for ecological sustainability demands that restoration help to counteract environmental impacts, while simultaneously rehabilitating forest species composition, structure, and function, and enhancing the carbon sequestration capacity of the land. Further, these tasks must now be accomplished under the dynamic nature of global change that implies higher water demand in most areas.

Therefore, the impetus for this Congress stems from the increasing challenges that we face working as scientists and practitioners in the complex field of forest restoration. A primary objective of the symposium was to complement current scientific knowledge of restoration of mesic temperate forests with recent advances in restoration of dry, harsh systems.

Key conclusions of the conference:

There is a need for increased specificity of the research focus toward the challenges faced in complex restoration environments.

A cost-benefit analysis of technical alternatives is needed with recognition of restoration of forest functions.

New technology for producing and evaluating stock types is necessary, considering the almost unlimited number of new species desired for forest restoration activities and the stressful conditions of degraded forest ecosystems. Seedling quality assessment must consider the specific functional traits of groups of species.

Mechanical site preparation is crucial in harsh areas. However, new techniques and a clearer understanding of functional relationships are needed to manage vegetative competition. Facilitation effects and microenvironment heterogeneity can improve establishment of seedlings, reducing the need of herbicide and other techniques that may have negative environmental consequences.

Increased attention needs to be given to the importance of genetics in driving science and operation; in particular, the role of seed sources and breeding was recognized as having a sustained impact on restoration success. Improving the process of extending research results to operation is still critical.

The participants have committed to reinforce their role as a multidisciplinary working group that periodically gathers foresters, ecologists, and natural resources economists to collectively address forest restoration issues. A new meeting has been announced to be held at Purdue University (USA) in 2013.

The conference (<http://www.restoringforests.net>) was held in Madrid, Spain, and supported by the Technological University of Madrid, Spanish Department of Science and Innovation, and Purdue University. IUFRO divisions involved were [1.06.00](#); [2.01.00](#); [3.02.00](#). A total of 105 participants attended. Along with eight invited speakers, there were 87 communications from 17 countries.