

## Introduction to the Special issue “Conservation, Restoration, and Sustainable Development of Mediterranean Forests”

Camilla Wellstein,<sup>1</sup> Stefan Zerbe<sup>2</sup>

<sup>1,2</sup> Free University of Bozen - Bolzano Faculty of Science and Technology  
Piazza Università 5 - I-39100 Bozen-Bolzano

Throughout the world, forests and forest landscapes are continuously declining due to land-use change towards agriculture and urban-industrial sprawl (FAO 2016). Consequently, related ecosystem services are lost, a development, which puts pressure on the environmental and socioeconomic systems. In the Mediterranean region, forest cover has been significantly reduced since the Middle Ages and the remaining forests had to face various land-use impacts like over-exploitation of timber, coppicing, litter gathering, and forest grazing (Scarascia-Mugnozza et al. 2000). Besides these forests, also unique close-to-nature forest ecosystems developed which consist of species assemblages and forest structures of high nature conservation value. An example are the ancient beech (*Fagus sylvatica*) forests on calcareous bedrock such as in the Pollino National Park in Basilicata, Southern Italy. There, the “Cozzo Ferriero” forest stand has just been recognized as a UNESCO World Heritage Site (UNESCO 2017). Today, in many Mediterranean countries, open land with agricultural land use is prevailing (Blondel & Aronson, 1995), thus representing anthropogenic ecosystems resilient to moderate and extensive human land-use impact throughout centuries (Blondel 2006). Due to their multi-functionality and manifold ecosystem services for humans and the society, forests today are subject to conservation, restoration, and sustainable forest development throughout Europe (Sayer

et al. 2013; Chazdon 2008; Lindenmayer et al. 2006). This encouraged and promoted forest certification systems such as the Forest Stewardship Council (FSC) and the Pan-European Forest Certification (PEFC) (Rametsteiner & Simula 2003).

On a workshop which was held at the Free University of Bozen-Bolzano in Sept. 2016, a group of experts from various Mediterranean countries discussed the current state of Mediterranean forests, concepts of nature conservation and restoration as well as strategies how to reach sustainability goals of forest development and forest use. Here we present a review paper and two cases studies from Mediterranean Forests in Greece and Italy.

The paper of Mercurio (2018) reviews past and new causes of forest degradation occurring in the Mediterranean region. Based on conceptual approaches and case studies it is shown how forest restoration is promoted currently and a further development towards a unified forest restoration strategy in Italy is discussed. Site ecology as well as cultural history has to be taken into account to meet the requirements of sustainable forest development and restoration.

In the paper from Goedecke and Bergmeier (2018), the focus lays on the endemic tree species *Zelkova abelicea*, exclusively occurring on the island of Crete, Greece. Based on a characterization of the ecologically distinct niches of the relict populations, the potential

distribution of the tree species on Crete is predicted. This approach can help to restore tree populations in other Mediterranean regions which have been declined due to fragmentation and anthropogenic impact.

Mantilla Contreras et al. (2018) focus on the Island of Asinara, a national park in the northwest of Sardinia, Italy. The island is mostly free of forests due to historic land-use development and its particular history

as prison island. Various scenarios of forest restoration are outlined, taking the remnants and ecological potential into account.

We are convinced that only joint international efforts can promote sustainable land-use development and the restoration of ecosystems which provide the society with all necessary ecosystem services. This special issue is considered a step into this direction.

## References

- Blondel, J. 2006. The ‘Design’ of Mediterranean landscapes: a millennial story of humans and ecological systems during the historic period. *Human Ecology*, Vol. 34, No. 5: 713-729.
- Blondel, J., Aronson, J. 1995. Biodiversity and ecosystem function in the Mediterranean basin: Human and non-human determinants. *Mediterranean-type ecosystems: The function of biodiversity*. Springer-Verlag, Heidelberg, Germany.
- Chazdon, R.L. 2008. Beyond Deforestation: Restoring Forests and Ecosystem Services on Degraded Lands. *Science*, Vol. 320, No. 5882: 1458-1460.
- FAO 2016. *Global Forest Resources Assessment 2015. How are the world’s forests changing?* Second edition. FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, Rome, 2016.
- Goedecke, F., Bergmeier, E. 2018. Ecology and potential distribution of the Cretan endemic tree species *Zelkova abelicea*. *Journal of Mediterranean Ecology* 16: 15-26.
- Lindenmayer, D.B., Franklin, J.F., Fischer, J. 2006. General management principles and a checklist of strategies to guide forest biodiversity conservation. *Biological Conservation* 131: 433-445.
- Mantilla-Contreras, J., Drissen, T., Wätzold, M., Stadtmann, R., Zerbe S. 2018. What we can learn from the current vegetation for forest restoration in the Mediterranean region - a case study from the island of Asinara. *Journal of Mediterranean Ecology* 16, in print.
- Mercurio, R. 2018. What does forest restoration mean in Italy? *Journal of Mediterranean Ecology* 16: 27-36.
- Rametsteiner, E., Simula, M. 2003. Forest certification—an instrument to promote sustainable forest management? *Journal of Environmental Management* 67: 87–98.
- Sayer, J., Sunderland, T., Ghazoul, J., Pfund, J.-L., Sheil, D., Meijaard, E., Venter, M., Boedhihartono, A.K., Day, M., Garcia, C., van Oosten, C., Buck, L.E. 2013. Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. *Proceedings of the National Academy of Sciences* 110 (21): 8349-8356.
- Scarascia-Mugnozza, G., Oswald, H., Piussi, P., Radoglou, K. 2000. Forests of the Mediterranean region: gaps in knowledge and research needs. *Forest Ecology and Management* 132: 97-109.
- UNESCO 2017. Supplementary Information on the Nomination “Primeval Beech Forests of the Carpathians and Other Regions of Europe” as extension to the existing Natural World Heritage Site “Primeval Beech Forests of the Carpathians and the Ancient Beech Forests of Germany” (1133bis). <https://whc.unesco.org/document/156799> (retrieved 16th Aug. 2018)