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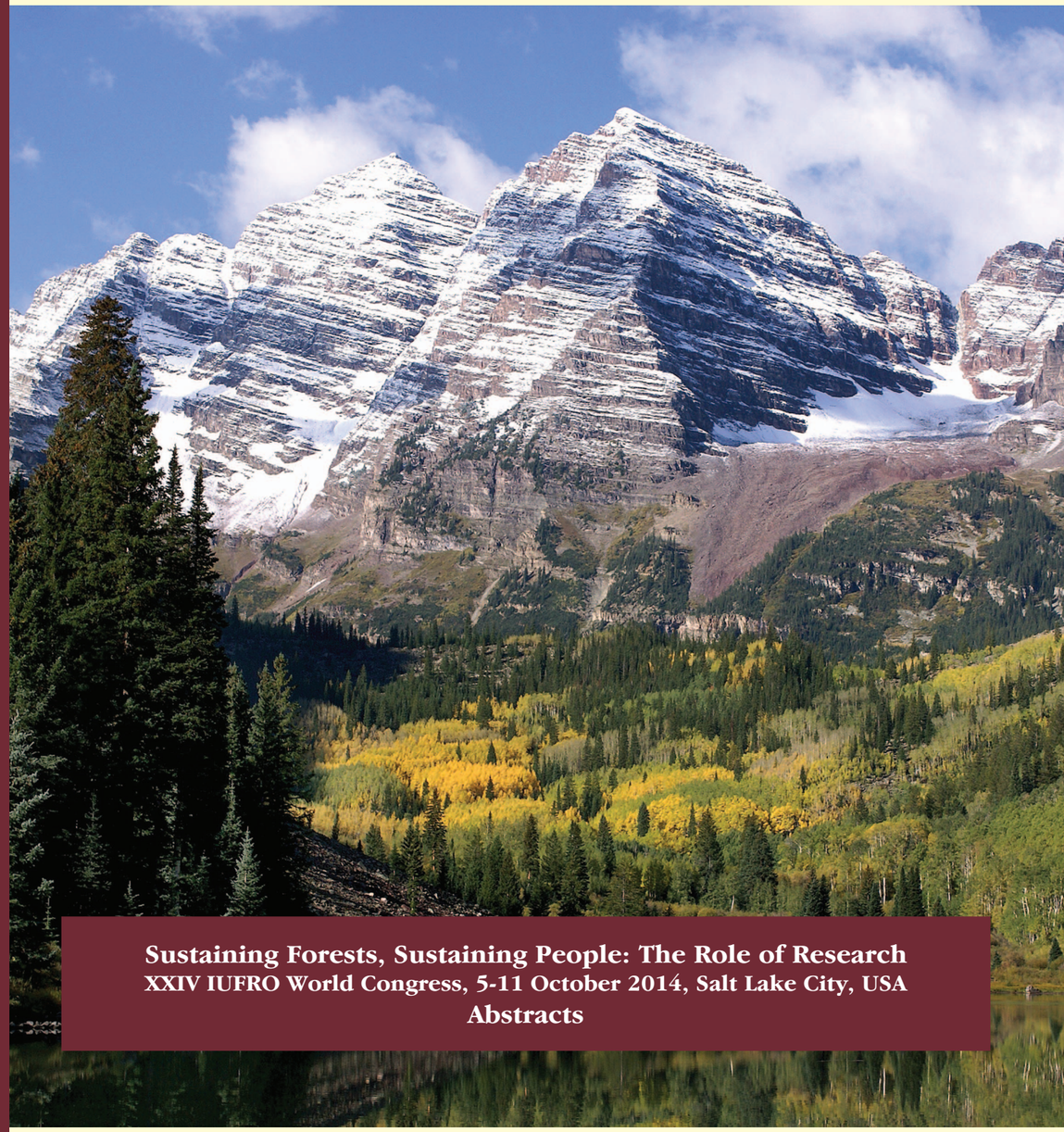

Sustaining Forests, Sustaining People: The Role of Research
XXIV IUFRO World Congress, 5-11 October 2014, Salt Lake City, USA
Abstracts

EDITORS: JOHN A. PARROTTA, CYNTHIA F. MOSER, AMY J. SCHERZER, NANCY E. KOERTH and DARYL R. LEDERLE

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groups and their influence on carbon dynamics. This study was conducted in an area of primary forest belonging to EMBRAPA Western Amazon, using data from three forest inventories conducted in 2005, 2007, and 2010, which measured all trees with DBH ≥10 cm. The aim of this study was to evaluate carbon dynamics in pioneer and non-pioneer forest species in an area of unmanaged forest, between 2005 and 2010, in order to determine the contribution of pioneer species (which have fast growth, and therefore absorb more carbon from the atmosphere) to the carbon balance of the area. Results showed that the pioneer species did not contribute significantly to the volume or to the carbon stock in the forest studied; only 13% of the local carbon stock was related to the pioneer species.

Contribution of Sapotaceae, Burseraceae, and Lecythidaceae families to carbon sequestration in an unmanaged forest in the Brazilian Amazon. Souza, C.R., Azevedo, C., Rossi, L.B. (*EMBRAPA, Brazil; cintia.souza@embrapa.br; celso.azevedo@embrapa.br; marcelo.rossi@embrapa.br*).

Tropical forests play an important role in the issue of global climate change. This study was conducted in an area of primary forest belonging to EMBRAPA Western Amazon, in Manaus/Amazonas. In this area, most species (approximately 40%) belong to the Lecythidaceae, Sapotaceae, and Burseraceae families. Data were used from three forest inventories that measured all trees with DBH ≥10 cm in 2005, 2007, and 2010. Considering the large representation of individuals of these families in the study area, the goal of this project was to evaluate the contribution of species in these three families to the carbon balance of the area between 2005 and 2010. The results showed that 31.3% of the timber volume of forest species studied was related to the selected families. The same can be observed in the case of carbon stock: 32% of the total carbon stock of the unmanaged area came from the three families studied. This contribution is significant but was expected, given that these families account for a large proportion of the forest species on the site.

Contribution of forest management to carbon sequestration in the Brazilian Amazon. Souza, C.R., Azevedo, C., Rossi, L.B. (*EMBRAPA, Brazil; cintia.souza@embrapa.br; celso.azevedo@embrapa.br; marcelo.rossi@embrapa.br*), Santos, J., Higuchi, N. (*National Institute of Amazonian Research (INPA), Brazil; joca@inpa.gov.br; niro@inpa.gov.br*).

The Amazon forest has received increased attention as global discussions consider the role of forests in global climate change. Burning or thinning forests can increase greenhouse gas emissions. On the other hand, carbon can be absorbed from the atmosphere through the growth of the stand. This study analyzed data from three forest inventories to evaluate the contribution of forest management to carbon sequestration, by quantifying carbon stocks and dynamics in a Central Amazon forest. No difference was found between logging treatments after 23 years of application. The control treatment (without logging) showed the highest carbon stocks. The carbon stocks in the forest equaled the existing stocks in 1986, prior to the experimental logging, indicating total recovery of the forest in terms of biomass. Nevertheless, the area may not be ready for harvest again, mainly due to the high number of pioneer species still existing in the managed area. In other words, the forest has recovered in terms of biomass but not in terms of species composition.

Modeling bark thickness and volume for Norway spruce (*Picea abies* [L.] Karst) in southwest Germany. Stängle, S., Brüchert, F, Nakou, A., Sauter, U. (*Forest Research Institute Baden-Wuerttemberg, Germany; stefan.staengle@forst.bwl.de; franka.bruechert@forst.bwl.de; Aikaterini.Nakou@Forst.bwl.de; udo.sauter@forst.bwl.de*).

Precise bark thickness estimates are important to calculate log diameters inside bark from measurements outside bark and to assess the availability of bark biomass. National forest inventories usually are based on diameter measurements outside bark, so wood volume can only be calculated with precise bark thickness estimates that should reflect regional conditions. In Central Europe the wood volume that is relevant for trade agreements between forest owner and wood buyer, can be calculated with modeled inside bark diameters using outside bark measurements. Another use for bark models is in bucking optimisation software for harvesters. Bark has become a valuable fuel, and bark components can be extracted for high-value biomaterial production. Thus, the assessment of available bark biomass is important to estimate the potential of such technologies for generating additional income for the forestry sector. Existing bark models have shown that bark thickness is strongly influenced by site conditions. Changing climate and increased nitrogen deposition, as well as changing silvicultural practices, might therefore have influenced relative bark thickness in the study area. This paper presents the results of modeling bark thickness for Norway spruce based on easy-to-measure tree variables, such as stem height, as well as seasonal changes, regional variation, and genetics.

Perspectives on integrating multi-phenological and multi-sensory remote sensing data into operational forest management. Stoffels, J., Hill, J., Mader, S., Sachtleber, T. (*Trier University, Germany; Stoffels@uni-trier.de; hillj@uni-trier.de; mader@uni-trier.de; sachtl@uni-trier.de*), Langshausen, J. (*Rhineland-Palatinate State Forest Administration, Germany; Joachim.Langshausen@wald-rlp.de*).

In the Federal State of Rhineland-Palatinate (Germany), local forest management plans are currently based on databases comprising attributes of various forest stand characteristics. Due to the prohibitive costs of traditional inventory concepts, there is a strong interest in exploring remote sensing as a replacement or complementary strategy. Emphasis is placed on detailed forest cover maps that, beyond their direct information content, can be used as stratification layers for reducing or optimizing field sampling efforts. Remote sensing-based forest inventory methods have to meet high quality requirements because of the high variation in forest communities and forest structure and the fragmentation of the Central European forested area. The aim of this study was to classify the main tree species and development stages of the total forest area in Rhineland-Palatinate (>800 000 ha) using multi-temporal ASTER, SPOT-5, and RapidEye data. To overcome current limitations in achieving acceptable mapping results within topographically heterogeneous and structurally complex forest systems, a spatially adaptive classification approach has been developed. The quality of the derived maps complies with the requirements of the state forest service. Further work will be focused on complete integration into forest management operations. Additionally, a conceptual framework will be presented for using Sentinel-2 data to support an optimized integrated inventory design.