

LCLUC Abstract

DRIVING FORCES OF CHANGE IN REGIONAL CARBON STOCKS:

COMPARISON OF THE WESTERN OREGON, USA AND ST. PETERSBURG REGION, RUSSIA

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To derive general principles concerning causes and consequences of land cover and land use change (LCLUC) in dynamic socio-economic environments we propose a synthesis of past research in two forest regions with contrasting land-use history and active ongoing changes in land management: Western Oregon, U.S.A. and St. Petersburg region in northwestern Russia. These regions represent distinct global trends in land-use, i.e. a move towards ecosystem management on public lands in developed market economies on one hand and on the other hand, the effects of profound macro-economic, institutional, and social transformation, that are common among economies in transition. Past studies of carbon dynamics in these two regions successfully integrated remote sensing technology with ground data for a comprehensive assessment of changes in regional carbon stores. The major goal of this new phase of research is to fully integrate the socio-economic drivers into the analysis of present and projected future LCLUC processes and associated changes in carbon stores. The hierarchical set of models that simulate regional carbon dynamics (StandCarb, MaxCarb, Harvest, and ForProd, all integrated in LandCarb) will be linked with the Forest and Agricultural Sector Optimization Model (FASOM) to analyze the effects of a recent decline in timber harvests in both regions. This analysis will emphasize the temporal patterns of response of different ecosystem components and economic variables to change in land-use. Examination of how (and if) changes in driving forces of land-use during 1990's and in preceding decades manifest themselves in current and future regional carbon dynamics can provide important evidence on the ability of humans to manipulate the processes of terrestrial carbon cycling at the decadal time-scale. Further, we will compare the role of environmental and social factors in defining the bounds of change in regional carbon stocks 10-20-30 years into the future under alternative economic development scenarios. Understanding the constraints on increasing carbon stores and the temporal patterns of ecosystem response to change in socio-economic conditions is crucial for evaluation of the feasibility and efficacy of various strategies designed to manage carbon storage on land. Finally, our proposed synthesis would advance the methodology of LCLUC studies by creating a synergy among ecosystem, remote sensing, and socio-economic research.