

Original article

EDN GBOEJC

DOI 10.24419/LHI.2304-3083.2024.1.03

Carbon Stock in Living Biomass of Russian Forests: New Quantification Based on Data from the First Cycle of the State Forest Inventory

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Abstract. The carbon stock in living forest biomass was quantified based on first-cycle State Forest Inventory (SFI) measurements in permanent sample plots. The total carbon stock in above- and below-ground living biomass was assessed to be $46.9 \pm 0.4 \times 10^9$ tons C and average carbon stock at 52.1 ± 0.5 t C ha⁻¹ as of 2020. The State Forest Register (SFR), the primary source of consolidated information on Russia's forests, estimates the forest growing stock to be 83.1×10^9 m³. The total growing stock volume in the forests, according to the SFI amounted to 113.1×10^9 m³. Owing to the updated and significantly higher growing stock volume, the estimate of carbon stock in living biomass is approximately 35 % higher than previously reported. The uncertainty of the total and average carbon stocks based on SFI data was substantially lower (approximately 1 %) than that reported in previous studies (15–30 %). Methods of accounting for the carbon stock in living biomass, the results of calculations for forest lands throughout the country, units of the administrative division, and forest zoning were considered. Assessment of living biomass based on representative sampling can substantially improve the relevance and reliability of national forest reporting.

Key words: Russian forests; living biomass; carbon stock; forest inventory; permanent sample plots

For citation: Filipchuk A., Malysheva N., Zolina T., Seleznev A. Carbon Stock in Living Biomass of Russian Forests: New Quantification Based on Data from the First Cycle of the State Forest Inventory. – Text: electronic // Forestry Information. 2024. № 1. P. 29–55. DOI 10.24419/LHI.2304-3083.2024.1.03. <https://elibrary.ru/gboejc>.

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