



## **Information system of forest growth and productivity by site quality type and elements of forest**

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The efficiency of forest management can be improved substantially by development and introduction of principally new models of forest growth and productivity dynamics based on regionalized site specific parameters. Therefore an innovative information system was developed. It describes the current state and gives a forecast for forest stand parameters: growth, structure, commercial and biological productivity depend on type of site quality. In contrast to existing yield tables, the new system has environmental basis: site quality type. The information system contains set of multivariate statistical models and can work at the level of individual trees or at the stand level. The system provides a graphical visualization, as well as export of the emulation results.

The System is able to calculate detailed description of any forest stand based on five initial indicators: site quality type, site index, stocking, composition, and tree age by elements of the forest. The results of the model run are following parameters: average diameter and height, top height, number of trees, basal area, growing stock (total, commercial with distribution by size, firewood and residuals), live biomass (stem, bark, branches, foliage). The system also provides the distribution of mentioned above forest stand parameters by tree diameter classes.

To predict the future forest stand dynamics the system require in addition the time slot only. Full set of forest parameters mention above will be provided by the System.

The most conservative initial parameters (site quality type and site index) can be kept in the form of geo referenced polygons. In this case the system would need only 3 dynamic initial parameters (stocking, composition and age) to simulate forest parameters and their dynamics.

The system can substitute traditional processing of forest inventory field data and provide users with detailed information on the current state of forest and give a prediction.

Implementation of the proposed system in combination with high resolution remote sensing is able to increase significantly the quality of forest inventory and at the same time reduce the costs. The system is a contribution to site oriented forest management.

The System is registered in the Russian State Register of Computer Programs 12.07.2011, No 2011615418.