

Reliable achievement of Douglas-fir stand management objectives using real time precision forestry  
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The goal of the project is to develop a novel stand management technique that synchronizes planned with implemented activities in real time. The project rethinks silviculture for the first time in the last 300 years by seeking simultaneous optimization of decisions for a stand (area) with decisions for a tree-neighborhood (point). The technique will consider three ecosystem services: resilience to wildfire, improvement of wildlife habitat, and production of raw material. The goal is achieved by three supporting aims: 1) enhancement and implementation of tree segmentation algorithms from photogrammetric point cloud, 2) development of a spatial explicit extension for the ORGANON software, and 3) optimize stand value by simultaneously considering the value of trees to be removed with the future value of the trees that remain. Aim1 is accomplished by two actions, one focused on describing the stand and trees with photogrammetric point clouds, and one on segmenting tree-neighborhoods from the point cloud. Aim 2 consists of inclusion of distance dependent competition indexes in ORGANON. Aim 3 will be attained in four actions, the main ones being development of a tree bucking algorithm using photogrammetric point clouds and maximization of stand value while optimizing tree-neighborhood objectives. The project develops an innovative management practice that enhances ecosystem services by significantly increasing the value of three services: provisioning, supporting and regulating. The main outcome of the project will be a ready-to-use technology by forestry practitioners. The project fits within the program area priority A1401 "Sustainable Agroecosystems: Functions, Processes and Management".