MONITORING THE HEALTH AND PRODUCTIVITY OF POWELL RIVER PROJECT FORESTS WITH SPECIAL EMPHASIS ON SUSTAINING HIGH-VALUE AND BIOLOGICALLY DIVERSE RECLAMATION SYSTEMS

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Introduction

Southwestern Virginia is well-known for coal. Yet forest resources management is also a critical part of the region's character and economy. For more than 25 years, the Powell River Project has played a key role in hosting research and education to support mining industry efforts to develop effective methods for reclaiming mined lands with forests. Now, partners are working to take the next step in reclamation on coalfields by researching and demonstrating profitable and sustainable forest management practices in the Powell River Project's natural and planted forests (see "A Working Laboratory at the Powell River Project To Research and Promote Sustainable Forest Management" by Munsell, Rockett, Worrell, and Whiteley in the Powell River Project's 2008 report). Rehabilitating degraded natural forests adjacent to reclaimed stands will provide examples of the benefits associated with forest restoration, while efforts to record the changing state and function of forests planted after mining operations will help scientists develop systematic approaches for profitably and sustainably managing reclamation forests. Sustainable forest management education offered through the Powell River Project Research and Education Center via Virginia's Link to Education about Forests (LEAF) partnership will offer programs related to managing productive, healthy, and diverse forested ecosystems on mining lands. This report documents the initiative's progress during the past year.

Background

Virginia Cooperative Extension and Virginia Tech's Department of Forest Resources and Environmental Conservation continue their efforts to take the next step in coalfield reclamation by researching and demonstrating sustainable forest management in natural and planted forests at the Powell River Project. The purpose is twofold: 1) monitor the health and productivity of reclamation forests with special emphasis on the long-term management of sustainable, high-value systems and 2) develop and administer a corresponding educational program via Virginia's LEAF partnership that regularly conveys critical insights and recommendations to stakeholders for profitably and sustainably managing forested ecosystems on Appalachian mining lands. Objectives consist of tracking species composition, health, and productivity in reclamation stands over time, developing systematic and operationally feasible silvicultural prescriptions to achieve a variety of goods and services over the course of stand rotation, and rehabilitating degraded adjacent natural forests using controlled, low-intensity burning and thinning. During the summer of 2009, a field technician re-measured a portion of overstory, regeneration, herbaceous, and downed woody debris plots established in 2008 in 4 Compartments (A, B, C, D) on about 200 acres of adjacent degraded natural forests (Figure 1). The technician also

established a similar inventory system on a 15-acre mixed-species reclamation stand of about 7 years in age.

Methods

In April 2008, a 12-acre controlled, low-intensity burn was conducted in concert with Virginia's Department of Forestry in Compartment A (Figure 2). The purpose was to reduce invasive species, enhance desirable regeneration, and prepare for future restorative cutting in a stand directly adjacent to the Education Center complex. In the summer of 2008, comprehensive forest inventory research plots were established in the treated compartment to track impacts on invasive vigor and compare herbaceous cover and tree regeneration with like data from similar plots in an adjacent control compartment (Compartment B).

The tenth-acre over-story plots, mil-acre regeneration plots, and woody debris transects were re-inventoried in Compartments A and B during the summer of 2009. Stems one inch in diameter at breast height (dbh) and greater were inventoried. Future inventories are planned to track the long-term impact of the burn treatment and inform follow-on restorative cutting. Plots in Compartments C and D were also spot-checked for consistency with 2008 measurements. Like forest inventory plots using 1/24th acre circular boundaries were established in a 7 year old, 15-acre mixed-species reclamation stand – Compartment E (Figures 1 and 3). Dbh, basal area, live crown ratio and crown positions were recorded. Merchantability was determined for each tree and a grade of acceptable or unacceptable growing stock was given based on species, bole shape, crown position and tree damage. The entire inventory system was mapped using a Global Positioning System. Data collected at each plot will be used to monitor the health, productivity, and diversity of the stand and identify management prescriptions and operational guidelines to achieve profitable and sustainable reclamation stand management.

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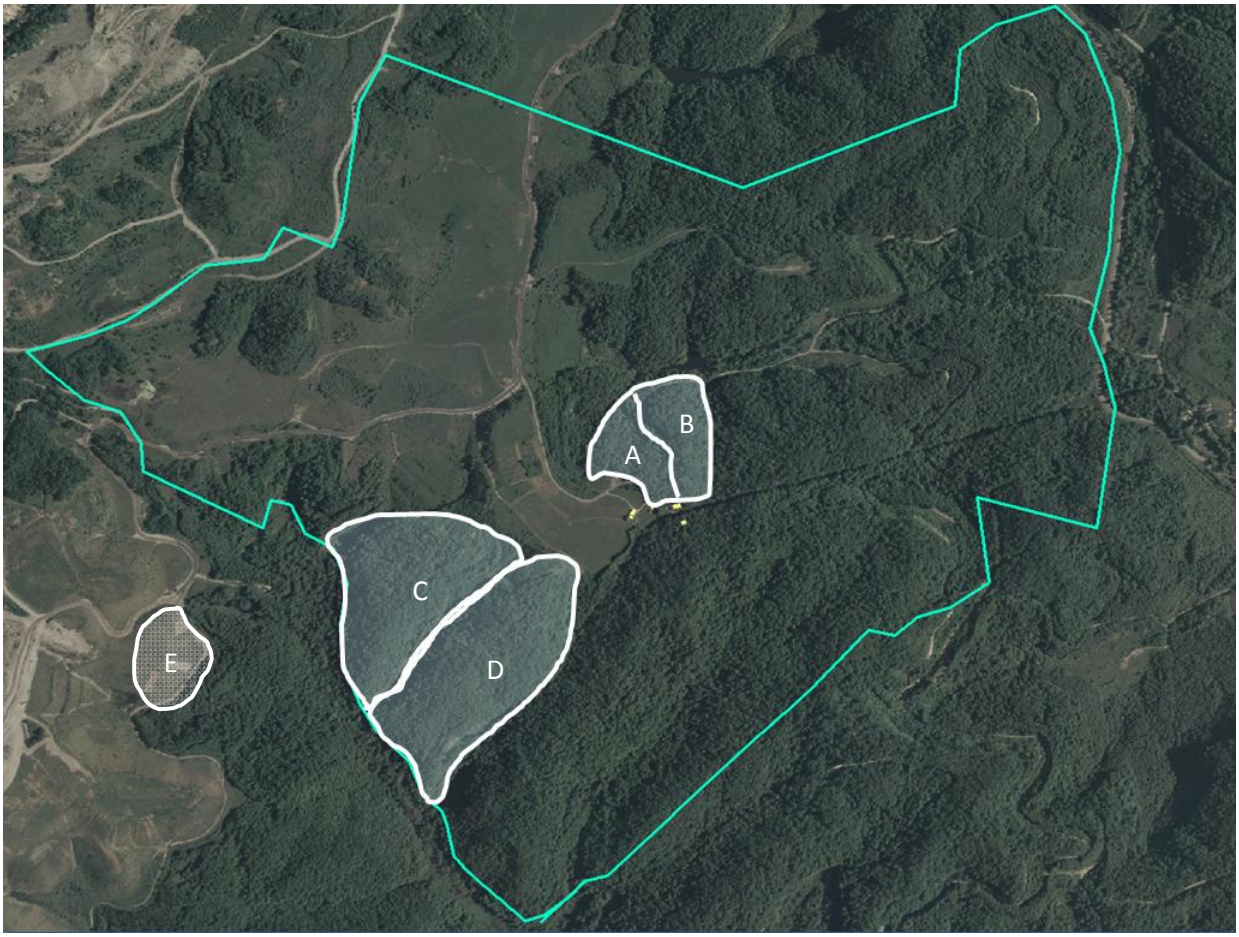

Figure 1. Four natural forest compartments (A, B, C, D) at the Powell River Project inventoried during the summer of 2008. Compartments A and B were fully re-inventoried and C and D spot-checked during the summer of 2009 and a comprehensive permanent forest inventory system established in Compartment E.

Figure 2. Virginia's Department of Forestry conducting a controlled burn in Compartment A.

Figure 3. Comprehensive forest inventory plot system established in Compartment E during the summer of 2009. Baseline data were collected via the system. Future inventory will provide time series changes in the maturing, mixed-species reclamation stand. Results will assist in designing best practices to sustain health, diversity, and productivity.