



Exploited Plant Monitoring – Trilliums, Bloodroot, Black Cohosh

Affected Parks

Blue Ridge Parkway (BLRI)

Importance / Issues

The illegal harvesting of plants for commercial sale in the herbal remedy and floral markets is of growing concern along the Blue Ridge Parkway, where individual poachers have been intercepted leaving the park with tens of thousands of plants. Numerous species of plants targeted by poachers are found in the Blue Ridge Mountains and there is evidence that illegal harvesting activity is increasing. Some of these species do not recover quickly (or at all) from intensive harvesting, and are being eliminated from habitats that are accessible to poachers. The close proximity of desirable species to the Parkway motor road makes them particularly vulnerable to illegal harvesting.

The National Park Service is working with NatureServe to develop a monitoring plan for several plant species known to be significant poaching targets, including black cohosh (*Actaea racemosa*), bloodroot (*Sanguinaria canadensis*), and several trillium species (*Trillium* sp.). These plants are often found in close proximity, in concentrations large enough to make sampling feasible and to make the results statistically informative. If monitoring efforts indicate significant declines in populations of these plants, park managers will have the information they need to decide whether additional law enforcement or public education efforts are required.

Preliminary Monitoring Objectives

The goals of this long-term monitoring effort are to determine whether populations of commonly poached plant species are declining along Blue Ridge Parkway and to detect any early warning signs that other potential poaching targets may be declining as well. Specific objectives are:

1. To be able to detect a 30 percent decrease in the overall abundance of black cohosh (*Actaea racemosa*), trilliums (*Trillium* sp.), and bloodroot (*Sanguinaria canadensis*) within the Blue Ridge Parkway study area;



Large-Flowered Trillium on Blue Ridge Parkway

2. To periodically collect and qualitatively review presence and absence data of all species found in sample units for patterns indicative of potential large-scale change in species composition and abundance.

Methods

A predictive GIS model developed by the U. S. Forest Service (Simon et al. 2005), is being used to identify potential habitat for the target species based upon a number of landform characteristics, geology and rainfall. The model is being modified for the Virginia portion of the Parkway, where habitat relationships for these species are somewhat different. Permanent plots are being randomly located in appropriate habitat in such a way as to achieve a representative geographic distribution of plots along the entire length of the Parkway.

Each plot will consist of three, 30 meter long belt transects placed along a permanent baseline. To address Objective #1, within each plot, black cohosh, bloodroot, and trillium densities will be measured annually and compared with previous years' data to assess population trends.



Bloodroot in early bloom

year's data indicates that a maximum of 40 plots will be needed in order to detect a 30 percent decrease in black cohosh and bloodroot populations on the Parkway; eighty plots, at most, will be needed to detect an equivalent change in trillium populations. We are currently analyzing the second year's data, which will incorporate an estimate of variability over time, and should ultimately reduce the number of plots needed to meet our long-term monitoring objectives.

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Transects will be wider for trilliums and bloodroot (4 m) than for black cohosh (2 m) to account for their greater rarity and patchiness.

To address Objective #2, a periodic inventory of all plant species within the belt transects will be carried out as often as funding allows, ideally at least once every five years. All species will be identified and recorded for each 10 meter long segment within the 2 meter wide belt transects used to count black cohosh.

Protocol Development and Status

Data have been collected from 72 sites in order to refine the predictive habitat model we're using. Additional field verification will be done in 2008, mostly on the northern end of the Parkway, in order to finalize the model.

As of winter, 2007, two consecutive years of sampling have been conducted, with permanent plots established in 18 locations; 15 of these were sampled in both years. In the first year, all species of tree, shrub and herb were identified in each 10 meter section of the belt transects. Auxiliary data collected in the plots included observations of disease, disturbance (landslides, windthrown trees, fire, etc.), deer herbivory, invasive exotic species and evidence of poaching. Analysis of the first