

## Ecological Communities Research

In 2001 Gary Fleming, ecologist with Virginia's Natural Heritage Program, conducted vegetation analyses that led up to portions of the Mountains being dedicated as the 34th Natural Area Preserve in Virginia.

### Ecological Communities of the Bull Run Mountains (2002)

*Natural Heritage Technical Report*

### 13 Years of Ecological Change on the Bull Run Mountains (2015)

*Natural Heritage Technical Report*

### Management Plan for the BRMNAP (2004)

*Natural Heritage Report 04-09*

### Natural Heritage Inventory of the Bull Run Mountains (1999)

*Natural Heritage Report 99-05*

This study was part of a state-wide effort led by Virginia's Department of Conservation and Recreation's Division of Natural Heritage (DCR-DNH) to define and catalog the natural vegetation communities of Virginia, an ambitious goal with significant conservation implications. As part of the project, Gary Fleming, a vegetation ecologist with DCR-DNH, documented the ecological communities on the Bull Run Mountains with assistance from BRMC. After setting up and sampling 72 vegetation plots on the mountains, Fleming was able to define 9 native ecological communities within four general ecological classes. His work was published in the [Natural Heritage Technical Report 02-12](#) (click for link) in 2002. This work led up to portions of the mountains becoming the 34th Natural Area Preserve in Virginia, Bull Run Mountains Natural Area Preserve (BRMNAP), the highest conservation designation in Virginia.



Figure 1 Gary Fleming recording data in the field, 2015

In 2014, BRMC obtained funding for supplies and staff to assist Fleming in resampling and permanently marking 40 of the original plots. One result of this work published in the [Natural Heritage Technical Report 16-05](#) (click for link) was that “non-native weeds have measurably increased, in some cases by an order of magnitude or more, in 45% of the plots.” As further re-sampling occurs every decade, this data will be critical in tracking changes in native flora over time, due to climate change, invasive plant species, and ever-present herbivory (Fleming, G.P. 2016).

Fleming’s studies have essentially taken a snapshot of each community type present on the mountains. The plots run from Biscuit Mountain, south of Interstate 66, to Route 50 in Aldie, Virginia. They were set up across the entire BRMNAP as well as on numerous private landholdings. In the data, four geographic regions, which come together on the Bull Run Mountains, are documented. Some plots represent the lower coastal plain areas; others capture the scraggly look of mountaintop communities. Some have elements of southern forests; and finally others capture communities associated with northern forests.



*Pinxster Rhododendron (Rhododendron periclymenoides)*

Areas for the plots were subjectively chosen based on where these different communities occur. Changes in geology, topography, and elevation all play a part in defining these communities. Topographic maps, aerial photographs, as well as Fleming’s own knowledge of the mountains were used to target all respective areas to plot.

The natural heritage network across the country ranks natural communities and species on two scales of rarity. The global rank (G-Rank) and state rank (S-rank) are based on the number of occurrences of an ecological community or species both globally and within a State. These ranks help direct conservation actions towards the protection of rare communities and species. With the overall goal being to protect all communities and species thus maximizing the protection of all biodiversity on a state and global scale. Once communities and species are assigned these rankings it allows for areas such as the Bull Run Mountains to be assigned a biodiversity rank (B-rank). B1 would be the most ecologically significant sites and B5 would be of lower ecological significance.



*Maidenhair Fern (Adiantum pedatum) in a Basic Mesic Forest community.*

From Fleming’s work, the Bull Run Mountains have been assigned a B2 ranking. The Bull Run Mountains “support 11 outstanding element occurrences of eight natural community types, as well as a globally rare tiger beetle. In addition, populations of seven watch-listed odonates (dragonflies and damselflies), two watch-listed groundwater amphipods (an order of small crustaceans), two watch-listed plant species occur” on the mountains. Additionally, the mountains are “recognized for their:

(1) biogeographic significance as a meeting ground of disjunct species from both the mountains and the Coastal Plain,

(2) high quality and diversity of natural communities including some that are uncommon or rare in the Piedmont, and

(3) ecosystem-scale viability due to a large, unfragmented forest and excellent water quality with its stream reaches” ([Leahy, M.J. and Erdle, S.Y. 2004](#) click for link to Management Plan, Natural Heritage Report 04-09).

The Bull Run Mountains and the surrounding communities will be forever indebted to Mr. Fleming for his tireless efforts to document and protect the natural communities and species on the Bull Run Mountains. BRMC has been proud to assist Mr. Fleming over the years with his work.