**Provisional Ecological Sites in MLRA 147 – Wetland Terraces and Shale Uplands**

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**Introduction**

Provisional ecological sites (PES) are being developed by the Natural Resources Conservation Service (NRCS) for soil survey mapunits within major land use area (MLRA) 147, the Northern Ridge and Valley Region of the Appalachians. PES are first approximations of conceptual groupings of soil map unit components and vegetation characteristics based on the similarities in response to management (USDA, 2015). Field work has begun to verify and refine two of the PES groupings, one for shale uplands and a second for poorly drained alluvial terraces. PES will eventually be developed into completed ecological site descriptions that will include fully described State and Transition Modules (STM), interpretations for various uses including wildlife and forestry, plant inventory data, and information for use in conservation planning.

**Method**

Soil survey data (SUURGCO, 2015) was sorted into potential ecological sites by combinations of geomorphology, geology, and differentiating soil characteristics including particle size, depth to bedrock, and drainage. PRISM (PRISM 2015) data of mean annual air temperature and mean annual precipitation showed an area of the Great Valley of Virginia that is slightly warmer and drier than the rest of the MLRA, Figure 2. For now, this has not been used as a criteria for PES differentiation, but will be used to inform field work. The soil sort resulted in 20 PES, Table 1, to which each soil mapunit was assigned. In ArcMap10.1, thin soils GIS layer was intersected with Landfire’s Biophysical Settings data layers (Landfire, 2015) and with plant site-specific inventories from the Heritage Programs of Pennsylvania (Zimmerman et al., 2012), West Virginia (Zimmerman et al., 2012), Maryland (Harrison 2004), West Virginia (WVTNDR 2014), and Virginia (Fleming et al. 2013) to determine broad reference vegetation classification. Combined with descriptions of communities from the Heritage programs and from NatureServe (NatureServe, 2015) these data were used to assign the most commonly associated plant communities to each PES.

The Shallow to Moderately Deep Upland Shale ecological site, Figure 3, and the Poorly Drained Fine Alluvial Terrace, Figure 4, PES were chosen for field evaluation. The former includes Berks and Weikert soil series which cover more than 3.2 million acres of the MLRA and the latter includes the hydric soil Purdy. PES information in wetlands is useful for NCRS wetland determinations.

Field sites were chosen from public and private lands to capture a range of geology, aspect, and landscape position. The high level of disturbance primarily through logging and farming throughout the eastern U.S. makes it extremely difficult to find areas of mature forest that can be considered reference states. Forest stands that seemed the healthiest as judged by lower level of invasive species, presence of saplings and seedlings of native tree species, and higher number of native species at the herbaceous and shrub layers, occurred in areas that had been logged but never farmed. For practical purposes, those were considered the reference states. The soil was described and NatureServe plant community types were recorded for each site. Basic State and Transition Models were developed, Figures 5 and 6.

**Ecological Summary of the Shallow Mixed Sedimentary Upland**

The soil series associated with the Shallow Mixed Sedimentary Ecological Site are: Weikert, Sequoia, Rough, Ramsey, Montezuela, Lauve, Elmwood, Gilpin, Cainsmoor, Calvin, and Berks, photo 1. These soils have weathered from mixed geologies of acid shales, sandstones, and siltstones and are mapped extensively throughout the Appalachian Highlands on several different geologic formations and on all slope aspects. The topography includes rolling hills to steep slopes. Depth to bedrock ranges from 10 to 40 inches (25 to 100 cm). These sites tend to create dry conditions with extreme to low forest productivity. The reference forest is an oak and hickory dominated community and is part of the Central Appalachian Dry Oak Forest System (CES202.991 from NatureServe, 2015). Although this system includes a number of diverse plant communities, a White Oak (Quercus alba) sandstone, Chestnut Oak (Quercus montana) - Pignut Hickory (Carya glabra) community was consistently observed in mature forests, photo 2. In addition, these landscapes included patches of Eastern White Pine (Pinus strobus) - Chestnut Oak (Quercus montana) forest and a more virginia Pine (Pinus virginiana)-Oak shale woodland. Soil descriptions and plant inventory were collected on 67 sites throughout MLRA 147.

**Conclusion**

Several useful methods exist to develop initial PES models using GIS analysis to classify the landscape and determine the most important predictive topographic, soil, and climate variables on vegetation (Ireland and Drohan, 2015; personal communications with 6-MOR soil survey staff, 2016). One advantage to developing PES using existing SUURGCO data as described in this poster, is that the descriptors can then be easily linked to the National Soils Information System (NASIS) database and made available to the public through current soil survey data delivery methods like Web Soil Survey. Any initial model must eventually undergo field verification and will most likely be further split and refined to better capture the complexity of the data.

**References**


