Ecological site F147XY009PA
Loamy Mixed Floodplain

Last updated: 9/27/2024
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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 147X–Northern Appalachian Ridges and Valleys

Major Land Resource Area 147 is in the Middle section of the Valley and Ridge Province of the Appalachian Highlands. Characteristic features include folded and faulted parallel ridges and valleys that are carved out of anticlines, synclines, and thrust blocks. The variability of weathering of the underlying bedrock has resulted in resistant sandstone and shale ridges separated by less resistant limestone and shale narrow to moderately broad valleys. The ridges are strongly sloping to extremely steep and have narrow, rolling crests, and the valleys are mainly level to strongly sloping. The Great Valley is a salient feature of the eastern portion and runs the entire length of the MLRA where it is called the Shenandoah Valley in the south. The western side of the MLRA is dominantly hilly to very steep and is rougher and much steeper than the rolling hills to the east. Parts of the northernmost section of the MLRA were subjected to pre-Illinoian glaciation (>770,000 years ago). Anthracite coal underlies some areas in the north and has been mined since the 1700's. Elevation in MLRA 147 generally ranges from 330 to 985 feet (100 to 300 meters) in the valleys and from 1,310 to 2,625 feet (400 to 800 meters) on the ridges and mountains. It is as high as 2,955 feet (900 meters) on some mountain crests and is nearly 4,430 feet (1,350 meters) on a few isolated, linear mountain ridges. Local relief in the valleys is about 15 to 165 feet (5 to 50 meters). The ridges rise about 660 feet (200 meters) above the adjoining valleys. (USDA, 2006).

Classification relationships

This ecological site is found in Major Land Resource Area 147- Northern Appalachian Ridges and Valleys, 148. MLRA 147 is located within Land Resource Region S - Northern Atlantic Slope Diversified Farming Region (USDA 2006), and in United States Forest Service ecoregion M221 – Central Appalachian Broadleaf Forest-Coniferous Forest-Meadow Province (Bailey, 1995). In addition, MLRA 147 falls within area #67 of EPA Ecoregion Level III – the Ridge and Valley (US EPA, 2013). The Loamy Mixed Floodplain ecological site occurs within 67a, 67b, and 69a of EPA Ecoregion IV - Northern Limestone/Dolomite Valleys, Northern Shale Valleys, and Forested Hills and Mountains respectively (Woods et. al., 1996).

Ecological site concept

The Loamy Mixed Floodplain ecological sites occur throughout MLRA 147 on floodplains, terraces, and alluvial fans in river and stream valleys. Currently, this ecological site encompasses small to large rivers and streams including both high and low gradient systems. This ecological site will most likely be split as more field investigation continues. The parent material is relatively fine-textured recent alluvium weathered from sandstones, siltstones, and shales. Areas are generally well drained to moderately well-drained with the seasonal high water table occurring below 40 inches (102 cm) although wet patches may have a water within 20 inches (51 cm) of the surface. Landscapes are predominantly flat with 0 to 3 percent slope. Depth to bedrock is 70 inches (178 cm) or more. The flat slopes, well-drained and nutrient rich loamy soils are conducive to agriculture, and most of these areas have been cleared for crop production, although flooding can be rare to frequent as classified by the National Soil Survey Handbook (USDA 2016). Frequent flooding is defined as more than a 50 percent chance of flooding in any year. Rare flooding is defined as 1 to 5 percent chance of flooding in any year or nearly 1 to 5 times in 100 years. Where forest exists, the vegetation is often a mosaic of forest, woodland, shrubland, and herbaceous communities. Common trees include Betula nigra (River birch), Platanus occidentalis (American Sycamore), and Acer negundo (Box elder). Acer saccharinum (Silver maple) and Populus deltoides (Eastern cottonwood) may also be characteristic in the larger floodplain systems. On high terraces or where flood-control structures have reduced the frequency and severity of flood events, Liriodendron tulipifera (Tuliptree), Quercus rubra (Northern red oak), Quercus alba (White oak), Pinus strobus (Eastern white pine), and Acer rubrum (Red maple) are additional species that can become established.

Associated sites

F147XY010PA	**Coarse Mixed Floodplain** Coarse Mixed Floodplain

Table 1. Dominant plant species

Tree	(1) *Acer saccharinum* (2) *Acer negundo*
Shrub	(1) *Ageratina altissima* (2) *Laportea canadensis*
Herbaceous	Not specified

Physiographic features

The Loamy Mixed Floodplain ecological sites are found on floodplains and alluvial fans in river and stream valleys throughout Major Land Resource Area 147, the Northern Appalachian Ridges and Valleys. The parent material is recent alluvium weathered from sandstones, siltstones, shales, limestone, dolomite, calcareous shale, as well as some metamorphic geology associated with the Blue Ridge Mountains to the east. These areas are subject to brief (2 to 7 days) flooding, but occasional or no ponding. They are distinguished from the natural stream bank levees of coarser textured gravelly soils directly next to the rivers and from the fine textured poorly drained back swamp areas furthest from the river banks. Areas are mostly well-drained to moderately well-drained with the seasonal high water table occurring below 40 inches (102 cm). The seasonal high water table in wetter inclusions may occur less than 20 (51 cm) inches of the surface. These landscapes are generally flat, with 0 to 3 percent slope. Included in this ecological site are areas that approach wetland status but are not ponded or inundated long enough to be true wetlands. Depth to bedrock is 70 inches (178 cm) or more. Most areas are cleared for cropland or pasture. In steeper valleys, these will be the flattest spots, making them highly conducive for human development. Flooding frequency is frequent to rare; up to a 50 percent chance of flooding in any year (USDA 2016).

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Alluvial fan (3) Stream terrace
Runoff class	Very low to very high
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Rare to frequent
Ponding duration	Brief (2 to 7 days)
Ponding frequency	None to occasional
Elevation	30 – 910 m

Slope	0 %
Ponding depth	0 – 40 cm
Water table depth	40 – 200 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate of this region is temperate and humid. The Ridge and Valley Province is not rugged enough for a true mountain type of climate but it does have many of the characteristics of such a climate (Daily 1971). The influence of the high and low topography on air movement causes somewhat greater temperature extremes than are experienced in the Piedmont region to the east. The differences in elevation also affect the length of the frost free season on the ridges verses that in the valleys. The cooler temperatures and the shorter freeze-free periods occur at the higher elevations and in the more northern latitudes. The maximum precipitation occurs from early spring through mid-summer, and the minimum occurs in January and February. The average annual snowfall ranges from 16 to more than 51 inches (40 to 130 centimeters). The average annual temperature is 44 to 57 degrees F (7 to 14 degrees C). A portion of this region that extends from Maryland southward through most of the Shenandoah Valley in Virginia falls within a rain shadow cast by the Appalachian Mountains to the west and the Blue Ridge Mountains to the east. The mountains on either side block moist flowing air from either the east or the west causing the valleys to be drier. Average annual precipitation in this shadow area can average 34 to 36 in/year (86 to 91cm) compared to 40 to 42 in/year (102 - 107 cm) for the rest of the region (PRISM 2013).

Data for mean annual precipitation, frost-free and freeze-free periods and monthly precipitation for this ecological site are shown below. The original data used in developing the tables was obtained from the USDA-NRCS National Water & Climate Center (2015) climate information database for 5 weather stations throughout MLRA 147 in proximity to this ecological site. All climate station monthly averages for maximum and minimum temperature and precipitation were then added together and averaged to make this table.

Table 3 Representative climatic features

Frost-free period (characteristic range)	140-150 days
Freeze-free period (characteristic range)	180-200 days
Precipitation total (characteristic range)	1,020-1,040 mm
Frost-free period (actual range)	140-170 days
Freeze-free period (actual range)	170-210 days
Precipitation total (actual range)	990-1,070 mm
Frost-free period (average)	150 days
Freeze-free period (average)	190 days
Precipitation total (average)	1,040 mm

- (1) HANCOCK [USC00184030], Hancock, MD
- (2) FRONT ROYAL [USC00443229], Front Royal, VA
- (3) LEXINGTON [USC00444876], Lexington, VA
- (4) HARRISBURG CPTL CY AP [USW00014751], New Cumberland, PA
- (5) SELINSGROVE 2 S [USC00367931], Port Trevorton, PA

Influencing water features

This ecological site may be influenced by high water table within depressions or flood events.

Soil features

The representative soil series associated with this site are: Wolfgap, Tioga, Speedwell, Sindion, Sensabaugh, Pope, Philo, Pagebrook, Ogles, Nomberville, Nolin, Middlebury, Lobdell, Lindside, Linden, Jugtown, Irongate, Ingledove, Huntington, Gladehill, Funkstown, Feedstone, Derroc, Deposit, Combs, Chagrin, Caverns, Broadway, Biltmore, Bigpool, Basher, and Barbour. This ecological site includes areas mapped as Udifluvents. These soils are formed from recent alluvium derived from a mixture of geologies including sandstone, siltstone, shale, limestone, dolomite, calcareous shale, interbedded limestone, as well as some metamorphic geology associated with the Blue Ridge Mountains to the east. They are on floodplains subjected to rare to frequent flooding. Depth to high water table is mostly below 40 inches (102 cm), but can include areas that are wetter. Surface textures are loams, silt loams, and fine sandy loams. Subsoil textures are loamy. Permeability is moderate to rapid. Depth to bedrock is over 60 inches (152 cm). Some soils may have lenses of sands and gravels. Soils data was obtained from the Natural Resources and Conservation Service (NRCS) National Soils Information System database (USDA 2015).

Table 4. Representative soil features

Parent material	(1) Alluvium – sandstone and shale
Surface texture	(1) Gravelly loam (2) Very cobbly fine sandy loam (3) Silt loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to well drained
Permeability class	Slow to rapid
Soil depth	100 – 230 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	5.33 – 23.11 cm

Soil reaction (1:1 water) (0-101.6cm)	4.6 – 10
Subsurface fragment volume <=3" (Depth not specified)	0 – 60 %
Subsurface fragment volume >3" (Depth not specified)	0 – 40 %

Ecological dynamics

The vegetation groupings described in this section are based on the terrestrial ecological system classification and vegetation associations developed by NatureServe (Comer 2003) and the Natural Heritage Programs of Pennsylvania (Zimmerman et al. 2012), Virginia (Fleming et al. 2013), West Virginia (WVDNR 2014), and Maryland (Harrison 2004). Terrestrial ecological systems are specifically defined as a group of plant community types (associations) that tend to co-occur within landscapes with similar ecological processes, substrates, and/or environmental gradients. They are intended to provide a classification unit that is readily mappable, often from remote imagery, and readily identifiable by conservation and resource managers in the field. A given system will typically manifest itself in a landscape at intermediate geographic scales of tens to thousands of hectares and will persist for 50 or more years. A vegetation association is a plant community that is much more specific to a given soil, geology, landform, climate, hydrology, and disturbance history. It is the basic unit for vegetation classification. Each association will be named by the dominant species that occupy the different strata (tree, sapling, shrub, and herb). Within the NatureServe database, individual vegetation associations are assigned an identification number called a Community Element Global Code (CEGL).

The Loamy Mixed Floodplain Ecological Site is located in the Ridge and Valley region of the Appalachian Highlands, an area that has undergone extensive human disturbance since pre and post-European settlement times (Braun, 1950). Floodplains of the Ridge and Valley are highly variable. NatureServe describes many plant associations within these landscapes. Differences can be attributed to natural and human disturbances both locally and regionally that affect the overall hydrology of an area, the land use history of a particular parcel of land, variations in soils, and climate. The reference forest community may be part of the Central Appalachian River Floodplain system (CES202.608) or the Central Appalachian Stream and Riparian System (CES202.609) as described by NatureServe (NatureServe 2009).

The Central Appalachian River Floodplain system encompasses floodplains of medium to large rivers in Atlantic drainages from southern New England to Virginia. This system can include a complex of wetland and upland vegetation on deep alluvial deposits and scoured vegetation on depositional bars and on bedrock where rivers cut through resistant geology. This complex includes floodplain forests in which Acer saccharinum (Silver maple), Populus deltoides (Eastern cottonwood), and Platanus occidentalis (American sycamore) are characteristic, as well as herbaceous sloughs, shrub wetlands, riverside prairies and woodlands. Most areas are underwater each spring; microtopography determines how long the various habitats are inundated.

The Central Appalachian Stream and Riparian System ranges from southern New England to Virginia and West Virginia and occurs over a wide range of elevations. It develops on floodplains and shores along river channels that lack a broad flat floodplain due to steeper sideslopes, higher gradient, or both. It may include communities influenced by flooding, erosion, or groundwater seepage. The vegetation is often a mosaic of forest, woodland, shrubland, and herbaceous communities. Common trees include Betula nigra (River birch), Platanus occidentalis (American sycamore), and Acer negundo (Boxelder). Open, flood-scoured rivershore prairies feature Panicum virgatum (Switchgrass) and Andropogon gerardii (Big bluestem), and Carex torta (Twisted sedge) is typical of wetter areas near the channel. This system is a high-gradient system unlike the Central Appalachian River Floodplain system.

In stream valleys and higher terraces where floodplains are relatively narrow before transitioning to uplands, the vegetation community will more closely resemble the Mixed Sedimentary Lower Slope ecological site with the inclusion of upland species like Quercus rubra (Northern red oak), Quercus alba (white oak), Liriodendron tulipifera (Tuliptree), Pinus strobus (Eastern white pine), and Tsuga Canadensis (Eastern hemlock).

Much of the Loamy Mixed Floodplain ecological site has been cleared for agriculture or for other development. Successional forests that recolonize former agricultural fields or other disturbed areas are often dominated by Juglans nigra (Black walnut) but can also contain Liriodendron tulipifera (Tuliptree), Robinia pseudoacacia (Black locust), Fraxinus Americana (white ash), Ulmus Americana (American elm), Platanus occidentalis (American sycamore), and Acer saccharum (Sugar maple). The subcanopy may include Carya cordiformis (Bitternut hickory), Celtis occidentalis (Common hackberry), Sassafras albidum (Sassafras), and Carpinus caroliniana (American hornbeam). The shrub layer may include Asimina triloba (Pawpaw), Viburnum prunifolium (Blackhaw), Lindera benzoin (Spicebush), and

a host of exotic invasives including Rosa multiflora (Multiflora rose), Microstegium vimineum (Nepalese browntop), Alliaria petiolate (Garlic mustard), and Persicaria longiseta (Smartweed).

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 7. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 8. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 9. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 10. Community 3.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Inventory data references

Site Development and Testing Plan Future work is needed, as described in a future project plan, to validate the information presented in this provisional ecological site description. Future work includes field sampling, data collection and analysis by qualified vegetation ecologists and soil scientists. As warranted, annual reviews of the project plan can be conducted by the Ecological Site Technical Team. A final field review, peer review, quality control, and quality assurance reviews of the ESD are necessary to approve a final document.

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Approval

Nels Barrett, 9/27/2024

Acknowledgments

This current draft provisional ecological site (PES) report is a generalized description of landform, climate, physiography, soils and associated vegetation. Future work is needed to validate this information and further refine the report into an ecological site description (ESD). An ESD will include detailed plant floristic inventory data on the reference state and most commonly occurring alternate states, interpretations for different land use, site productivity data, as well as descriptions of the ecological dynamics. Development of ESDs will require field data collection of soils and vegetation and subsequent data analysis. Production of ESDs will begin after draft provisional ecological site reports have been completed for most soil survey areas. The target completion date for PES is 2020, therefore the development of ESDs will not start until 2021. ESD development prioritization will be based on national priorities, state priorities, soil survey regional priorities, and funding and staffing limitations. The following people assisted with the development of this provisional ecological site report: Yuri Plowden, Ecological Site Specialist, NRCS, Mill Hall, PA Aron Sattler, 6-MIL Soil Survey Project Leader, NRCS, Mill Hall, PA Mike McDevitt, Soil Scientist, NRCS, Mill Hall, PA Nels Barrett, Ph.D, Regional Ecological Site Specialist, NRCS, Amherst, MA Ephraim Zimmerman, Ecological Assessment Manager, Western PA Conservancy, Pittsburgh, PA Don Flegel, Resource Soil Scientist, NRCS, Harrisonburg, VA Kevin Godsey, Ecological Site Specialist, NRCS, Springfield, MO

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	08/29/2026
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

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17. **Perennial plant reproductive capability:**
