

## Noteworthy Plant Records from Fort A. P. Hill, Caroline County, Virginia

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### ABSTRACT

Since 2013, 14 new discrete locations of state- and/or federally-listed vascular plants have been documented on Fort A. P. Hill, Virginia, including seven new sites of *Helonias bullata*, six of *Juncus caesariensis*, and one of *Panax quinquefolius*. Geographic Information Systems (GIS) data were used to effectively predict habitat for the protected wetland species *Helonias bullata* and *Juncus caesariensis*. In 2014, 16 new vascular plant records were documented for Caroline County, Virginia, eight of which were non-native and/or invasive species; *Liparis loeselii* was the rarest of the 16 new records.

*Key words:* Fort A. P. Hill, *Helonias bullata*, *Juncus caesariensis*, *Panax quinquefolius*, county records, Caroline County, Virginia, *Liparis loeselii*.

### INTRODUCTION

U.S. Army Garrison, Fort A. P. Hill occupies 30,673 ha of the inner Coastal Plain within Caroline (99.8%) and Essex (0.2%) counties, Virginia. The installation is approximately 65 km west of the Chesapeake Bay between the Rappahannock and Mattaponi Rivers (Fig. 1) (Fort A. P. Hill, 2008). In accordance with the Endangered Species Act, the Sikes

Act, and Fort A. P. Hill's Integrated Natural Resources Management Plan, Fort A. P. Hill manages threatened and endangered species to ensure no net loss in military readiness and to provide a conservation benefit to listed species. Fort A. P. Hill's Directorate of Public Works, Environmental & Natural Resources Division (ENRD) monitors the populations and habitat of listed species while also extending conservation and management considerations to all natural resources within its jurisdiction (Fort A. P. Hill, 2008).

Fort A. P. Hill harbors two federally-threatened, state-endangered plant species, *Helonias bullata* (belonging to a monotypic genus, hereafter referred to as *Helonias*) and *Isotria medeoloides*, and two state-threatened species, *Juncus caesariensis* and *Panax quinquefolius* (Townsend, 2014).

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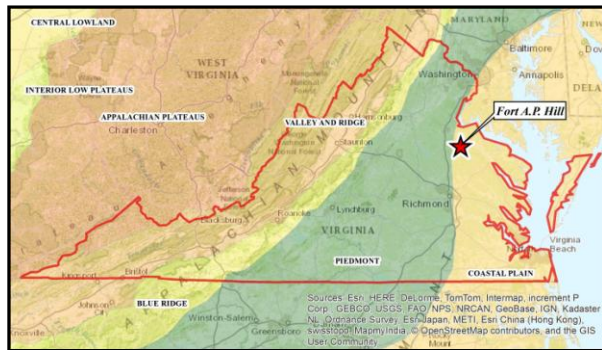


Fig. 1. Location of Fort A.P. Hill in the context of regional physiographic provinces; map by Fort A.P. Hill, ENRD.

### NEW PROTECTED SPECIES OCCURRENCES

ENRD reviews all Fort A. P. Hill projects for potential impacts to protected species, and typically field reconnaissance (i.e., a search for plants) is conducted before ground-disturbing activities (e.g., timber harvests, construction, etc.). To assist in this process, ENRD developed two GIS models to improve the efficacy of their surveys for the two listed wetland species. Prior to the 2013 field season, *Helonias* was documented at Fort A. P. Hill at 47 discrete sites. Principal habitat includes acidic sandy swamps, bogs, seeps, drainages, and small streambanks which do not receive prolonged periods of inundation (Sutter, 1984; Laidig et al., 2009; Punsalan, 2014; Floyd et al., 2015). To predict *Helonias* habitat, wetlands were assigned a habitat probability score based on the presence and spatial extents of three criteria: (1) proximity to known *Helonias* locations, (2) palustrine forested wetlands, and (3) acidic seepage swamps. The United States National Vegetation Classification (USNVC) was used to identify acidic seepage swamps (Hazler & Taverna, 2012), and spatial data for the first two criteria were provided by subject matter experts at Fort A. P. Hill. To validate this methodology, ENRD reconnoitered 212 ha of predicted *Helonias* habitat; 173 ha (82%) were found to be either ideal *Helonias* habitat (i.e., acidic wetland seepages) or at least a mosaic of *Helonias* habitat mixed with other wetland types, and initially two new *Helonias* sites were discovered through the course of model validation (Floyd et al., 2015). Through a combination of field reconnaissance and model validation, ENRD has discovered a total of seven new *Helonias* locations since 2013.

*Juncus caesariensis*, was previously documented at nine sites on Fort A. P. Hill. Across its range, *J. caesariensis* is associated with groundwater seepage as its defining habitat feature (Wieboldt, 2000). This

species is generally restricted to acidic, saturated soil with overlaying layers of Sphagnum and open sunlight (Strong & Sheridan, 1991). Sites at Fort A. P. Hill are typically found in inundated, and occasionally submerged, acidic soils (Wieboldt, 2000). *Juncus caesariensis* may possess some degree of dependence on disturbance to remove secondary woody succession (Strong & Sheridan, 1991), and at Fort A. P. Hill, this species is often found at sites that receive intermittent beaver-facilitated flood events that likely function as necessary disturbance. Using GIS spatial data, ENRD identified that known *J. caesariensis* sites were often located adjacent to a non-standard USNVC map unit identified as “semi-permanent impoundments” (e.g., beaver ponds) (Hazler & Taverna, 2012). To validate this observation, ENRD identified and reconnoitered 134 ha of wetlands adjacent to other “semi-permanent impoundments” within the same watersheds as known *J. caesariensis* sites. The result was the initial discovery of three new locations with *J. caesariensis* during the validation of the model (Floyd et al., 2015). Three additional sites (six in total) harboring *J. caesariensis* have since been discovered within the wetlands of Fort A. P. Hill.

One new *Panax quinquefolius* occurrence was also found while conducting field reconnaissance near Mount Creek. One individual was found growing in a mature hardwood forest along a generally east-facing slope characterized primarily by various species of *Quercus* spp. *Carya* spp., and *Fagus grandifolia*.

### NEW COUNTY RECORDS

While conducting habitat assessments and various surveys of the protected species of Fort A. P. Hill, ENRD began collecting voucher specimens of plant species that were not recorded in the installation’s herbarium records. Concurrently, using the flora list provided by the Digital Atlas of the Virginia Flora (Virginia Botanical Associates, 2014), ENRD also collected voucher specimens as contributions to the flora of Caroline County. From April to September 2014, 16 new distributional records were verified for the county (Table 1). All voucher specimens were deposited at the Massey Herbarium (VPI).

Among the new county records, *Liparis loeselii* (Fig. 2), a Virginia G5/S2 rare plant species (Townsend, 2014), was recorded from one site along an old earthen berm under forest canopy. This habitat description is contrary to typical descriptions of this species’ habitat, which is more often characterized by fens and wet grassy areas open to sunlight (Bentley, 2000; Weakley et al., 2012). However, there are

Table 1. Noteworthy plant records from Fort A. P. Hill.

New Records for Caroline County, Virginia		
Scientific Name*	Family	Common Name
<i>Berberis bealei</i>	Berberidaceae	Leatherleaf Mahonia
<i>Conoclinium coelestinum</i>	Asteraceae	Mistflower
<i>Dipsacus fullonum</i>	Caprifoliaceae	Common Teasel
<i>Hypericum perforatum</i>	Hypericaceae	Common St. John's-wort
<i>Iris domestica</i>	Iridaceae	Blackberry-lily
<i>Lespedeza bicolor</i>	Fabaceae	Shrubby Bush- clover
<i>Liparis loeselii</i>	Orchidaceae	Bog Twayblade
<i>Nyssa biflora</i>	Nyssaceae	Swamp Tupelo
<i>Passiflora incarnata</i>	Passifloraceae	Purple Passionflower
<i>Passiflora lutea</i>	Passifloraceae	Yellow Passionflower
<i>Pueraria montana</i> var. <i>lobata</i>	Fabaceae	Kudzu
<i>Pyrus calleryana</i>	Rosaceae	Bradford Pear
<i>Rubus phoenicolasius</i>	Rosaceae	Wineberry
<i>Senna marilandica</i>	Fabaceae	Southern Wild Senna
<i>Silene stellata</i>	Caryophyllaceae	Starry Champion
<i>Vitis cinerea</i> var. <i>floridana</i>	Vitaceae	Florida Grape
New occurrences of federally and state listed Species		
<i>Helonias bullata</i>	Heloniadaceae	Swamp Pink
<i>Juncus caesariensis</i>	Juncaceae	New Jersey Rush
<i>Panax quinquefolius</i>	Araliaceae	American Ginseng

\*Taxonomy follows Weakley et al. (2012).

accounts of *L. loeselii* growing in drier environments, often in early successional forests (McMaster, 2001). Based on 1943 aerial photography of Fort A. P. Hill, this site is believed to have once been the downhill edge of an agricultural field, which has since become a successional transition zone between a pine forest (*Pinus taeda* and *Pinus virginiana*) and a mature hardwood forest with greater diversity. The herb layer along the berm was characterized by a high diversity of orchid species including *Aplectrum hyemale*, *Corallorhiza odontorhiza*, *Cypripedium acaule*, *Goodyera pubescens*, *Liparis liliifolia*, and *Malaxis unifolia*. *Liparis liliifolia* was equally as abundant as *L. loeselii* in the immediate area, but the two species were easily distinguished by flowering individuals. The discovery of *L. loeselii* at Fort A. P. Hill adds to the



Fig. 2. *Liparis loeselii*, photo by Fort A. P. Hill, ENRD.

already rich orchid diversity known to exist on the installation.

Two of the new distributional records represent a northward extension of the known range within Virginia. *Vitis cinerea* var. *floridana*, a Coastal Plain taxon, was previously recorded in Virginia only as far north as King and Queen County; this species has also been recorded from Maryland (Maryland Biodiversity Project, 2015). Many previous Virginia records of this species are not identified to the level of variety, making the relative distribution of the two forms within the state uncertain (Virginia Botanical Associates, 2014). Similarly, the northward range limit of *Nyssa biflora* was not well documented because this taxon was previously included within *Nyssa sylvatica*. Both species of *Nyssa* are found throughout Fort A. P. Hill, but *N. biflora* was recorded as a separate species for Caroline County for the first time by ENRD in 2014.

Four county records are recognized invasive alien plant species in the Commonwealth of Virginia (Heffernan, 2014): *Dipsacus fullonum*, *Lespedeza bicolor*, *Pueraria montana* var. *lobata*, and *Rubus phoenicolasius*. Each of these records was fully naturalized in the environments in which they were recorded. In addition to the invasive species, four additional non-native species were collected as new records for Caroline County: *Berberis bealei*, *Iris domestica*, *Hypericum perforatum*, and *Pyrus calleryana*. *Iris domestica* and *Hypericum perforatum* are likely to have escaped from plantings from historic home sites predating the Army's acquisition of the land in 1939 based on the proximity of the collection site to these cultural sites. The origin of the other non-native and invasive species cannot be definitively identified.

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