

A Survey of Rare Natural Heritage Resources at Fort Stanton Reservoir,  
Washington, D.C.

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## INTRODUCTION

In the spring and early summer of 2010, a survey was conducted at Fort Stanton Reservoir and the adjacent 50' perimeter for Rare, Threatened, and Endangered (R,T,&E) plants. Significant natural communities and other conservation priorities, if observed, were also noted. Mature and notable trees occurring within the study area were not measured and individually included in this report because they had previously been documented. In general, the results of previous research at the site and environs, such as extensive floristic surveys of D.C. Fort Circle Parks by Mary Pat Rowan, Lou Aronica, and volunteers with the Maryland Native Plant Society, were not included, except to cite literature. Surveys were conducted from early April through June of 2010, with a final visit in July to document some of the warm-season grasses and summer wildflowers.

In addition to R,T,&E surveys, an assessment of invasive exotic species within the study area was included.

## STUDY AREA

Fort Stanton Reservoir and surrounding 50' perimeter is located in southeast Washington, D.C., mostly at the summit of a Pliocene-aged terrace overlooking the Anacostia River and southeast D.C. Oak-Heath Forest originally covered most of the survey site, but much of the site today (area within fencing) is open mowed turf (Fig. 1.).



Fig. 1. Fort Stanton Reservoir, Washington, D.C.

## *Geology*

The survey site lies within the western edge of the coastal plain physiographic province near the eastern edge of the fall line (zone). The fall line is a zone of transition between the coastal plain and piedmont provinces, where the hard, crystalline bedrock of the piedmont descends under the soft coastal sediments, giving rise to numerous falls and rapids in streams and rivers.

All of the lower Anacostia River watershed in southeast Washington, D.C. is within the coastal plain physiographic province and is underlain by vast deposits of sand, gravel, silt, and clay of the Lower Cretaceous Potomac Group (Patuxent Formation). These deposits overlie crystalline bedrock and are highly variable throughout the formation, ranging from small to massive, heterogeneous lenses to interbedded layers. The thickness of the unit varies from thin layers in places along the fall line to several thousand feet off the eastern shore (Mixon et al. 2000), with an average thickness of 500 feet (Obermeier 1984).

Tertiary terraces of Pliocene age cap the highest elevations in southeast D.C., such as Fort Stanton Reservoir. Gravel terraces are composed of interbedded lenses of gravel, sand, silt, and clay deposited over broad plains as river channel alluvium and overbank deposits by ancient river systems during glacial episodes, which give them a characteristic flatness except where dissected by streams (Obermeier 1984). They vary in depth from 3 to 60 feet, with an average thickness of about 20 feet (Obermeier 1984). The soils are typically highly weathered, contain very low levels of calcium and magnesium cations, are rich in iron, and are strongly acidic with an average pH of 4.0 (Simmons 1995). Oak-Heath Forests thrive in these conditions and are the characteristic vegetation of the terraces.

Terrace gravel deposits hold large amounts of rainwater in the porous sand and gravel soils, forming perched aquifers, and are important resources for groundwater infiltration. Hillside seeps and springs often occur on slopes where a perched aquifer intersects the ground surface above an impervious layer of clay. Slabs of "bog iron" or iron conglomerate sandstone are typically present in these areas indicating that this geohydrologic process has been occurring for millenia. Massive outcrops of iron conglomerate sandstone or "bog iron" occur along the seepage stream that flows through the large ravine below the southeastern edge of the reservoir.

The process that begins with rainwater infiltration into the terraces, including the formation of seeps and springs as groundwater comes in contact with clays of the Potomac Formation, occasionally gives rise to Fall Line Terrace Gravel Magnolia Bogs – CEG006219, a globally-rare type of upland seepage wetland uniquely associated with Potomac Formation soils and acidic terrace gravel forest communities (Strong et al, in prep.). The nearby Oxon Run Magnolia Bogs are good examples of this rare natural community.

Over long periods of time, gravel terraces and the underlying Potomac Formation throughout the region have become deeply dissected, especially near large streams and rivers, creating an extensive, dendritic drainage system and a landscape of steep slopes, numerous seeps and streams, and large, deep valleys. Consequently, most of the mid to upper ravine slopes in southeast D.C. are characterized by a gravelly layer of colluvium of varying depths. Quaternary sand and gravel deposits and alluvium outcrop at lower elevations along streams and incised lowland valleys.

## METHODS

Field surveys began in early April of 2010 and continued through June of 2010, with a final visit in July to document some of the warm-season grasses and summer blooming plants. Plant identifications were made using the floras of Brown and Brown (1972, 1984) and Fernald (1950). Vegetation community type names follow, in part, Fleming et al. (2006), Harrison (2004), Lea (2004), and the National Vegetation Classification. Digital photographs of selected flora, forest communities, and geologic features were also taken.

## RESULTS AND DISCUSSION

Although much of the surveyed area is mowed turf with large portions of the 50' perimeter comprised of extensive infestations of invasive exotic plants, a relatively large section of quality forest occurs at the northwestern edge of the reservoir, both within the survey area and beyond. Much of this woodland comprises a variant of Appalachian/Northern Piedmont Low-Elevation Chestnut Oak Forest that was once widespread on mid-to-upper slopes below gravel terraces in the greater Washington, D.C. region, with good examples today increasingly hard to find.

As is typically the case with this type, intermixed stands of White Oak (*Quercus alba*), Chestnut Oak (*Quercus montana*), Black Oak (*Quercus velutina*), Southern Red Oak (*Quercus falcata*), and to a lesser extent Post Oak (*Quercus stellata*), Pignut Hickory (*Carya glabra*), and Mockernut Hickory (*Carya alba*) comprise the canopy. Sassafras (*Sassafras albidum*), Black Gum (*Nyssa sylvatica*), Dogwood (*Cornus florida*), Downy Serviceberry (*Amelanchier arborea*), and Greenbrier (*Smilax* spp.) are the dominant understory plants. Maple-leaf Viburnum (*Viburnum acerifolium*) is the dominant shrub, intermixed with Lowbush Blueberry (*Vaccinium pallidum*) and Pinxterflower (*Rhododendron periclymenoides*). The herb layer is sparse except for high covers of Mayapple (*Podophyllum peltatum*) and Cut-leaf Toothwort (*Cardamine concatenata*) in spring (Fig 2.).

Also occupying the northwestern slope below the reservoir terrace is a steep forested ravine that formed slowly over millennia as a result of draining groundwater from the terrace above. This small, steep gravelly area is vegetated almost exclusively with Chestnut Oak and large Witch Hazel (*Hamamelis virginiana*) shrubs and is a variant of *Quercus montana* – *Quercus rubra* / *Hamamelis virginiana* Forest – CEGL006057.



Fig. 2. Appalachian/Northern Piedmont Low-Elevation Chestnut Oak Forest variant that occurs on gentle slopes below the terrace on the northwestern side of the reservoir.

The vegetation type of the lower southeastern slopes of the reservoir, including both sides of the seepage stream well below the terrace, is Mesic Mixed Hardwood Forest – CEG006075. This community type probably also once extended up to the edge of the terrace on both the southeastern and northeastern sides of the reservoir. Much of the mid to upper slopes of the northeastern side are almost completely overrun with invasive exotic plants, but most of the lower slopes and streambanks on the southeastern side, including much of the stream itself, are in remarkably good condition.

The canopy of this forest type is predominately composed of White Oak, Northern Red Oak (*Quercus rubra*), Tulip Tree (*Liriodendron tulipifera*), and Beech (*Fagus grandifolia*), which occurs along the steep banks of the seepage stream but not in the study area. Red Maple (*Acer rubrum*), Hickories (*Carya* spp.), American Elm (*Ulmus americana*), and American Holly (*Ilex opaca*) to a lesser extent comprise the understory. Spicebush (*Lindera benzoin*) is the dominant shrub throughout. Mayapple and Cut-leaf Toothwort are the dominant herbs in spring. Christmas Fern (*Polystichum acrostichoides*) and Lady Fern (*Athyrium filix-femina* ssp. *asplenioides*) are diagnostic indicators of Mesic Mixed Hardwood Forest in association with the above species, and occur along the lower slopes and streambanks.

### *Conservation Priorities*

No R,T,&E species were found in the study area, including species considered rare in the District of Columbia or species included in the *Rare, Threatened, and Endangered Plants of Maryland* and *Natural Heritage Resources of Virginia: Rare Plants* lists.

However, in addition to the intact, quality examples of the three upland forest community types that occur within and abutting the study area, two species of conservation significance for Washington, D.C. were noted: Sweet Joe-pye-weed (*Eupatorium purpureum*) and Red Mulberry (*Morus rubra*). Both of these species occur in somewhat degraded Mesic Mixed Hardwood Forest within the 50' perimeter near the southeastern edge of the reservoir gate.

### *Management Implications and Recommendations*

Paramount among the many irreplaceable natural features of the Fort Circle Parks and Connectors in the District of Columbia is the preservation of relatively large tracts of



Fig. 3. Major infestations of Norway Maple (*Acer platanoides*), English Ivy (*Hedera helix*), Oriental Bittersweet (*Celastrus orbiculatus*), and other invasive exotic species within and below the 50' perimeter along the northeastern side of the reservoir.

indigenous forest communities, including natural landforms, wetlands and waterways, native flora, geologic features, and wildlife.

During surveys for potential R,T,&E species within the study area this spring, extensive infestations of invasive exotic plants were noted (Fig. 3.). These highly degraded areas and the subsequent spread of invasive species indicate areas of past soil disturbance and clearing. This is especially the case when activities creating disturbance are located near a source of invasive species producing seed material. Moreover, seed material from a source near or far can be transported into relatively pristine or undisturbed natural areas, such as interior forest, where it can persist dormant in the seed bank indefinitely until a disturbance mechanism, natural or otherwise, allows it to emerge (Honu et al. 2009). In addition to a comprehensive invasive exotic species management plan for the site, it is strongly recommended that an absolute minimum of soil disturbance be the overarching concern in determining all activities planned for the site.

Minimizing soil disturbance within the study area and environs is also especially critical because of the extensive highly erodible, sandy soils and steep slopes surrounding the reservoir terrace (Fig. 4.) and the potential for irreparable damage to the site and surrounding parkland, including water resources.



Fig. 4. Thick lens of exposed Potomac Group sand mid-slope in stream valley below southeastern side of reservoir.

## ANNOTATED LIST OF VASCULAR PLANTS

Families, genera, species, and subtaxa are arranged alphabetically within major taxonomic divisions. The scientific name is listed first with author(s), followed by the common name. Nomenclature follows Kartesz (BONAP 1998, 1999) and Weakley (April 2008 Draft). Synonyms are provided in parentheses for some recently revised species that may be unfamiliar.

### **PTERIDOPHYTA – Spore Producing Plants**

#### **Dryopteridaceae** (Wood Fern Family)

*Athyrium filix-femina* (L.) Roth ssp. *asplenioides* (Michx.) Hultén Southern Lady Fern  
*Polystichum acrostichoides* (Michx.) Schott Christmas Fern

### **SPERMATOPHYTA – Seed Bearing Plants**

#### **Gymnospermae – Conifers Class**

#### **Cupressaceae** (Cypress Family)

*Juniperus virginiana* L. Eastern Red Cedar

#### **Pinaceae** (Pine Family)

*Pinus virginiana* P. Mill. Virginia Pine

#### **Angiospermae – Flowering Plants Class**

#### **Monocotyledoneae – Lower Flowering Plants Subclass**

#### **Commelinaceae** (Spiderwort Family)

*Commelina communis* L. Asiatic Dayflower

#### **Cyperaceae** (Sedge Family)

*Carex amphibola* Steud. Narrow-leaved Sedge  
*Carex blanda* Dewey Charming Sedge  
*Carex vulpinoidea* Michx. Foxtail Sedge  
*Cyperus esculentus* L. Chufa Flatsedge

#### **Dioscoreaceae** (Yam Family)

*Dioscorea quaternata* J.F. Gmel. Four-leaved Wild Yam



**Juncaceae** (Rush Family)

*Juncus effusus* L. Soft Rush  
*Juncus tenuis* Willd. Path Rush

**Liliaceae** (Lily Family)

*Allium vineale* L. Field Garlic  
*Polygonatum biflorum* (Walt.) Ell. Solomon's Seal

**Poaceae** (Grass Family)

*Cynodon dactylon* L. Bermuda Grass  
*Dactylis glomerata* L. Orchard Grass  
*Dichanthelium clandestinum* (L.) Gould Deertongue Grass  
*Digitaria ischaemum* (Schreb.) Muhl. Smooth Crabgrass  
*Echinochloa crus-galli* (L.) P. Beauv. Barnyard Grass  
*Elymus virginicus* L. var. *virginicus* Virginia Wild Rye  
*Festuca pratensis* Huds. Meadow Fescue  
*Leersia virginica* Willd. White Grass  
*Lolium perenne* L. Perennial Ryegrass  
*Muhlenbergia schreberi* J.F. Gmel. Nimblewill  
*Paspalum laeve* Michx. Field Crowngrass  
*Phalaris arundinacea* L. Reed Canary Grass  
*Setaria faberi* Herrm. Nodding Foxtail  
*Setaria viridis* (L.) Beauv. Green Foxtail

**Smilacaceae** (Greenbrier Family)

*Smilax glauca* Walt. Glaucous Greenbrier  
*Smilax rotundifolia* L. Round-leaved Greenbrier

**Dicotyledoneae – Higher Flowering Plants Subclass**

**Aceraceae** (Maple Family)

*Acer negundo* L. Ash-leaved Maple, Box Elder  
*Acer platanoides* L. Norway Maple  
*Acer rubrum* L. Red Maple  
*Acer saccharinum* L. Silver Maple  
*Acer saccharum* Marsh. Sugar Maple

**Anacardiaceae** (Cashew Family)

*Rhus copallinum* L. Winged Sumac  
*Rhus glabra* L. Smooth Sumac

*Rhus hirta* (L.) Sudworth Staghorn Sumac  
(Syn. *Rhus typhina* L.)  
*Toxicodendron radicans* (L.) Kuntze Poison Ivy

**Apiaceae** (Parsley Family)

*Cryptotaenia canadensis* (L.) DC. Honewort  
*Osmorhiza longistylis* (Torr.) DC. Sweet Cicely  
*Sanicula canadensis* L. Black Snakeroot

**Apocynaceae** (Dogbane Family)

*Vinca minor* L. Common Periwinkle

**Aquifoliaceae** (Holly Family)

*Ilex opaca* Ait. American Holly

**Araliaceae** (Ginseng Family)

*Aralia spinosa* L. Devil's Walking Stick  
*Hedera helix* L. English Ivy

**Asclepiadaceae** (Milkweed Family)

*Asclepias syriaca* L. Common Milkweed  
*Cynanchum laeve* (Michx.) Pers. Honeyvine

**Asteraceae** (Aster Family)

*Ageratina altissima* (L.) King & H.E. Robins. var. *altissima* White Snakeroot  
(Syn. *Eupatorium rugosum* Houtt.)  
*Ambrosia artemisiifolia* L. Common Ragweed  
*Ambrosia trifida* L. Giant Ragweed  
*Arctium minus* Bernh. Burdock  
*Artemisia vulgaris* L. var. *vulgaris* Common Mugwort  
*Cichorium intybus* L. Chicory  
*Cirsium arvense* (L.) Scop. Canada Thistle  
*Erigeron annuus* (L.) Pers. Daisy Fleabane  
*Eupatorium purpureum* L. Sweet Joe-pye-weed  
*Helianthus decapetalus* L. Thin-leaved Sunflower  
*Helianthus tuberosus* L. Jerusalem Artichoke  
*Hypochaeris radicata* L. Cat's-ear  
*Lactuca floridana* (L.) Gaertn. Woodland Lettuce  
*Solidago caesia* L. Blue-stemmed Goldenrod, Wreath Goldenrod  
*Solidago canadensis* L. var. *scabra* Torr. & Gray Tall Goldenrod

*Symphyotrichum dumosum* (L.) Nesom var. *dumosum* Bushy Aster  
*Symphyotrichum lanceolatum* (Willd.) Nesom var. *lanceolatum* Tall White Aster  
(=*Aster simplex* Willd.)  
*Symphyotrichum lateriflorum* (L.) A. & D. Löve var. *lateriflorum* Calico Aster  
(=*Aster lateriflorus* (L.) Britt.)  
*Symphyotrichum pilosum* (Willd.) Nesom var. *pilosum* White Oldfield Aster  
(=*Aster pilosus* Willd.)  
*Symphyotrichum racemosum* (Ell.) Nesom Small White Aster  
(=*Aster vimineus* Lam.)  
*Taraxacum officinale* G.H. Weber ex Wiggers Common Dandelion

### **Berberidaceae** (Barberry Family)

*Podophyllum peltatum* L. Mayapple

### **Brassicaceae** (Mustard Family)

*Alliaria petiolata* (Bieb.) Cavara & Grande Garlic Mustard  
*Capsella bursa-pastoris* (L.) Medicus Shepherd's Purse  
*Cardamine concatenata* (Michx.) Sw. Cut-leaved Toothwort  
(Syn. *Dentaria laciniata* Muhl. ex Willd.)  
*Lepidium virginicum* L. Poor-man's Pepper

### **Caprifoliaceae** (Honeysuckle Family)

*Lonicera japonica* Thunb. Japanese Honeysuckle  
*Lonicera maackii* (Rupr.) Maxim. Amur Honeysuckle  
*Sambucus canadensis* L. Elderberry  
*Viburnum acerifolium* L. Maple-leaved Viburnum  
*Viburnum dentatum* L. var. *lucidum* Ait. Southern Arrowwood  
(Syn. *V. recognitum* Fern.)  
*Viburnum prunifolium* L. Black-haw  
*Viburnum setigerum* Hance Tea Viburnum

### **Caryophyllaceae** (Pink Family)

*Scleranthus annuus* L. Knawel, German Moss

### **Celastraceae** (Staff Tree Family)

*Celastrus orbiculatus* Thunb. Oriental Bittersweet

### **Chenopodiaceae** (Goosefoot Family)

*Chenopodium album* L. Lambsquarters

**Convolvulaceae** (Morning Glory Family)

*Calystegia sepium* (L.) R. Br. Hedge Bindweed

*Ipomoea pandurata* (L.) G.F.W. Mey. Wild Potato Vine

**Cornaceae** (Dogwood Family)

*Cornus florida* L. Flowering Dogwood

**Ericaceae** (Heath Family)

*Kalmia latifolia* L. Mountain Laurel

*Rhododendron periclymenoides* (Michx.) Shinn. Pinxterbloom

*Vaccinium fuscatum* Ait. Black Highbush Blueberry

*Vaccinium pallidum* Ait. Lowbush Blueberry

**Fabaceae** (Legume Family)

*Albizia julibrissin* Durz. Mimosa

*Coronilla varia* L. Crown Vetch

*Lespedeza striata* (Thunberg) H. & A. Japanese Clover

*Melilotus albus* Medik. White Sweet Clover

*Robinia pseudoacacia* L. Black Locust

*Strophostyles helvula* (L.) Ell. Trailing Wild Bean

*Trifolium pretense* L. Red Clover

*Trifolium repens* L. Dutch White Clover

**Fagaceae** (Beech Family)

*Quercus alba* L. White Oak

*Quercus coccinea* Muenchh. Scarlet Oak

*Quercus falcata* Michx. Southern Red Oak

*Quercus x fernowii* Trel. [*Q. alba* L. x *Q. stellata* Wangenh.] Fernow's Oak

*Quercus montana* Willd. Chestnut Oak

(Syn. *Q. prinus* L.)

*Quercus phellos* L. Willow Oak

*Quercus rubra* L. Northern Red Oak

*Quercus x saulii* Schneid. [*Q. alba* L. x *Q. prinus* L.] Saul's Oak

*Quercus stellata* Wangenh. Post Oak

*Quercus velutina* Lam. Black Oak

**Hamamelidaceae** (Witch Hazel Family)

*Hamamelis virginiana* L. Witch Hazel

*Liquidambar styraciflua* L. Sweet Gum

**Juglandaceae** (Walnut Family)

*Carya alba* (L.) Nutt. ex Ell. Mockernut Hickory  
(Syn. *Carya tomentosa* (Lam. ex Poir.) Nutt.)  
*Carya glabra* (P. Mill.) Sweet Pignut Hickory

**Lamiaceae** (Mint Family)

*Glechoma hederacea* L. Ground Ivy

**Lauraceae** (Laurel Family)

*Lindera benzoin* (L.) Blume Spicebush  
*Sassafras albidum* (Nutt.) Nees Sassafras

**Magnoliaceae** (Magnolia Family)

*Liriodendron tulipifera* L. Tulip Tree

**Malvaceae** (Mallow Family)

*Abutilon theophrasti* Medik. Velvet-leaf

**Moraceae** (Mulberry Family)

*Morus alba* L. White Mulberry  
*Morus rubra* L. Red Mulberry

**Nyssaceae** (Sour Gum Family)

*Nyssa sylvatica* Marsh. Black Gum

**Oleaceae** (Olive Family)

*Chionanthus virginicus* L. Fringe Tree  
*Fraxinus pennsylvanica* Marsh. Green Ash

**Oxalidaceae** (Wood Sorrel Family)

*Oxalis stricta* L. Common Wood Sorrel

**Phytolaccaceae** (Pokeweed Family)

*Phytolacca americana* L. Pokeweed

**Plantaginaceae** (Plantain Family)

*Plantago lanceolata* L. Narrow-leaved Plantain  
*Plantago major* L. Common Plantain

**Platanaceae** (Planetree Family)

*Platanus occidentalis* L. Sycamore

**Polygonaceae** (Buckwheat Family)

*Polygonum caespitosum* Blume var. *longisetum* (de Bruyn) A.N. Steward Long-bristled Smartweed

*Polygonum perfoliatum* L. Mile-a-Minute Weed

*Polygonum virginianum* L. Jumpseed  
(Syn. *Tovara virginiana* (L.) Raf.)

*Rumex crispus* L. Curly Dock

**Ranunculaceae** (Buttercup Family)

*Clematis terniflora* DC. Sweet Autumn Clematis

*Ranunculus abortivus* L. Kidney-leaved Buttercup

*Ranunculus bulbosus* L. Bulbous Buttercup

**Rosaceae** (Rose Family)

*Amelanchier arborea* (Michx. f.) Fern. Downy Serviceberry

*Duchesnea indica* (Andre.) Focke Indian Strawberry

*Geum canadense* Jacq. White Avens

*Malus* sp. Asian Crabapple

*Prunus avium* (L.) L. Sweet Cherry

*Prunus serotina* Ehrh. Black Cherry

*Pyrus calleryana* Dcne. Bradford Pear

*Rosa multiflora* Thunb. ex Murr. Multiflora Rose

*Rubus argutus* Link Sawtooth Blackberry

*Rubus flagellaris* Willd. Northern Dewberry

*Rubus occidentalis* L. Black Raspberry

*Rubus phoenicolasius* Maxim. Wineberry

*Rubus pensilvanicus* Poir. Pennsylvania Blackberry

**Rubiaceae** (Madder Family)

*Galium aparine* L. Cleavers

**Salicaceae** (Willow Family)

*Populus deltoides* Bartr. ex Marsh. Eastern Cottonwood

**Simaroubaceae** (Quassia Family)

*Ailanthus altissima* (P. Mill.) Swingle Tree-of-Heaven

**Solanaceae** (Nightshade Family)

*Solanum carolinense* L. Horse Nettle

*Solanum dulcamara* L. Climbing Nightshade

**Staphyleaceae** (Bladdernut Family)

*Staphylea trifolia* L. Bladdernut

**Ulmaceae** (Elm Family)

*Celtis occidentalis* L. Hackberry

*Ulmus americana* L. American Elm

**Urticaceae** (Nettle Family)

*Boehmeria cylindrica* (L.) Sw. Swamp Nettle

**Verbenaceae** (Verbena Family)

*Verbena urticifolia* L. White Vervain

**Violaceae** (Violet Family)

*Viola bicolor* Pursh Field Pansy

*Viola sororia* Willd. Common Blue Violet

**Vitaceae** (Grape Family)

*Ampelopsis brevipedunculata* (Maxim.) Trautv. Porcelainberry

*Parthenocissus quinquefolia* (L.) Planch. Virginia Creeper, Woodbine

*Vitis aestivalis* Michx. var. *aestivalis* Summer Grape

*Vitis vulpina* L. Winter Grape

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