

A Survey of Rare Natural Heritage Resources Along Three Trails at Chapman State Park, Charles County, Maryland



October 2009

Front cover photos clockwise from top left:
State or co-state champion Chinquapin Oak (*Quercus muehlenbergii*) by R.H. Simmons;
Eastern Anglepod (*Gonolobus suberosus* var. *suberosus*), a highly state rare species
(S1?), by R.H. Simmons; Spring Peeper by Beth Johnson; Shell-Marl Ravine Forest by
R.H. Simmons; Needham's Skimmer by Randy Pheobus.

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INTRODUCTION

The Friends of Chapman State Park received a grant from the Southern Maryland Heritage Area Consortium (with matching funds from the Chapman Forest Foundation) in October 2008 to conduct a survey for Rare, Threatened, and Endangered (R,T,&E) species along three unofficial trails that traverse interior forest at Chapman State Park (Chapman site north). As one of several important considerations of allowing access into sensitive areas and because of the high concentration of previously documented R,T,&E species in the section of forest with two of the trails, the Maryland Department of Natural Resources (DNR) and the Friends of Chapman State Park wanted surveys conducted to determine if and to what extent R,T,&E species occur on or near the trails. Of the three trails studied, the “Ridge Trail” and “Marsh Trail” were deemed the highest priorities, followed by the “Coastal Woodland Trail.” Surveys were conducted from early April through September of 2009.

In addition to R,T,&E surveys, an assessment of invasive exotic species along the three trails was conducted, including other negative impacts associated with anthropogenic landscape alteration, such as over-browsing by white-tailed deer, operating motorized vehicles and equipment along trails, using the trails for walking dogs, hunting, and invasive exotic plant removal projects involving large groups in sensitive areas.

STUDY AREA

The survey sites are situated within Chapman State Park, Charles County, Maryland, within a c. 800-acre section of land that fronts the Potomac River. Chapman State Park is more or less equally divided by the old carriage road to Mount Aventine, the historic antebellum home of the Chapman family. The section on the west side of the carriage road contains the rarest and most sensitive natural communities and associated species of the entire 2,200-acre Chapman site (north and south tracts combined), with the Ridge Trail traversing the most sensitive areas.

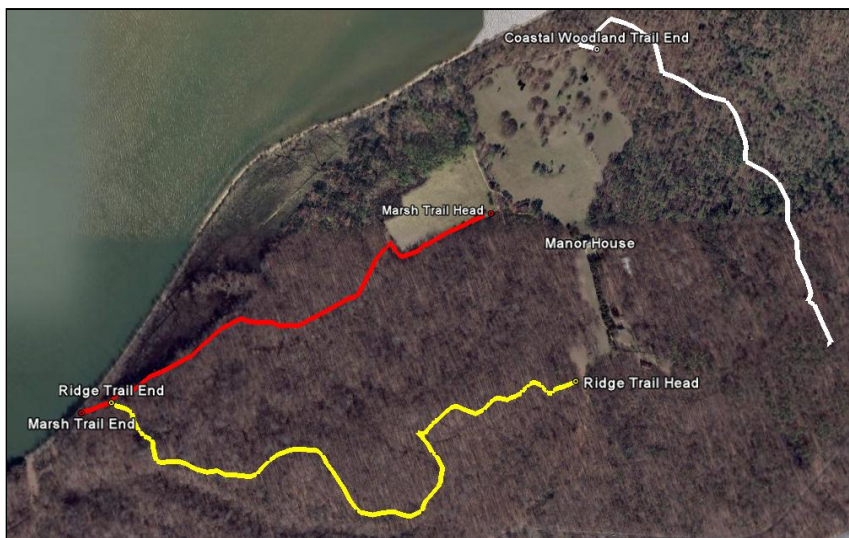


Figure 1. Chapman State Park Trail Map.

Much of the Ridge Trail is an old logging road that skirts the upland terrace and an extensive network of ravines that descend sharply on the north and south sides of the terrace and ridge. The ravines and rolling valleys throughout the entire forested tract to the west of Mount Aventine comprise a globally-rare natural community called Shell-Marl Ravine Forest, coined by Harvard botanist M.L. Fernald in the 1930s after discovering similar forest communities in the Virginia tidewater region. This community type occurs only on the coastal plain where river bluffs and deep ravines over millennia have exposed underlying calcareous and glauconitic marine sands and marl beds deposited during the Paleocene-Eocene Epoch when the area was a shallow sea at the western edge of the Atlantic Ocean. The Brightseat and Aquia Formations are the prominent underlying strata in this section of Chapman State Park (Schultz and Compton-Gooding 1991).



Chapman Shell-Marl Ravine Forest. Photo: R.H. Simmons

The combination of deep ravines, calcareous soils, and close proximity to the Potomac River has produced a remarkable flora predominately composed of species typical of the inner piedmont and limestone areas of the Appalachians that are otherwise rare to absent on the coastal plain, especially in association. Such species include Chinquapin Oak (*Quercus muehlenbergii*), Northern Red Oak (*Quercus rubra*), White Ash (*Fraxinus americana*), Basswood (*Tilia americana*), Slippery Elm (*Ulmus rubra*), Sweet Pignut (*Carya ovalis*), Redbud (*Cercis canadensis*), Hop Hornbeam (*Ostrya virginiana*), Dwarf Hackberry (*Celtis tenuifolia*), Bladdernut (*Staphylea trifolia*), Glade Fern (*Diplazium pycnocarpon*), Narrow Melic Grass (*Melica mutica*), Eastern Brome Grass (*Bromus pubescens*), White Bear Sedge (*Carex albursina*), Hitchcock's Sedge (*Carex hitchcockiana*), James' Sedge (*Carex jamesii*), Flat-spiked Sedge (*Carex planispicata*), Bur-reed Sedge (*Carex sparganioides*), Toadshade (*Trillium sessile*), Showy Orchis (*Orchis spectabilis*), Wild Ginger (*Asarum canadense*), Black Cohosh (*Actaea racemosa*), Rock Crowfoot (*Ranunculus micranthus*), Dutchman's Breeches (*Dicentra*

cucullaria), Smooth Rockcress (*Arabis laevigata*), Wild Stonecrop (*Sedum ternatum*), Foamflower (*Tiarella cordifolia*), Bishop's Cap (*Mitella diphylla*), Ginseng (*Panax quinquefolius*), Harbinger of Spring (*Erigenia bulbosa*), Maryland Sanicle (*Sanicula marilandica*), Shining Bedstraw (*Galium concinnum*), Tall Bellflower (*Campanula americana*), Elm-leaf Goldenrod (*Solidago ulmifolia*), and others.

Common and less disjunct species of the coastal plain, including Tulip Tree (*Liriodendron tulipifera*), Sweetgum (*Liquidambar styraciflua*), American Beech (*Fagus grandifolia*), Bitternut (*Carya cordiformis*), Black Walnut (*Juglans nigra*), Pawpaw (*Asimina triloba*), and Spicebush (*Lindera benzoin*), occur with the above and together form the characteristic flora of this community type.

Fernald's descriptions of calcareous coastal ravine forests are remarkably similar to those at Chapman State Park: "Here the fossiliferous sands and clays are near the surface and the banks of streams and the wooded gullies conspicuously display them. Calcareous springs and rills abound and the freely available 'marl' and the friable soil support rich forests of *Ulmus rubra*, *Asimina triloba*, *Juglans cinerea*, *Fraxinus americana*, *Tilia* sp., and many other trees and shrubs hardly characteristic of the coastal plain... The herbaceous flora is as rich as one could ask, with *Orchis spectabilis*, *Aplectrum hyemale*, *Cimicifuga* [*Actaea*] *racemosa*, *Dentaria laciniata*, *Heuchera americana*, and *Nemophila* [*aphylla*]... The flora is, however, definitely not a typically coastal plain one; it is of the Blue Ridge and the Appalachian Upland..." (Fernald 1939).

Rare fauna has also been documented from the Shell-Marl Ravine Forest section at Chapman State Park, including a diversity of land snails. The species Perforate Dome (*Ventridens demissus*), Northern Threetooth (*Triodopsis tridentata*), Bladetooth Wedge (*Xolotrema fosteri*), Domed Disc (*Discus patulus*), and Velvet Wedge (*Xolotrema denotatum*) are particularly notable as rare or disjunct species. *V. demissus* and *T. tridentata* are both endemic to the limestone regions of the Appalachian Ridge and have been reported along the western border of Maryland, but have not been discovered in the piedmont and coastal plain. *X. fosteri* is mainly confined to the Mississippi drainage and is not recorded for the Appalachians. Isolated populations do occur in New Jersey and the Delmarva, but it is not reported within the Potomac watershed (Grimm 1998).

A renaissance of the study of this community type has occurred in the past two decades with the work of Donna Ware, Hal Wiggins, and extensively Gary Fleming in Virginia, and the Maryland Native Plant Society (MNPS) and Jason Harrison in Maryland. The Shell-Marl Ravine Forest section at Chapman State Park is widely recognized as Maryland's finest and largest remaining example of this type.

Shell-Marl Ravine Forest is currently classified in the United States National Vegetation Classification (USNVC) as a coastal variant of Northern Coastal Plain / Piedmont Basic Mesic Hardwood Forest: *Fagus grandifolia* - *Liriodendron tulipifera* - *Carya cordiformis* / *Lindera benzoin* / *Podophyllum pelatatum* Forest (USNVC CEGLO06055). The coastal variant of this ecological community is globally rare because of its restricted global range. Moreover, since Fernald's time most have been heavily logged with many

remaining ones severely damaged by strong winds and invasive exotic plants (Wiggins 2008).



Disjunct montane flora of Chapman Shell-Marl Ravine Forest. Photo: R.H. Simmons

In addition, the Shell-Marl Ravine Forest section at Chapman State Park has been documented as an old-age forest community by extensive work over the years by MNPS and other researchers. Numerable indicators of old-age status are present, including counts of radial growth rings on typical canopy species throughout the forest (selectively logged for veneer in the late 1980s) dating between 180 – 220 yr old; a number of state champion trees, including a national champion; soil structure; and others.

Surrounding the Shell-Marl Ravine Forest section and comprising the vegetation along much of the Ridge and Marsh Trails is the coastal variant of Mid-Atlantic Mesic Mixed Hardwood Forest: *Fagus grandifolia* - *Quercus* (*alba*, *rubra*) - *Liriodendron tulipifera* / *Ilex opaca* / *Polystichum acrostichoides* Forest (USNVC CEG006075). It occupies mesic to sub-mesic, relatively infertile, acidic sandy loams of rolling uplands, slopes, and ravines and is the dominant vegetation type throughout Chapman State Park and Chapman site south.

Being a coastal variant of the above ecological community, dominant species include Southern Red Oak (*Quercus falcata*) and Pagoda Oak (*Quercus pagoda*) instead of Red Oak (*Quercus rubra*), and Sweetgum (*Liquidambar styraciflua*); in addition to White Oak (*Quercus alba*), Black Oak (*Quercus velutina*), American Beech (*Fagus grandifolia*), Tulip Tree (*Liriodendron tulipifera*), and American Holly (*Ilex opaca*). Spicebush (*Lindera benzoin*) and Pawpaw (*Asimina triloba*) are common in the more mesic areas, along with Jack-in-the-Pulpit (*Arisaema triphyllum*), various fern species, and other herbaceous plants.

The Marsh Trail begins at a gravel road near the old tobacco barn below Mount Aventine and extends along a maintained open pasture at the forest edge for approximately ¼ of its length. At the southwest corner, it enters a large stand of Mesic Mixed Hardwood Forest and eventually converges with the eastern edge of a large Water-willow Shrub Swamp that is situated between the Potomac River shore and low-lying Mesic Mixed Hardwood Forest. This uncommon to rare natural community typically occurs as flooded ponds and pools in old oxbows and meanders of floodplains along large rivers of the piedmont and coastal plain (Fleming et al. 2006). The shrublands at Chapman State Park is regionally significant because of its large size and diversity. This ecological community is classified in the USNVC as *Decodon Verticillatus Semipermanently Flooded Shrubland* (USNVC CEGLO05089).

Characteristic species include Water-willow (*Decodon verticillatus*), Crimson-eyed Rose Mallow (*Hibiscus moscheutos*), and Buttonbush (*Cephalanthus occidentalis*) to a lesser extent, which grow throughout the swamp on hummocks. Aquatic species are prevalent in areas of deeper water, and include Arrow Arum (*Peltandra virginica*), Duckweeds (*Lemna* spp.), American Frog's-bit (*Limnobium spongia*), Carolina Mosquito-fern (*Azolla caroliniana*), and others.

These communities are also important breeding habitats for reptiles and amphibians, including rare fauna (Fleming et al. 2006), as well as critical habitat for certain birds, such as herons, Wood Ducks, Bald Eagles, Red-headed Woodpeckers, and Prothonotary Warblers, Odonates, and other wildlife.



Water-willow Shrublands. Photo: R.H. Simmons

The Marsh Trail follows the shrublands past the western end of the swamp near the convergence of the Ridge and Marsh Trails, and continues a short distance between a

steep Shell-Marl Ravine Forest bluff and the Potomac River shore before ending at the convergence of the old fish hatchery and the river.

The Coastal Woodland Trail is situated on the east side of the carriage road and begins as a spur off an old farm road, following the old Chapman Landing Road (Jim Long, pers. comm.) through sandy woods down to the Potomac River where it ends at one of the lower meadows below Mount Aventine. All of the vegetation along this trail is the coastal variant of Mesic Mixed Hardwood Forest. However, the upper section of the trail that traverses rolling uplands contains stands of mature Loblolly Pine (*Pinus taeda*) that were planted in the 1920s (Alex Winter pers. comm.). Extensive springy areas where the water table is close to the surface (capillary fringe) also occur near the trail and are distinguished by large colonies of Clubmosses (*Lycopodium* spp.) and ferns.

METHODS

In early 2009, Friends of Chapman State Park marked the study sites using a geographic positioning system (GPS). Field surveys were conducted on April 7, 12, 14, 19; May 4, 12, 15, 30; June 13, 16, 27; July 4, 11, 30; and August 1, 5, 8, 11, 16, 24 of 2009. The locations of R,T,&E species were marked with GPS to be sent to the Maryland DNR Natural Heritage Program with accompanying reporting forms for each species. Specimens of notable flora were collected, pressed, and will be deposited at the United States National Herbarium – D.C. and Vicinity Collection (US).

Quantitative compositional and environmental data using the relevé method (Peet et al. 1998, Fleming et al. 2006) were collected from seven representative 400m² Shell-Marl Ravine Forest plots. Plot data will be sent to the Maryland DNR Natural Heritage Program and will be included in a regional analysis of natural community types as part of the USNVC.

Several state champion trees, including a national champion, were also measured and scored, and submitted to the Maryland Big Tree Program (with kindly assistance from Greg Zell, Arlington County Natural Resource Specialist).

RESULTS AND DISCUSSION

Rare Flora

A total of eleven R,T,&E species listed by the Maryland DNR Natural Heritage Program (2007) were documented either in the direct walkways of the trails or along the edges, including other areas of Chapman State Park. As expected, the Ridge Trail contained the highest concentration of rare species and traversed the rarest and most sensitive habitats. Rare species were also documented along the Marsh Trail and vicinity, though to a lesser extent, and one was noted for the Coastal Woodland Trail.

Pubescent Sedge (*Carex hirtifolia*): A rhizomatous perennial with a northeastern and Midwestern distribution that reaches the southern limits of its range in Maryland,

Virginia, and Tennessee. A new station for this plant was discovered at Chapman State Park growing in rich, moist, sandy-loamy soil along the Ridge Trail in the section west of the convergence of the sharp bend and the original trail. It is a "Watch List" (S3) species that is rare to uncommon in Maryland.

Hitchcock's Sedge (*Carex hitchcockiana*): A perennial species with a primarily northeastern and Midwestern distribution that is "infrequent and local" throughout its range, often inhabiting "calcium-rich loams on slopes above streams" (Naczi and Bryson 2002). Three new stations for this species were discovered for Chapman State Park during this survey, all occurring in rich, moist loamy soils on slopes of ravines and above streams in the Shell-Marl Ravine Forest section between the Ridge Trail (and Glymont access road) and Marsh Trail and Potomac River. It is highly state rare (S1) in Maryland with an Endangered (E) status.

Flat-spiked Sedge (*Carex planispicata*): A spreading perennial with a Mid-Atlantic, central and lower Midwestern, and southeastern distribution that typically grows in rich, moist loamy soils of lower forested slopes and alluvial floodplains (Naczi and Bryson 2002). A large colony was discovered in Shell-Marl Ravine Forest north of the middle section of the Ridge Trail and along the Ridge Trail in the section just above its northwest turn towards the Marsh Trail. This is the first documented record of this species for Charles County (Frye and Lea 2001) and a new taxon for the Chapman site flora. It is highly state rare (S1S2) in Maryland.

Burr-reed Sedge (*Carex sparganioides*): A relatively tall perennial with a primarily northeastern and Midwestern distribution that occurs on rich loamy or basic soils of forests (Ball 2002). Several plants were discovered under the dripline of the newly measured and scored state-champion Pagoda Oak (*Quercus pagoda*) at an ecotone atop the river bluffs and Shell-Marl Ravine Forest at the southwestern edge of the park. This is the first documented record of this species for Charles County (Frye and Lea 2001) and a new taxon for the Chapman site flora. It is highly state rare (S1S2) in Maryland.

Few-flowered Panicgrass (*Dichanthelium oligosanthes*) = *Panicum oligosanthes*: A perennial grass that typically occurs in dry, sandy open areas and woodland edges. It is well distributed throughout North America (Freckmann and Lelong 2003). Two stations for this plant were discovered in the lower sandy pastures below Mount Aventine; one near the wood's edge below the large Prickly Pear (*Opuntia humifusa*) colony and the other at the wood's edge and pasture at the trail end of the Coastal Woodland Trail. This is a new taxon for the Chapman site flora (have not yet determined species to variety) and is state rare (S2S3) in Maryland.

Eastern Anglepod (*Gonolobus suberosus* var. *suberosus*) = *Matelea gonocarpos*: A perennial twining vine in the Milkweed Family with a southeastern and central Midwestern distribution that reaches its northernmost coastal plain extension in Maryland. It inhabits edges and openings of nutrient rich or calcareous woodlands and thickets, and along streams and riverbanks. A robust flowering specimen was discovered on the west side of the carriage road opposite the Chapman's Landing historical marker.

Non-flowering Anglepod vines were noted from three locations in Shell-Marl Ravine Forest at Chapman State Park, but identification between Eastern Anglepod and Anglepod (*Matelea carolinensis*), a highly state rare species with Endangered status, cannot be accurately determined with non-flowering specimens. Eastern Anglepod is a highly state rare species (S1?) and a new taxon for the Chapman site flora.

American Frog's-bit (*Limnobium spongia*): A perennial, floating aquatic species that roots by runners in pools or stagnant water. It is uncommon throughout its primary range in the southeastern U.S., extending somewhat into the central Midwest and rarely southern New England (Fernald 1950). Colonies of this plant occur in deeper water of the Water-willow Shrub Swamp near the Potomac Shore. It is highly state rare (S1) in Maryland with an Endangered (E) status. It is also a new taxon for the Chapman site flora and only the second known occurrence of this species in southern Maryland (Katharine McCarthy pers. comm.).

Large-seeded Forget-me-not (*Myosotis macrosperma*): A spring flowering annual wildflower that inhabits rich, mesic forests, well-drained bottomlands, and calcareous soils of the southeastern U.S., eastern central Midwest to Ontario, and parts of the mid-Atlantic region. This species occurs along the Ridge Trail near the trail head and along the middle portion of the trail. It also occurs infrequently along the Marsh Trail from the trail head to end. This species is state rare (S2S3) in Maryland.

Small-flowered Baby-blue-eyes (*Nemophila aphylla*): A diminutive, spring blooming annual wildflower that often forms extensive colonies in rich, sandy-loamy, moist woodland. This species has a primary range of distribution in the southeastern U.S. and reaches its northernmost extent in Maryland and the Delmarva. It is highly state rare (S1) in Maryland.

This species is nearly continuous along the Ridge Trail from the mowed grassy area at the trail head to where the trail takes a sharp bend to the south (see Fig. 1.). It occurs sporadically and much less abundantly along the U-shaped trail bend, but increases in abundance where the bend takes a sharp westward turn and returns along the path of the original trail (original trail did not have U-shaped bend). It occurs infrequently near the convergence with the Marsh Trail.

Nemophila aphylla also occurs along the Marsh Trail, both at the trail head and end, and infrequently along its expanse. It was not noted for the Coastal Woodland Trail, but does occur in abundance in a grassy edge and ravine on the east side of the carriage road near the old riding rink.

Shumard's Oak (*Quercus shumardii*): A large tree of rich, well-drained bottomlands and calcareous soils, with a primary range in the southeastern U.S. and extending up through the central Midwest to Ontario. Two trees were discovered in Shell-Marl Ravine Forest between the Ridge Trail and the Marsh Trail. It is state rare (S2) in Maryland with a Threatened (T) status. It is also a new taxon for the Chapman site flora.

Rare Fauna

Bald Eagle (*Haliaeetus leucocephalus*): An active eagle nest was observed near the terminus of the Coastal Woodland Trail. This species is federally-listed as threatened (LT) and is state rare (S2S3) with a Threatened (T) status.

Champion Trees

Four ancient and remarkable trees within the Shell-Marl Ravine Forest section at Chapman State Park were measured, scored, and nominated for champion status. Nominations were sent to the Maryland Big Tree Program. An American Basswood (*Tilia americana*) qualifies as both national and state champion; two Pagoda Oaks (*Quercus pagoda*) qualify as state and co-state champions; and a Chinquapin Oak (*Quercus muehlenbergii*) qualifies as state or state co-champion.



National champion American Basswood in Shell-Marl Ravine Forest section of Chapman State Park. Photo: R.H. Simmons

Management Implications and Recommendations

The results and recommendations of this survey, as well as the initial reason for conducting it, accord well with planning principles that hold the overarching concept of

“do no harm” and the preservation of the site’s natural resources as centrally important and the critical measure for what activities are planned.

In addition to documenting various R,T,&E species in harm’s way in and along the Ridge Trail during this survey, several additional factors were clearly evidenced to be highly damaging to the exceptionally-rare and sensitive natural resources and wildlife accessed or traversed by the trail.

It is now widely recognized that invasive exotic species are perhaps the greatest threat to natural areas and global biodiversity (Vitousek et al. 1996, Knight et al. 2009), second only to habitat loss resulting from development and urbanization. Unfortunately, this trend is expected to increase.

In 1996, when the Shell-Marl Ravine Forest section at Chapman State Park was first discovered by the Maryland Native Plant Society, it was completely free of the invasive exotic plants that threaten it today: Japanese Stiltgrass (*Microstegium vimineum*), Garlic Mustard (*Alliaria petiolata*), and Beefsteak Plant (*Perilla frutescens*). Moreover, all interior forest and habitats, including all three trails surveyed in this study, were also largely free of invasive species. Small amounts of the above species were observed infrequently along the Mount Aventine driveway, Chapman’s Landing Road, the sewer easement at Glymont, and the access road in from Glymont.

In 2002, alarmed at the finding of Japanese Stiltgrass in the Shell-Marl Ravine Forest section, Dr. Marc Imlay measured and marked on topographic maps all existing occurrences of Japanese Stiltgrass within this area in the hopes that a program to eradicate it through careful herbicide applications would be established under the supervision of Maryland DNR. However, no such program was established and Dr. Imlay and Rod Simmons re-visited the Stiltgrass sites again in 2007 and noted that they had increased exponentially, both in the size of the colonies and in the spread of new ones. The Stiltgrass infestations at the forest edges and grassy open areas along the carriage road and Chapman’s Landing Road had also greatly increased. And this trend was observed again during surveys this year, with several of the largest infestations reaching more than an acre in size.

The spread of invasive species correlates directly with soil disturbance, especially 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).

Volunteer invasive exotic plant pulls targeting Garlic Mustard along the first half and near the end of the Ridge Trail have been conducted over the past decade, and have been largely successful in greatly reducing and in some areas eradicating that species from the trail and areas from where it was spreading outwards. However, the combination of foot traffic and pulling Garlic Mustard caused soil disturbance, which in turn resulted in a



Large Japanese Stiltgrass infestation at Chapman State Park along the Ridge Trail bend.
Photo: R.H. Simmons

rapid and extensive invasion of Japanese Stiltgrass and Beefsteak Plant, starting in the footprint of where the Garlic Mustard was pulled, but also eventually spreading to areas away from the trail. For these reasons and because the target species has been largely controlled in this area, it is the strong recommendation of this report that no further invasive exotic plant removal efforts involving hand-pulling, soil disturbance, and groups of volunteers be conducted anywhere along the Ridge Trail, its spurs, and nearby areas within the forest. Instead, it is recommended that invasive species in this sensitive area be controlled only with herbicide applications carefully administered by a qualified technician, either a Maryland DNR employee or certified volunteer. Invasive exotic plant removal efforts involving hand-pulling and volunteers would be valuable and effective if restricted to both sides of the Mount Aventine driveway and other old roads, the Marsh Trail, the Coastal Woodland Trail, and edges of Chapman's Landing Road. Over time, this would greatly reduce the available seed bank and viability of invasive species throughout Chapman State Park.

Unprecedented numbers of White-tailed Deer (*Odocoileus virginianus*), whose population increases directly correspond with human actions, are also causing severe disturbance to herbaceous and understory vegetation throughout forest communities in the eastern U.S. (Knight et al. 2009). Similarly, deer overpopulation and browse at Chapman State Park since the late 1990s has resulted in a serious reduction in the abundance and diversity of spring ephemerals and numerous other native plants, such as the state-rare Glade Fern (*Diplazium pycnocarpon*) and Ginseng (*Panax quinquefolius*). Moreover, an overpopulation of deer results in new infestations of invasive exotic plants, especially Japanese Stiltgrass and Garlic Mustard, into hitherto undisturbed forest, as well as increasing the spread and abundance of invasives (Knight 2009). Current hunting

practices at Chapman State Park that are geared to sport and not deer management appear to be ineffective at reducing the abundance of deer and damage to the site.

Dog walking with leashes is apparently sanctioned for certain sections of Chapman State Park. However, on several occasions during this survey dogs were observed free-roaming the forest, including the rare Shell-Marl Ravine Forest section, off the leash with owners following well behind. Obviously, this has the potential to be seriously disruptive and damaging to wildlife and the park's ecological communities. Areas of digging and soil disturbance by dogs along both the Ridge and Marsh Trails were also observed. As a management guideline, it is the strong recommendation of this report to not allow dog walking, with or without a leash, into any forested area or wetland at Chapman State Park, including any of the Ridge, Marsh, and Coastal Woodland Trails.

Operating motorized vehicles along any of the trails, except for rare emergency situations, and widening the trails would also be highly damaging to fragile soils, vegetation, and wildlife, as well as create an active disturbance mechanism for the spread of invasive exotic species. And of course exceptions to this should not be made for hunters or other recreational users of the park.

In conclusion and taken together with the results of this survey, it is strongly recommended that no portion of the Ridge Trail be opened for regular access, with the possible exception being in the months of December through February to allow walking access for individuals, small groups, and hunters. However, it is not recommended that the trail head or end be officially marked with signage.

The results of this survey do not preclude opening the Marsh and Coastal Woodland Trails to walking access for individuals, groups, and hunters year-round, except in the seasonal interest of wildlife or to protect a feature of the site, i.e., closing a portion or trail to avoid nesting Bald Eagles, Wood Ducks, etc. On-site signage is probably not necessary for the Marsh Trail, but is probably helpful for the Coastal Woodland Trail.

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