

Natural Heritage – Locality Liaison/Habitat Restoration

Final Report for FY2012 VCZMP Grant No. NA12NOS4190168 Task #6

November 15, 2013

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*Virginia Department of Conservation and Recreation –
Division of Natural Heritage*



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The views expressed herein are those of the authors and do not necessarily reflect the views of the U.S. Department of Commerce, NOAA, or any of its subagencies.

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Executive Summary

During the FY2012 grant year, the Locality Liaison reviewed 921 projects for impacts to natural heritage resources in the coastal zone (43% of the projects reviewed statewide). Fort Belvoir has continued to have numerous projects as a result of the Base Re-alignment and Closure Act (BRAC). Utility upgrades included water lines, wastewater line and electrical upgrades throughout the base, alternate implementation of the Army lodging privatization was reviewed and a Real Property Master Plan included 57 sites for review. Naval Air Station Oceana Dam Neck Annex also had several projects this grant period including relocating the entrance, building a logistics facility, and shoreline protection repair. Due to ongoing projects at Oceana, and at NALF Fentress, a consultant requested information on natural heritage resource conservation sites for a Natural Heritage Survey Report they were preparing for these bases.

Many presentations were given to localities and other conservation partners. One state agency and four local government participants were trained in two presentations during November and December of 2012. With the launch of the upgraded Natural Heritage Data Explorer website (<https://vanhde.org>) on March 1, 2013, the Environmental Review section held twelve training sessions around the state through March to transition users to the new site. Ten additional sessions were held in Richmond continuing the transition of existing users as well as adding new users. The new site is on an ArcServer platform and has enhanced functionality for both the general public and subscription users. Coastal participants in the training sessions included 32 from state agencies, 3 from Federal agencies, 26 from local governments, 5 from Planning District Commissions, 5 from land trusts and 21 from consulting companies.

Presentations included an overview of DCR's Natural Heritage Program, the Locality Assistance Program, the upgraded Natural Heritage Data Explorer (NHDE) website, that now includes the Land Conservation Data Explorer (LCDE) layers and the Virginia Species and Communities Database Search, and the Wetland Restoration Catalog, as well as other conservation tools such as Coastal Ecological Value Assessment (Coastal VEVA) part of the Virginia DEQ's Coastal GEMS. Natural Heritage information is updated quarterly on the NHDE website and shapefiles including the updated information are also distributed to licensed users.

The Locality Liaison provided language, tables and a Conservation Sites map to Spotsylvania for use in their comprehensive plan and is working with Stafford County, the City of Suffolk, and King and Queen Counties to add natural heritage information in their comprehensive plans or implementation documentation.

The Locality Liaison participated in three outreach events. On October 14, 2012, The Rappahannock River Valley National Wildlife Refuge held their "Go Wild" event hosting approximately 200 children and parents, where a Natural Heritage booth was one of the 17 exhibitors. On October 18, 2013, the Locality Liaison gave a short description of Coastal VEVA at the "Evaluating and Conserving Natural Assets: Maximizing Conservation Potential in the Developing Landscape" workshop held at the Virginia Institute of Marine Science. On April 18, 2013, the Locality Liaison provided natural heritage information for Fort A. P. Hill in Caroline County at the Army's on site Earth Day Event for several hundred students and teachers.

A Natural Resources Conservation Services (NRCS) grant with matching funds from DCR-DNH, Virginia Commonwealth University (VCU), The Nature Conservancy (TNC), and the Virginia Department of Transportation (VDOT) was provided to update, modify and expand the DCR Wetlands Catalog. The updated catalog will incorporate revised methodology identifying more opportunities for wetland and stream mitigation that was developed for an 11-subwatershed pilot area of the Pamunkey River. In FY12 the preliminary main base layers were completed and the final version is expected to be completed by the spring of 2014.

In November 2010, the Virginia Department of Game and Inland Fisheries (DGIF) contracted with the Virginia Department of Conservation and Recreation, Division of Natural Heritage (DCR-DNH) to determine the historical and current distribution of all Lepidoptera and Odonata of Virginia that are Species of Greatest Conservation Need (SGCN) and/or tracked by DCR-DNH (i.e. rare species). In June of 2013 the information was made available to the public, researchers, conservation agencies and organizations, and other interested parties via a web-accessible *Atlas of Rare Butterflies, Skippers, Moths, Dragonflies & Damselflies of Virginia* (<http://www.vararespecies.org/>).

Introduction

Through the Locality Liaison program, the Virginia Department of Conservation and Recreation's Division of Natural Heritage (DCR-DNH) works with local and regional planners to assist them in fully utilizing natural heritage resource information as well as the consultative services we provide to ensure protection of natural heritage resources. The Locality Liaison program seeks to establish natural heritage resource information as part of fundamental locality decision-making criteria through tools such as project review, comprehensive planning, project sitings, zoning amendments, and open space planning.

Virginia Coastal Zone Management Program (VCZMP) and the Chesapeake Bay Program initiatives have generated considerable interest in land use issues within the Coastal Zone. In addition, the Bay Total Maximum Daily Load (TMDL) program is encouraging localities to incorporate green infrastructure into their land planning. Coastal localities are developing conservation objectives, identifying potential areas for protection and looking at innovative approaches in making land use decisions that will lessen the trend toward urban sprawl. The Locality Liaison program is working to have natural heritage resources play a larger role in helping localities find beneficial answers to the problems and opportunities they face.

Staffing

Alli Baird currently serves as the Coastal Zone Locality Liaison (Locality Liaison) and reviews projects within the coastal zone with assistance from other environmental review staff. Rene' Hypes (Environmental Review Coordinator) provides general oversight for all projects reviewed within the Coastal Zone. Numerous other DCR-DNH staff members also support the Locality Liaison program, including Data Manager Megan Rollins, Information Manager Jason Bulluck, Project Review Assistants, and various Natural Heritage biological inventory personnel.

Environmental Review

The DCR-DNH Environmental Review Section, to which the Locality Liaison is assigned, works with local, state, and federal government agencies as well as private individuals and consultants to assess the potential for proposed activities to impact natural heritage resources and to recommend ways to avoid or minimize these impacts. The Locality Liaison has primary responsibility for reviewing projects in the Coastal Zone. She conducts the review for Coastal Zone projects and provides oversight for the Project Review staff assisting in the review process. During this grant year DCR-DNH has reviewed 921 projects in the Coastal Zone. This represents 43% of the projects reviewed statewide by DCR-DNH.

Through environmental review, the Locality Liaison provides service in connecting clients directly to needed information about natural heritage resources. With the state's most comprehensive database for rare, threatened and endangered species and significant natural communities, environmental review provides an opportunity for cooperating with other organizations. Many private consultants routinely and voluntarily coordinate with DCR-DNH

before taking development project applications to regulatory agencies. Though DCR-DNH does not have regulatory authority, it has agreements with regulatory agencies that rely on our natural heritage resource data. The United States Army Corps of Engineers (ACOE) and the Department of Environmental Quality (DEQ) Virginia Water Protection Permit Program (VWPP) screen all wetland development projects against the DCR-DNH database and forward potential conflicts for our comment. The DEQ Virginia Pollutant Discharge Elimination System (VPDES) program also screens issuance and re-issuances of permits for point source discharges to surface waters against the DCR-DNH database, and the Virginia Department of Health screens for issuance or re-issuance of pump-out as part of their permitting process. The United States Fish and Wildlife Service (USFWS) also relies heavily on DCR-DNH data for their own regulatory responses. The USFWS Information, Planning, and Conservation (IPaC) System web site on-line screening process includes DCR-DNH species distribution models and references the Natural Heritage website for species coordination purposes.

The DCR-DNH has a Memorandum of Agreement with the Virginia Department of Game and Inland Fisheries (VDGIF) for sharing of data and species coordination between the two agencies. In addition to regulatory agencies, the Virginia Department of Transportation (VDOT) integrates Natural Heritage data into CEDARs, their internal database for environmental screening purposes, and uses the Natural Heritage Data Explorer for submitting projects. Also, under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR-DNH represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species.

Specific Projects

Department of Defense

Fort Belvoir

Fort Belvoir continues to develop projects as a result of the Base Re-alignment and Closure Act (BRAC). During this grant year, two projects, the Fort Belvoir Real Property Master Plan (Appendix A) and the Fort Belvoir Water and Wastewater Utility Upgrade included projects adjacent to or within the Accotink Wetlands and Area T-17 Ravines Conservation Sites and the Dogue Creek Stream Conservation Unit. Additionally the Alternate Implementation of Privatization of Army Lodging, was proposed within the vicinity of the Area T-17 Ravine Conservation Site, where the only known extant occurrence of the Northern Virginia well amphipod in the world has been documented, in areas with the potential to support the Northern Virginia well amphipod. The Pohick Road Waterline Replacement, McRee Rod Barracks Waterline Replacement, Alternate Implementation of Privatization of Army Lodging, and Dominion Virginia Power Electrical Replacement were adjacent to or within the Pohick/Accotink Conservation site where River bulrush, the historically documented occurrences of Laura's Clubtail and the Wood turtle could be impacted by changes in water quality as a result of these projects.

As a result of comments on these multiple projects in the prior grant year, Fort Belvoir contracted the Division of Natural Heritage to conduct an inventory for mussels, odonates, bats, Lepidoptera, Sensitive joint-vetch, Small whorled pogonia and the Northern Virginia well amphipod on the base. The surveys began in September of 2011 and were completed during the FY12 grant year, with four Technical Reports finalized in May and June of 2013.

Naval Air Station Oceana Dam Neck Annex

The Naval Air Station (NAS) at Oceana Dam Neck has continued to improve facilities with projects such as the NAS Oceana Dam Neck Annex P-I-64 Logistics Facility that was proposed within the Camp Pendleton-Dam Neck Dune and Swale Conservation Site where there is potential for Bluejack oak to exist. DCR recommended a survey of the resource in the project area and avoidance of any Bluejack oak removal for construction. For natural resource management purposes, NAS Oceana and NALF Fentress are conducting an updated Natural Heritage survey for which DCR provided information on conservation sites within the base boundaries. Additionally, the Shoreline Protection System Repair, Oceana Dam Neck Annex project proposed improvements to the adjacent shoreline within the Dam Neck Middle Beach Dunes Conservation Site where the Loggerhead sea turtle has been documented. DCR recommended coordination with both the USFWS and VDGIF to assure compliance with protected species legislation. DCR also recommended a time-of-year restriction of December 1 – May 15 for beach nourishment. (Appendix B)

Virginia Department of Transportation

Virginia Capital Trail

The Virginia Department of Transportation continues to develop the Route 5 Capital to Capital Trail from Richmond to Williamsburg, and DCR-DNH reviewed four projects within the trail for impacts to natural heritage resources. DCR-DNH recommended a survey for Swamp pink in the proposed New Market Heights Phase. To avoid potential impacts to Atlantic sturgeon and Sensitive joint-vetch in the proposed New Market Heights section, Aquatic Natural Communities downstream of the proposed Varina and Park Phases of the Capital Trail and an historic documentation of Laura's clubtail in the James River downstream of the proposed Segment II phase of the Capital Trail, DCR-DNH also recommended adherence to erosion and sediment control and storm water management laws and regulations. Additionally DCR-DNH made general recommendations to avoid and minimize the potential for invasive species to become established throughout this project. (Appendix C)

National Park Service

Battlefield Bluffs Subdivision

York County requested a review of a proposed subdivision in an area that was surrounded by National Park Service land that also contains sensitive resources associated with the Grafton Ponds complex. DCR recommended the implementation of and strict adherence to applicable

state and local erosion and sediment control/storm water management laws and regulations. In addition, DCR included pages 26-29 of the May 2001 Natural Heritage Technical Report 01-9, *A Biological Survey of the Coastal Plain Depression Ponds (Sinkholes) of Colonial National Historical Park, Yorktown, Virginia*, for site description, map of pond and protection recommendations for ponds in the vicinity of the proposed project (Appendix D).

Other Projects

Lynnhaven River Basin Ecosystem Restoration Study

The proposal for a multi-site project to restore submerged aquatic vegetation, scallop and reef habitats within the Lynnhaven River Basin was supported by DCR. However, for the sites proposed for restoration involving the eradication of *Phragmites australis*, DCR expressed concerns of the proposed methods and recommended incorporation of methods DCR – DNH has found to be successful for *Phragmites* eradication. A brochure on *Phragmites* control was included in the response. (Appendix E)

Great Wicomico River Oyster Restoration Project

For an oyster restoration project within the Great Wicomico River, concerns for impacts to the Atlantic sturgeon caused DCR to recommend restricting the activities to the fall and winter only and to support using the best available technology to prevent the suspension of solids and fines in the water column. (Appendix F)

Lower James River Mitigation Bank

A request for review of the proposed Lower James River Mitigation Bank was submitted. The bank is within the Pipsico Forest-Eastover Ravines Conservation Site which has a biodiversity ranking of B2 with two globally rare calcareous natural communities represented and the potential to support populations of ephemeral wetland species. A survey was recommended to include identification of all vernal pools, emergent wetlands with ephemeral hydrology and ephemeral wetland breeding amphibians. Additionally a Small whorled pogonia survey was recommended prior to any timbering, road cutting or other land disturbance. If resources are documented within the proposed mitigation bank boundaries, DCR will work with the property owner to offer specific protection recommendations for minimizing impacts to the documented resources and/or enhancing habitat to support ephemeral wetland species. (Appendix G)

Natural Heritage Data and Natural Heritage Data Explorer

The heart of DCR-DNH's service to localities is the set of databases and information tools that indicate what is rare, where the rarities are, and how they can be protected. DCR-DNH databases contain information about approximately 8,622 specific occurrences of natural heritage

resources, 2,308 of which reside in the coastal zone. Over the years, DCR-DNH has continually worked to improve the quality of the data and the utility of the tools used to present the data to researchers, planners, and decision-makers. All DCR-DNH data has been converted to modified polygons within the GIS system. Conservation sites are now the primary mechanism for distributing natural heritage location information for public use. Conservation sites identify areas that potentially warrant conservation action because of the associated natural heritage resources and the habitat they support. They incorporate contextual information about the key areas of the landscape surrounding the actual locations of natural heritage resources that are necessary to ensure protection of those resources. DCR-DNH currently tracks over 1,974 conservation sites, of which 542 are in the coastal zone. These sites are continuously being updated by DCR-DNH staff. The decrease of conservation sites from the prior year's report is a consequence of the removal of bald eagle nest sites that had been separated into individual sites in anticipation of their state de-listing.

The Virginia Natural Heritage Data Explorer (NHDE) allows Internet users to access Natural Heritage data on a remote website. This GIS informational tool can alert planners to potential areas of opportunity or concern, facilitate proactive planning for county resources, and allow preliminary screening of projects and activities for potential impacts to natural heritage resources. The natural heritage data on the website is updated quarterly, as updates are released for digital screening coverage shapefiles.

The website was upgraded this year from an ArcIMS platform to an ArcServer platform by NatureServe. Development of map services is a part of this upgrade which makes the release of digital data more efficient. In addition, the Land Conservation Data Explorer functionality and the Species and Communities Search function have been incorporated into the new site. Several different levels of access are available, from a public access level to a paid subscription with increasing information made available to different Tier level users. The upgraded website tool can be accessed at www.vanhde.org.

The site was launched on March 1, 2013, with a month of overlap of the sites being active, before the old site was de-activated in June of 2013. In order to transition users of the old site to the new one, DCR held twelve training sessions at five locations throughout the state, including three coastal zones locations at Prince William, Virginia Institute of Marine Science and the Richmond DEQ office.

A news release on June 25, 2013 announced the updated Virginia Natural Heritage Data Explorer. In addition, a news release announcing the upgrade was included in the Virginia Association of Planning District Commissions' July 2013 edition of *VAPDC Connections*, their association newsletter that is sent to all Virginia PDCs. (Available at: <http://archive.constantcontact.com/fs166/1102142213466/archive/1114264009091.html>)

After the initial transition period during March, hands-on training sessions for the Natural Heritage Data Explorer have generally been held on an every-other-month basis. Most have been held in Richmond at the DEQ office. Training is provided by the project review staff, including the Locality Liaison. The general training sessions are open to all organizations, but are divided into three sections according to the user's tier access level. During this grant year,

twenty-four hands-on training sessions for NHDE were held.

Approximately 944 projects have been submitted through NHDE within the FY2012 with 315 for the coastal zone. In addition, 86 projects statewide including 31 in the coastal zone did not have natural heritage resources within two miles of the project location and a report was automatically sent to the requestor stating this information and that no further review was required by DCR-DNH staff. NHDE has made project submittal significantly easier for clients as they receive natural heritage information within minutes and streamlined workflow for DCR-DNH staff by capturing shapefiles of projects submitted through the website.

Participants in Locality Liaison Presentations

Presentations included an overview of DCR's Natural Heritage Program, the Locality Assistance Program, the Natural Heritage Data Explorer (NHDE) website, that now includes the Land Conservation Data Explorer layers and the Species and Communities Search function, as well as information about the Wetland Restoration Catalog and Coastal Virginia Ecological Value Assessment (VEVA).

Coastal participants in the training sessions included 32 from state agencies, 3 from Federal agencies, 26 from local governments, 5 from Planning District Commissions, 5 from land trusts and 21 from consulting companies. A list of the local governments, conservation partners and state, federal agencies and consultants that participated in these training sessions can be found in Appendix H.

Locality Partnerships with DCR-Natural Heritage

The Locality Liaison has worked with localities within the Coastal Zone to encourage comprehensive use of natural heritage data and DCR-DNH services for conservation planning. Also, the Liaison has continued working with other conservation partners such as land trusts and other state agencies.

During this grant year, the Locality Liaison has provided specific language about natural heritage resources to Spotsylvania for use in their comprehensive plan update (Appendix I). In addition, tables of the resources that have been documented within their locality and a map showing the locations of conservation sites associated with these natural heritage resources were included. Some localities that have expressed interest in incorporating natural heritage information into their upcoming comprehensive plan updates are: Stafford, King and Queen and Suffolk Counties.

At the end of FY212, there were twenty-five coastal counties and twelve coastal cities, eight Planning District Commissions and fourteen land trusts within the Coastal Zone with access to NHDE, digital shapefile data, and/or a combination of these tools. This equates to approximately 84% of Coastal Zone counties or cities having utilizing Natural Heritage data. Please see

Appendix J for a map of the Virginia localities with Natural Heritage information. It may also be viewed online at the Locality Liaison web page: http://www.dcr.virginia.gov/natural_heritage/images/localitiesmap.jpg

The Locality Liaison participated in three outreach events during the grant period.. On October 14, 2012, The Rappahannock River Valley National Wildlife Refuge held their “Go Wild” event hosting approximately 200 children and parents, where a Natural Heritage booth was one of the 17 exhibitors. On October 18, 2013, the Locality Liaison gave a short description of Coastal VEVA at the “Evaluating and Conserving Natural Assets: Maximizing Conservation Potential in the Developing Landscape” workshop held at the Virginia Institute of Marine Science. On April 18, 2013, the Locality Liaison provided natural heritage information for Fort A. P. Hill in Caroline County at the Army’s on site Earth Day Event for several hundred students and teachers.

Habitat Restoration and Protection Initiatives

Wetland Restoration Catalog

The current Wetland Restoration Catalog contains potential wetland restoration sites that are within or adjacent to Natural Heritage Conservation Sites. This catalog is intended to guide localities and regulatory agencies to appropriate sites for various conservation purposes including wetland mitigation. These sites represent high-probability opportunities to design and implement high-value wetland restoration projects. The Wetland Restoration Catalog is included in the DEQ Coastal Zone Program’s Coastal GEMS (<http://www.coastalgems.org/>) with an accompanying factsheet.

The Virginia Natural Heritage Program has developed a revised methodology for updating and modifying the Virginia Wetlands Catalog. This methodology identifies more opportunities for wetland and stream mitigation, and guides selection of mitigation opportunities, via a ranking of sites based on multiple datasets. This methodology was developed to apply statewide and was tested in an 11-subwatershed pilot area of the Pamunkey River of Virginia. The methodology first enables the development of an expanded wetlands/streams base layer beyond the National Wetlands Inventory (NWI) that was then prioritized, to assign all areas with a rank of their mitigation value. This rank is based on the likelihood of an identified area being wetland, and an area’s contributions to biodiversity conservation and/or water quality. The revised Wetland Catalog provides a map-based summary of mitigation opportunities ranked from 1-to-5 to clearly indicate their relative value as mitigation sites. All opportunities are tied to sub-watershed and tax parcel IDs in two separate map outputs.

DCR-DNH is utilizing funding from the Natural Resources Conservation Service (NRCS) to update, modify and expand the Virginia Wetlands Catalog using the revised methodology that identifies more opportunities for wetland and stream mitigation. Matching funds for the grant was be provided by DCR-DNH, Virginia Commonwealth University (VCU), The Nature Conservancy (TNC), and the Virginia Department of Transportation (VDOT). NCRS will use the

catalog in its Wetland Reserve program to identify and target the best locations for restoration and protection of wetlands. In FY12, the preliminary main base layers were completed and the projected timeline for completion of the project is spring of 2014.

Coastal Virginia Ecological Value Assessment (VEVA)

The Coastal Virginia Ecological Value Assessment (VEVA) was developed to provide guidance to local governments engaged in land use management and conservation planning. VEVA is a collaborative effort among several state programs to synthesize the best available natural resource information into a single geospatial product. VEVA combines scientific data and best professional judgment to rank terrestrial and aquatic areas for their ecological value. These values can be used to prioritize areas for preservation, develop strategies for special area management actions, or to build awareness about Virginia's natural communities.

Coastal VEVA is incorporated into Coastal GEMS and can be accessed online at: <http://www.coastalgems.org/> as well as on Landscape Chesapeake. The Locality Liaison, as part of the NHDE training, shows participants the location of Coastal GEMS and provides information about the Wetlands Restoration Catalog and the VEVA.

Landscape

Landscape is a collaborative project between NatureServe and the National Geographic Society. This online resource for the land conservation community and the public gathers stories, maps, data and photos in order to inform and inspire the conservation community to conserve our lands and waters. Many partners contribute content to encourage natural heritage protection. Virginia is one of the five pilot states participating in this effort.

During the past grant cycle, the site has been updated to include the Draft Virginia Biodiversity Assessment. The site can be accessed at: <http://www.landscape.org/virginia>. The Locality Liaison includes information about Landscape as one of the several additional conservation resources available to NHDE training participants.

Atlas of Rare Butterflies, Skippers, Moths, Dragonflies & Damselflies of Virginia

In November 2010, the Virginia Department of Game and Inland Fisheries (DGIF) contracted with the Virginia Department of Conservation and Recreation, Division of Natural Heritage (DCR-DNH) to determine the historical and current distribution of all Lepidoptera and Odonata of Virginia that are Species of Greatest Conservation Need (SGCN) and/or tracked by DCR-DNH (i.e. rare species). In June of 2013 the information was made available to the public, researchers, conservation agencies and organizations, and other interested parties via a web-accessible *Atlas of Rare Butterflies, Skippers, Moths, Dragonflies & Damselflies of Virginia* (<http://www.vararespecies.org/>). (Appendix K)

Recommendations for Further Actions

The Locality Liaison program has proven most effective when the Locality Liaison can become actively involved in a specific project of concern to the locality. Furthermore, interest in natural heritage information often depends on timing such as whether a comprehensive plan is under review or a major development project is being considered. Thus, the Locality Liaison will strive to stay aware of upcoming locality events coordination with other Heritage regional and agency staff. The Liaison continues to identify when Coastal Zone localities comprehensive plans are due for review and will contact these localities at the appropriate time to offer assistance.

The upgraded Natural Heritage Data Explorer training will continue to be available every other month to provide interested users with the ability to access natural heritage information. Training may include the ability for participants to attend by webinar to increase participation by localities in NHDE training sessions.

The Locality Liaison will continue to focus on contacting Localities that are not currently using Natural Heritage data. In some cases this may involve contacting departments other than planning, such as GIS, Environmental, Recreation, Parks or Utilities departments if they are separate entities. This may also involve an effort to assist Localities in developing ordinances or regulations necessitating the review of Natural Heritage information for certain projects, including renewable energy projects. Contacting PDCs may help in identifying the best way to involve some of the localities.

In addition, 37 Coastal Zone localities currently have access to NHDE or digital shapefile data. It is very important to provide follow-up assistance to these localities beyond the initial presentation. The Locality Liaison plans to work with these localities to determine how these data are being used and discuss local needs for further assistance. It is also important to keep in contact with the localities due to possible staffing changes.

The Locality Liaison web page and Landscape will continue to be updated as relevant information becomes available. The Liaison will work to further the promotion and use of the updated Wetland Restoration Catalog as an effective tool for planning and environmental review processes. The Locality Liaison along with the project review staff will continue to work to improve the overall project submittal and the environmental review process.

Appendix A

Letter for
Fort Belvoir (BRAC)

Douglas W. Domenech
Secretary of Natural Resources



David A. Johnson
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

600 East Main Street, 24th Floor
Richmond, Virginia 23219
(804) 786-6124

August 16, 2013

Janet C. O'Neill
Carter's Run Environmental Corporation
7137 Wilson Road
Marshall, VA 20115

Re: 11120, Fort Belvoir Real Property Master Plan-Main Post and North Area

Dear Ms. O'Neill:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Sites # 2, 3, 5, 6, 9, 13, 20, 24, 30, 37, 39, 50 & LT 3, 4, 5, 8

Biotics documents the presence of natural heritage resources in the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

Sites #1, 7, 8, 11, 12, 15, 17, 18, 19, 21, 25 - 29, 33, 34, 36, 38, 40 - 43, 45 - 47, 49, 52 & LT 1, 2, 6A, 7

According to the information currently in our files, the Accotink Wetlands Conservation Site is located downstream from the project sites. Conservation sites are tools for representing key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat they support. Conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation. Conservation sites are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. Accotink Wetlands Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resources of concern at this site are:

	Tidal Freshwater Marsh (Mixed High Marsh Type)	G3/S4?/NL/NL
<i>Bolboschoenus fluviatilis</i>	River bulrush	G5/S2/NL/NL
<i>Lathyrus palustris</i>	Marsh pea	G3/S1/NL/NL
<i>Ranunculus ambigenus</i>	Water-plantain crowfoot	G4/S1/NL/NL
<i>Glyptemys insculpta</i>	Wood turtle	G3/S2/NL/LT

Site #4

According to the information currently in our files, the Dogue Creek Wetlands Conservation Site is located downstream from the project sites. Dogue Creek Wetlands Conservation Site has been given a biodiversity significance ranking of B5, which represents a site of general significance. The natural heritage resource of concern at this site is:

<i>Glyptemys insculpta</i>	Wood turtle	G3/S2/NL/LT
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The Wood turtle (*Glyptemys insculpta*, G3/S2/NL/LT) ranges from southeastern Canada, south to the Great Lake states and New England. In Virginia, it is known from northern counties within the Potomac River drainage (NatureServe, 2009). The Wood turtle inhabits areas with clear streams with adjacent forested floodplains and nearby fields, wet meadows, and farmlands (Buhlmann et al., 2008; Mitchell, 1994). Since this species overwinters on the bottoms of creeks and streams, a primary habitat requirement is the presence of water (Mitchell, 1994).

Threats to the wood turtle include habitat fragmentation, urbanization, and automobile or farm machinery mortality (Buhlmann et al., 2008). Please note that the Wood turtle is currently classified as threatened by the Virginia Department of Game and Inland Fisheries (VDGIF).

In addition, Dogue Creek has been designated by the VDGIF as a “Threatened and Endangered Species Water” for this species.

Sites # 22, 31, 32, 44, 51

According to the information currently in our files, this site is located within the –Area T-17 Ravines Conservation Site that has been given a biodiversity significance ranking of B1, which represents a site of outstanding significance. The natural heritage resource of concern at this site is:

Northern Virginia Well Amphipod	<i>Syngnathus phreaticus</i>	G1/S1/SOC/NL
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The Northern Virginia Well amphipod, is a distinctive species of subterranean amphipod that has a very limited range (Holsinger, 1991). Amphipods are tiny crustaceans more commonly known as freshwater shrimp, scuds, or sideswimmers. Their common names arise from their resemblance to shrimp and their habit of swimming or “scudding” along the substrate on their sides in an undulating motion (Pennak, 1978). Amphipods are common in freshwater ecosystems of Virginia; they also occur in brackish and marine waters along the coast. Unable to swim in open water, amphipods are confined to the substrate--the stones, wet leaves and aquatic vegetation of their freshwater habitats--where they feed on detritus (dead animal and plant matter).

The Northern Virginia Well amphipod has been documented at only three sites, including historical collections obtained from wells in Alexandria (1921) and Vienna (1948) in northern Virginia (suburbs of Washington, D.C.). The exact locations of both collection sites are unknown, but they are presumed to have been destroyed by subsequent urbanization (Holsinger, 1991). The only recent collections (1996

and 2003) are from a single ravine seepage habitat on a military base in Fairfax County, Virginia (Chazal and Hobson, 2003).

Threats to the Northern Virginia Well amphipod are pollution of the groundwater, disturbance of the groundwater recharge area (such as urbanization) and disturbance of aquatic habitats. Please note that this species is tracked as a species of concern by the United States Fish and Wildlife Service (USFWS); however, this designation does not have any official legal status.

Sites #11, 12, 23

According to the information currently in our files, the Fort Belvoir Proving Ground Conservation Site is located within the project sites. Fort Belvoir Proving Ground Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resource of concern at this site is:

Isotria medeoloides Small whorled pogonia G2/S2/LT/LE

Small whorled pogonia, a perennial orchid, grows in a variety of woodland habitats in Virginia, but tends to favor mid-aged woodland habitats on gently north or northeast facing slopes often within small draws. It is quite natural for plants of this species to remain dormant in the soil for long periods of time. Direct destruction, as well as habitat loss and alteration, are principle reasons for the species' decline (Ware, 1991). The Virginia Field Office of the U.S. Fish and Wildlife Service recommends that field surveys for this species be conducted in areas of Virginia south of Caroline County from May 25 through July 15 and in areas of Virginia from Caroline County and north from June 1 through July 20 (K. Mayne, pers. com. 1999). Please note that this species is currently classified as threatened by the United States Fish and Wildlife Service (USFWS) and as endangered by the Virginia Department of Agriculture and Consumer Services (VDACS).

Due to the potential for these sites to support populations of small whorled pogonia, DCR recommends an inventory for the resource in the study area prior to any forest clearing. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

DCR-Division of Natural Heritage biologists are qualified and available to conduct inventories for rare, threatened, and endangered species. Please contact J. Christopher Ludwig, Natural Heritage Inventory Manager, at chris.ludwig@dcr.virginia.gov or 804-371-6206 to discuss arrangements for field work. A list of other individuals who are qualified to conduct inventories may be obtained from the USFWS.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. Survey results should be coordinated with DCR-DNH and USFWS. Upon review of the results, if it is determined the species is present, and there is a likelihood of a negative impact on the species, DCR-DNH will recommend coordination with VDACS to ensure compliance with Virginia's Endangered Plant and Insect Species Act.

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. In the areas within or adjacent to the Area T-17 Ravines, avoid disturbing any seeps or springs. Due to the legal status of Wood turtle, DCR also recommends coordination with Virginia's regulatory authority for the management and protection of this

species, the VDGIF, to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

In addition, DCR also recommends a re-review when site specific plans become available, prior to any land disturbing activity.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov). **For Sites 2, 4, 5, 13, 24, 30** Dogue Creek and Unnamed Tributary to Dogue Creek, which have been designated by the Virginia Department of Game and Inland Fisheries (VDGIF) as a "Threatened and Endangered Species Water", are downstream of the project sites. The species associated with these T & E Waters is the Wood turtle.

Should you have any questions or concerns, feel free to contact me at (804) 692-0984. Thank you for the opportunity to comment on this project.

Sincerely,



Alli Baird, LA, ASLA
Coastal Zone Locality Liaison

Cc: Amy Ewing, VDGIF
Troy Andersen, USFWS

Literature Cited

- Buhlmann, K, T. Tuberville, and W. Gibbons. 2008. Turtles of the southeast. University of Georgia Press. Athens, GA. 252 pp.
- Chazal, A.C. and C. S. Hobson. 2003. Surveys for the Northern Virginia Well Amphipod (*Stygobromus phreaticus*) at Fort Belvoir, Virginia. Natural Heritage Technical Report 03-11. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond, Virginia. Unpublished report submitted to USAG Fort Belvoir. 11 pp plus appendix.
- Holsinger, John R. 1991. *Stygobromus phreaticus*. In Virginia's Endangered Species: Proceedings of a Symposium. K. Terwilliger ed. The McDonald and Woodward Publishing Company, Blacksburg, Virginia. p185.
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- NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: April 8, 2010).
- Pennak, R.W. 1978. Freshwater invertebrates of the southeastern United States, 2nd edition. John Wiley and sons, New York, NY. pp. 451-463.
- Ware, D.M.E. 1991. Small whorled pogonia. In Virginia's Endangered Species: Proceedings of a Symposium. K. Terwilliger ed. The McDonald and Woodward Publishing Company, Blacksburg, Virginia.

Appendix B

Letter for
Naval Air Station Oceana

Douglas W. Domenech
Secretary of Natural Resources



David A. Johnson
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

600 East Main Street, 24th Floor
Richmond, Virginia 23219
(804) 786-6124

September 12, 2013

Melissa Nash
Norfolk District, Corps of Engineers
ATTN: CENAO-WR-R
803 Front Street
Norfolk, VA 23510-1096

Re: NAO-2013-1502, 13-V1207, Shoreline Protection System Repair, Oceana Dam Neck Annex

Dear Ms. Nash:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, this site is located within the Dam Neck Middle Beach Dunes Conservation Site. Conservation sites are tools for representing key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat they support. Conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation. Conservation sites are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. Dam Neck Middle Beach Dunes Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resource of concern at this site is:

Caretta caretta

Loggerhead sea turtle

G3/S1B,S1N/LE/LT

The Loggerhead is a cosmopolitan sea turtle which nests regularly in small numbers in Virginia. Loggerheads mate from late March to early June. From late April to early September, females make their way to shore to dig nests on ocean beaches, generally preferring high energy, relatively narrow, steeply sloped, coarse-grained beaches. Though thousands of eggs may be laid, only a few individuals are believed to survive to adulthood. Please note this species is classified as endangered by the United States

Fish and Wildlife Service (USFWS) and threatened by the Virginia Department of Game and Inland Fisheries (DGIF).

Loggerheads face threats both in the marine environment and on nesting beaches. The greatest cause of decline and the continuing primary threat to Loggerhead turtle populations worldwide is incidental capture in fishing gear, primarily in longlines and gillnets, but also in trawls, traps and pots, and dredges (USFWS, 2005). On land, Loggerheads face threats from habitat loss and alteration (primarily development of beaches, dredging, riprap, groins and jetties etc), increased nest predation by raccoons and feral animals, trampling by foot and vehicle traffic, and beachfront lighting which may affect hatchlings from reaching the ocean (NatureServe, 2009).

Due to the legal status of the Loggerhead sea turtle, DCR recommends coordination with the U.S. Fish and Wildlife Service (USFWS) and Virginia's regulatory authority for the management and protection of this species, the VDGIF, to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570). DCR also supports the Time-of-Year Restriction for beach nourishment to be conducted only from Dec 1 – May 15.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov).

Should you have any questions or concerns, feel free to contact me at 804-692-0984. Thank you for the opportunity to comment on this project.

Sincerely,



Alli Baird, LA, ASLA
Coastal Zone Locality Liaison

Cc: Amy Ewing, VDGIF
Troy Andersen, USFWS

Literature Cited

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: March 23, 2010).

U.S. Fish and Wildlife, Northern Florida Office. Loggerhead sea turtle. Decemeber 29, 2005. <http://www.fws.gov/northflorida/SeaTurtles/Turtle%20Factsheets/loggerhead-sea-turtle.htm>

Appendix C

Letter for
Virginia Capital Trail

MEMORANDUM

DATE: August 9, 2013
TO: Jennifer Parrott, VDOT
FROM: Alli Baird, DCR-DNH
SUBJECT: Due August 15, 2013
005-043-714, Rt 5 – Virginia Capital Trail Park Phase

The Department of Conservation and Recreation (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, the Fourmile Creek at Rt. 5 Stream Conservation Unit (SCU) is located within the project site. SCUs identify stream reaches that contain aquatic natural heritage resources, including 2 miles upstream and 1 mile downstream of documented occurrences, and all tributaries within this reach. SCUs are also given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain. The Fourmile Creek at Rt. 5 SCU has been given a biodiversity ranking of B3, which represents a site of high significance. The natural heritage resource associated with this site is:

Aquatic Natural Community

G2/S2/NL/NL

The documented Aquatic Natural Community is based on Virginia Commonwealth University's **INSTAR** (*Interactive Stream Assessment Resource*) database which includes over 2,000 aquatic (stream and river) collections statewide for fish and macroinvertebrate. These data represent fish and macroinvertebrate assemblages, instream habitat, and stream health assessments. The associated Aquatic Natural Community is significant on multiple levels. First, this stream is a grade B, per the VCU-Center for Environmental Sciences (CES), indicating its relative regional significance, considering its aquatic community composition and the present-day conditions of other streams in the region. This stream reach also holds a "Healthy" stream designation per the INSTAR Virtual Stream Assessment (VSS) score. This score assesses the similarity of this stream to ideal stream conditions of biology and habitat for this region. Lastly, this stream contributes to high Biological Integrity at the watershed level (6th order) based on number of native/non-native, pollution-tolerant/intolerant and rare, threatened or endangered fish and macroinvertebrate species present.

Threats to the significant Aquatic Natural Community and the surrounding watershed include water quality degradation related to point and non-point pollution, water withdrawal and introduction of non-native species. To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations, establishment/enhancement of riparian buffers with native plant species and maintaining natural stream flow.

In addition, regarding the Invasive Species Questions, DCR is unable to determine whether any invasive plant species occur within the project study area. DCR does not have a database of invasive species locations comparable to Biotics maintained for natural heritage resources. We have only general

information about the distribution of invasives in the state, information that has been made available to VDOT. For DCR to provide specific comments on any specific VDOT project would require our staff to make site visits for that project, which our resources will not allow. We can offer the following general comments which we hope will help.

Many invasive plant species are adapted to take advantage of soil disturbances and poor soil conditions. These adaptations are part of what enable certain species to be invasive. Non-native invasive plants are found through Virginia. Therefore, the potential exists for some VDOT projects to further the establishment of invasive species. To minimize the potential for invasive species infestation, projects should be conducted to minimize the area of disturbance, and disturbed sites should be revegetated with desirable species at the earliest opportunity following disturbance. Equally as important, species used for revegetation should not include the highly invasive species that have traditionally been used for revegetating disturbed sites. We recommend VDOT avoid using Crown vetch, Tall fescue, Weeping lovegrass, and Autumn olive if at all possible.

For more information on invasive alien plants and native plants, see the DCR-Division of Natural Heritage website (http://www.dcr.virginia.gov/natural_heritage/invspinfo.shtml). For sources of native plant material, see the Virginia Native Plant Society's website (<http://www.vnps.org>) For information on revegetation with native plants, see the USDA Natural Resources Conservation Service and Ducks Unlimited publications.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

All VDOT projects on state-owned lands must comply with the Virginia Erosion & Sediment Control (ESC) Law and Regulations, the Virginia Stormwater Management (SWM) Law and Regulations, the most current version of the DCR approved VDOT Annual ESC and SWM Specifications and Standards, and the project-specific ESC and SWM plans. [Reference: VESCL §10.1-560, §10.1-564; VESCR §4VAC50-30 et al; VSWML §10.1-603 et al; VSWMR §4VAC-3-20 et al].

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters, that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis>, or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov).

Thank you for the opportunity to comment on this project.

Appendix D

Letter for
Battlefields Bluff Subdivision

Douglas W. Domenech
Secretary of Natural Resources



David A. Johnson
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

600 East Main Street, 24th Floor
Richmond, Virginia 23219
(804) 786-6124

September 12, 2013

Mary Higgins Clark
York County Planning Department
PO Box 532
Yorktown, VA 23690-0532

Re: Battlefield Bluffs Subdivision

Dear Ms. Clark:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, the Grafton Ponds Conservation Site is located downstream from the project site. Conservation sites are tools for representing key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat they support. Conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation. Conservation sites are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. Grafton Ponds Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

<i>Ardea alba</i>	Great egret	G5/S2S3B,S3N/NL/NL
	Colonial Wading Bird Colony	G5/S2/NL/NL

The Great egret (*Ardea alba*, G5/S2S3B,S3N/NL/NL) is a tall, all white heron found across much of the globe, including southern Canada south to Argentina (Cornell, 2009). In Virginia, there are nesting records primarily around the Chesapeake Bay and Atlantic coast; however, scattered records from across the state are known (VSO, 2001). It is found along freshwater and saltwater marshes, mud flats, damp

meadows, river margins, and lake shores. In Virginia, this species prefers relatively open wetlands for foraging. It is a colonial nester, preferring to nest close to other birds, including other species, in trees over water or on islands (Cornell, 2009).

The greatest threat to the Great Egret is the loss of available nesting and foraging wetland habitat (Bradshaw, 1991).

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. Please see pages 26-29 of the May 2001 Natural Heritage Technical Report 01-9, *A Biological Survey of the Coastal Plain Depression Ponds (Sinkholes) of Colonial National Historical Park, Yorktown, Virginia*, for site description, map of pond and protection comments (see attached).

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

Our files show that Grafton Ponds Natural Area Preserve is in the project vicinity. However, we do not anticipate any adverse effects to the Natural Area Preserve and associated resources due to the project scope and location

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov). This project is located within 2 miles of documented occurrences of state listed animals. Therefore, DCR recommends coordination with VDGIF, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

Should you have any questions or concerns, feel free to contact me at 804-692-0984. Thank you for the opportunity to comment on this project.

Sincerely,



Alli Baird, LA, ASLA
Coastal Zone Locality Liaison

Cc: Dorothy Geyer, NPS
Amy Ewing, VDGIF

Literature Cited:

Bradshaw, Dana S. 1991. Great Egret. In Virginia's Endangered Species: Proceedings of a Symposium. K. Terwilliger ed. The McDonald and Woodward Publishing Company, Blacksburg, Virginia. Pp. 489-491.

Cornell Lab of Ornithology. 2009. All About Birds: Great Egret. At:
http://www.allaboutbirds.org/guide/great_Egret/id. Accessed 18Mar2010.

Virginia Society of Ornithology. 2001. The Virginia Breeding Bird Atlas Project 1985-1989. Special Publication Number 3. Virginia Department of Game and Inland Fisheries. Richmond, VA. 229pp.

COMMONWEALTH of VIRGINIA

A BIOLOGICAL SURVEY OF THE COASTAL PLAIN DEPRESSION PONDS (SINKHOLES) OF COLONIAL NATIONAL HISTORICAL PARK, YORKTOWN, VIRGINIA

FINAL REPORT

Submitted to:
National Park Service
Colonial National Historical Park

Virginia Department of Conservation and Recreation
Division of Natural Heritage
Natural Heritage Technical Report 01-9
May 2001



Department of Conservation & Recreation

CONSERVING VIRGINIA'S NATURAL AND RECREATIONAL RESOURCES

**A BIOLOGICAL SURVEY OF THE COASTAL PLAIN DEPRESSION PONDS (SINKHOLES)
OF COLONIAL NATIONAL HISTORICAL PARK, YORKTOWN, VIRGINIA**

Natural Heritage Technical Report 01-9

Prepared for:
National Park Service
Colonial National Historical Park
P.O. Box 210
Yorktown, Virginia 23690

Prepared by:
Nancy E. Van Alstine, Anne C. Chazal, and Kathleen M. McCoy
Virginia Department of Conservation and Recreation
Division of Natural Heritage
217 Governor Street, 3rd floor
Richmond, VA 23219

This report should be cited as follows:

Van Alstine, N.E, A.C. Chazal, and K.M. McCoy. 2001. A biological survey of the coastal plain depression ponds (sinkholes) of Colonial National Historical Park, Yorktown, Virginia. Natural Heritage Technical Report 01-9. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond, VA. 56 pp. plus appendices.

CRAWFORD ROAD POND
(Pond 15)

Size: Ca. 46 acres

Biodiversity Rank: B2

Locality: York County, VA

Quadrangle: Yorktown

Quadrangle Code: 3707625

Location: Just west of Crawford Road, ca. 0.8 kilometers north of the Crawford Road crossing of Baptist Run, Colonial National Historical Park.

NATURAL HERITAGE RESOURCES SUMMARY TABLE

ELEMENT NAME	GLOBAL RARITY RANKS	STATE RARITY RANKS	USFWS STATUS	VA LEGAL STATUS	ELEMENT OCCURRENCE RANK
COMMUNITIES:					
Coastal Plain Depression Pond Loblolly Pine-Willow Oak Type	G?	S1	-	-	B
Coastal Plain Depression Pond Sweetgum – Swamp Black Gum (-Black Gum) Type	G1G2?	S1	-	--	B

ANIMALS: None

PLANTS: None

Site Description: This site contains a Coastal Plain Depression Pond (Pond 15) within a forest matrix. Sweetgum (*Liquidambar styraciflua*) contributes the most woody stems in this seasonal pond, but willow oak (*Quercus phellos*) and red maple (*Acer rubrum*) also contribute high cover. A hummock in the middle of this pond supports a dense stand of fetterbush (*Leucothoe racemosa*). The *Sphagnum* layer is highly developed. Both the Loblolly Pine – Willow Oak / American Holly / Slender Spikegrass (*Pinus taeda* – *Quercus phellos* / *Ilex opaca* var. *opaca* / *Chasmanthium laxum*) Association and the Sweetgum – Swamp Black Gum (-Black Gum) / Cypress-swamp Sedge (*Liquidambar styraciflua* – *Nyssa biflora* – *Nyssa sylvatica* / *Carex jorii*) Association defined for the Grafton Ponds Complex (Rawinski 1997) are found at this site. The watchlist damselfly *Enallagma daeckii* was observed.

Boundary Justification: The boundary contains the significant natural community and adjacent uplands within at least the surface flow watershed for the pond. The recharge zone for any groundwater input into the pond is currently unknown and hydrological studies may result in modification of this boundary. Protection of the watershed for this pond is critical in order to maintain the hydrological regime of the pond and the vegetation communities it supports. An upland buffer may also provide some protection from the introduction of invasive alien plant species.

Threats: None noted at the time of survey.

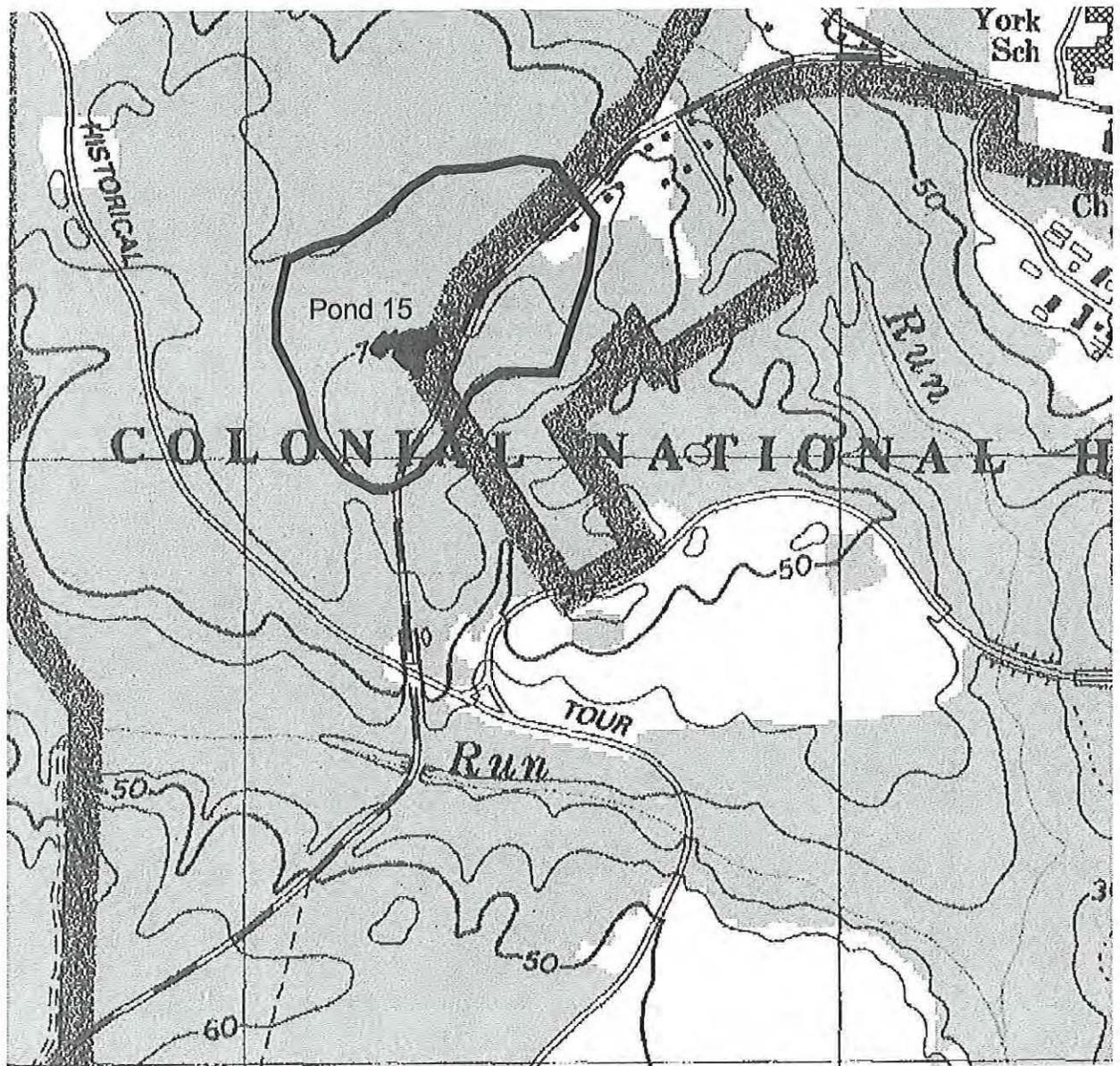
Management Recommendations: Development, tree canopy alteration (e.g., logging), and nutrient input would alter the quality of the pond and its associated vegetation. The site should be protected from

ground water contamination and disturbances to the hydrologic regime. Timber harvesting of the surrounding uplands should be restricted. The status of the vegetation communities present should be monitored. Hydrological studies are needed to determine the relative importance of input from groundwater vs. surface flow.

Protection Recommendations: Protection measures should include the implementation of management recommendations and consultation with DCR-DNH when changes in land use or management practices are contemplated. The Conservation Planning Boundary should be formally incorporated into the planning and management documents for Colonial National Historical Park.

References:

Rawinski, T.J. 1997. Vegetation ecology of the Grafton Ponds, York County, Virginia, with notes on Waterfowl use. Natural Heritage Technical Report 97-10. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond. 42 pp. plus appendix.



300 0 300 600 Meters

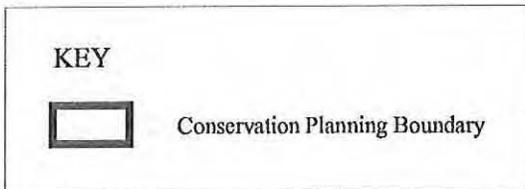
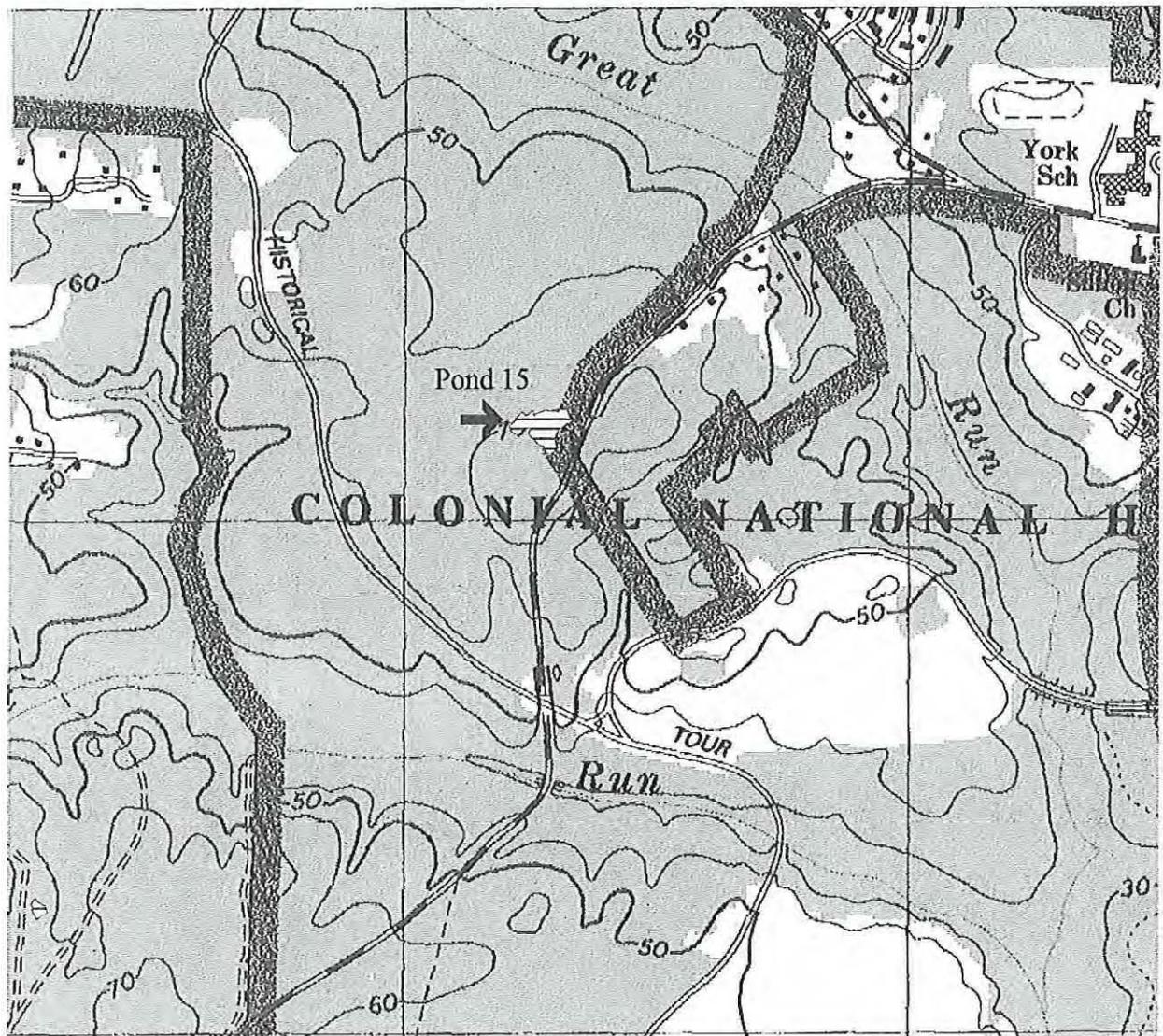


Figure 3. Conservation Planning Boundary for the Crawford Road Pond Conservation Site. Colonial National Historical Park, Yorktown USGS 7.5' quadrangle.



400 0 400 800 Meters

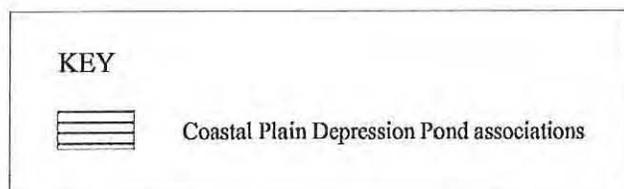


Figure 4. Location of the Coastal Plain Depression Pond community associations within the Crawford Road Pond Conservation Site. The exact locations of the associations are not shown as they are intermingled within the site. Colonial National Historical Park, Yorktown USGS 7.5' quadrangle.

Appendix E

Letter for
Lynnhaven River Ecological System
Restoration Study

Douglas W. Domenech
Secretary of Natural Resources



David A. Johnson
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

600 East Main Street, 24th Floor
Richmond, Virginia 23219
(804) 786-6124

September 16, 2013

Janet Cote
Norfolk District, Corps of Engineers
Planning and Policy Branch
803 Front Street
Norfolk, VA 23510-1096

Re: Lynnhaven River Basin Ecosystem Restoration Study

Dear Ms. Cote:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

SAV / Scallop, and Reef Habitat Sites

Biotics documents the presence of natural heritage resources in the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

Princess Anne, Great Neck North, Mill Dam Creek, and Great Neck South Wetland Restoration / Diversification Sites

DCR supports the efforts to control *Phragmites australis* in the wetland restoration areas, however DCR has the following concerns with the approach for *Phragmites australis* eradication within the Princess Anne and Great Neck North sites:

1. Excavation of the upper peat layer "in order to remove as much *P. australis* as possible to prevent re-colonization" will likely not remove all *Phragmites* rhizomes. *Phragmites* rhizome penetrates six feet or more into marsh substrate. Rhizomes are very hearty and in a dense stand, there is

abundant rhizome. Re-sprouting of any remaining rhizome will quickly overcome any new plantings.

2. Such soil disturbance is likely to encourage new *Phragmites* growth from seed or rhizome fragments.
3. Excavation adds the potential for fragments of rhizome to break off and migrate to other areas and establish new stands of *Phragmites*.
4. Removal of the peat will also remove any surviving native seed bank.

In addition, for the Mill Dam Creek and Great Neck South sites, the proposed creation of channels and pools will encourage *Phragmites* growth and the building of upland mounds from excavated material will expand the existing *Phragmites* footprint.

Instead, DCR recommends three consecutive years of herbicide treatment which is a proven method of controlling *Phragmites*. DCR also recommends minimizing soil disturbance as much possible during the proposed activities and, to leave the native seed bank in place to re-colonize the area. Please see the attached brochure for more details. If you have questions, please feel free to contact Kevin Heffernan, Stewardship Biologist (kevin.heffernan@dcr.virginia.gov, or 804-786-9112).

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov). This project is located within 2 miles of a documented occurrence of a state listed animal. Therefore, DCR recommends coordination with VDGIF, Virginia's regulatory authority for the management and protection of this or these species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

Should you have any questions or concerns, feel free to contact me at 804-692-0984. Thank you for the opportunity to comment on this project.

Sincerely,



Alli Baird, LA, ASLA
Coastal Zone Locality Liaison

Cc: Amy Ewing, VDGIF

Identification

Phragmites stems are green, rigid, ¼ to ½ inch in diameter and can exceed 12 feet in height. Bluish-green leaves are 1-1.5 inches wide and up to 20 inches long. The leaves and stems turn tan during the fall. The dense, oval-shaped flowering plume takes on a purple-red color as the inflorescence matures in July and August, later turning golden brown with a "fluffy" appearance. It typically grows in dense stands and forms a mat of roots 8-12 inches thick.

Contact DCR - Natural Heritage for assistance with identifying *Phragmites*.



Steve Dewey, Utah State University, Bugwood.org

Distribution and Abundance

Phragmites is concentrated in the wetlands of the Coastal Plain. It prefers to grow in marshes, but will also grow under trees. It will grow anywhere with sufficient soil moisture: ditches, septic drainage fields, ponds, but is not tolerant of high salinity.

Aerial mapping has helped to document the distribution of *Phragmites* in Virginia. Between 2004 and 2007, more than 3000 acres was mapped on the Eastern Shore. Nearly 1000 acres was mapped on the tidal Rappahannock River in 2006 and 2007. Further mapping will be done as resources become available.

View maps online by using the Virginia *Phragmites* Web Mapping Application on the DCR-Natural Heritage website at www.dcr.virginia.gov/natural_heritage.

Threats

- Reduces desirable native vegetation
- Reduces food and cover for wildlife
- Increases risk of wildfires
- Obstructs the viewshed of waterfront properties
- Rhizomes can clog drain fields
- Clogs ditches and ponds



Prevention

Minimize soil disturbances, and when they are unavoidable, quickly revegetate the sites. Revegetate sites by planting native wetland grasses and shrubs.

Remove vegetation fragments from equipment like pile drivers and lawn mowers before moving from an infested site.

Early detection and control of new stands prevents expansion. *Phragmites* is far easier to kill when the patch is smaller and younger: less herbicide is needed because the root system is smaller and less developed.



Resources

- Free Technical Advice
DCR - Natural Heritage, USDA, TNC
- Federal Cost Share Programs
Natural Resources Conservation Service
- Virginia Invasive Species Working Group
Contact DCR - Natural Heritage
- Form a Community Action Committee
Band together with other private landowners and pool your resources

Marsh Invader!

Common reed (*Phragmites australis*) is a tall perennial wetland grass found throughout the United States. Native and non-native strains are found in Virginia. The non-native strain is an aggressive wetland invader that out competes many native plant species. It grows in dense monotypic stands and forms a thick rhizome (underground stems) layer. While *Phragmites* does spread by seed, it primarily spreads by sending out underground shoots from rhizomes.



Phragmites invades disturbed sites more readily than undisturbed sites. Natural disturbances like storms can provide an avenue for invasion, but human disturbances are the more common culprit. *Phragmites* frequently pops up around docks, and in ponds and ditches. Once it becomes established, it spreads like cancer and is very difficult to eradicate.

If we want to protect Virginia's wetlands from *Phragmites*, we need to work together. Government agencies, non-profit organizations, businesses, and the general public need to work together in order to prevent further expansion and control existing infestations.



Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL AND RECREATIONAL RESOURCES
Virginia Natural Heritage Program

This brochure is provided by DCR during Year Five of the Seaside Heritage Program. It is coordinated by the Virginia Coastal Zone Management Program at the Department of Environmental Quality through grant #NA06NOS4190241 of the National Oceanic and Atmospheric Administration, Office of Ocean and Coastal Resource Management, under the Coastal Zone Management Act of 1972, as amended.



Virginia Coastal Zone
MANAGEMENT PROGRAM



Virginia Natural Heritage Program
217 Governor Street
Richmond, VA 23219
(804) 786-7951
FAX (804) 371-2674
www.dcr.virginia.gov/natural_heritage

PHRAGMITES CONTROL FOR LANDOWNERS



PRESERVING AND PROTECTING
VIRGINIA'S WETLANDS

Phragmites Control

Techniques

Mechanical control can be effective, but is labor intensive. Repeated mowing or disking over several years will eventually deplete energy stored in the rhizomes and kill the plant. Getting into the marsh with the necessary equipment is usually a limiting factor.

Biological control methods are in experimental stages. Both Cornell University and the University of Florida are studying insects that feed on *Phragmites* in Europe. However, biological control is still years away.

Where water levels can be manipulated such as in ponds, ditches, or impounded marsh, flooding can reduce *Phragmites*. To be effective, rhizomes must be deeply flooded (2-3 feet) for four months during the growing season. Cutting combined with flooding with brackish water has also been shown to kill *Phragmites*.

Fire clears away dead stems and allows light to reach the soil, which can encourage the germination of native seeds. However, fire alone tends to invigorate *Phragmites*. Prescribed fire following chemical treatment has been very effective. Fire in *Phragmites* stands can be hazardous to both property and life, and should be left to professionals.

Two herbicides have been approved by the EPA for *Phragmites* control: glyphosate and imazapyr. While both are available in several formulations, only the aquatic formulation can be used to control *Phragmites*. When using herbicides, Federal law requires you to follow label instructions.

Chemical treatment, combined with fire or mowing, is the preferred method to control *Phragmites*.

Herbicides

Glyphosate, which is the active ingredient in Roundup®, is a non-specific herbicide. It will kill any plant tissue it contacts. Glyphosate degrades quickly in soil (average of 40 days). While glyphosate is available to the general public, keep in mind that you need to use an aquatic formulation (Roundup® is not).

Imazapyr is also a non-specific herbicide, though it does not affect conifers (pines, cedar). Imazapyr can remain soil active for up to five months. Only certified aquatic pesticide applicators can use imazapyr.

Imazapyr costs more per acre treated than glyphosate, but is generally considered to be more effective, in part because it remains active in the soil longer. Some applicators prefer to use a mixture of glyphosate and imazapyr.



Richard Old, XID Services, Inc., Bugwood.org

When should I call a pro?

As a general rule, treating an area larger than 1/4 acre (66x66 feet) is too much for a backpack sprayer. Patches up to one acre (200x200 feet) can be treated from the ground with a powered sprayer mounted on a vehicle.

Aerial application should be considered for areas over one acre and will usually be more cost effective for five acres or more. However, costs of aerial application should be compared to those of ground-based application. Getting multiple cost quotes from service providers is recommended for both ground application and aerial application. To bring costs down, landowners should consider partnering to contract an aerial herbicide applicator.



Timing the treatment

Timing is important in all the treatment options. Mowing must be done during the growing season before seed set. The two herbicides recommended have different timing recommendations. Failure to properly time treatments will usually result in wasted time and money.

Application Prescriptions

Marsh-upland Interface

Phragmites often takes hold in the zone between low marsh and upland, probably due to lower salinity levels in the water table and less frequent flooding. If the upland is in shrub or forest, these sites are difficult to access from land or water. Aerial spraying is the most feasible treatment in this situation. If the upland is agricultural land or lawn, mowing is an option if the soils will safely support equipment or personnel.

Agricultural Fields and Lawns

Agricultural fields and lawns adjacent to wetlands are frequently invaded by *Phragmites*, due in part to on-going soil disturbances and nutrient inputs from fertilizers. Low, wet areas of agricultural fields are those most likely to become infested. In these situations, mowing or mowing combined with herbicide treatment will provide control – in addition to the control provided by on-going annual tillage operations. Cessation of tillage for even one year can result in rapid spread of *Phragmites* into field areas.

Boat Docks and Boardwalks

Areas around boat docks and boardwalks may become infested with *Phragmites* during or after construction or maintenance, when soils are disturbed and competing vegetation has been removed. The tall stature of *Phragmites* may obscure the views from these structures. Rapid response with cutting equipment or an herbicide treatment will help keep a new infestation from becoming large, difficult, and expensive to control.

Rights-of-Way

Rights-of-way through wet areas are frequently invaded by *Phragmites*. Maintenance activities (mowing equipment) disturb soils and facilitates invasion. In these settings, herbicide treatment is recommended for control.



Impoundments, Ponds, Ditches

Where water levels can be manipulated, lowering the water level and cutting or burning *Phragmites*, then reflooding the site, has resulted in reduction of *Phragmites*. One study suggests that at least three feet of water is needed to cover rhizomes for four months during the growing season in order to reduce *Phragmites* abundance. A combination of mowing and flooding with brackish water is another method that has been shown to have some success. *Phragmites* that occurs in irrigation ponds may not be treated with imazapyr herbicide, as stated on the label.

Commercial Forests

Commercial pine forests situated on low elevation wet sites near Eastern Shore tidal waters are frequently invaded by *Phragmites*. Establishment of *Phragmites* in such settings is likely to occur after thinning or final harvest when soil has been disturbed and exposed to direct sunlight. As the next generation of trees grows, *Phragmites* may persist in the understory where the canopy is open or light gaps occur. *Phragmites* patches in managed forests may supply propagules, through seed and rhizome fragments, to adjacent wetlands. Ground-based or aerial application of imazapyr herbicide is recommended, perhaps in combination with treatments intended to control competing hardwoods and other woody competition. Imazapyr herbicides do not impact pine and have been used in forestry for hardwood control for many years.



Appendix F

Letter for
Great Wicomico River
Oyster Restoration



DCR
Interoffice

MEMORANDUM

To: Robbie Rhur, DCR-DPRR
From: Alli Baird, DCR-DNH
Date: September 20, 2013
Subject: MRC 13-1115, Great Wicomico River Oyster Restoration Project
Due September 23, 2013

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Dredging Site: James River at Tribell Shoals and Shell Planting Site: Great Wicomico River

According to the information currently in our files, the Atlantic sturgeon (*Acipenser oxyrinchus*, G3/S2/LE/LT) has been documented in the project vicinity in the James River. Atlantic sturgeon is a large fish that reaches a maximum length of about 4.3 meters and may live for several decades. The adults migrate between fresh water spawning areas and salt water non-spawning areas. They feed primarily on benthic invertebrates and small fishes as available.

Stocks on the Atlantic slope have been severely reduced by overfishing (mainly late 1800s and early 1900s), pollution, sedimentation, and blockage of access to spawning areas by dams (Gilbert 1989, Burkhead and Jenkins 1991, Marine and Coastal Species Information System 1996). In Chesapeake Bay and elsewhere in the range, hypoxic events have increased and may degrade nursery habitat for Atlantic sturgeon (Secor and Gunderson 1997). Habitat loss due to dam construction and water pollution are thought to be major factors impeding full recovery of populations (Smith 1985, cited by Johnson et al. 1997; Gilbert 1989). A late maturation age and use of estuaries, coastal bays, and upstream areas of rivers for spawning and juvenile development make stocks vulnerable to habitat alterations in many areas (NatureServe 2012). Please note that this species is currently classified as endangered by the United States Fish and Wildlife Service (USFWS) and threatened by the Virginia Department of Game and Inland Fisheries (VDGIF).

To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. DCR also recommends restricting all activities to the fall and winter only and supports using the best available technology to prevent suspension of solids and fines in the water column. Due to the legal status of the Atlantic sturgeon, DCR recommends coordination with the U.S. Fish and Wildlife Service (USFWS) and Virginia's regulatory authority for the management and protection of this species, the VDGIF, to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

Please note this project is within a section of the James River, which has been designated as a scenic river in the state of Virginia. Due to this designation, DCR recommends you contact Lynn Crump of the DCR-Division of Planning and Recreation at 804-786-5054 or Lynn.Crump@dcr.virginia.gov.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov).

Thank you for the opportunity to comment on this project.

Cc: Amy Ewing, VDGIF
Troy Andersen, USFWS
Lynn Crump, DCR-DPRR

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Appendix G
Letter for
Lower James
Stream Mitigation Bank

Douglas W. Domenech
Secretary of Natural Resources



David A. Johnson
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

600 East Main Street, 24th Floor
Richmond, Virginia 23219
(804) 786-6124

April 26, 2013

Norfolk District, Corps of Engineers
Richmond Field Office
ATTN: Steven VanderPloeg
9100 Arboretum Parkway, Suite 235
Richmond, VA 23236

Re: NAO-2012-2048, Lower James Stream Mitigation Bank

Dear Mr. VanderPloeg

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, the Pipsico Forest - Eastover Ravines Conservation Site is within the project area. Conservation sites are tools for representing key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat they support. Conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation. Conservation sites are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. Pipsico Forest - Eastover Ravines Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

Coastal Plain Calcareous Seepage Swamp	G2/S2/NL/NL
Coastal Plain Dry Calcareous Forest	G1/S1/NL/NL

The Coastal Plain Calcareous Seepage Swamp occurs on the Virginia Coastal Plain on groundwater-saturated stream bottoms in ravines that have cut into Tertiary shell deposits or limesands. Braided streams and hummock-and-hollow microtopography are characteristic of the environmental setting. Soils

are highly calcareous with pH values up to 7.4 and calcium levels that range up to 6000 ppm. The tree canopy is consistently codominated by green ash (*Fraxinus pennsylvanica*) and red maple (*Acer rubrum*) with a few other species locally important. The shrub layer is typically open and contains northern spicebush (*Lindera benzoin*), wax myrtle (*Morella cerifera* (= *Myrica cerifera*)), American hornbeam (*Carpinus caroliniana*), and stiff dogwood (*Cornus foemina*). Vines are often abundant, especially woodvamp (*Decumaria Barbara*). The herb layer is dense, lush, and clearly divisible into two relatively discrete assemblages that occupy hummocks and mucky hollows, respectively. The most constant patch-dominants of the relatively well-drained hummocks are golden ragwort (*Packera aurea* (= *Senecio aureus*)) and brome-like sedge (*Carex bromoides*). Characteristic patch-dominants of the wet, mucky hollows are lesser clearweed (*Pilea Fontana*), smooth beggartick (*Bidens laevis*), lizard's tail (*Saururus cernuus*), spotted water hemlock (*Cicuta maculata* var. *maculate*), jewelweed (*Impatiens capensis*), and fowl mannagrass (*Glyceria striata*).

This calcareous seepage swamp occurs in dissected terrain in the central Virginia Coastal Plain. It is known only from calcareous ravines in the James and York River drainages, in James City, Surry, and York counties (Fleming, et al., 2012).

The Coastal Plain Dry Calcerous Forest, a dry, open, forest or woodland of the Coastal Plain of Virginia and Maryland, is restricted to subxeric to xeric, fertile habitats over unconsolidated, calcareous deposits. These localized habitats are found on southeast- to southwest-facing, usually convex slopes of deep ravines or stream-fronting bluffs that have downcut into Tertiary shell deposits or limesands. Occurrences are small (typically <1 acre) and highly localized in dissected portions of the Virginia inner Coastal Plain and Maryland outer Coastal Plain. Chinkapin oak (*Quercus muehlenbergii*) is a constant, codominant or dominant canopy tree and is the most characteristic tree of this type. Important associate trees include bitternut hickory (*Carya cordiformis*), American beech (*Fagus grandifolia*) and, in southeastern Virginia only, southern sugar maple (*Acer barbatum*). Some stands tend toward a woodland physiognomy, with low-statured, gnarled trees and a very open canopy. The understory includes eastern red cedar (*Juniperus virginiana* var. *virginiana*) and redbud (*Cercis canadensis* var. *Canadensis*). The herb layer is usually patchy but contains a diversity of species, including several long-range mountain disjuncts. Particularly abundant or noteworthy herbaceous species include Robin's plantain (*Erigeron pulchellus* var. *pulchellus*), Bosc's panicgrass (*Dichanthelium boscii*), hairy woodland brome (*Bromus pubescens*), and red columbine (*Aquilegia canadensis*). Other locally important species are bellow-beaked sedge (*Carex albicans*), Carolina anglepod (*Matelea carolinensis*), bottlebrush grass (*Elymus hystrix* var. *hystrix*), hairy wild rye (*Elymus villosus*), elmleaf goldenrod (*Solidago ulmifolia* var. *ulmifolia*), late purple aster (*Symphotrichum patens*), smooth rockcress (*Arabis laevigata*), white crownbeard (*Verbesina virginica* var. *virginica*), American bellflower (*Campanulastrum americanum*), hairy leafcup (*Smallanthus uvedalium*), whorled rosinweed (*Silphium trifoliatum* var. *trifoliatum*), few-flowered ticktrefoil (*Desmodium pauciflorum*), crested coralroot (*Hexalectris spicata*), and eastern needlegrass (*Piptochaetium avenaceum*) (NatureServe, 2012).

Compared to Basic Mesic Forests of the Coastal Plain, these dry calcareous forests have a larger component of oaks (particularly chinkapin oak) in the overstory and have a much less lush herb layer (Fleming, et al., 2012.).

In addition, the Barking treefrog (*Hyla gratiosa*, G5/S1/NL/LT) and the Oak toad (*Bufo quercicus*, G5/S2/NL/NL) have been historically documented within the project area. The Barking treefrog ranges through the coastal plain from North Carolina to Florida and west to Mississippi and eastern Louisiana (NatureServe, 2009). There are disjunct populations in Delaware, Maryland, Kentucky and Tennessee, and southeastern Virginia (NatureServe, 2009). Across its range, it inhabits areas near shallow ponds in pine savannas and in low wet woods and swamps (Martof et al., 1980). In Virginia, this species breeds in fish-free vernal ponds (Pague & Young, 1991). When inactive during cold or dry seasons, they burrow

under tree roots, vegetation, or in the soil; otherwise, this species is mostly arboreal and thus dependent on trees near the water (Pague & Young, 1991). Adult frogs feed on insects and other invertebrates; tadpoles consume primarily algae (VDGIF, 1993).

Major threats to the Barking treefrog include continued logging of native pine, destruction of breeding ponds, and over collecting (Pague & Young, 1991). Please note that this species is currently classified as threatened by the Virginia Department of Game and Inland Fisheries (VDGIF).

The Oak toad ranges along the Coastal Plain from south Virginia south and west to Louisiana (NatureServe, 2009). Typically growing to a length of 19 to 33 mm, the oak toad has been documented in Virginia's coastal plain, south of the James River (Martof et al., 1980). This species inhabits southern pine woods where it hides under all manner of objects. Unlike most other toads, the Oak toad is active by day. Breeding occurs in shallow pools, ditches, cypress ponds and flatwood ponds from April to October, depending on the arrival of warm, heavy rains (Conant, 1991).

The Oak toad does not do well in urban or suburban settings; however it might persist in some agricultural areas (Bartlett and Bartlett, 1999). It is threatened by increasing monocultures of loblolly pine and the continuous draining of remaining natural pine woodlands (Mitchell, 1991).

Due to the potential for this site to support populations of natural heritage resources including calcareous communities and ephemeral wetland species, DCR recommends a survey for these resources in the study area. The survey should include the identification of all vernal pools and emergent wetlands with ephemeral hydrology and ephemeral wetland breeding amphibian species during the appropriate time of year (May – July/August), including the oak toad and barking treefrog. With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources and/or enhancing habitat to support ephemeral wetland species.

Furthermore, there is a potential for Small whorled pogonia (*Isotria medeoloides*, G2/S2/LT/LE) to occur within the project area if suitable habitat exists on site. Small whorled pogonia, a perennial orchid, grows in a variety of woodland habitats in Virginia, but tends to favor mid-aged woodland habitats on gently north or northeast facing slopes often within small draws. It is quite natural for plants of this species to remain dormant in the soil for long periods of time. Direct destruction, as well as habitat loss and alteration, are principle reasons for the species' decline (Ware, 1991). The Virginia Field Office of the U.S. Fish and Wildlife Service recommends that field surveys for this species be conducted in areas of Virginia south of Caroline County from May 25 through July 15 and in areas of Virginia from Caroline County and north from June 1 through July 20 (K. Mayne, pers. com. 1999). Please note that this species is currently classified as threatened by the United States Fish and Wildlife Service (USFWS) and as endangered by the Virginia Department of Agriculture and Consumer Services (VDACS).

Due to the potential for this site to support populations of Small whorled pogonia, DCR recommends an inventory for the resource in the study area if there are plans for land disturbance (including cutting roads, timbering or other ground disturbance). With the survey results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

DCR-Division of Natural Heritage biologists are qualified and available to conduct inventories for rare, threatened, and endangered species. Please contact J. Christopher Ludwig, Natural Heritage Inventory Manager, at chris.ludwig@dcr.virginia.gov or 804-371-6206 to discuss arrangements for field work. A list of other individuals who are qualified to conduct inventories may be obtained from the USFWS.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. Survey results should be coordinated with DCR-DNH and USFWS. Upon review of the results, if it is determined the species is present, and there is a likelihood of a negative impact on the species, DCR-DNH will recommend coordination with VDACS to ensure compliance with Virginia's Endangered Plant and Insect Species Act.

Due to the legal status of the Barking treefrog, DCR recommends coordination with the VDGIF, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570). Due to the legal status of Small whorled pogonia, DCR also recommends coordination with the U.S. Fish and Wildlife Service (USFWS) to ensure compliance with protected species legislation. Furthermore, when site development plans are finalized for this project, DCR recommends a re-review by this office to determine potential impacts to natural heritage resources.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov).

Should you have any questions or concerns, feel free to contact me at 804-692-0984. Thank you for the opportunity to comment on this project.

Sincerely,



Alli Baird, LA, ASLA
Coastal Zone Locality Liaison

Cc: Amy Ewing, VDGIF
Kim Smith, USFWS

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Appendix H

List of Organizations that
Participated in Training

Accomack-Northampton PDC	Lancaster County
Advantage Environmental Consultants, LLC	McCormick Taylor, Inc.
Bowman Consulting	Mead Westvaco
CDM Smith	Middle Peninsula PDC
Chesterfield County	Natural Resource Group
City of Alexandria	New Kent Co.
City of Chesapeake Public Works	Newport News - Dept of Engineering
City of Hopewell	Northern Neck PDC
City of Lynchburg	Northern Virginia Land Trust
City of Virginia Beach, Dept. of Public Works	Northern Virginia Regional Commission
City of Williamsburg, Planning Dept	Northern Virginia Regional Park Authority
Clark Nexsen	Prince William County
Crater PDC	Prince William County, Dept of Parks and Recreation
DCR (Multiple Divisions)	Resource International Ltd.
DEQ (Multiple Divisions)	Richmond Regional PDC
Dewberry	Rinker Design Associates, PC
Draper Aden	Spotsylvania County
ECS Mid-Atlantic	Stafford Planning & Zoning
EEE Consulting	Suffolk Parks and Recreation
Fort Pickett	Town of Ashland
Fredericksburg	US Fish & Wildlife Service - Gloucester
Froehling & Robertson	US Forestry Service
Fugro Consultants, Inc.	USDA – Natural Resources Conservation Service
GAI Consultants, Inc.	Vanasse, Hangen, Brustlin, Inc.
Gloucester County Planning Dept.	VA Dept of Agriculture and Consumer Services
HDR Engineering, Inc.	VA Dept of Game and Inland Fisheries
Henrico Co.- Dept of Public Works	VA Dept of Forestry
Isle of Wight	VA Dept of Transportation
James City County	VIMS – Chesapeake Bay National Estuarine Research Reserve
Kapstone Kraft Paper Corporation, Roanoke Rapids Virginia	Virginia Dept of Health
Supply	Virginia Outdoors Foundation
Kimley-Horn and Assoc., Inc.	Westmoreland County

Williamsburg Environmental Group

Williamsburg Land Trust

York County Planning Division

Appendix J
Spotsylvania County
Comprehensive Plan
Information Provided

Spotsylvania Natural Heritage Resources

Natural heritage resources as defined by the Virginia Department of Conservation and Recreation – Division of Natural Heritage (DCR) are the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations such as caves and karst features. Spotsylvania is currently home to 24 distinct types of natural heritage resources with 37 total occurrences throughout the county (Table I: Natural Heritage Resources). In addition, DCR has identified 22 terrestrial and aquatic conservation sites as areas necessary for their survival.

DCR identifies and protects natural heritage resources statewide and maintains a comprehensive database of all documented occurrences of natural heritage resources in Virginia. DCR has developed conservation sites that contain known populations of natural heritage resources and include adjacent or surrounding habitat vital for their protection. Conservation sites do not represent protected lands. They are recommended for protection and stewardship because of the natural heritage resources and habitat they support, but are not currently under any official protection designation. Conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element’s conservation. Conservation sites can be used to screen development projects for potential impacts to natural heritage resources, aid local and regional planning, identify targets for acquisitions and easements and guide priorities for restoration activities.

An example of a conservation site in Spotsylvania County is Hamilton’s Thicket Conservation Site. In addition to multiple rare species and habitat types found here, the site/ecosystem are critically important because of the geographic location. Conservation sites are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. Hamilton’s Thicket Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resources associated with this conservation site are:

Coastal Plain / Outer Piedmont Acidic Seepage Swamp	G3/S3/NL/NL
Coastal Plain Depression Wetland	G3/S2/NL/NL



Coastal Plain / Outer Piedmont Acidic Seepage Swamp
©2006, DCR-DNH, Gary P. Fleming

The Coastal Plain / Outer Piedmont Acidic Seepage Swamp (*Acer rubrum* – *Nyssa sylvatica* – *Magnolia virginiana* – *Viburnum nudum* – *Osmunda cinnamomea* – *Woodwardia areolata* Forest.), is an acidic groundwater saturated swamp forest that ranges from southeastern New York and New Jersey to southeastern Virginia, primarily on the Coastal Plain. In Virginia, it occurs mostly in the inner (western) portion of the Coastal Plain and the extreme eastern portion of the Piedmont. This community occurs in nutrient-poor soils in stream headwaters, where abundant groundwater is discharged in springs and seeps. The soil typically consists of muck or shallow peat over sandy mineral soil, with Sphagnum-covered hummocks and pools of standing water also present. The vegetation is a closed-canopy forest with red maple (*Acer rubrum*) and black gum (*Nyssa sylvatica*) typically dominant. Characteristic understory trees and shrubs include sweetbay magnolia (*Magnolia virginiana*), possum-haw (*Viburnum nudum*), and sweet pepperbush (*Clethra alnifolia*). The herbaceous flora is usually rich in sedges and ferns, especially cinnamon fern (*Osmunda cinnamomea*) and netted chain fern (*Woodwardia areolata*). Skunk-cabbage (*Symplocarpus foetidus*) forms large colonies early the growing season in many stands. This uncommon wetland habitat is vulnerable to alteration or destruction by beavers and various anthropogenic activities including hydrologic modifications (NatureServe, 2010).



Coastal Plain Depression Wetland
©2001 DCR-DNH, Gary P. Fleming

The Coastal Plain Depression Wetland is a seasonally flooded forest of shallow seasonal ponds and other, more irregular basin depressions of the Chesapeake Bay region. The habitat is flooded up to 50 cm deep during the winter and spring, but typically draws down early in the summer. The substrate is characterized by mineral soils, generally acidic, gleyed to mottled, sandy or clay loams. Characteristic tree species include red maple (*Acer rubrum*), sweet gum (*Liquidambar styraciflua*), and black gum (*Nyssa sylvatica*), which are nearly constant in the canopy. Mature stands, however, usually contain willow oak (*Quercus phellos*) as an overstory dominant or co-dominant. Associates include American holly (*Ilex opaca*), southern magnolia (*Magnolia virginiana*), swamp tupelo (*Nyssa biflora*), sassafras (*Sassafras albidum*), pin oak (*Quercus palustris*), and loblolly pine (*Pinus taeda*). The shrub layer is characterized by fetterbush (*Leucothoe racemosa*), highbush blueberries (*Vaccinium formosum* and *V. fuscatum*), sweet pepperbush (*Clethra alnifolia*), winterberry (*Ilex verticillata*), and swamp azalea (*Rhododendron viscosum*). Roundleaf greenbriar (*Smilax rotundifolia*) is a particularly characteristic vine. Herbs characteristic of these communities are well adapted to periods of submersion and are generally sparse.

This community type has been greatly reduced since European settlement by draining and clearing for agricultural conversion. Ongoing threats include ditching, damage from timber harvests, ATV incursions, and adjacent agriculture with insufficient buffers to protect from pesticide and fertilizer use. Since this community depends on groundwater hydrology, depletion of the water table is a serious threat in developed areas. (NatureServe, June 5, 2012)

Potential Threats to Natural Heritage Resources:

The single greatest threat to natural heritage resources is the ongoing conversion of habitat to residential and commercial development. Forest removal, and increased impervious surfaces can influence water quality, and aquatic natural communities. Alteration of the local hydrology by land disturbance can change or eliminate terrestrial habitat. Fragmentation of forests and the introduction of invasives, both flora and fauna, can have a direct effect on the survival of many native plants and the resources that rely upon them for survival. Threats to the Natural Communities include incompatible development, and recreational activities, invasive species; and incompatible agricultural and forestry practices.

For protection of Natural Heritage resources, DCR recommends that localities and landowners utilize natural heritage information to help locate new development outside identified conservation sites to the greatest extent possible.

Literature Cited

NatureServe. 2010. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: March 19, 2012).

NatureServe. 2012. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: June 5, 2012)

Appendix:

Definitions of Abbreviations Used on Natural Heritage Resource Lists of the Virginia Department of Conservation and Recreation can be found at:
http://www.dcr.virginia.gov/natural_heritage/help.shtml

Spotsylvania County - Table I
Natural Heritage Resources and Conservation sites

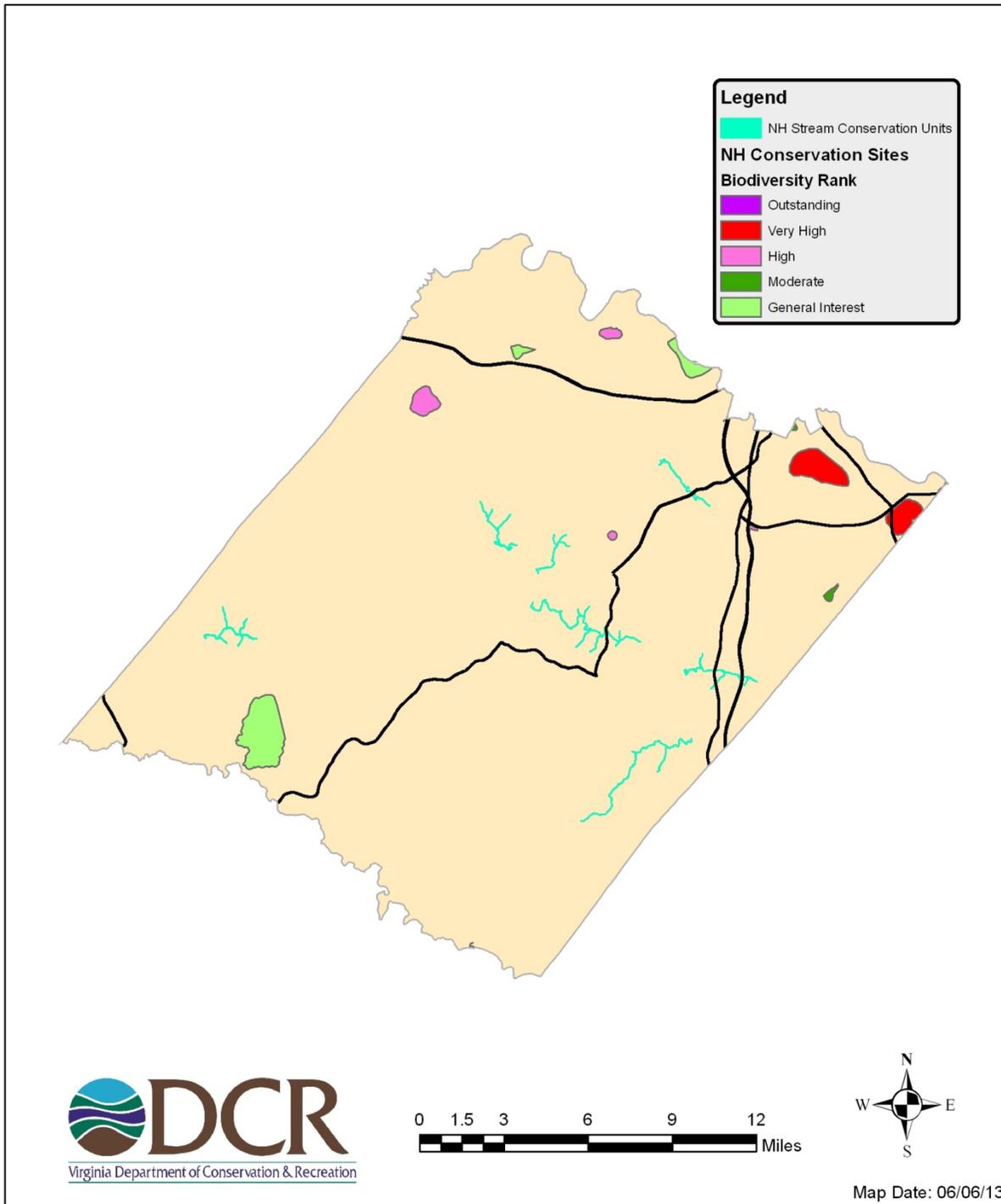
Group Name	Scientific Name	Common Name	Ecological Group	Last Observed	First Observed	Global Rank	FWS Species of concern	State Rank	Federal Status	State Status	Conservation Site Name
Nonvascular Plant	<i>Sphagnum carolinianum</i>	Carolina Peatmoss		1992-04-21	1999-04-21	G3		S2			SUMMIT RAILROAD TRACKS
Terrestrial Natural Community	<i>Acer rubrum</i> - <i>Nyssa sylvatica</i> - <i>Magnolia virginiana</i> / <i>Viburnum nudum</i> / <i>Osmunda cinnamomeum</i> - <i>Woodwardia areolata</i> Forest	Coastal Plain / Outer Piedmont Acidic Seepage Swamp	Coastal Plain / Piedmont Acidic Seepage Swamp	2004-07-19	2004-07-06	G3?		S3			HAMILTONS THICKET
Terrestrial Natural Community	<i>Acer rubrum</i> - <i>Nyssa sylvatica</i> - <i>Magnolia virginiana</i> / <i>Viburnum nudum</i> / <i>Osmunda cinnamomeum</i> - <i>Woodwardia areolata</i> Forest	Coastal Plain / Outer Piedmont Acidic Seepage Swamp	Coastal Plain / Piedmont Acidic Seepage Swamp	2004-06-15	2004-06-03	G3?		S3			PICKETTS CIRCLE
Terrestrial Natural Community	<i>Acer rubrum</i> - <i>Nyssa sylvatica</i> - <i>Magnolia virginiana</i> / <i>Viburnum nudum</i> / <i>Osmunda cinnamomeum</i> - <i>Woodwardia areolata</i> Forest	Coastal Plain / Outer Piedmont Acidic Seepage Swamp	Coastal Plain / Piedmont Acidic Seepage Swamp	2005-05-17	2005-05-02	G3?		S3			SOUTH FREDERICKSBURG
Terrestrial Natural Community	<i>Quercus phellos</i> - <i>Acer rubrum</i> - <i>Liquidambar styraciflua</i> / <i>Vaccinium formosum</i> , <i>fuscatum</i>) Forest	Coastal Plain Depression Swamp (Willow Oak - Red Maple - Sweetgum Type)	Coastal Plain Depression Wetland	2004-05-07	2002-08-08	G3		S2			HAMILTONS THICKET
Vascular Plant	<i>Saccharum coarctatum</i>	Compressed phragmites		1972-10-08	1972-10-08	G5?		S1?			
Vascular Plant	<i>Quercus prinoides</i>	Dwarf Chingapin Oak		1977-07-24	1977-	G5		S1			
Vascular Plant	<i>Quercus prinoides</i>	Dwarf Chingapin Oak		2001-05-31	1977-07-24	G5		S1			
Invertebrate Animal	<i>Alasmidobata heterodon</i>	Dwarf Wedgemussel		1935-08-18	1925-	G1G2		S1	LE	LE	
Invertebrate Animal	<i>Alasmidobata heterodon</i>	Dwarf Wedgemussel		1994-09-12	1994-08-27	G1G2		S1	LE	LE	RAPPAHANNOCK RIVER - ROCKY PEN RUN SCU
Invertebrate Animal	<i>Alasmidobata heterodon</i>	Dwarf Wedgemussel		2008-06-12	1993-12-09	G1G2		S1	LE	LE	PO RIVER - ANDREWS BRIDGE SCU
Invertebrate Animal	<i>Alasmidobata heterodon</i>	Dwarf Wedgemussel		2000-06-09	1998-05-15	G1G2		S1	LE	LE	PO RIVER - WRIGHTS POND - PILTZER CREEK SCU
Invertebrate Animal	<i>Lampsilis radiata</i>	Eastern Lampmussel		1989-09-04	1989-	G5		S2S3			PO RIVER - STANARDS HILL SCU
Invertebrate Animal	<i>Calyptrina inus</i>	Frosted Elm		1993-04-21	1993-04-21	G3		S2?			
Invertebrate Animal	<i>Lampyris subviridis</i>	Green Flasher		1927-10-07	1927-	G3		S2		LT	
Invertebrate Animal	<i>Syllis borea</i>	Leech's Clitellid		1947	1947	G4		S2			
Terrestrial Natural Community	<i>Quercus (phellos, pagoda, michauxii) / Ilex opaca - Clethra alifolia / Woodwardia areolata</i> Forest	Non-Riverine Wet Hardwood Forest (Northern Coastal Plain Type)	Non-Riverine Flatwood / Swamp	2005-05-31	2004-05-19	G2?		S2			SOUTH FREDERICKSBURG
Terrestrial Natural Community	<i>Quercus (phellos, pagoda, michauxii) / Ilex opaca - Clethra alifolia / Woodwardia areolata</i> Forest	Non-Riverine Wet Hardwood Forest (Northern Coastal Plain Type)	Non-Riverine Flatwood / Swamp	2009-06-12	2008-09-23	G2?		S2			NEW POST FLATWOODS
Vascular Plant	<i>Sarcocolla purpurea</i>	Northern pitcher plant		1986-08-20	1986-	G5		S1			
Aquatic Natural Community	NP-Lower Rappahannock Second Order Stream	Second Order Stream		2011-01	2011-01	G2?		S2?			MASSAPONAX CREEK SCU

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Spotsylvania County - Table I
Natural Heritage Resources and Conservation sites

Aquatic Natural Community	NP-Mattaponi First Order Stream	NP-Mattaponi First Order Stream		2011-01	2011-01	G3P													PO RIVER AT RT 613 SCU
Aquatic Natural Community	NP-Mattaponi First Order Stream	NP-Mattaponi First Order Stream		2011-01	2011-01	G3P													MATTA RIVER SCU
Aquatic Natural Community	NP-Pamunkey Fifth Order Stream	NP-Pamunkey Fifth Order Stream		2011-01	2011-01	G1G2													NORTH ANNA RIVER BELOW RT 601 SCU
Aquatic Natural Community	NP-Pamunkey Second Order Stream	NP-Pamunkey Second Order Stream		2011-01		G3													PLENTRFUL CREEK SCU
Aquatic Natural Community	NP-Rapid-Upper Rappahannock Second Order Stream	NP-Rapid-Upper Rappahannock Second Order Stream		2011-01	2011-01	G3													
Terrestrial Natural Community	Quercus alba - Quercus (occinea, velutina, moitana) / Gaylussacia baccata Forest	Piedmont / Central Appalachian Mixed Oak / Heath Forest	Oak / Heath Forest	2011-05-18	2007-07-17	G5													LAKE ANNA UPLANDS
Vascular Plant	Asclepias m. lora	Red Milkweed		1990-07-21	1990-07-21	G4G5													
Vascular Plant	Asclepias m. lora	Red Milkweed		1992-10-02	1993-	G4G5													
Invertebrate Animal	Ellyptic rose olivacea	Roseate Stabshell		2000-06-09	1999-08-17	G3													PO RIVER - WRIGHTS POND - PLITZER CREEK SCU
Vascular Plant	Isoetes medeoloides	Small Whorled Pogonia		1999-06-23	1998-06-24	G2													UPPER MINE RUN TRIBUTARY
Vascular Plant	Isoetes medeoloides	Small Whorled Pogonia		2006-06-15	2006-06-15	G2													NI RIVER TRIBUTARY SLOPES
Vascular Plant	Isoetes medeoloides	Small Whorled Pogonia		2006-06	2006-06	G2													COGNER CORNER EAST
Invertebrate Animal	Sigara depressa	Virginia Piedmont Water Boatman		1969-07-03	1969-07-03	G1G2													
Vascular Plant	Ranunculus abortivus	Water-plantain crowfoot		1977-07-31	1977-07-31	G4													
Terrestrial Natural Community	Juncus americana	Water-Willow Rocky Bar and Shore	Rocky Bar / Shore	2008-08-26	2008-08-26	G4G5													BHBBEY HILL
Invertebrate Animal	Ellyptic lanceolata	Yellow Lance		1992-07-26	1995-	G2G3													PO RIVER - ANDREWS BRIDGE SCU
Invertebrate Animal	Ellyptic lanceolata	Yellow Lance		1994-10-22	1993-11-24	G2G3													MATTA RIVER SCU
Conservation Site Name		Biodiversity Rank																	
Little Hunting Run		B5																	
Seminole Railroad Tracks		B4																	
Upper Mine Run Tributary		B3																	
Rappahannock River - Rocky Post Run SCU		B2																	
Pa River - Andrews Bridge SCU		B2																	
Harrison's Thicket		B3																	
Pickens Circle		B4																	
South Fredericksburg		B2																	
NI River Tributary Slopes		B3																	
Cogner Corner East		B3																	
Matta River SCU		B4																	
Lake Anna Uplands		B5																	
New Post Flatwoods		B2																	
Slow Creek Ravine		B4																	
Embrey Hill		B5																	
Plentiful Creek SCU		B4																	
Massaponac Creek SCU		B3																	
Hazel Run Rt 1 To Rt 2 SCU		B3																	
Pa River - Sorwards Mill SCU		B5																	
Pa River - Wrights Pond - Plitzer Creek SCU		B2																	
Pa River At Rt 613 SCU		B4																	
North Anna River Below Rt 601 SCU		B2																	

Spotsylvania County Natural Heritage Conservation Sites



Appendix K
Map of Localities with
Natural Heritage Information

Virginia Localities with Natural Heritage Information



Department of Conservation & Recreation
 CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES



Western Localities

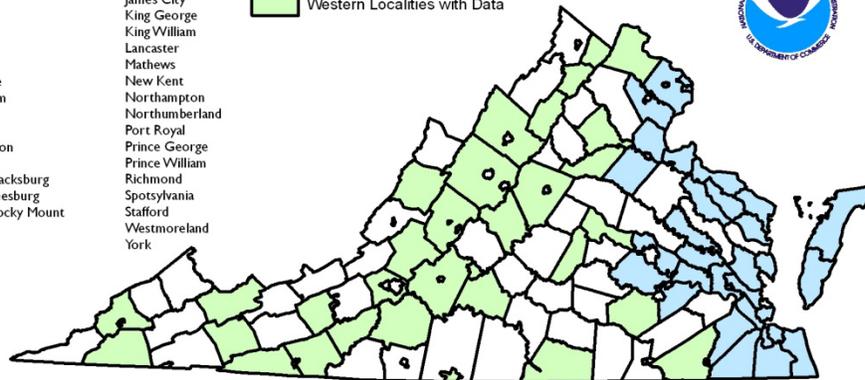
- Albemarle
- Augusta
- Bath
- Bedford
- Botetourt
- Campbell
- Carroll
- City of Danville
- City of Emporia
- City of Lynchburg
- Clarke
- Culpeper
- Cumberland
- Dinwiddie
- Fauquier
- Floyd
- Franklin
- Goochland
- Grayson
- Loudoun
- Mecklenburg
- Montgomery
- Nelson
- Orange
- Page
- Pulaski
- Roanoke
- Rockbridge
- Rockingham
- Scott
- Smyth
- Southampton
- Tazewell
- Town of Blacksburg
- Town of Leesburg
- Town of Rocky Mount
- Warren
- Wise

Coastal Localities

- Accomack
- Arlington
- Charles City
- Chesterfield
- City of Alexandria
- City of Chesapeake
- City of Colonial Heights
- City of Fredericksburg
- City of Hampton
- City of Hopewell
- City of Newport News
- City of Norfolk
- City of Portsmouth
- City of Suffolk
- City of Virginia Beach
- City of Williamsburg
- Essex
- Fairfax
- Gloucester
- Hanover
- Henrico
- Isle of Wight
- James City
- King George
- King William
- Lancaster
- Mathews
- New Kent
- Northampton
- Northumberland
- Port Royal
- Prince George
- Prince William
- Richmond
- Spotsylvania
- Stafford
- Westmoreland
- York

Legend

- Virginia Counties
- Coastal Localities with Data
- Western Localities with Data



NOAA Grant # NA12NOS4190168 FY 2012 Task #6
 Prepared by DCR-DNH September 30, 2013

Map Showing Localities with Natural Heritage Information

Appendix L
Atlas of Rare Butterflies, Skippers, Moths,
Dragonflies & Damselflies of Virginia

Virginia.gov Online Services | Agencies | Governor | Help Search Virginia.Gov

Atlas of Rare Butterflies, Skippers, Moths, Dragonflies & Damselflies of Virginia



Home Methods Search References Credits Contact

Introduction to the Rare Species Atlas

In the past two decades, two groups of insects, the Order Lepidoptera (butterflies, skippers and moths) and Order Odonata (dragonflies and damselflies), have gained increased popularity. Beginning with birdwatchers and naturalists, this swell of interest has extended to the general public, driven much by the proliferation of user-friendly field guides and on-line identification resources. Moreover, relatively affordable close-focus binoculars and easy-to-use digital cameras have also made butterfly and dragonfly watching fun and accessible. Fortunately, this has all led to a greater awareness of the roles of these organisms in plant and animal communities, and thus, a call for conservation of these insects. Indeed, many species of Lepidoptera and Odonata (sometimes referred to as 'Odonates') are considered rare at state, national and global levels.

The [Virginia Wildlife Action Plan](#) (Virginia Department of Game and Inland Fisheries, 2005) identifies 57 species of Lepidoptera and 76 species of Odonata as **Species of Greatest Conservation Need (SGCN)**. Nearly all of these, plus 60 additional species are tracked as "**natural heritage elements**" by the Virginia Department of Conservation and Recreation, Division of Natural Heritage (Roble, 2010).

In November 2010, the Virginia Department of Game and Inland Fisheries (DGIF) contracted with the Virginia Department of Conservation and Recreation, Division of Natural Heritage (DCR-DNH) to determine the historical and current distribution of all Lepidoptera and Odonata of Virginia that are SGCN and/or tracked by DCR-DNH (i.e. rare species). This information would also be made available to the public, researchers, conservation agencies and organizations, and other interested parties via this web-accessible Atlas of Rare Butterflies, Skippers, Moths, Dragonflies & Damselflies of Virginia.

[Click here](#) for an alphabetical list of the rare species included in this web atlas.

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 Virginia Department of Conservation and Recreation, Natural Heritage Program, 600 E. Main St., 24th Floor, Richmond, VA 23219

This atlas was compiled by the VA Natural Heritage Program with funds provided by the VA Dept. of Game and Inland Fisheries through a state wildlife grant from U.S. Fish and Wildlife Service. Questions/Comments? [Check the contacts page](#) | [Internet Privacy Policy Statement](#)

Last Modified: Friday, 21 June 2013, 09:19:50 PM

Homepage of the Atlas of Rare Butterflies, Skippers, Moths, Dragonflies & Damselflies of Virginia
 (<http://www.vararespecies.org/>)