

Natural Heritage – Locality Liaison/Habitat Restoration

Final Report for FY2010 VCZMP Grant No. NA10NOS4190205 Task #7

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By Rene' Hypes and Alli Baird

*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

For the 2010 grant year, 988 projects were reviewed for impacts to natural Heritage resources in the coastal zone (44% of the projects reviewed statewide). Some of the projects involved continued activity on NASA's Flight Facilities on Wallops Island including final shoreline restoration documents and final plans for installation of alternative energy sources (wind & solar). Fort Belvoir continued to have numerous projects as a result of the Base Re-alignment and Closure Act (BRAC) including recreational facilities, infrastructure upgrades, rehabilitation of existing buildings and new development. Additionally, the U. S. Fish and Wildlife Service requested information about natural heritage resources for the National Wildlife Refuge Draft Comprehensive Conservation Plans for Mason Neck, Featherstone, and Chincoteague National Wildlife Refuges (NWRs) and held a preliminary scoping meeting on the Presquile NWR plan.

Many presentations have been given to localities and other conservation partners, including: The city of Alexandria, Hampton Land Conservancy, James River Association, City of Williamsburg, Arlington County, Northampton County, King William County, City of Portsmouth, Fort A. P. Hill, Northern Virginia Regional Park Authority, Spotsylvania County, Hanover-Caroline Soil & Water Conservation District, and Tri-County/City Soil & Water Conservation District. In addition two consultants were trained; the Timmons Group and A. Morton Thompson & Associates, Inc. Presentations included an overview of DCR's Natural Heritage Program, the Locality Assistance Program, the Natural Heritage Data Explorer (NHDE) website, the Virginia Conservation Lands Needs Assessment (VCLNA), the Land Conservation Data Explorer (LCDE), and the Wetland Restoration Catalog as well as other conservation tools. Natural Heritage information is updated quarterly and shapefiles including that information is distributed to all licensed participants.

The Locality Liaison provided language and Conservation Sites maps to Charles City County, Essex County, King George County, King William County, Mathews County, New Kent County, Northampton County, Prince William County, and York County for use in their Comprehensive Plans and/or supporting documents.

The Locality Liaison gave a presentation on the benefits of riparian buffers for water quality and natural heritage resources for the Middle James River Roundtable meeting on March 15, 2011. The Locality Liaison also attended the 2010 CZM Coastal Partner's Workshop at DEQ in Richmond on December 8, 2010.

On April 14, 2011 the Locality Liaison provided natural heritage information found on Fort A. P. Hill in Caroline County at the Army's Earth Day Event on site for several hundred students and teachers.

The DCR-DNH continues to seek funding for the Wetland Restoration Catalog which is available on the DEQ Coastal GEMS website, found at: <http://128.172.160.131/gems2/> DCR-DNH has developed a revised methodology to identify more opportunities of

wetland and stream restoration and was tested in an 11-subwatershed pilot area of the Pamunkey River.

The Information Services Order Form, that can be filled out online, was posted on the DCR web site. The form may be found at:

http://dcrintra.dcr.virginia.gov/DCR_Public/NH/NHServiceFormNF.cfm

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.

VCZMP and Chesapeake Bay Program initiatives have generated considerable interest in land use issues within the Coastal Zone. 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). In addition to general oversight for all projects reviewed, Rene' Hypes (Environmental Review Coordinator) continues project review for Virginia Department of Transportation (VDOT) projects 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, several 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 provides oversight for the Project Review staff and/or conducts the review herself for all Coastal Zone projects, except for VDOT projects. During this grant year DCR-DNH has reviewed 988 projects in the Coastal Zone. This represents 44% 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, we have 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 our 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 our database and coordinates with Natural Heritage.. The United States Fish and Wildlife Service (USFWS) also relies heavily on DCR-DNH data for their own regulatory responses. The newly revised USFWS Information, Planning, and Conservation (IPaC) System web site on-line screening process includes a reference to the Natural Heritage website for species coordination purposes.

The DCR-DNH is currently working on updating a Memorandum of Agreement with the Virginia Department of Game and Inland Fisheries (VDGIF) for data sharing and species coordination.

In addition to regulatory agencies, the Virginia Department of Transportation (VDOT) integrates Natural Heritage data into their internal database for environmental screening purposes.

Specific Projects

Fort Belvoir

Fort Belvoir has continued to develop projects as a result of the Base Re-alignment and Closure Act (BRAC). Several projects, the Recreational Travel Camp, Route 1 Improvements, Parade Ground Area Water Upgrade and Central Post, Dewitt Hospital, were proposed adjacent to or within and the Area T-17 Ravine Conservation Site where the only extant occurrence of the Northern Virginia well amphipod has been documented. The 29th Infantry Parking Lot, Privatization of Army Lodging – Renovation and Construction, Corporate Campus and PX Shopping Center were adjacent to or within the Pohick/Accotink Conservation site where River bulrush, or the historically documented occurrences of Laura's Clubtail and the Wood turtle could be affected by changes in water quality as a result of these projects. (Appendix D)

As a result of comments on these multiple projects, Fort Belvoir has contracted the Division of Natural Heritage to inventory for mussels, odonates, bats, Lepidoptera, Sensitive joint-vetch, Small whorled pogonia and the Northern well amphipod on the base. The surveys began this past September and are scheduled to continue through September 2012.

NASA, Wallops Flight Facility, Wallops Island

Numerous projects on Wallops Island were reviewed for impacts to natural heritage resources, including the Final Shoreline Restoration EA. DCR-DNH provided comments to NASA in regards to the Environmental Impact Study for shoreline restoration and

infrastructure protection program for Wallop’s Island in November 2010. DCR-DNH and others expressed concerns of potential impacts to the natural heritage resources on Wallop’s Island during nesting season and the consequences of placing groins and other shoreline hardening on shoreline drift. DCR-DNH recommended continued exploration of the feasibility of inland relocation of existing facilities due to anticipated sea level rise and climate change.

Through collaboration with DCR-DNH and other reviewers, NASA chose the alternative that minimized the seawall extent, and eliminated the proposed use of groins and breakwaters which would have potentially disrupted sand transport for resources located to the south of the project area.

In another project, NASA proposed the installation wind turbines and solar panels for alternative energy at Wallops Island Flight Facility. While DCR-DNH supports the use of alternative energy, the recommendation was for the non-preferred alternative using residential scale wind turbines, rather than the “utility scale” wind turbine that has a greater possibility of bird and bat mortality. The Eastern Shore is part of a significant migratory bird area and Wallops Island supports breeding populations of several federally and state listed bird species. DCR-DNH also recommended post construction monitoring of bird/bat mortality and mitigation of impacts through possible seasonal low wind shut-downs. NASA decided to move the proposed utility scale wind turbines and solar panels from the island to the Flight Facility on the mainland and the wind turbines were reduced to residential scale.

NASA also requested information for preparation of an Environmental Assessment (EA) for impacts to natural heritage resources from the construction and operation of an Unmanned Aerial Systems airstrip at the north end of Wallops Island in the prior grant year. DCR-DNH recommended that the proposed airstrip be relocated to avoid impacts to a globally rare community and state rare plants and recommended a study to evaluate the impacts to threatened and endangered as well as migratory and colonial birds documented in the vicinity of the project. As a follow-up to DCR-DNH comments, the environmental staff at NASA Goddard Flight Facility requested access to natural heritage digital data and contracted DCR-DNH to perform a re-inventory of resources at the north end of Wallops Island where several rare birds, natural communities and plants have been documented.



DCR-DNH Ecologist and Locality Liaison on
North Wallops Island
Photo by Gary Fleming, DCR-DNH

The Locality Liaison assisted DCR-DNH ecologists in the field for a day and a half while they inventoried areas potentially affected by the proposed unmanned airstrip. In addition, they are considering several alternatives including different locations, different configuration and minimization of any impacts, as well as looking at potential mitigation measures to protect the natural heritage resources at the site.

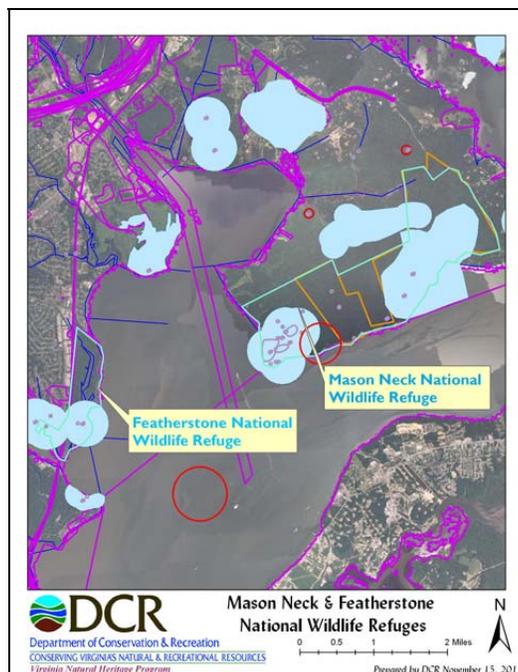
NASA has also requested information for a preliminary EIS for all proposed Wallops Island Activities. DCR-DNH recommended that the current re-survey at North Wallops Island be extended to encompass Wallops Main Base, Wallops Mainland and Assawoman Island in order to have up-to-date information with which to evaluate potential impacts to resources from proposed activities within the facility. (Appendix E)

Tangier Island Wind Turbine Project

A small turbine, 100 kW was proposed for Tangier Island, which, after a survey for potential impacts to wading birds, was determined to be sited outside of potential areas of impact. (Appendix F)

Mason Neck and Featherstone NWR Draft Comprehensive Conservation Plans

Both Mason Neck and Featherstone National Wildlife Refuges (NWRs) have Bald eagles documented within the vicinity and Tidal Freshwater Marshes that have the potential to support natural heritage resources. In order to incorporate accurate information into the conservation plans, DCR-DNH recommended surveys for additional resources including Sensitive joint-vetch, Parker's pipewort and River bulrush in the tidal freshwater marshes as well as surveys for the Fine-lined emerald and the Rare skipper. A survey for the Small whorled pogonia was also recommended for the uplands portions of the project areas. (Appendix G)



Chincoteague National Wildlife Refuge Comprehensive Conservation Plan

DCR provided a table of all the natural heritage resources within the refuge and offered to provide the U. S. Fish and Wildlife Service and the National Park Service with digital information about documented resources in the refuge. DCR also recommended a re-survey of the refuge in order to accurately document the current location and extent of natural heritage resources for use in their planning efforts. Additionally, DCR supports efforts to maintain lands to maximize habitat and wildlife management strategies for rare, threatened and endangered species, migratory birds and resident wildlife in all of the proposed alternatives. (Appendix H)

Presquile National Wildlife Refuge

The Locality Liaison participated in a Government Partners Issues and Concerns Scoping Meeting for the Presquile National Wildlife Refuge Comprehensive Conservation Plan. Several natural heritage resources documented within the NWR include Sensitive joint-vetch, Bald eagle and Northern harrier.

Natural Heritage Data Explorer Internet Website

The heart of DCR-DNH's service to localities is the set of databases and information tools that indicate what's rare, where the rarities are, and how they can be protected. DCR-DNH databases contain information about approximately 9,501 specific occurrences of natural heritage resources, 925 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 2,351 conservation sites, of which 865 are in the coastal zone. These sites are continuously being updated by DCR-DNH staff. There has also been work in data development to further the concept of conservation sites by forming "building blocks" around natural heritage resource occurrences as well as automating our current conservation site development process.

The Virginia Natural Heritage Data Explorer (NHDE) allows Internet users to access Natural Heritage data on a remote website, requiring only a Microsoft Internet Explorer web browser and minimal instruction. 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. By providing immediate access to our data through the

internet, we are empowering our partners to utilize and apply our data more rapidly and effectively by having it easily available at their desktop. This user-friendly tool for accessing natural heritage resource data is available on a subscription basis to local governments, state and federal agencies, land trusts, consultants, private companies and other organizations. A signed data license agreement is required for all data subscriptions. In updating licenses, DCR-DNH has changed the license term for counties, non-profits and land trusts to a two year term, facilitating the renewal process. Please see Appendix A for an example of the license agreement normally sent to localities. The natural heritage data on the website is updated quarterly, as updates are released for digital screening coverage shapefiles. The website is proposed to be upgraded from the current ArcIMS platform to an ArcServer platform by the summer of 2012. Development of map services will be a part of this upgrade which will make the release of digital data more efficient. The website can be accessed at www.vanaturalheritageexplorer.org.

Hands-on training sessions for the Natural Heritage Data Explorer are generally held on an every-other-month basis. Most are held in Richmond at the DEQ Central office computer lab but it is also made available through a webinar, facilitating participation by long distance localities and conservation partners. 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, eight hands-on general training sessions for NHDE were held in Richmond and one state-wide training session for Soil and Water Conservation Districts (SWCDs) at Graves Mountain that included two Coastal Zone SWCDs.

At the end of the grant period, there were 29 localities and eight Planning District Commissions within the Coastal Zone using NHDE. In addition thirteen land trusts within the Coastal Zone are using NHDE and/or natural heritage data.

Approximately 626 projects have been submitted through NHDE within the FY2010 with 253 for the coastal zone. In addition, 130 projects statewide including 49 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 so 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.

A user guide for the NHDE continues to be updated (Appendix B). This manual is designed to assist users by providing guidelines for use of the data, explaining the various layers and functions, and offering trouble-shooting tips for common problems.

Updates to the NHDE website within this reporting period include:

- Continued site infrastructure updates and quarterly data updates
- Ongoing routine testing and validation to ensure site and scope of work compliance

Locality Partnerships with DCR-Natural Heritage

The Locality Liaison has worked with various organizations 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 several localities including Charles City County, Essex County, King George County, King William County, Mathews County, New Kent County, Northampton County, Prince William County, and York County for use in their comprehensive plan updates. In addition, tables of the resources that have been documented within their locality and maps showing the locations of conservation sites associated with natural heritage resources were included. Mathews and New Kent Counties incorporated some or all of the natural heritage information into their Comprehensive Plans by using language and/or the map supplied by the Locality Liaison. (Appendix I) The other localities are still in the process of updating, or have not yet adopted the new plans. Other localities that have expressed interest in incorporating natural heritage information into their upcoming comprehensive plan updates are: the Cities of Williamsburg and Chesapeake, and King and Queen, Stafford, Hanover, and Spotsylvania Counties.

At the end of FY2010, there are twenty-four coastal counties and ten coastal cities with access to NHDE, digital shapefile data, a combination of these tools and/or information within their comprehensive plan. This equates to approximately 77% of Coastal Zone counties or cities having utilizing Natural Heritage data. A combination of DCR-DNH project review staff and data management staff work to update annual license agreements and provide updated digital shapefile data quarterly. Please see Appendix J for a map of the Virginia localities with Natural Heritage information. It may also be viewed online at: http://www.dcr.virginia.gov/natural_heritage/documents/localitiesmap.pdf

The Locality Liaison participated in the Earth Day activities at Fort A.P. Hill, where approximately 300 school children attended. The display consisted of maps and details about the rare natural heritage resources in Caroline County including the Purple pitcher plant, an example of which was on display. Handouts about the natural heritage program and an activity were provided.

The Locality Liaison gave a presentation on the benefits of riparian buffers for water quality and natural heritage resources for the Middle James River Roundtable meeting on March 15, 2011 (Appendix K). The Locality Liaison also attended the 2010 CZM Coastal Partner's Workshop at DEQ in Richmond on December 8, 2010.

List of Participants in Presentations

Presentations included an overview of DCR's Natural Heritage Program, the Locality Assistance Program, the Natural Heritage Data Explorer (NHDE) website, the Virginia Conservation Lands Needs Assessment (VCLNA), the Land Conservation Data Explorer (LCDE), and the Wetland Restoration Catalog.

The following localities and conservation partners participated in these training sessions:

- Northampton County
- King William County
- Spotsylvania County
- City of Portsmouth
- Northern Virginia Regional Park Authority
- Fort A. P. Hill
- Hanover-Caroline SWCD
- Tri-county/Cities SWCD
- Timmons Group
- A. Morton Thompson & Assoc., Inc.
- James River Association
- Hampton Land Conservancy
- Arlington County
- City of Williamsburg
- City of Alexandria

Habitat Restoration and Protection Initiatives

Wetland Restoration Catalog

The Wetland Restoration Catalog contains potential wetland restoration sites that are within or adjacent to Natural Heritage Conservation Sites. Natural Heritage Conservation sites larger than 500 acres with a biodiversity rank of B1 (outstanding significance), B2 (very high significance) and B3 (high significance) were selected. Chief Biologist, J. Christopher Ludwig, reviewed each conservation site against Virginia Basemap aerial photography, National Wetland Inventory wetland coverage, and other GIS datasets. This catalog is intended to guide localities and regulatory agencies to appropriate sites for various conservation purposes including wetland mitigation.

Please note, these prior-converted wetland patches occur on a mix of private and public lands and property information has not been referenced. The wetland restoration opportunities have not been field verified. Additional property research, site evaluation and coordination with DCR-DNH will be necessary to determine which areas are suitable candidates for restoration. Nevertheless these sites represent high-probability opportunities to design and implement high-value wetland restoration projects.

The Wetland Restoration Catalog web page (http://www.dcr.virginia.gov/natural_heritage/wetrestcat.shtml) includes an overview of the catalog, methodology, a discussion of the results, a PDF version of the catalog including an attributes table, interactive state map of the sites with HUC codes and individual site maps. The Wetland Restoration Catalog is being utilized by consultants and localities as a way to focus and target potential conservation easements and wetland restoration projects. The Wetland Restoration Catalog is included in the DEQ Coastal Zone Program's Coastal GEMS (<http://128.172.160.131/gems2/>) with an accompanying factsheet.

The Virginia Natural Heritage Program 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

This pilot 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. (Appendix L) The expanded pilot area has been used as an example for discussions of funding with NatureServe and the Federal Highway Department. While interest in the product is positive, a funding source has yet to be identified.

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. A handout briefly describing the VEVA was developed and used in addition to a presentation. (Appendix M)

Coastal VEVA is incorporated into Coastal GEMS and can be accessed online at: <http://128.172.160.131/gems2/> 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 five pilot states participating in this effort.

During the past grant cycle, the site has been updated to include all new conservation lands. Featured areas within the coastal zone include Crow's Nest, Savage Neck Dunes, Dameron Marsh and Hughlett Point Natural Area Preserves. Additionally all of the Virginia Conservation Needs Assessment layers have been added to Landscape including two new water focused layers; John Smith Voyages and Public Access Sites. The site can be accessed at: <http://www.landscape.org/virginia> . The Locality Liaison includes Landscape as one of the several additional conservation resources available to NHDE training participants.

The Locality Liaison web page has been updated to include the current locality Information Services Order Form, and a current map of the localities that have Natural Heritage information.

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 research the Coastal Zone localities to determine when their comprehensive plans are due for review and will contact these localities at the appropriate time to offer assistance.

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 or Environmental 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. Contacting PDCs may help in identifying the best way to involve some of the remaining localities.

In addition, 34 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 the data has been 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 this 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 environmental review process.

Appendix

Appendix A

Sample Data License Agreement



COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

203 Governor Street
Richmond, Virginia 23219-2010
(804) 786-1712

License for Use of Digital Data and NHDE Website
provided by the
Virginia Department of Conservation and Recreation
Natural Heritage Program

The Virginia Department of Conservation and Recreation's Natural Heritage Program (DCR) hereby grants a revocable license to _____(Licensee) to use the following data: Natural Heritage Screening Coverage (Tier II) and NHDE website access for environmental screening purposes for planning and development.

Use of these data is subject to the following conditions:

1. The license is nonexclusive and revocable.
2. The license is nontransferable, and any attempted transfer is void.
3. The license conveys no rights for Licensee to release or distribute these data, or derivative works containing these data, in any electronic/magnetic or machine-readable form.
4. Licensee will identify "Virginia Department of Conservation and Recreation, Natural Heritage Program" as data source on any map or publication using DCR data. If format permits, Licensee will also include the date provided.
5. Licensee will provide DCR with a list of any reports or printed materials prepared using Natural Heritage Program data, and will provide a sample copy of such material if requested by DCR.
6. Although DCR maintains high standards of data quality control, DCR makes no warranty as to the fitness of the data for any purpose, nor that the data are necessarily accurate or complete.
7. Licensee understands and acknowledges that these data are provided for planning and assessment purposes only. Specific projects or activities should be reviewed for potential environmental impacts with appropriate regulatory agencies. If ground-disturbing activities are proposed in the vicinity of indicated natural heritage resources, DCR will be contacted for a site-specific review of the project area.

8. Licensee understands and acknowledges that release of precise species locations may threaten natural heritage resources. Licensee shall take reasonable precautions to ensure the security of species locations.
9. Licensee understands and acknowledges that the accuracy of these data is time-limited. Licensee agrees to use DCR-provided data only for the term specified by DCR, and to incorporate all updates provided by DCR. By the following date: _____ (which shall be no later than two years following the issuance of this license), Licensee will either
 - a. certify that all copies of these data have been destroyed or returned to DCR-DNH; or
 - b. complete arrangements with DCR to renew the subscription. These arrangements will include an updated license.
10. This License is the entire agreement between the parties with respect to the subject matter hereof. It shall be construed in accordance with the law of the Commonwealth of Virginia and may be amended only in writing signed by both parties.

By accepting the DCR data, Licensee agrees to abide by all of the above conditions. Licensee shall sign this license and return it to DCR to indicate receipt and acknowledgment of the terms of this license.

Signature

date

Print Name and Title

for _____
agency/company

Licensee e-mail address

Name: GIS data recipient

E-mail: GIS data recipient

Approved:

Thomas L. Smith, Director
DCR Division of Natural Heritage

date

Appendix B

NHDE User Manual Updated

Available online at:

<http://www.vanaturalheritageexplorer.org>

COMMONWEALTH of VIRGINIA

Virginia Department of Conservation and Recreation
Division of Natural Heritage

NATURAL HERITAGE DATA EXPLORER: USER MANUAL



<http://www.vanaturalheritageexplorer.org>

USER NAME: _____

PASSWORD: _____



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



VIRGINIA NATURAL HERITAGE PROGRAM

Appendix C

New Locality Information Services Order Form



INFORMATION SERVICES ORDER FORM
Updated 11/10



Mail or Email to:
Project Review Coordinator
DCR Division of Natural Heritage
217 Governor St
Richmond, VA 23219
Voice: (804) 371-2708 Fax: (804) 371-2674
nhreview@dcr.virginia.gov

ENVIRONMENTAL REVIEW SERVICES:

- Project Review** (30 calendar day turnaround); Natural heritage occurrences (rare plants, rare animals, significant communities and karst).
- Project Review with Accompanying Map**; for projects with potential impact to Natural Heritage Resources including alternative energy projects, written comments with 8.5 X 11 map displaying Natural Heritage Screening Coverage.

Details: Describe project in the space below, please include detailed project description, project location information including **latitude, longitude**, acreage, and existing site conditions (photographs if available). Attach additional information as necessary. In order to ensure an accurate assesment, please submit **an electronic copy of a site map**. (preferably from a USGS topo map with identified project boundaries) and all other information to **nhreview@dcr.virginia.gov** or fax a map to: **Environmental Review Coordinator @ (804) 371-2674**. Please include the project title on all correspondence. **Incomplete submittal of information will delay the review process.**

Project Title: XXX

Project Description:



INFORMATION SERVICES ORDER FORM
Updated 11/10



Natural Heritage Resource Reports & Distribution Maps

- Custom NHR Maps (describe, call for more information)

- Custom NHR Reports (describe, call for more information)

SUBSCRIPTION SERVICES: [Hyperlink to an example of the license agreement](#)

Natural Heritage Data Explorer Subscription Service

- (unlimited access per subscription year, complete a digital license agreement is required).

Digital Conservation Sites Subscription Service (specify area of interest; complete a digital license agreement is required)

- 1 county or 12 quads or less.
- 13-100 quads.
- Statewide coverage.

Please provide details in the space below: **(failure to provide information will delay subscription processing)**

Conditions:

1. Digitized DCR natural heritage resource locational data for GIS or map production, whether provided by DCR digitally or entered by the client from tables or reports, may not be used without first completing a data licensing agreement with DCR Division of Natural Heritage. A license form is available on request.
2. Although DCR-DNH data are closely quality controlled, DCR-DNH makes no warranty as to the fitness of the data for any purpose.
3. Any publication of data provided by DCR, whether as text, table or map, must acknowledge Virginia DCR-Natural Heritage Program, and include the date the data were provided by DCR

I understand and agree to the above conditions: Yes



INFORMATION SERVICES ORDER FORM
Updated 11/10



INFORMATION SERVICES ORDER FORM

DCR maintains lists of natural heritage resources monitored by the Natural Heritage Program. These lists provide information on taxonomy, rarity and federal/state legal statuses. These reports are not site specific and are **NOT** to be substituted for a project review or for on-site surveys required for environmental assessments of specific project areas.

Due to staff and budget constraints we ask that you use the online service whenever possible to download these lists of natural heritage resources:

Hyperlink to on-line reports (these may change as they are updated by inventory staff)

[The Natural Communities of Virginia, 2nd Approximation](#)

Natural Heritage Resources of Virginia: Rare Animals (PDF)

Natural Heritage Resources of Virginia: Rare Plants (PDF)

County lists of natural heritage resources can be generated using the Internet Database Search Tool:

Or requested below :

Send data and invoice (if applicable) to: (Please be sure to include a phone number and e-mail so we may contact you if we have any questions regarding your data needs)

Name: XX

Company: XX

Address: XX

City: XX

State/Zip: VA XX

Phone: 111-111-1111

Fax: 111-111-1112

Email: xx@xx.com

Appendix D

Letters

Fort Belvoir (BRAC)



DCR
Interoffice
MEMORANDUM

To: Robbie Rhur, DCR-DPRR
From: Alli Baird, DCR-DNH
Date: January 21, 2011
Subject: DEQ 10-180F, Recreational Travel Camp, Fort Belvoir
Date Due: January 21, 2011

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 Area T-17 Ravine 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. Area T-17 Ravine 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:

Stygobromus phreaticus Northern Virginia well amphipod G2G3/S1/SOC/NL

The northern Virginia well amphipod is a distinctive species of subterranean crustacean that has a very limited range. It 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. The only recent collections (1996 and 2003) are from a ravine seepage habitat on the Fort Belvoir Military Reservation in Fairfax County, Virginia. Please note that this species is globally rare and 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.

DCR consulted with the US Fish & Wildlife Service (USFWS) who were unaware of the project until we sent them the EA. In an email dated 1/21/2011, Tylan Dean stated, "The Northern Virginia well amphipod (*Stygobromus phreaticus*) has been documented (1996, 2003) from ravine seepages in the project area. The Northern Virginia well amphipod is globally rare and considered a "Species of Concern;" these species do not have official Federal status, but the Service is concerned about protecting these species. Any protective measures taken to decrease or prevent negative impacts to the habitat that supports these species, or the species themselves, could prevent them from being listed. In this case we recommend Ft. Belvoir investigate alternative project locations or modify the project footprint so the construction does not impact the ravine seepages. We encourage Ft. Belvoir to work and coordinate with the Virginia Department of Conservation and Recreation, Division of Natural Heritage on the management of the species on Ft. Belvoir.

If you have any questions, please contact Sumalee Hoskin of this office at (804) 693-6694, extension 128, or via email at sumalee_hoskin@fws.gov

Due to the potential for this site to support populations of natural heritage resources, DCR recommends an inventory for Northern Virginia well amphipod habitat including identification of any seeps/springs within the project boundaries. With the survey results we can more accurately evaluate the potential for impacts to natural heritage resources and offer specific protection recommendations. In addition, DCR concurs with the USFWS recommendation that Fort Belvoir should take protective measures to avoid negative impacts to any habitat that supports the species that may be found through the habitat inventory. DCR also concurs with the recommendation to investigate alternative project locations or modify the footprint to avoid impacts to potential habitat.

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 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.

Our files do not indicate the presence of any 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 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 Shirl Dressler at (804) 367-6913.

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: Tylan Dean, USFWS

Douglas W. Domenech
Secretary of Natural Resources



David A. Johnson
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

Division of Natural Heritage
217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951

May 13, 2011

Jack Van Dop
Federal Highway Administration
21400 Ridgetop Circle
Sterling, VA 20166

Re: U.S. Route 1 Improvements at Fort Belvoir

Dear Mr. Van Dop:

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 Pohick/Accotink Wetlands 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. Pohick/Accotink Wetlands 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:

<i>Schoenoplectus fluviatilis</i>	River bulrush	G5/S2/NL/NL
<i>Glyptemys insculpta</i>	Wood turtle	G4/S2/NL/LT
Natural Community	Tidal Freshwater Marsh	G3/SNR/NL/NL

River bulrush, a state-rare plant species, inhabits fresh tidal marshes of the coastal plain of Virginia. This species forms predominantly sterile colonies that spread by rhizomes. Water pollution and sedimentation, sea level rise, and invasive species such as *Phragmites australis* pose the greatest threats to populations of this sedge. Nine populations of river bulrush are believed to be extant in Virginia.

The Wood turtle 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).

Tidal freshwater marshes occur along the Atlantic Coast from Maine to Virginia. Its southern limit is the intertidal portion of the James River in east-central Virginia. In the southern part of the range (northern Virginia, Maryland, and Delaware), this is the principal mixed freshwater tidal marsh community, forming extensive patches along many tidal rivers. Tidal freshwater marshes are mixed, dense, and often diverse marshes with highly variable species composition and patch dominance. They are subject to diurnal flooding by tides and seasonal and episodic flooding from river discharge. Plant composition of freshwater tidal marshes generally occurs as a mosaic of patches dominated by a few or a single species.

In addition, Laura's clubtail (*Stylurus laurae*, G4/S2/NL/NL), has been historically documented at the project site. Laura's clubtail, a state rare dragonfly, ranges from Ohio south to Florida with westward records to Texas (Kondratieff, 2000). In Virginia, there are records across the Piedmont and west to the Ridge and Valley region. Its habitat consists of moderated gradient streams with many shallow riffles and runs (NatureServe, 2009).

Though somewhat tolerant of decreased water quality, threats include activities which alter the water flow or substrate such as: impoundments, channelization, dredging, siltation, agricultural non-point pollution, and municipal and industrial pollution. In addition, timber harvest may increase siltation and cause a decrease in dissolved oxygen as canopy cover is removed and water temperature rises (NatureServe, 2009).

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. Due to the legal status of the Wood turtle, DCR also recommends coordination with the VDGIF in order to ensure compliance with protected species legislation.

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.

Our files do not indicate the presence of any 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 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 Shirl Dressler at (804) 367-6913.

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
Robbie Rhur, DCR-DRPR

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Appendix E

Letter for NASA Wallops Flight Facility PEIS

Douglas W. Domenech
Secretary of Natural Resources



David A. Johnson
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

Division of Natural Heritage
217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951

September 2, 2011

Shari Silbert
Manager, Site-wide PEIS
NASA Goddard Space Flight Center's Wallops Flight Facility
Wallops Island, VA 23337

Re: Goddard Space Flight Center, Wallops Flight Facility, PEIS

Dear Ms. Silbert:

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.

Wallops Main Base:

According to the information currently in our files, Wallops Island Seeps and Little Mosquito Creek Conservation Sites are within the Wallops Main Base section of 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. Wallops Island Seeps Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance and the Little Mosquito Creek Conservation Site has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resources of concern associated with these sites are:

Wallops Island Seeps Conservation Site:

	Coastal Plain/Piedmont Seepage Bog	G2/SNR/NL/NL
<i>Crocanthemum propinquum</i>	Low frostweed	G4/S1/NL/NL

The saturated shrub and herbaceous vegetation of the Coastal Plain / Seepage Bog occupies oligotrophic spring-heads, seepage slopes, and less frequently small, headwater stream bottoms. Sites are scattered

throughout the Coastal Plain (except the maritime zone) and outer Piedmont, typically on lower or toe slopes, where groundwater is forced to the surface by impermeable clay layers. Surficial soils are usually peaty or sandy, very acidic, infertile, and covered by dense mats of *Sphagnum* mosses. The term "bog," as applied to these wetlands, is a technical misnomer, since most of these habitats are not true peatlands and none is an ombrotrophic system. This term, however, is now so widely used in the southeastern United States as a descriptor for open, acidic seepage wetlands that we have adopted it here for consistency (see Weakley and Schafale 1994 for additional discussion). Although early botanical explorers of Virginia frequently reported open boggy habitats, natural examples of these communities have nearly been extirpated by decades of fire exclusion, hydrologic alterations (ditching, draining, and impoundments), or outright destruction. The elimination of fire as an ecological process has allowed many former bogs to become overgrown with shrubs and trees. Good examples remain in military base training ("impact") areas at Quantico Marine Base (Fauquier and Prince William Counties), Fort A.P. Hill (Caroline County), and Fort Pickett (Nottoway County), where habitats have been subject to frequent incendiary burning for at least 50 years. Artificially maintained bog habitats are frequent in powerline clearings.

The vegetation of seepage bogs is usually a mosaic of scattered trees, shrub patches, and graminoid-dominated herbaceous patches. Typical woody species include sweetbay (*Magnolia virginiana*), poison sumac (*Toxicodendron vernix*), highbush blueberries (*Vaccinium corymbosum*, *Vaccinium fuscatum*, and *Vaccinium formosum*), possum-haw (*Viburnum nudum*), and smooth alder (*Alnus serrulata*). Among the most abundant herbaceous species, are twisted spikerush (*Eleocharis tortilis*), beakrushes (*Rhynchospora* spp.), narrow-leaved bluestem (*Andropogon perangustatus*), panic grasses (*Dichanthelium dichotomum* var. *dichotomum* and var. *ensifolium*), hairy umbrella-sedge (*Fuirena squarrosa*), meadow-beauties (*Rhexia mariana* var. *mariana*, *Rhexia nashii*, and *Rhexia petiolata*), clubmosses (*Lycopodiella alopecuroides* and *Lycopodiella appressa*), sundews (*Drosera brevifolia*, (*Drosera capillaris*), and *Drosera rotundifolia* var. *rotundifolia*), tawny cotton-grass (*Eriophorum virginicum*), bushy bluestem (*Andropogon glomeratus* var. *glomeratus*), Nuttall's reed-grass (*Calamagrostis coarctata*), yellow-eyed-grasses (*Xyris* spp.), yellow milkwort (*Polygala lutea*), and vervain thoroughwort (*Eupatorium pilosum*). Widely scattered, but nevertheless diagnostic, species of these bogs include red milkweed (*Asclepias rubra*), Rafinesque's seedbox (*Ludwigia hirtella*), large white fringed orchid (*Platanthera blephariglottis* var. *conspicua*), crossleaf milkwort (*Polygala cruciata*), purple pitcher-plant (*Sarracenia purpurea* ssp. *venosa* and ssp. *purpurea*), and large-flowered camas (*Zigadenus glaberrimus*). A large number of state-rare plants and several state-rare odonates (dragonflies and damselflies) are associated with seepage bogs. (Fleming et al. 2011)

Low frostweed (*Crocantemum propinquum* = formerly *Helianthemum propinquum*, G4/S1/NL/NL) is a perennial rhizomatous herb in the rock-rose family (Cistaceae). A plant of sandy, dry soil found from New England south through western North Carolina into Tennessee, in Virginia low frostweed has been documented, mostly historically, from a few locations in open, disturbed habitat scattered from the Outer Coastal Plain, Northern Piedmont, and Ridge and Valley regions. Clusters of 2-6 yellow, 5-petaled flowers arise from June-July on the scattered, alternate-leaved stems (Gleason and Cronquist 1991); self-pollinating flowers lacking petals arise later from July-September (Weakley, A. In prep.). Surveys should be conducted during the June-July blooming period of the earlier flowers as later season plants can be difficult to identify (Virginia Botanical Associates 2011). Threats include habitat destruction, herbicides, and succession to shadier habitat.

Little Mosquito Creek Conservation Site:

<i>Cordulegaster diastatops</i>	Delta-spotted spiketail	G5/S1/NL/NL
<i>Haliaeetus leucocephalus</i>	Bald eagle	G5/S2S3B,S3N/NL/LT
	Tidal Oligohaline Marsh	G3/SNR/NL/NL

Additionally Brown-fruited rush (*Juncus pelocarpus*, G5/S1/NL/NL) has been documented on the Wallops Main Base site. Brown-fruited rush is a rhizomatous, colonial, slender-leaved member of the rush family (Juncaceae) (Gleason and Cronquist 1991). It has a global distribution mostly northerly from Labrador to as far west as Minnesota, but also scattered as far south as Florida and Alabama (Weakley In prep). Associated with various wetland habitats across its range, brown-fruited rush in Virginia is found in freshwater seepages, referred to as sea-level fens, bordering marshes in the Outer Coastal Plain region. Threats include hydrological disturbances, sedimentation, pollutants, habitat destruction, and sea-level rise. Surveys for this species should be conducted in late August – October when it is flowering and fruiting.

Adult Odonata (dragonflies and damselflies), such as the Delta-spotted spiketail, commonly seen flitting and hovering along the shores of most freshwater habitats, are accomplished predators. Adults typically forage in clearings with scattered trees and shrubs near the parent river. They feed on mosquitoes and other smaller flying insects, and are thus considered highly beneficial. Odonates lay their eggs on emergent vegetation or debris at the water's edge. Unlike the adults, the larvae are aquatic and typically inhabit the sand and gravel substrates. Wingless and possessing gills, the larvae crawl about the submerged leaf litter and debris stalking their insect prey. The larvae seize unsuspecting prey with a long, hinged "grasper" that folds neatly under their chin. When larval development is complete, the aquatic larvae crawl from the water to the bank, climb up the stalk of the shoreline vegetation, and the winged adult emerges (Hoffman 1991; Thorpe and Covich 1991).

Because of their aquatic lifestyle and limited mobility, the larvae are particularly vulnerable to shoreline disturbances that cause the loss of shoreline vegetation and siltation. They are also sensitive to alterations that result in poor water quality, aquatic substrate changes, and thermal fluctuations.

The Bald eagle breeds from Alaska eastward through Canada and the Great Lakes region, along coastal areas off the Pacific and Atlantic Oceans, and the Gulf of Mexico, and in pockets throughout the western United States (NatureServe, 2009). In Virginia, it primarily breeds along the large Atlantic slope rivers (James, Rappahannock, Potomac, etc) with a few records at inland sites near large reservoirs (Byrd, 1991). Bald eagle nest sites are often found in the midst of large wooded areas near marshes or other bodies of water (Byrd, 1991). Bald eagles feed on fish, waterfowl, seabirds (Campbell et. al., 1990), various mammals and carrion (Terres, 1980). Please note that this species is currently classified as threatened by the Virginia Department of Game and Inland Fisheries (VDGIF).

Threats to this species include human disturbance of nest sites (Byrd, 1991), habitat loss, biocide contamination, decreasing food supply and illegal shooting (Herkert, 1992).

The Tidal Oligohaline Marsh association is an irregularly flooded oligohaline marsh ranging discontinuously along the coast from Massachusetts to Virginia. It occurs as a narrow band in the transition zone between high salt marsh and salt shrub vegetation. Groundwater seepage dilutes tidal floodwaters. It occurs on peat or muck of variable depth over sand. It is heavily dominated by *Eleocharis rostellata*, growing in association with *Spartina patens*, (NatureServe, 2011)

Wallops Mainland:

According to information currently in our files the Wallops Island Causeway Marshes Conservation site is within the Wallops Mainland section of the project site. Wallops Island Causeway Marshes Conservation Site

has been given a biodiversity significance ranking of B4, which represents a site of moderate significance. The natural heritage resources of concern associated with this site are:

<i>Ammodramus caudacutus</i>	Saltmarsh Sharp-tailed sparrow	G4/S2B,S3N/NL/NL
<i>Circus cyaneus</i>	Northern harrier	G5/S1S2B,S3N/NL/NL
<i>Schinia siren</i>	A Flower moth	GNR/S1S2/NL/NL

The secretive Saltmarsh Sharp-tailed sparrow is a small songbird that breeds in a narrow strip of salt marshes along the Atlantic seaboard from southern Maine all the way south to the Florida Peninsula (NatureServe, 2009). Until 1995 this and Nelson's Sharp-tailed sparrow were considered a single species. In Virginia, Saltmarsh Sharp-tailed Sparrows are uncommon winter residents, but they rarely start to breed with only a few nesting locations in tidal marshes of the Atlantic coast and Chesapeake Bay known each summer (Wilds, 1991).

This Sharp-tailed sparrow has a streaked back and breast with alternating gray and orange-buff colored stripes on its head. It has a distinctive gray nape and a gray cheek surrounded by a rather bright orange triangle. Nests are built low to the ground just above the water. Eggs are laid from May to August with double broods typical (Wilds, 1991).

Widespread loss, degradation, and fragmentation of coastal salt marshes along the eastern seaboard are the biggest threats to this species. Alteration of the habitat from the invasion of the exotic common reed (*Phragmites australis*; Benoit and Askins, 1999 per NatureServe, 2009) and spraying for mosquito and other pest control (Byrd and Johnston, 1991) may also be concerns.

The Northern Harrier is a slender bird of prey that breeds throughout the northern parts of the northern hemisphere in Canada, the northernmost USA, and in northern Eurasia (Bazuin, 1991). Marsh Hawk is a disused common name for the American form. Northern Harriers hunt small mammals and birds, surprising them as they drift low over fields and marshes they inhabit. While Northern Harriers are common in Virginia during the winter, they rarely breed this far south, with only a few nesting locations known each summer in the coastal plain. There are scattered, non-breeding summer records from across the state.

In the early 20th century, hunting posed a great threat to the Northern Harrier (Bazuin, 1991). Later, it suffered from the effects of DDT, a widely used pesticide, which resulted in the thinning of its egg shells and thus failed reproduction (NatureServe). Current threats to the Northern Harrier include human disturbances to nesting birds and destruction of breeding habitats, including the alterations of wetlands and the conversion of grasslands from native grasses to monotypic farmland (Bazuin, 1991; NatureServe, 2009).

Adult Lepidoptera (butterflies and moths) are readily recognizable flying insects which utilize almost all terrestrial habitats. As adults, Lepidoptera are important pollinators to many plants; however, caterpillars (larvae), are often considered pests (in particular, moth species; Covell, 2005) with appetites for stems and leaves of many economically important plants.

Butterflies and moths go through four distinct life stages: egg, caterpillar, pupa (chrysalis) and adult. The process of changing from caterpillar to adult, through the pupa stage is called metamorphosis. Like all living organisms, Lepidoptera populations need to meet their needs for food, shelter, and water to survive. Any of these variables, or a combination, may act as limiting factors to population size and success. These variables include the availability of appropriate host plants and nectar sources, being able to survive a given climate

(neither too hot nor too cold, too dry or too wet), finding adequate shelter, and the availability of basking sites or perches to defend territory (Glassberg, 1999).

Threats to Lepidoptera populations include habitat loss, pesticides, and over-collecting. Glassberg (1999) sites the loss of successional habitats (i.e. old fields with native grassed and forbs) to mowed lawns and shaded woodlands as significant a loss as land converted to urban use or as of a wetland drained. Pesticide use is often broadcast sprayed over vast areas and some do not have species specific targets, thus adversely affecting non-target taxa. This may be the case with some gypsy moth and mosquito control measures (Glassberg, 1999). The final threat, over collecting, pertains mainly to butterflies and while not as large-scale, can be as devastating to a single population as the previous threats. There are documented cases of populations being eradicated by unscrupulous collectors (Glassberg, 1999).

Wallops Island:

According to information, currently in our files, North Wallops Island and Assawoman Island Conservation Sites are within the Wallops Island section of the project site. North Wallops Island and Assawoman Island Conservation Sites have a biodiversity rank of B2, which represents a site of very high significance. The natural heritage resources of concern associated with these sites are:

Assawoman Island Conservation Site:

	Bird Nesting Colony	G5/SNR/NL/NL
<i>Charadrius melodus</i>	Piping plover	G3/S2B,S1N/LT/LT
<i>Charadrius wilsonia</i>	Wilson's plover	G5/S1B/NL/LE
<i>Rynchops niger</i>	Black skimmer	G5/S2B,S1N/NL/NL
<i>Sternula antillarum</i>	Least tern	G4/S2B/NL/NL
<i>Caretta caretta</i>	Loggerhead sea turtle	G3/S1B,S1N/LT,PE/LT

The Piping plover is a shore bird with two distinct breeding populations in the Great Plains and along the Atlantic Coast both spanning parts of Canada and the United States (NatureServe, 2009). It is migratory, spending the non-breeding season in southern states (North Carolina to Texas and the Caribbean. In Virginia, individuals are from the Atlantic Coast population and breed in coastal areas, utilizing the flat, sandy beaches of barrier islands for nesting (Cross, 1991). They feed on worms, insect larvae, beetles, crustaceans, mollusks along open sections of beaches, intertidal mud flats, or tidal pool edges (NatureServe, 2009). Please note that the Atlantic Coast population of the Piping Plover is listed as threatened by the United States Fish and Wildlife Service (USFWS) and the species is listed as threatened by the Virginia Department of Game and Inland Fisheries (VDGIF).

Threats to this species include predation of eggs and young by fox, raccoon, and seagulls, and the development and disturbance of barrier island breeding sites including human foot traffic and harassment by domesticated, free-running dogs (Cross, 1991).

Wilson's plover is a shorebird which ranges along both the Pacific and Atlantic coasts from the United States to South America (NatureServe, 2009). In Virginia, it is a rare breeder along the lower Chesapeake Bay and the Atlantic Coast south of Cape Henry. The summer males have a thick black bill and a white breast with a single band while the females, young, and winter males are grayish brown to reddish brown (Bergstrom, 1991). Wilson's plover habitat consists of the upper portions of sandy beaches on barrier islands, usually within 30 m of dune vegetation. Requirements for nesting include suitable foraging sites nearby for chicks,

usually mud or sand flats. Please note, Wilson's plover is listed as an endangered species by the Virginia Department of Game and Inland Fisheries (VDGIF).

Predatory threats to the eggs and young Wilson's plovers include foxes, herring gulls, greater black-backed gulls, and fish crows. Nesting habitats are lost to both natural processes such as erosion and coastal development, as well as human disturbance during the nesting season. Since the eggs are a pale tan or buff with irregular black specks, they blend easily into the sand which allows for them to be overlooked by unsuspecting beach visitors who crush them (Bergstrom, 1991).

The Black skimmer ranges from coastal areas of the United States south to most of South America (NatureServe, 2009). In Virginia, it breeds on islands and beaches along the Atlantic Ocean and the Chesapeake Bay. It generally occurs along coastal waters, including bays, estuaries, lagoons and mudflats in the breeding season, and along quiet water of rivers and lakes in migration and in winter (NatureServe, 2009). Black skimmers nest primarily near the coast on sandy beaches, shell banks, coastal and estuary islands, on wrack and drift of salt marshes, and on dredged material sites. They typically feed on small fish and crustaceans by skimming food from the surface of the water while flying. Black skimmers roost in flocks of up to the hundreds or thousands of birds.

In the Eastern United States, major threats include flooding of nests, predation, and human disturbance (NatureServe, 2009).

The Least tern breeds worldwide except in Antarctica and portions of the West Indies and East Indies (Beck, 1991). In Virginia, it breeds on beaches along both the Chesapeake Bay and the Atlantic Ocean (Beck, 1991). It nests on broad, flat beaches with minimal vegetation and forages in saltwater near the shore.

Threats to this species include loss of nesting habitat due to development and disturbance of breeding colonies by human activities and high numbers of predators (Beck, 1991).

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 threatened by both the United States Fish and Wildlife Service (USFWS) and 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).

North Wallops Island Conservation Site:

Chamaesyce bombensis
Charadrius melodus

Southern beach spurge
Piping plover

G4G5/S2/NL/NL
G3/S2B,S1N/LT/LT

<i>Falco peregrinus</i>	Peregrine falcon	G4/S1B,S2N/NL/LT
<i>Haliaeetus leucocephalus</i>	Bald eagle	G5/S2S3B,S3N/NL/LT
	Interdune Pond	G3/SNR/NL/NL
<i>Juncus megacephalus</i>	Big-headed rush	G4G5/S2/NL/NL
	Maritime Dune Grassland	G2/SNR/NL/NL
	Maritime Dune Scrub	G2/SNR/NL/NL
	Maritime Dune Woodland	G1G2/SNR/NL/NL
<i>Plantago maritime</i> var. <i>Juncoides</i>	Seaside plantain	G5T5/S1/NL/NL
	Tidal Mesohaline/Polyhaline Marsh	G4G5/SNR/NL/NL
<i>Caretta caretta</i>	Loggerhead sea turtle	G3/S1B,S1N/LT,PE/LT
<i>Scinia siren</i>	A Flower moth	GNR/S1S2/NL/NL
<i>Circus cyaneus</i>	Northern harrier	G5/S1S2B,S3N/NL?NL

Southern beach spurge, a state rare plant species, occurs in mats and is found on the secondary dunes of the Atlantic Ocean and Chesapeake Bay. Virginia is the northern limit of its range with ten documented sites state-wide. The rarity of this plant is due to habitat destruction associated with commercial development along the coast (Ludwig, 1996). Southern beach spurge is currently known from 10 occurrences in Virginia, and historically known from an additional five occurrences.

The Peregrine Falcon nests on cliffs, bluffs, talus slopes, old tree hollows, and abandoned nests of other birds of prey (Byrd, 1991). The adult Peregrine Falcon has long and pointed wings, a dark blue or slate back, black on its head and cheeks and white on its throat and sides of its neck. Their belly is barred white and blackish brown and its long, narrow tail is blue-grey with rounded narrow black bands and a white tipped end (Byrd, 1991). The Peregrine Falcon declined dramatically worldwide as a result of pesticide use in the mid-1900's and was once extirpated from east of the Mississippi, including Virginia (CCB, 2006). Once nesting took place in mountainous areas with sheer cliffs (CCB, 2006); currently, nesting pairs in Virginia use artificial structures such as tall buildings, bridge supports, and towers primarily in the coastal plain (Byrd, 1991; CCB, 2006). Intensive reintroduction efforts have been applied in Virginia since the 1970s, and current the population in Virginia still warrants protection and management.

Threats to the Peregrine Falcon include continued exposure to pesticides and human disruption of nesting attempts (Byrd, 1991). Please note that this species is currently classified as threatened by the Virginia Department of Game and Inland Fisheries (VDGIF).

Interdune Ponds are seasonally to semipermanently flooded, maritime herbaceous wetlands occupying deep interdune basins and swales. Examples are known from New Jersey south to North Carolina, but the complete range is uncertain. In Virginia these wetlands are distributed very locally in zones behind barrier beaches from the Eastern Shore (Accomack and Northampton Counties) to Cape Henry and False Cape (City of Virginia Beach). This ecological group includes both freshwater ponds, in which rainwater and groundwater quickly dilutes infrequent salt-water inputs, and slightly brackish ponds subject to more frequent salt water inputs. The latter, which appear to have salinity regimes that vary over time from entirely fresh to slightly mesohaline, are probably best characterized as oligohaline ponds. Community composition varies with geography, topographic position, exposure to storm surges and salt spray, hydroperiod, and soil properties. In general, types occurring in Virginia can be considered very locally distributed, small-patch wetlands that are state-rare.

Seasonally flooded, freshwater ponds usually contain large cover of bulrushes (e.g., *Scirpus cyperinus*, *Schoenoplectus pungens* var. *pungens*, *Schoenoplectus tabernaemontani*), grasses (e.g., *Panicum virgatum* var. *virgatum*, *Panicum rigidulum* var. *condensum*, *Spartina patens*), or squarestem spikerush (*Eleocharis quadrangulata*). Rare freshwater ponds, or their marginal zones, are dominated by nearly pure stands of twig rush (*Cladium mariscoides*). Seasonally flooded oligohaline ponds may be dominated by narrow-leaved cattail (*Typha angustifolia*), eastern rose-mallow (*Hibiscus moscheutos* ssp. *moscheutos*), or saltmarsh bulrush (*Schoenoplectus robustus*, = *Scirpus robustus*), compositionally resembling Tidal Oligohaline Marshes. Semipermanently flooded oligohaline ponds are dominated by coastal water-hyssop (*Bacopa monnieri*), white spikerush (*Eleocharis albidum*), and sago pondweed (*Stuckenia pectinata*, = *Potamogeton pectinatus*). (Fleming et al, 2011)

Big-headed rush, a rare perennial in Virginia, is found along the coastal plain usually in open moist or wet areas and often in shallow water, sands, peats and marls; marshy shores, interdune hollows, swales, brackish and fresh marshes, marl prairies and bogs. It is also known to colonize abundantly in ditches. Big-headed rush occurs from south of Virginia to Florida and as far west as southeast Texas. It is known currently in Virginia from nine occurrences, and historically from two occurrences.

The Maritime Wet Grassland, a brackish, interdunal swale and overwash community of the northeastern Atlantic coast, occurs in low areas behind primary or secondary sand dunes. The substrate is sand with little or no organic accumulation. The water source for this wetland community is variable, including seasonally high groundwater table, salt spray, and sporadic tidal overwash, resulting in widely variable salinity levels. Substrate is deep sand with or without a layer of surficial peat. The dominant species is generally *Spartina patens*, but it can be *Eleocharis parvula*, *Schoenoplectus pungens* (= *Scirpus pungens*), *Cyperus polystachyos*, and/or *Juncus articulatus*. Associated species depend on salinity and hydrology of a site. *Iva frutescens* and *Baccharis halimifolia* may occur on hummocks within the swale. Mats of blue-green and/or brown algae can proliferate across the soil surface. *Phragmites australis* can readily invade in this environmental setting. Brackish swale vegetation can be ephemeral or can represent early stages of salt marsh or coastal salt pond development (Reschke 1990). Overwash flats can succeed into dune grasslands with sand accumulation and plant burial. (NatureServe, 2011)

The Maritime Dune Scrub community is a maritime shrubland dominated by *Morella pensylvanica* (= *Myrica pensylvanica*), occurring with *Baccharis halimifolia*, *Rhus copallinum*, and stunted individuals of *Pinus taeda*, *Prunus serotina*, *Quercus virginiana*, and *Diospyros virginiana*. The constant movement of sand in this community limits the herbaceous cover. Typical herbaceous species include *Ammophila breviligulata*, *Panicum amarum* var. *amarulum*, *Cyperus grayi*, *Lechea maritima*, *Dichantherium acuminatum*, *Spartina patens*, *Triplasis purpurea*, *Cenchrus tribuloides*, *Chamaesyce polygonifolia*, *Diodia teres*, *Hudsonia tomentosa*, *Oenothera humifusa*, *Parthenocissus quinquefolia*, *Rumex acetosella*, *Solidago sempervirens*, and *Toxicodendron radicans*. This maritime shrubland usually occupies the intermediate areas between the very unstable oceanward portions of the dunes and the more protected backdunes, where it forms partially open to dense shrub thickets. The substrate is sand with no soil profile development, and with variable amounts of accumulated leaf litter. Where this community occupies the lee side of foredunes, greater exposure to winds and storms contributes to a shorter stature and more open aspect of the vegetation. Here there are large patches of open unvegetated or sparsely vegetated sand. This community occurs from Delaware south to northern North Carolina. (NatureServe, 2011)

The Maritime Dune Woodland is a tall, deciduous, maritime shrubland or scrub forest of the mid-Atlantic coast, although physiognomy can vary dramatically, ranging from open woodland to stunted forest to dense nearly impenetrable thicket. Individual trees tend to be wind-pruned and multi-stemmed. It generally occurs

on the lee side of sand dunes along the coast and is subject to salt spray and winds. The substrate varies from pure sand directly adjacent to the ocean to loamy sands in more sheltered areas of the coast. At the southern end of the range in Virginia, this community occurs as a woodland variably dominated by *Prunus serotina*, *Sassafras albidum*, *Diospyros virginiana*, and *Malus angustifolia* var. *angustifolia*. Vine tangles are patchy and interspersed with areas of open sand dominated by *Schizachyrium littorale* and also containing *Opuntia humifusa*, *Conyza canadensis*, *Nuttallanthus canadensis*, *Cirsium horridulum* var. *horridulum*, and other xerophytic herbs at lower cover. This maritime shrubland community is restricted to a narrow range on coastal dunes of barrier islands on the mid-Atlantic coast. It does not occur north of southern New Jersey or south of Virginia. Occurrences are naturally small (a few acres), confined to the oceanward portion of barrier islands. Potential or historic habitat has been reduced by extensive human development such as residential or commercial building, recreation, or road expansion. (Fleming et al. 2011)

Seaside plantain is a low perennial herb of salt marshes, beaches and coastal rocks (Gleason and Cronquist 1991). Spikes of mostly densely arranged small white flowers arise on leafless stems from a basal rosette of fleshy, linear-lanceolate leaves. The species is circumboreal, with variety *juncooides* at least being found in Greenland, Canada, and extending into the east coast of the US in New England, New York, New Jersey and Virginia; plants of northwestern North America are variously included or separated from var. *juncooides* (Kartesz 1999, Weakley in prep.). In Virginia, seaside plantain has only been documented in salt marshes and flats on the Eastern Shore in Accomack County. Threats include habitat destruction from development and sea-level rise.

The Tidal Mesohaline / Polyhaline Marsh coastal community is an irregularly tidally flooded high salt marsh of the mid- and southern Atlantic Coast from Delaware south to Florida. It is dominated by *Spartina patens*, which forms meadows with a distinct "cowlicked" appearance. These meadows occur at slightly higher elevations than adjacent, regularly flooded low salt marsh occupying the zone extending from mean high tide landward approximately to the limit of high spring tides. The substrate is peat of variable depths overlying sand. *Distichlis spicata* can be codominant. Additional associated species that generally occur in low abundance can include *Limonium carolinianum*, *Agalinis maritima*, *Salicornia virginica*, *Juncus roemerianus*, *Sabatia stellaris*, *Borrhichia frutescens*, *Lythrum lineare*, *Solidago sempervirens*, *Pluchea odorata* (= *Pluchea purpurascens*), *Hibiscus moscheutos* ssp. *moscheutos* (= *Hibiscus palustris*), or *Atriplex prostrata* (= *Atriplex patula* var. *hastata*). Shrub seedlings of *Baccharis halimifolia*, *Iva frutescens*, and/or *Morella cerifera* (= *Myrica cerifera*) may occur sporadically. Diagnostic species are *Spartina patens*, *Distichlis spicata*, *Borrhichia frutescens*, *Kosteletzkya virginica*, and *Pluchea odorata*. Currently, some unusually diverse variants exist in Virginia that may warrant recognition as a separate association. One unusual Virginia occurrence is dominated by *Plantago maritima* var. *juncooides*. (NatureServe. 2011)

In 1994 and 1995, DCR-DNH ecologists conducted an inventory of natural communities in all three sections of the NASA Goddard Space Flight Center: the Main Base, Wallops Mainland, and Wallops Island. Seven significant occurrences of natural communities were found, two of them on the Main Base and five on Wallops Island. NASA and contracted researchers currently have natural heritage data through a current subscription service which is updated on a quarterly basis and will include information from the most recent surveys as they become available. This information should be utilized in the planning process

The dune grasslands and dune scrub communities, Maritime Dune Grassland, Maritime Dune Scrub, Maritime Dune Woodland, and Interdune Pond, that are found on Wallops Island occupy dynamic habitats that shift rapidly over time. By all accounts, conditions in the near-maritime dunes have changed dramatically on Wallops Island over the past 16 years. DCR-DNH is currently under contract to re-inventory North Wallops Island, and ecologists plan to visit these areas in September 2011 to re-assess their spatial

location, extent, and condition. The Maritime Dune Woodland and Interdune Pond documented in 1994-1995 were located in stable habitats and will also be revisited and re-assessed.

In addition, DCR biologists have been contracted to update the survey of North Wallops Island for documented rare plants and animals. DCR recommends that, once up-to-date information is obtained, occurrences of natural heritage communities, and other natural heritage resources be carefully considered in the PEIS and those areas avoided and the resources protected to the maximum extent practicable when developing plans for future facilities.

Furthermore, DCR recommends broadening the current survey of the Goddard Space Flight Center to include Assawoman Island, Wallops Main Base and Wallops Mainland. The two significant natural communities on the Main Base were a Tidal Oligohaline Marsh along Little Mosquito Creek and a Coastal Plain / Piedmont Seepage Bog located in a swale at the southwest end of the airfield. Updated information is needed on the current status and condition of these communities, as well as other documented natural heritage resources, and should be obtained prior to planning for future development at these locations.

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

Due to the legal status of the Piping plover and Loggerhead sea turtle, DCR recommends coordination with the U.S. Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (VDGIF) to ensure compliance with protected species legislation. Due to the legal status of the Wilson's plover, Bald eagle, and Peregrine falcon, DCR recommends coordination with VDGIF to ensure compliance with protected species legislation.

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.

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 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 Shirl Dressler at (804) 367-6913.

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
Tylan Dean, USFWS

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Appendix F

Letter for Tangier Island Wind Turbine Project



COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

Division of Natural Heritage
217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951

April 12, 2011

Jon Foster
Sustainable Energy Developments, Inc
317 Route 104
Ontario, NT 14519-8958
Re: Tangier Island 100KW Wind Turbine

Dear Mr. Foster:

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.

Documented Natural Heritage Resources

The Northeastern Beach tiger beetle (G4T2/S2/LT/LT) has been documented in the project vicinity. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact this natural heritage resource.

Bat hibernacula have not been documented within 5 miles of the project site nor have maternity and bachelor colonies been documented within 12 miles of the project sites.

Potential for Natural Heritage Resources

According to DCR biologist, Dr. Steve Roble there is potential for colonial wading birds to be active within the project area. Due to the potential for this site to support colonial wading birds, DCR recommends a survey to evaluate bird activity at the sit of the proposed turbine. With the 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

Mines; Rock Outcrops; Cliffs and Wetlands

DCR does not track or maintain locational information on invasive species in our database. Please contact the Department of Mines, Minerals and Energy for information on mines and the Virginia Department of Environmental Quality for information on wetlands

Invasive Species

DCR does not track or maintain locational information on invasive species in our database. However, DCR recommends referencing the Invasive Species List located on DCR's website (http://www.dcr.virginia.gov/natural_heritage/documents/invlist.pdf) for mapping any invasive species within the disturbance zone.

Other

Coastal Avian Protection Zones

The proposed residential turbine project areas are located within Zone 6 on the Coastal Avian Protection Zones map (see attached map). Zone 6 is the Southern end and mouth of the Chesapeake Bay, including the waters off of the western shore of the Delmarva Peninsula that extend from Wise Point north to the mouth of Craddock Creek. In this zone, the relevant avian species and other avian mitigation factors are: migratory staging area and wintering area for seabirds and waterfowl that may be of hemispheric importance.

Managed Lands

The Tangier Island 100 kw Wind Turbine project area is within five miles of state owned Tidal Lands and Chesapeake Bay Foundation owned Port Isabel, both managed lands (see attached map).

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.

Our files do not indicate the presence of any 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.

A fee of \$590.00 has been assessed for the service of providing this information. Please find enclosed an invoice for that amount. Please return one copy of the invoice along with your remittance made payable to the Treasurer of Virginia, **DCR - Division of Natural Heritage, 217 Governor Street Richmond, VA 23219**. Payment is due within thirty days of the invoice date. Please note the change of address for remittance of payment as of July 1, 2008. Late payment may result in the suspension of project review service for future projects.

The Virginia Department of Game and Inland Fisheries 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 Shirl Dressler at (804) 367-6913.

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,

A handwritten signature in black ink that reads "Alli Baird". The signature is written in a cursive, flowing style.

Alli Baird, LA, ASLA
Coastal Zone Locality Liaison

Appendix G

Letter for Mason Neck & Featherstone National Wildlife Refuges Comprehensive Conservation Plans

Douglas W. Domenech
Secretary of Natural Resources



David A. Johnson
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

Division of Natural Heritage
217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951

January 21, 2010

Nancy McGarigal
US Fish and Wildlife Service
300 Westgate Center Drive
Hadley, MA 01035

Re: Mason Neck and Featherstone Refuge, CCP Project

Dear Ms. McGarigal:

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.

DCR-DNH has reviewed the U.S. Fish & Wildlife Service Elizabeth Hartwell Mason Neck and Featherstone National Wildlife Refuges Draft Comprehensive Plan and Environmental Assessment and strongly prefers "Alternative B-Enhanced Management" for both refuges. In addition, we have the following comments:

Mason Neck

According to the information currently in our files, this site is located within the Mason Neck – Sycamore Point 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. Mason Neck – Sycamore Point Conservation Site has been given a biodiversity significance ranking of B4, which represents a site of moderate significance. The natural heritage resources at this site are:

Haliaeetus leucocephalus

Bald eagle
Tidal Freshwater Marsh

G5/S2S3B,S3N/NL/LT
G3/SNR/NL/NL

Mason Neck State Park-Kane Creek Headquarters Conservation Site, which has been given a biodiversity ranking of G4, representing a site of moderate significance, Marumsc Conservation Site and High

*State Parks • Soil and Water Conservation • Natural Heritage • Outdoor Recreation Planning
Chesapeake Bay Local Assistance • Dam Safety and Floodplain Management • Land Conservation*

Point NE Conservation Site, which have been given a biodiversity ranking of B5, representing a site of general significance are also within the project area. The natural heritage resources of concern at these sites are:

<i>Haliaeetus leucocephalus</i>	Bald eagle	G5/S2S3B,S3N/NL/LT
<i>Somatochlora filosa</i>	Fine-lined emerald	G5/S2/NL/NL
	Colonial Wading Bird Colony	G5/S2/NL/NL

Bald eagle nest sites are often found in the midst of large wooded areas near marshes or other bodies of water (Byrd, 1991). Bald eagles feed on fish, waterfowl, seabirds (Campbell et. al., 1990), various mammals and carrion (Terres, 1980). Threats to this species include human disturbance of nest sites (Byrd, 1991), habitat loss, biocide contamination, decreasing food supply and illegal shooting (Herkert, 1992). Please note that this species is currently classified as threatened by the Virginia Department of Game and Inland Fisheries (VDGIF).

The fine-lined emerald is a state rare dragonfly species measuring 54-66 mm in length (Needham and Westfall, 1975). This colorful, slender species inhabits slow-flowing blackwater with sand, mud or silt substrate and emergent vegetation along the banks (NatureServe, 2009). The fine-lined emerald ranges throughout the southeastern United States (Dunkle, 2000) and from several sites throughout the piedmont and coastal plain of Virginia.

Adult Odonata (dragonflies and damselflies), commonly seen flitting and hovering along the shores of most freshwater habitats, are accomplished predators. They lay their eggs on emergent vegetation or debris at the water's edge. Unlike the adults, the larvae are aquatic where they typically inhabit the sand and gravel of the substrates. Wingless and possessing gills, they crawl about the submerged leaf litter and debris stalking their insect prey. The larvae seize unsuspecting prey with a long, hinged "grasper" that folds neatly under their chin. When larval development is complete, the aquatic larvae crawl from the water to the bank, climb up the stalk of the shoreline vegetation, and the winged adult emerges (Hoffman 1991; Thorpe and Covich 1991).

Because of their aquatic lifestyle and limited mobility, the larvae are particularly vulnerable to shoreline disturbances that cause the loss of shoreline vegetation and siltation. They are also sensitive to alterations that result in poor water quality, aquatic substrate changes, and thermal fluctuations.

In addition, Parker's pipewort (*Eriocaulon parkeri*, G3/S2/NL/NL) has been historically documented within the project vicinity. Furthermore, DCR botanists have identified the potential for Small whorled pogonia (*Isotria medeoloides*, G2/S2/LT/LE) within the project area, as well as the potential for Sensitive joint-vetch (*Aeschynomene virginica*, G2/S2/LT/LT) and River bulrush (*Schoenoplectus fluviatilis*, G5/S2/NL/NL) to occur in the Freshwater Tidal Marshes within the project area.

Parker's pipewort is classified as very rare to uncommon in Virginia. This diminutive pipewort species displays a greyish-white button flower and often occurs with other rare mudwort species in the intertidal zone of tidal regions from Maine to North Carolina. Potential threats include activities that alter natural river currents causing sedimentation, which could inhibit germination of seeds or smother seedlings, and/or erosion of the habitat. Other potential threats include activities that result in increased salinity levels, water pollution, and displacement by aggressive species (J. C. Ludwig, 1996). Parker's pipewort is known from 21 current occurrences in Virginia, and 9 historic occurrences.

Small whorled pogonia 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). 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).

Sensitive joint-vetch is a bristly stemmed annual legume growing to 2 meters in height. The characteristic pinnately divided leaves are gland-dotted and may fold slightly if touched. The pea-shaped flowers are yellow streaked with orange-red. This legume occurs in freshwater to brackish wetland habitats, primarily marshes, in the intertidal zone of our larger coastal rivers. This habitat type often supports a high diversity of both rare and common plant species. This annual herbaceous plant is classified as federally threatened by the United States Fish and Wildlife Service (USFWS) and the Virginia Department of Agriculture and Consumer Services (VDACS).

River bulrush, a state-rare plant species, inhabits fresh tidal marshes of the coastal plain of Virginia. This species forms predominantly sterile colonies that spread by rhizomes. Water pollution and sedimentation, sea level rise, and invasive species such as *Phragmites australis* pose the greatest threats to populations of this sedge (M.T. Strong, 1994). Nine populations of river bulrush are believed to be extant in Virginia.

Featherstone Refuge

According to the information currently in our files, this site is located within the Neabsco Creek 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. Neabsco Creek has been given a biodiversity ranking of B5, which represents a site of general significance. The natural heritage resource at this site is:

<i>Haliaeetus leucocephalus</i>	Bald eagle	G5/S2S3B,S3N/NL/LT
---------------------------------	------------	--------------------

In addition, the project area is within the vicinity of Powell Creek Conservation Site which 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:

<i>Haliaeetus leucocephalus</i>	Bald eagle	G5/S2S3B,S3N/NL/LT
	Tidal Freshwater Marsh	G3/SNR/NL/NL

Furthermore, DCR biologists have identified the potential for Rare skipper (*Problema bulenta*, G2G3/S1S2/SOC/NL) within the tidal freshwater marshes of the project areas. The rare skipper is a small, yellow-orange butterfly species that inhabits tidal marshes from New Jersey south to Georgia (NatureServe, 2009). In Virginia, it is recorded from tidal sections of the James and York River drainages. This species occurs in wetlands along tidal rivers, but may range out as much as half a kilometer in search of nectar (NatureServe, 2009). The best nectar flower is swamp milkweed, but common milkweed, dogbane, and buttonbush are also highly favored. The caterpillars probably feed on giant cordgrass (*Spartina cynosuroides*) and species of wild rice (*Zizania* and *Zizaniopsis*) (Glassberg, 1999).

Threats to the rare skipper include mosquito spraying and habitat loss (NatureServe, 2009). Please note that this is designated as a species of concern by the U.S. Fish and Wildlife Service; however, this is not a legal status.

Due to the potential for all the refuges in the Potomac River Complex including Mason Neck and Featherstone National Wildlife Refuges to support populations of natural heritage resources, DCR supports conducting inventories for, Sensitive joint-vetch, Parker's pipewort and River bulrush, in all tidal freshwater marshes within the project areas and Small whorled pogonia in the uplands of the project areas as stated on pages 154, 157 and 211 of the draft CCP. In addition, DCR recommends conducting surveys for the Fine-lined emerald and the Rare skipper in the tidal freshwater marshes of the refuges. 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.

Due to the legal status of the Bald eagle, DCR recommends coordination with the VDGIF to ensure compliance with protected species legislation.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and 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 Small whorled pogonia, and/or Sensitive joint-vetch 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.

Our files do not indicate the presence of any 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 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 Shirl Dressler at (804) 367-6913.

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: Tylan Dean, USFWS
Amy Ewing, VDGIF

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Appendix H

Letter and Table for Chincoteague NWR Comprehensive Conservation Plan

Douglas W. Domenech
Secretary of Natural Resources



David A. Johnson
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

Division of Natural Heritage
217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951

October 31, 2011

Lou Hinds
Refuge Manager
Chincoteague National Wildlife Refuge
P.O. Box 62
Chincoteague Island, VA 23336

Re: Chincoteague NWR Comprehensive Conservation Planning Update

Dear Mr. Hinds:

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 rare, threatened and endangered species listed on the attached table have been documented within the Chincoteague National Wildlife Refuge. DCR supports efforts to maintain lands to maximize habitat and wildlife management strategies for rare, threatened and endangered species, migratory birds and resident wildlife for all of the proposed alternatives.

In order to facilitate planning DCR-DNH can provide U.S. Fish and Wildlife Service and the National Park Service with the digital information about documented natural heritage resources within the refuge for use in GIS mapping and planning tools. Please contact Rene' Hypes at 804-371-2708 or Rene.Hypes@dcr.virginia.gov for information on how to obtain these data.

Additionally, DCR Chief Biologist, Chris Ludwig recommends a re-survey of the refuge in order to accurately document the current location and extent of natural heritage resources within the wildlife refuge and allow for appropriate planning based on current information.

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.

DCR also supports the inclusion of data gathering efforts to measure and monitor the effects of climate change and sea level rise for all alternatives. Geographic ranges of natural heritage resources will be impacted by a shift in climatic factors such as temperature, precipitation, soil moisture, humidity, and

*State Parks • Stormwater Management • Outdoor Recreation Planning
Natural Heritage • Dam Safety and Floodplain Management • Land Conservation*

wind. Species that are sensitive to temperature will respond to a warmer climate by moving to higher latitudes or elevations, or simply winking out. In addition, species will be impacted by invasive species habitat encroachment and the spread of disease, also resulting in modification of their current range and status.

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 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 Shirl Dressler at (804) 367-6913.

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
Tylan Dean, USFWS

**Table I:Chincoteague National Wildlife Refuge
Natural Heritage Resources**

Group Name	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Protection	USFWS Species of Concern	Site Name
Vertebrate Animal	Falco peregrinus	Peregrine Falcon	G4	S1B,S2N		LT		
Vascular Plant	Carex silicea	Sea-beach Sedge	G5	S1				
Terrestrial Natural Community	Maritime Dune Woodland	Maritime Dune Woodland	G1G2	SNR				ASSATEAGUE ISLAND
Vascular Plant	Heliotropium curassavicum	Seaside Heliotrope	G5	S1				ASSATEAGUE ISLAND
Vertebrate Animal	Haliaeetus leucocephalus	Bald Eagle	G5	S2S3B,S3N		LT		WILDCAT MARSH
Terrestrial Natural Community	Interdune Pond	Interdune Pond	G1Q	SNR				ASSATEAGUE ISLAND
Terrestrial Natural Community	Tidal Oligohaline Marsh	Tidal Oligohaline Marsh	G3	SNR				ASSATEAGUE ISLAND
Terrestrial Natural Community	Maritime Wet Grassland	Maritime Wet Grassland	G3	SNR				ASSATEAGUE ISLAND
Terrestrial Natural Community	Interdune Pond	Interdune Pond	G1Q	SNR				ASSATEAGUE ISLAND
Terrestrial Natural Community	Maritime Dune Grassland	Maritime Dune Grassland	G2	SNR				ASSATEAGUE ISLAND
Terrestrial Natural Community	Maritime Wet Grassland	Maritime Wet Grassland	G1G2	SNR				ASSATEAGUE ISLAND
Vascular Plant	Vaccinium macrocarpon	Large Cranberry	G4	S2				ASSATEAGUE ISLAND
Terrestrial Natural Community	Maritime Wet Grassland	Maritime Wet Grassland	G3	SNR				ASSATEAGUE ISLAND
Terrestrial Natural Community	Maritime Dune Woodland	Maritime Dune Woodland	G1G2	SNR				ASSATEAGUE ISLAND
Terrestrial Natural Community	Interdune Pond	Interdune Pond	G1Q	SNR				ASSATEAGUE ISLAND
Vascular Plant	Plantago maritima var. juncooides	Seaside Plantain	G5T5	S1				
Vertebrate Animal	Charadrius wilsonia	Wilson's Plover	G5	S1B		LE		ASSATEAGUE ISLAND
Vascular Plant	Polygonum glaucum	Sea-beach Knotweed	G3	S1S2				ASSATEAGUE ISLAND
Vertebrate Animal	Haliaeetus leucocephalus	Bald Eagle	G5	S2S3B,S3N		LT		ASSATEAGUE ISLAND
Vascular Plant	Juncus megacephalus	Big-head Rush	G4G5	S2				ASSATEAGUE ISLAND
Vascular Plant	Cyperus diandrus	Umbrella Flatsedge	G5	S1				ASSATEAGUE ISLAND
Vascular Plant	Dichanthelium ovale var. ovale	Oval-fruited Panic Grass	G5T5	S1?				WILDCAT MARSH, ASSATEAGUE ISLAND
Vascular Plant	Chamaesyce bombensis	Southern Beach Spurge	G4G5	S2				ASSATEAGUE ISLAND
Vascular Plant	Paspalum distichum	Joint Paspalum	G5	S2				ASSATEAGUE ISLAND
Vascular Plant	Amaranthus pumilus	Seabeach Amaranth	G2	S1	LT	LT		ASSATEAGUE ISLAND
Terrestrial Natural Community	Maritime Swamp Forest	Maritime Swamp Forest	G3	SNR				ASSATEAGUE ISLAND
Terrestrial Natural Community	Interdune Pond	Interdune Pond	G2G4	SNR				ASSATEAGUE ISLAND
Terrestrial Natural Community	Interdune Pond	Interdune Pond	G2G4	SNR				ASSATEAGUE ISLAND
Vascular Plant	Scleria verticillata	Whorled Nutrush	G5	S2				ASSATEAGUE ISLAND
Vascular Plant	Chamaesyce bombensis	Southern Beach Spurge	G4G5	S2				ASSATEAGUE ISLAND
Terrestrial Natural Community	Maritime Upland Forest	Maritime Upland Forest	G2	SNR				ASSATEAGUE ISLAND
Terrestrial Natural Community	Maritime Upland Forest	Maritime Upland Forest	G2	SNR				ASSATEAGUE ISLAND
Terrestrial Natural Community	Maritime Upland Forest	Maritime Upland Forest	G2	SNR				ASSATEAGUE ISLAND
Vascular Plant	Plantago maritima var. juncooides	Seaside Plantain	G5T5	S1				
Vascular Plant	Polygonum glaucum	Sea-beach Knotweed	G3	S1S2				
Vertebrate Animal	Caretta caretta	Loggerhead (Sea Turtle)	G3	S1B,S1N	LE	LT		ASSATEAGUE ISLAND

**Table 1:Chincoteague National Wildlife Refuge
Natural Heritage Resources**

Vascular Plant	<i>Cuscuta polygonorum</i>	Smartweed Dodder	G5	S2?				ASSATEAGUE ISLAND
Vascular Plant	<i>Cyperus diandrus</i>	Umbrella Flatsedge	G5	S1				ASSATEAGUE ISLAND
Terrestrial Natural Community	Maritime Wet Grassland	Maritime Wet Grassland	G1G2	SNR				ASSATEAGUE ISLAND
Terrestrial Natural Community	Interdune Pond	Interdune Pond	G1Q	SNR				ASSATEAGUE ISLAND
Terrestrial Natural Community	Maritime Dune Woodland	Maritime Dune Woodland	G1G2	SNR				ASSATEAGUE ISLAND
Vascular Plant	<i>Heliotropium curassavicum</i>	Seaside Heliotrope	G5	S1				
Vascular Plant	<i>Amaranthus pumilus</i>	Seabeach Amaranth	G2	S1	LT	LT		
Vertebrate Animal	<i>Charadrius melodus</i>	Piping Plover	G3	S2B,S1N	LT	LT		ASSATEAGUE ISLAND
Vertebrate Animal	<i>Sciurus niger cinereus</i>	Delmarva Fox Squirrel	G5T3	S1	LE	LE		
Invertebrate Animal	<i>Cicindela lepida</i>	Spectral Tiger Beetle	G3G4	S1				ASSATEAGUE ISLAND
Vascular Plant	<i>Amaranthus pumilus</i>	Seabeach Amaranth	G2	S1	LT	LT		
Vascular Plant	<i>Dichantherium caeruleum</i>	Blue Witch Grass	G2G3	S1			SOC	ASSATEAGUE ISLAND
Invertebrate Animal	<i>Drasteria graphica</i>	Graphic moth	G4	S2S3				ASSATEAGUE ISLAND
Invertebrate Animal	<i>Papaipema duovata</i>	Seaside Goldenrod Stem Borer	G4	S1S3				ASSATEAGUE ISLAND

Appendix I

Mathews and New Kent Counties Comprehensive Plan Natural Heritage Section



Natural Heritage Resources

The Virginia Department of Conservation and Recreation (DCR) identifies and protects natural heritage resources statewide; they maintain a comprehensive database of all documented occurrences of natural heritage resources in Virginia. The database includes conservation sites that contain known populations of natural heritage resources and adjacent 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; there is no official protection. 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. 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.

There are several areas in Mathews County designated for conservation. These areas include: the Bethel Beach Natural Area Preserve, New Point Comfort Preserve, and most of the eastern shoreline of Mathews County toward Milford Haven and the Piankatank River. These lands have value for natural resource conservation, outdoor recreation and open space protection.

The Bethel Beach Conservation Site has a biodiversity significance ranking of B3, which represents a site of high significance. Bethel Beach features a long sandy beach, low dunes and an extensive salt marsh. The beach is essential habitat for several rare species. Among these is the federally threatened northeastern beach tiger beetle (*Cicindela dorsalis*), which spends its entire two-year life cycle on the beach. The beach also provides important nesting habitat for the least tern (*Sterna antillarum*), which makes a shallow depression in the sand for its clutch of eggs. Another species, the sea-beach knotweed (*Polygonum glaucum*), is found on the back portions of the beach in the overwash zone. The sea-beach knotweed is an annual with a blue-green coloration and a whitish coating. Behind Bethel Beach is an extensive saltmarsh. This marsh is one of only a few places in Virginia that has been documented as a nesting site for the Northern Harrier (*Circus cyaneus*), a hawk that commonly nests in more northern regions.

As development of natural areas and forest lands increase in Mathews County, the natural heritage resources may be threatened. Fragmentation of forests and the introduction of invasive flora and fauna can have a direct effect on the survival of many species. Alteration of the local hydrology by land disturbance and/or sea level rise can change or eliminate habitat.

Useful DCR References and Resources:

Bethel Beach Natural Area Preserve Fact Sheet . Virginia Department of Conservation and Recreation, Natural Heritage Program.

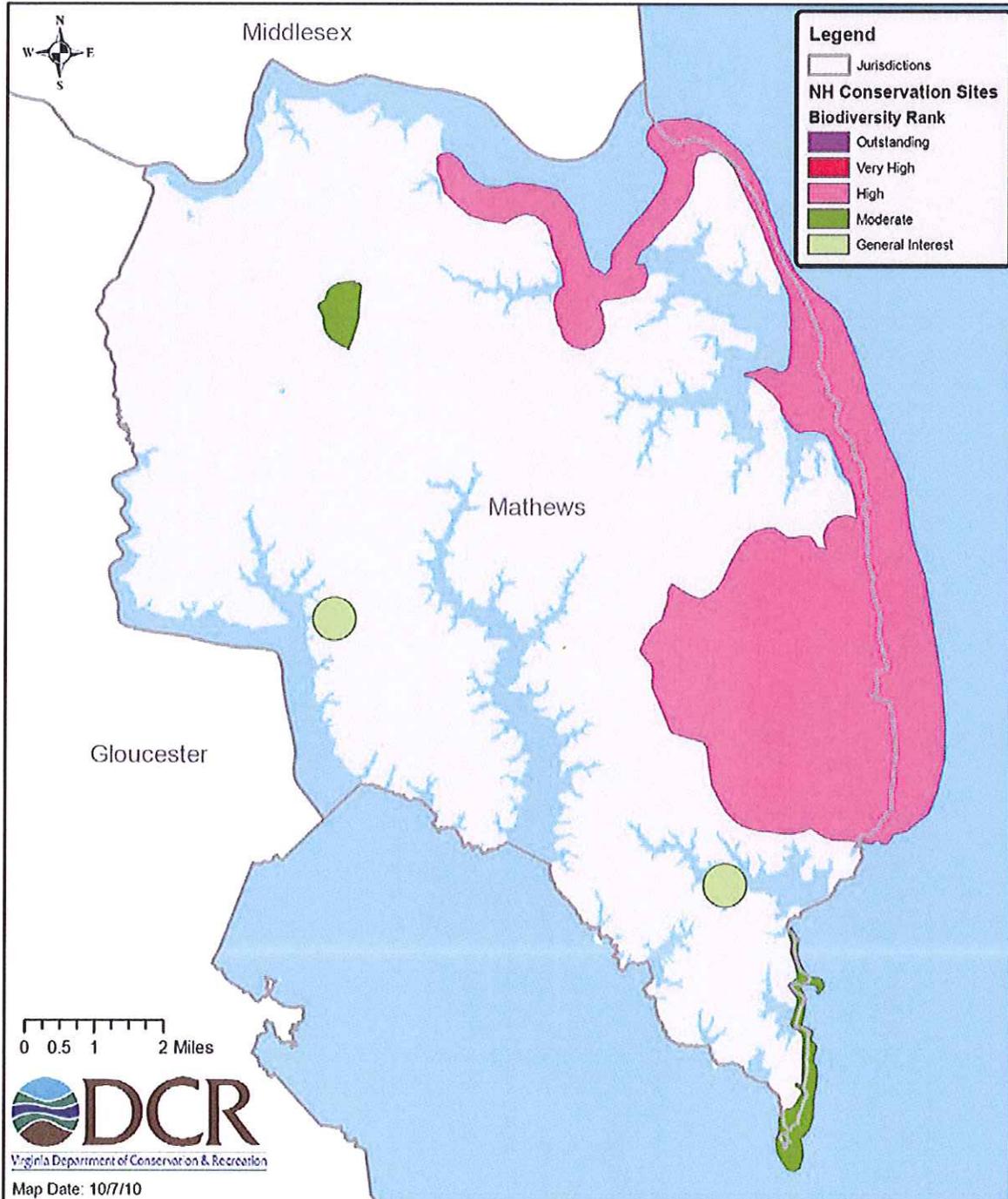
http://www.dcr.virginia.gov/natural_heritage/documents/pgbethel.pdf

Definitions of Abbreviations used on Natural Heritage Resource Lists

http://www.dcr.virginia.gov/natural_heritage/help.shtml



NATURAL HERITAGE CONSERVATION SITES





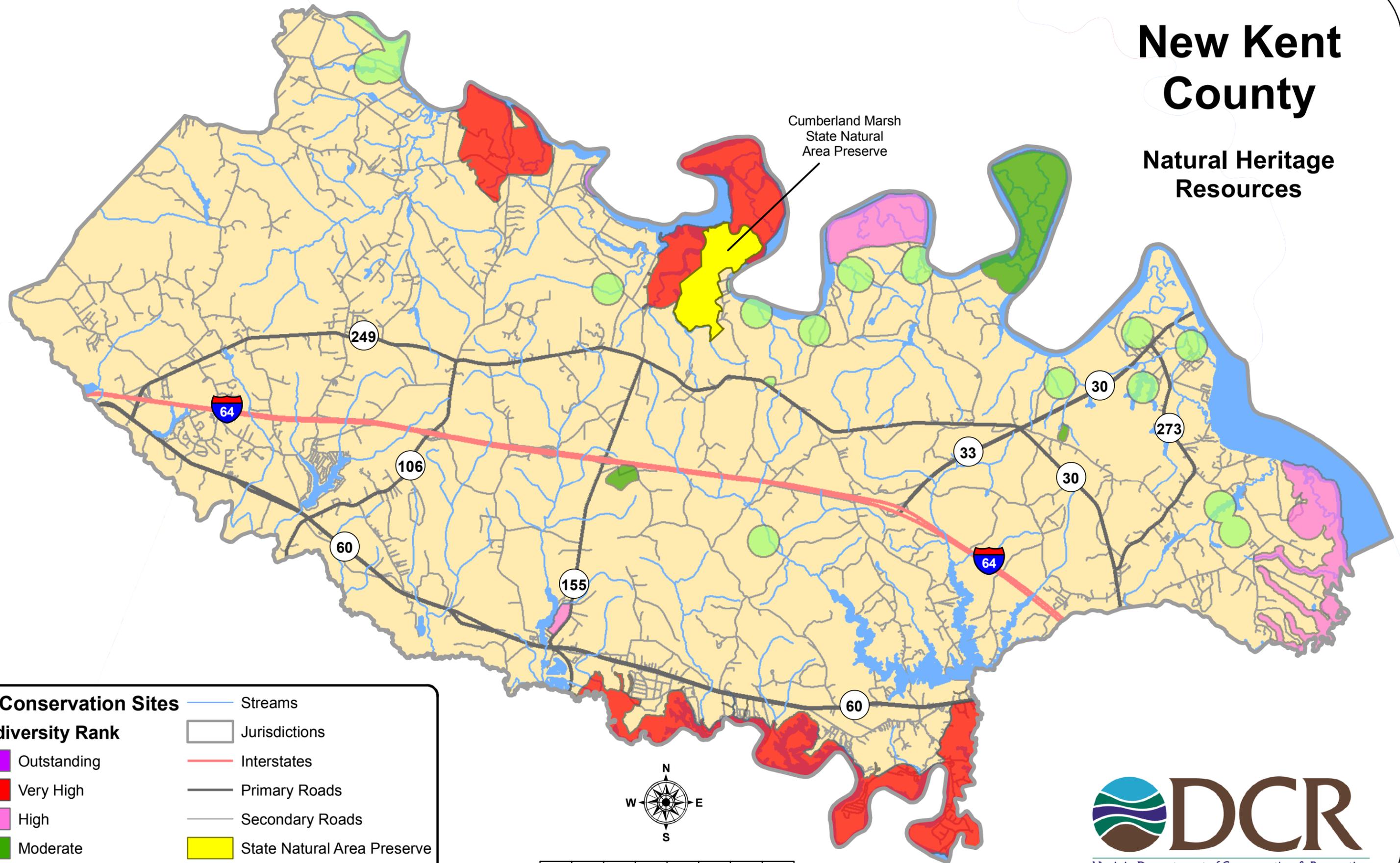
V. Mathews County Today and Tomorrow:
Conditions, Opportunities, Policies and Strategies

Threatened and Endangered Species of Mathews County							
Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status	Last Year Observed	Site Name
Amphibians							
<i>Ambystoma mabeei</i>	Mabee's Salamander	G4	S1S2		LT	2000	Blakes Ponds
<i>Ambystoma tigrinum</i>	Tiger Salamander	G5	S1		LE	1988	
<i>Hyla gratiosa</i>	Barking Treefrog	G5	S1		LT	1984	
Birds							
<i>Ammodramus caudacutus</i>	Saltmarsh Sharp-tailed Sparrow	G4	S2B,S3N		SC	1985	
<i>Asio flammeus</i>	Short-eared Owl	G5	S1B,S3N			1988	
<i>Cistithorus platensis</i>	Sedge Wren	G5	S1B,S1S2N		SC	1992	New Pt Comfort
<i>Circus cyaneus</i>	Northern Harrier	G5	S1S2B,S3N		SC	1994	Bethel Beach
<i>Haliaeetus leucocephalus</i>	Bald Eagle	G5	S2S3B,S3N		LT	2002	Bethel Beach, Horn Harbor, Cardinal,
<i>Sterna antillarum</i>	Least Tern	G4	S2B		SC	2007	Bethel Beach
Communities							
	Coastal Plain Depression Wetland	G3	SNR			1988	Blakes Ponds
Invertebrates							
<i>Cicindela dorsalis</i>	Northeastern Beach Tiger Beetle	G4T2	S2	LT	LT		New Point Comfort, Bethel Beach
Vascular Plants							
<i>Chelone obliqua</i>	Red Turtlehead	G4	S1			1979	
<i>Mitreola petiolata</i>	Lax Hornpod	G5	S1			1979	
<i>Polygonum glaucum</i>	Sea-beach Knotweed	G3	S1S2			2007	Bethel Beach
Natural Area Preserves							
Bethel Beach							
New Point Comfort							
State Ranking: S1-Extremely rare; S2-Very rare; S3-Rare to uncommon; S#B-Breeding; S#N-Non-breeding Global Ranking: G1-Extremely rare; G2-Very rare; G3-Rare to uncommon; G4-Common; G5-Very common Federal Status: LE= Listed Endangered; LT= Listed Threatened State Status: LE= Listed Endangered; LT=Listed Threatened; SC= Special Concern							

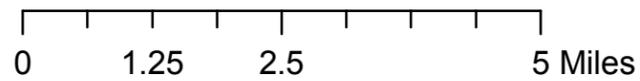
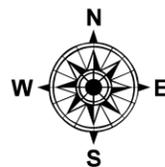
Source: Virginia Department of Conservation and Recreation, 2010.

New Kent County

Natural Heritage Resources



NH Conservation Sites	
	Outstanding
	Very High
	High
	Moderate
	General Interest
	Streams
	Jurisdictions
	Interstates
	Primary Roads
	Secondary Roads
	State Natural Area Preserve



Virginia Department of Conservation & Recreation

Map Date: 2/23/11

Appendix J

Map of Coastal Zone Localities with Natural Heritage Information

Virginia Localities with Natural Heritage Information



Department of Conservation & Recreation

CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

Coastal Localities

Accomack
Arlington
Charles City
Chesterfield
City of Alexandria
City of Chesapeake
City of Colonial Heights
City of Fredericksburg
City of Hopewell
City of Newport News
City of Norfolk
City of Portsmouth
City of Virginia Beach
City of Williamsburg
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

Western Localities

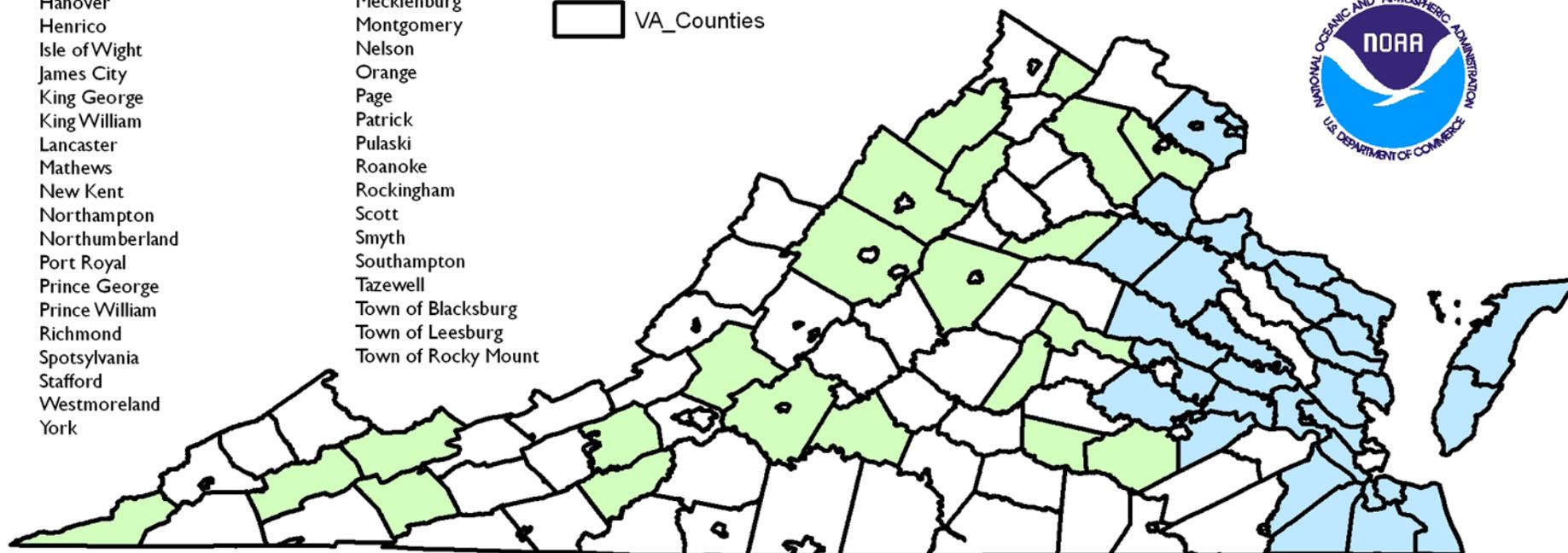
Albemarle
Augusta
Bedford
Botetourt
Campbell
City of Danville
City of Emporia
City of Lynchburg
Clarke
Cumberland
Dinwiddie
Fauquier
Floyd
Franklin
Goochland
Loudoun
Mecklenburg
Montgomery
Nelson
Orange
Page
Patrick
Pulaski
Roanoke
Rockingham
Scott
Smyth
Southampton
Tazewell
Town of Blacksburg
Town of Leesburg
Town of Rocky Mount

Legend

-  Western Localities with Data
-  Coastal Localities with Data
-  VA_Counties



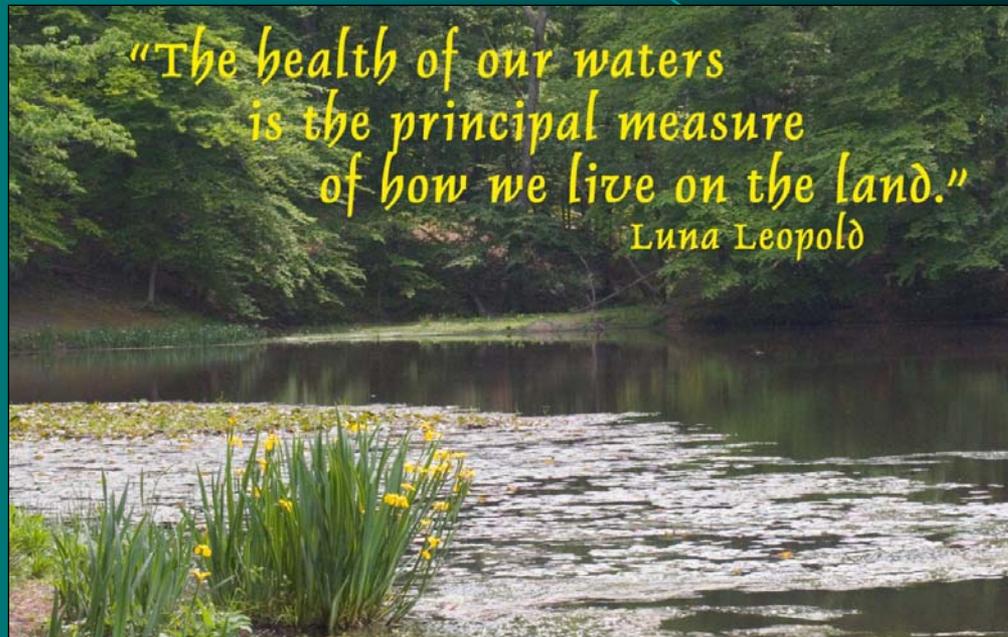
Virginia Coastal Zone
MANAGEMENT PROGRAM



Appendix K

Introduction to Buffers & Natural
Heritage Program
Middle James Roundtable

Introduction to Riparian Buffers and Natural Heritage Resources



Middle James River Roundtable
March 15, 2011

Department of Conservation and Recreation
www.dcr.virginia.gov



Premise of the Chesapeake Bay Preservation Act

- Land can be used and developed in a manner that **minimizes negative impacts on water quality.**
- Local governments are best suited to administer the program because **land use management is a local responsibility.**
- The relationship between **DCR** and municipality staff is one of **program oversight and local assistance.**

Philosophy of the Bay Act:

“Healthy state and local economies and a healthy Chesapeake Bay are integrally related; balanced economic development and water quality protection are not mutually exclusive.”

(Chesapeake Bay Preservation Act, Sec. 10.1-2100 A)



84 Bay Act Localities

17 Cities
29 Counties
38 Towns



Chesapeake Bay Preservation Act

Key Elements

- Established:
 - Chesapeake Bay Local Assistance Board
 - Chesapeake Bay Local Assistance Department (merged as a division of DCR in July 2004)
- Authorized CBLAB to:
 - Promulgate *Chesapeake Bay Preservation Area Designation and Management Regulations*
 - Review implementation of local programs
- Regulations include specific requirements:
 - Resource Protection Areas
 - Resource Management Areas
 - Local ordinance requirements



Resource Protection Areas



- Certain non-tidal wetlands
- Tidal Shores
- 100-foot RPA buffer
- Other lands as determined by locality
- Development generally prohibited
- Certain uses and activities are allowed
- Administrative and/or formal process for granting exceptions
- Tidal wetlands



Resource Management Areas

- Contiguous to the Resource Protection Area
- Should include certain land categories
- Locality has flexibility in area designated
- No prohibited land uses; must meet performance criteria in local ordinance
- Must pump out a septic tank
- Must maintain any BMPs



Chesapeake Bay Preservation Act Buffer Requirements

9 VAC 10-20-130.3:

“To minimize the adverse effects of human activities on the other components of the Resource Protection Area, state waters, and aquatic life, a 100-foot buffer wide buffer area of vegetation that is **effective in retarding runoff, preventing erosion, and filtering nonpoint source pollution from runoff** shall be retained if present and established where it does not exist.”



Why a Riparian Buffer?



In their natural condition, buffers provide for the removal or reduction of sediments, nutrients and potentially harmful substances in runoff, and minimize the adverse effects of human activities on waters and aquatic resources



Key Buffer Functions

- Trap and store sediment
- Stabilize banks and shorelines
- Groundwater recharge
- Nutrient and pollutant removal
- Provide shade to streams – reducing temperature
- Maintain biodiversity



Riparian Buffer Pollutant Removal

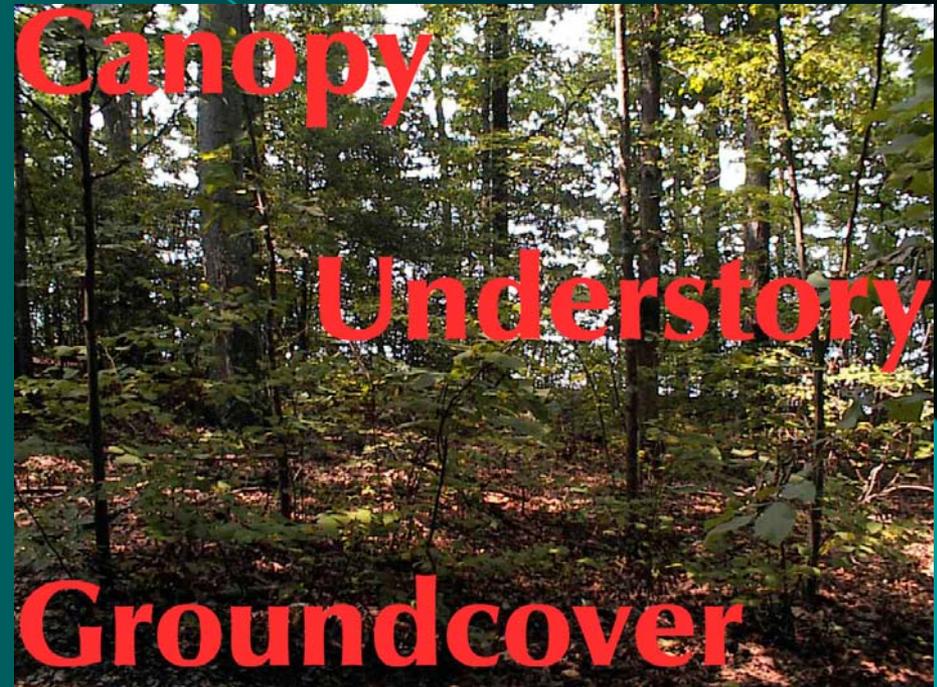


- 75% reduction of sediments
- 40% reduction of nutrients



Buffer Components

- Forest canopy
- Tree trunks, branches & roots
- Under-story trees, saplings and shrubs
- Groundcover
- Duff/decaying matter



Vegetation Stocking Rates

Based on unpublished data from the Department of Conservation and Recreation, Division of Natural Heritage

TYPICAL STOCKING RATES OF VIRGINIA FOREST STANDS			
	All Stands MEAN	Riparian Stands MEAN	Estuarine Stands MEAN
Shrub/Sapling^a Density (stems/acre)	269.6	199.2	340.0
Subcanopy^b Density (stems/acre)	110.4	83.3	137.5
Overstory^c Density (stems/acre)	100.8	94.2	107.5
Total Density (stems/acre)	480.8	376.7	585.0
Basal Area (ft²/acre)	228.7	239.5	217.9

a - shrub/sapling stems range from 1 to 4 inch dbh (diameter breast height - 4.5 ft.); **b** - subcanopy stems range from 4 to 10 inches dbh; **c** - overstory stems are equal to or greater than 10 inches dbh.

- 56%
- 23%
- 21%

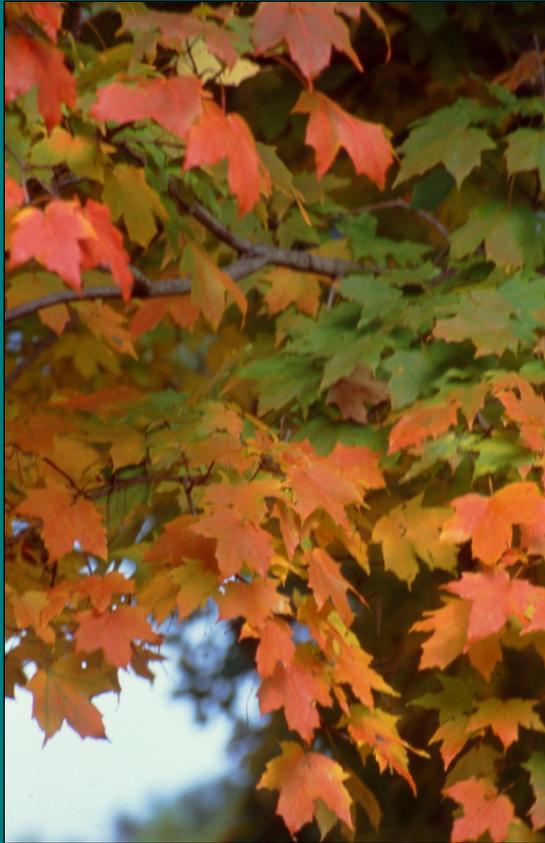


Buffer Components

- With virtually no understory or shrub/sapling layer, 79% of this buffer is lost.



Forest Canopy- the first defense



- Canopy – Canopies of shade trees intercept raindrops before they hit the ground, decreasing their erosive impact
- Canopies cool the air and the ground water that provides the majority of a stream's base flow.



Tree trunks & branches



- **Tree trunks & branches** hold raindrops allowing them to slowly reach the ground rather than splashing and eroding the woods' floor, or creating runoff



Under-story plants



- **Under-story trees, saplings and shrubs** protect the ground with additional canopy and a network of fine intertwined roots.
- The understory **uptakes nutrients** before they reach surface waters.



The Forest Floor



- Groundcover, along with leaves and twigs, provides additional protection from erosion for the forest floor.
- Sediment is removed from water that does filter through



Decaying matter



- A soft, spongy, forest floor of leaf litter retards runoff aiding water absorption and sediment retention.
- This decaying organic duff layer provides carbon necessary for denitrification.



So What Achieves these Goals ?

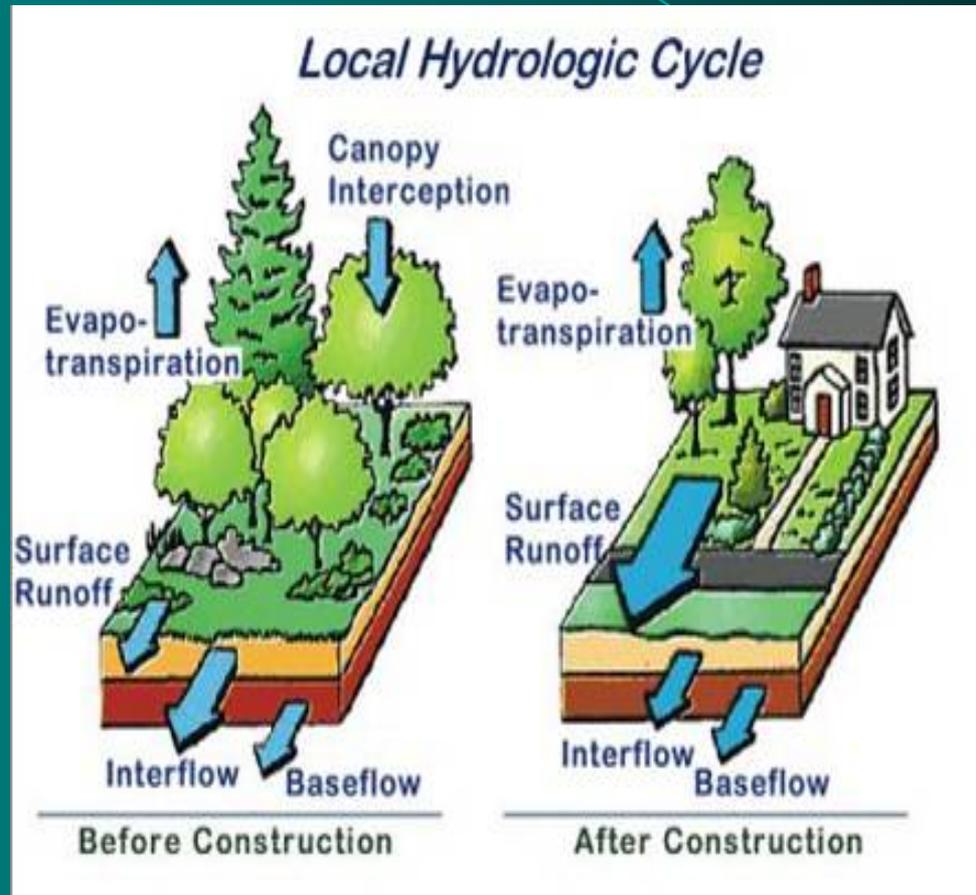


- Prevent erosion
- Retard runoff
- Pollutant removal

- **Above Ground** – trees and shrubs with canopies of leaves or needles and branches
- **Ground Level** – groundcover plants, mulch, leaves, twigs, duff and decaying logs.



Runoff From Development



Benefits of One Tree

Rain interception:

760 gallons/year

Evapotranspiration:

100 gallons/year

Nutrient uptake:

0.05 lbs/year*



** Urban Watershed Forestry Manual Part 2: Conserving and Planting Trees at Development Sites. Center for Watershed Protection. May 2006*



DCR – Division of Chesapeake Bay Local Assistance

www.dcr.virginia.gov



Turfgrass-Not a good buffer

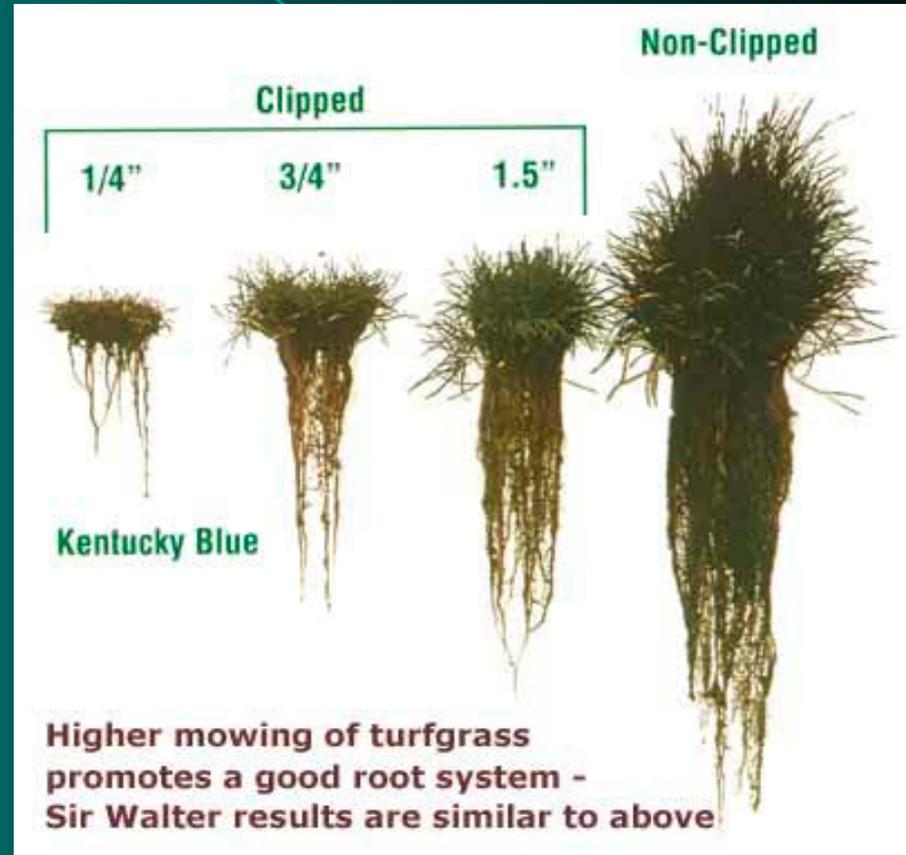


- Typically the public perceives **grass** as a manicured lawn. A lawn is not as effective as a wooded buffer, with the three trophic layers and a ground covering of leaf litter and duff, in achieving the level of pollutant removal required by the Bay Act.



Un-mowed Grasses

- One difference between mowed and un-mowed grass is a much greater depth of root system
- Deeper roots hold the soil in place and contribute to greater nutrient uptake



Cumulative effects



- The cumulative effects of many small, individual, buffer impacts allow excess nutrients that combine to produce algae, smother SAV and impair waters.



Cumulative Effects



Nobody wants this, but everybody thinks his/her little lawn won't make a difference if it doesn't have adequate woody vegetation.



Natural Buffer



- Canopy 21%,
- Sub-canopy 23%
- Saplings & shrubs 56%



Why Native Plants?

- Native plants have evolved to thrive in the local climate: soil, rainfall, temperature
- They do not need “coddling” with extra care, fertilizer or pesticides
- Native plants are in balance with the other plants and animals of an area – not invasive
- They develop specific relationships with local animals, providing food and shelter on the correct time-table.



Water Quality for Conservation of our Resources

- Riparian Buffers help maintain water quality
- Unbroken forested buffers provide habitat and migration corridors for wildlife
- Biodiversity depends upon the conservation of natural areas



Virginia's Natural Heritage Program

- Mission: Identify, protect & conserve Virginia's biodiversity

- Focus on:

- Rare plants and animals
- Rare and exemplary natural communities
- Significant caves and karst features



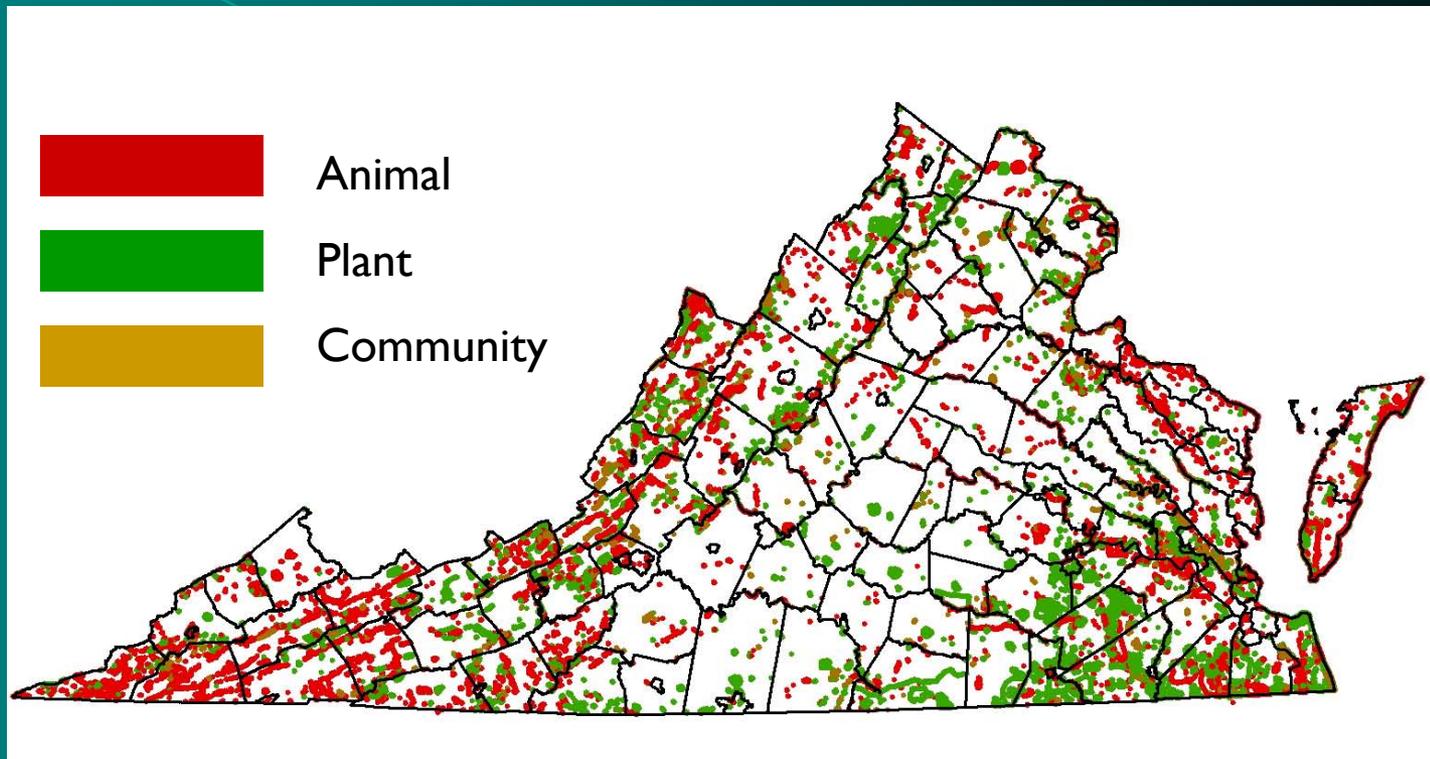
Inventory

- Staff of botanists, zoologists and ecologists
- Find & document location and condition of natural heritage resources
- Work on public & private land
- Inventories done on a contract basis
 - Fee charged for this service



Distribution of Natural Heritage Resources

- 3,723 rare animal populations
- 3,843 rare plant populations
- 1,239 exemplary natural communities



Natural Area Protection

Protect habitat through:

- Landowner education
- Resource management plans
- Virginia Registry of Natural Areas
- Conservation easements
- Acquisition of land through gift or purchase



Naked Mountain Natural Area Preserve

Land Conservation Easements

Typical conservation easement language to protect natural heritage resources/water quality

- “Therefore we recommend forested riparian buffers along the river and any streams on the property. These buffers should be at least 100 feet wide on both sides of the waterways. If slopes are 11-25 % the buffers should be 150 feet wide and if slopes are greater than 25% buffers should be at least 200 feet wide. These buffers should be kept free of livestock and soil disturbances. Timber harvesting of 50% cover of the landward 50 feet these buffers may be acceptable.”



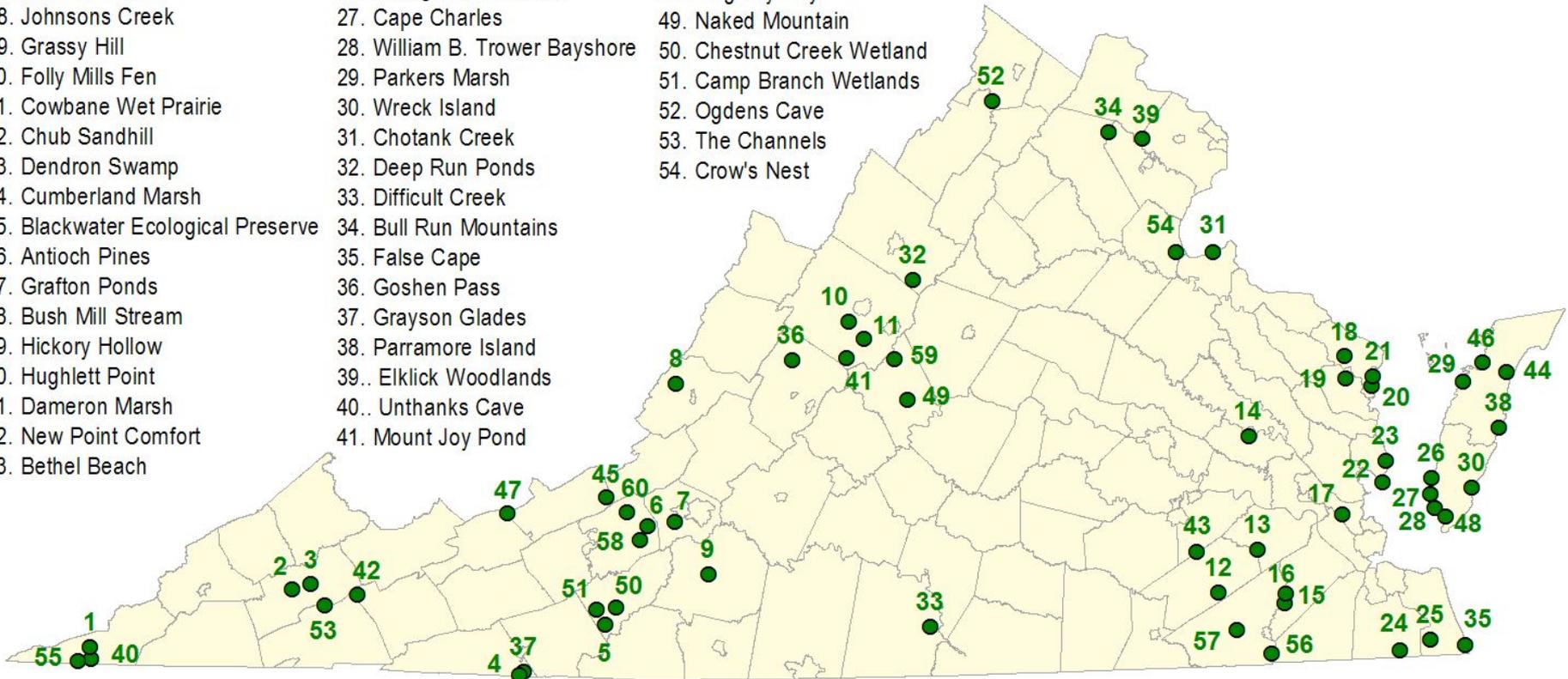
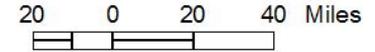
Virginia Department of Conservation and Recreation

60 State Natural Area Preserves - 49,901 Acres

● NATURAL AREA PRESERVES

- | | |
|------------------------------------|--------------------------------|
| 1. The Cedars | 20. Hughlett Point |
| 2. Cleveland Barrens | 21. Dameron Marsh |
| 3. Pinnacle | 22. New Point Comfort |
| 4. Big Spring Bog | 23. Bethel Beach |
| 5. Buffalo Mountain | 24. Northwest River |
| 6. Pedlar Hills | 25. North Landing River |
| 7. Poor Mountain | 26. Savage Neck Dunes |
| 8. Johnsons Creek | 27. Cape Charles |
| 9. Grassy Hill | 28. William B. Trower Bayshore |
| 10. Folly Mills Fen | 29. Parkers Marsh |
| 11. Cowbane Wet Prairie | 30. Wreck Island |
| 12. Chub Sandhill | 31. Chotank Creek |
| 13. Dendron Swamp | 32. Deep Run Ponds |
| 14. Cumberland Marsh | 33. Difficult Creek |
| 15. Blackwater Ecological Preserve | 34. Bull Run Mountains |
| 16. Antioch Pines | 35. False Cape |
| 17. Grafton Ponds | 36. Goshen Pass |
| 18. Bush Mill Stream | 37. Grayson Glades |
| 19. Hickory Hollow | 38. Parramore Island |
| 20. Hughlett Point | 39. Elklick Woodlands |
| 21. Dameron Marsh | 40. Unthanks Cave |
| 22. New Point Comfort | 41. Mount Joy Pond |
| 23. Bethel Beach | |

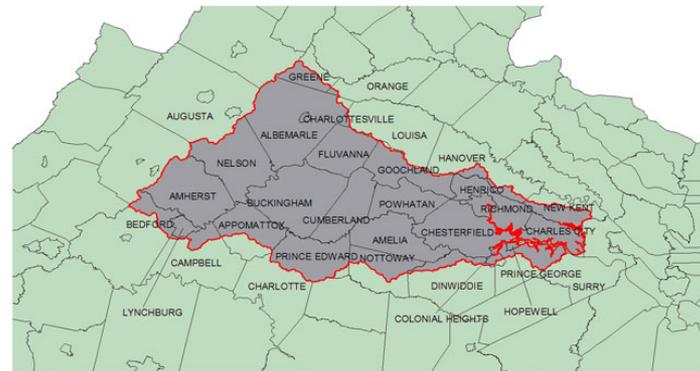
- | | |
|-----------------------------|--------------------------|
| 42. Red Rock Mountain | 55. Fletcher Ford |
| 43. Cherry Orchard Bog | 56. South Quay Sandhill |
| 44. Mutton Hunk Fen | 57. Cypress Bridge Swamp |
| 45. Clover Hollow | 58. Sweet Springs |
| 46. Marks and Jacks Islands | 59. Crawford's Knob |
| 47. Chestnut Ridge | 60. Mill Creek Springs |
| 48. Magothy Bay | |
| 49. Naked Mountain | |
| 50. Chestnut Creek Wetland | |
| 51. Camp Branch Wetlands | |
| 52. Ogdens Cave | |
| 53. The Channels | |
| 54. Crow's Nest | |



Natural Heritage Resources within the Middle James River Watershed

Over 600
individual
occurrences of
natural heritage
resources
within the
Middle James
Watershed

Jurisdictions within the Middle James Watershed

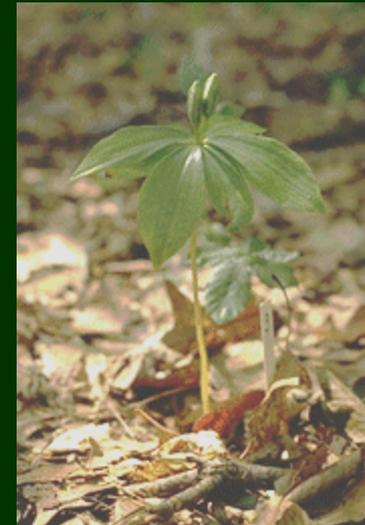


Bald Eagle, *Haliaeetus leucocephalus*

(G4/S2S3B,S3N/NL/LT)



Small Whorled Pogonia
Isotria medeoloides, G2/S2/LT/LE



Aquatic resources within the watershed

- Mussels depend upon water quality for existence.
- Riparian buffers provide protection by
 - preventing pollutants from entering the water
 - shading streams to maintain habitat temperatures
 - Providing debris for habitat and nutrients





Yellow lampmussel



James spiny mussel



Dwarf wedgemussel



Yellow lance



Green floater



Eastern lampmussel

Roanoke Logperch, *Percina rex* (G1G2/S1S2/LE/LE)



Tidal Freshwater Marsh

G4/SNR



Why not just listed species?

- DNH tracks information on 419 G1 and G2 species and communities (the rarest of the rare globally). 367 plants and animals, 52 communities)
- 52 of the 419 are communities, which are not listed
- 52 of the 419 are federally listed
- 30 of the 419 are not federally listed but are state listed
- This leaves 285 G1 - G2 NH resources unlisted
- 70 of the non-listed G1 - G2 species and communities are known from 2 or 3 locations
- 98 of the non-listed G1 - G2 species and communities are known from one location (95 plants and animals, 3 communities)
- Conclusion: protecting only listed species could cause a species' extinction with just one construction project



Information Management

- Manages natural heritage resource data
 - Integrated system
 - Oracle Database
 - Comprehensive GIS mapping system
- Develops products for federal, state & local governments, and citizens that present the data in a user-friendly format
 - Digital Data
 - NH Data Explorer
 - Land Conservation Data Explorer
 - VCLNA
 - Maps



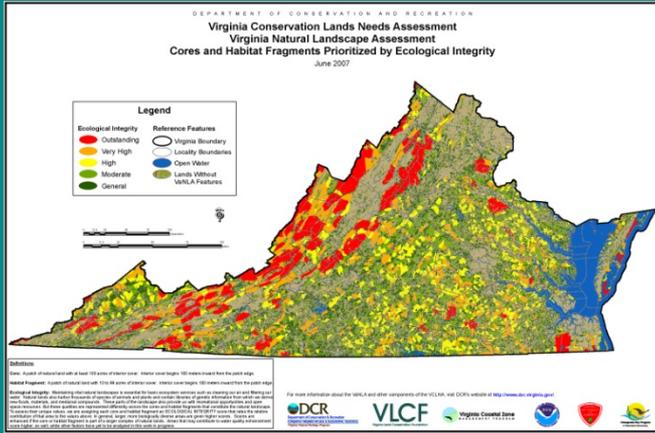
VA Conservation Lands Needs Assessment (VCLNA)

- An integrated assemblage of datasets and prioritization guidelines that serves as a flexible tool that can identify Green Infrastructure according to the needs and strategies of different conservation interests
 - Widely applicable tool for identifying and prioritizing land conservation
- Data is available in:
 - GIS format for in house manipulation and use
 - Web based application to provide local users with GIS tools and information at the desktop via the Web (i.e. ArcIMS site)

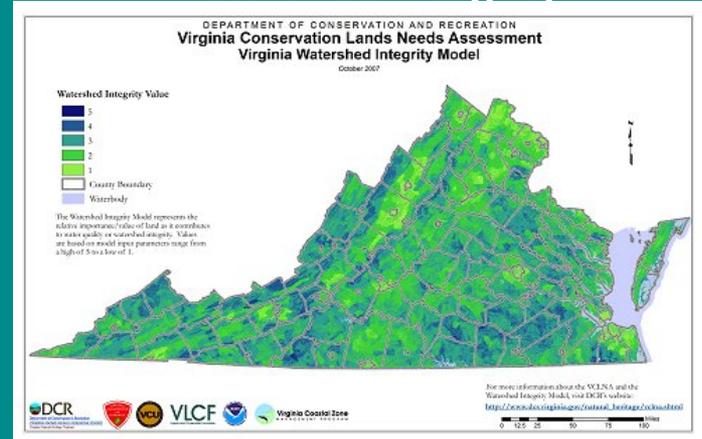


VCLNA Models

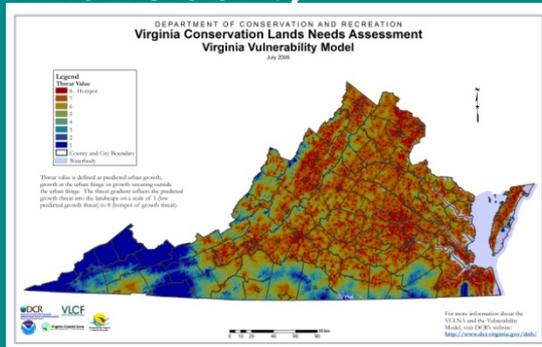
Ecological



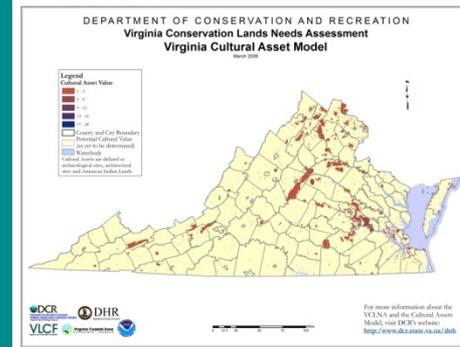
Watershed Integrity



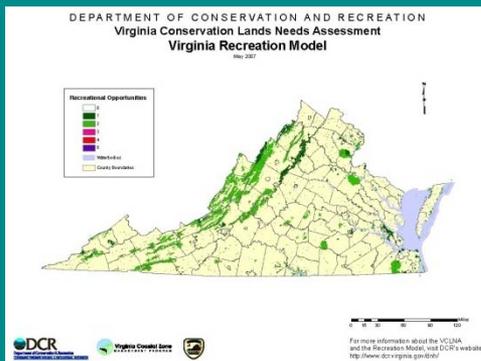
Vulnerability



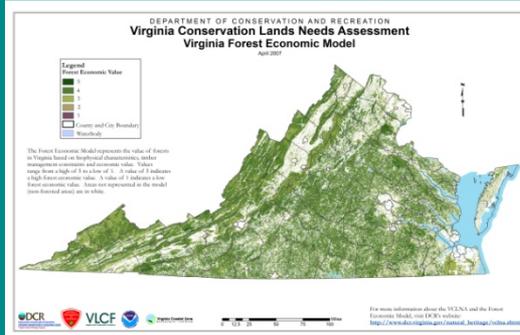
Cultural



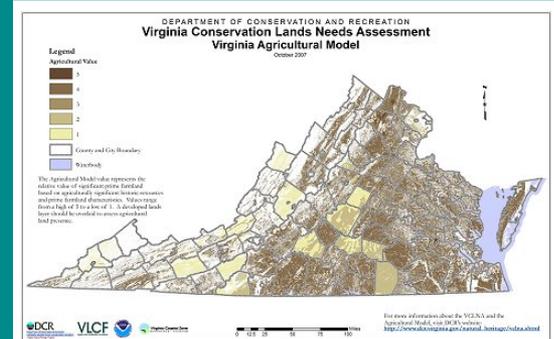
Recreation



Forest Economics



Agricultural



Land Conservation Data Explorer

- Online GIS mapping application that can be used to display, search, query, and print maps and lists of Virginia's conservation lands and VCLNA data.
- <http://www.vaconservedlands.org>

[Info](#) [Layers](#) [Legend](#) [Find](#)

UPDATE MAP

Reference Layers

- DRG Quad Grid
- USGS Placenames
- VDOT Roads
- Trails
- Scenic Rivers
- NHD Streams
- NWI Wetlands
- Managed Conservation Lands

Boundaries

- Subwatershed Boundaries
- 8 Digit Watershed Boundaries
- Counties
- Physiographic Provinces
- Planning Districts (PDC)

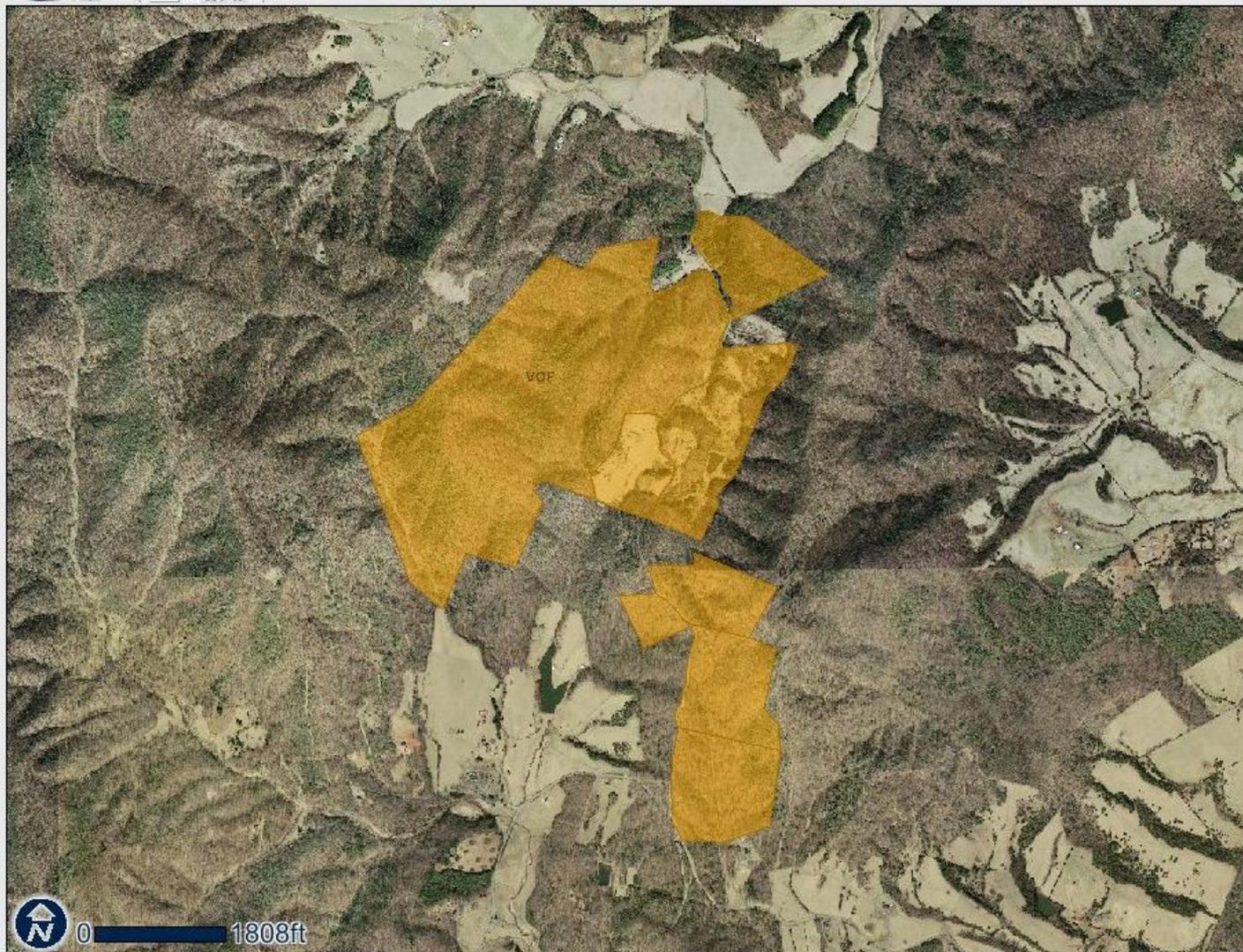
VCLNA

- Landscape Corridors
- Ecological Cores
- Agricultural Model
- Cultural Asset Model
- Forest Economics Model
- Recreation Model
- Water Quality Integrity Model
- Vulnerability Model All Threats

Base Layers

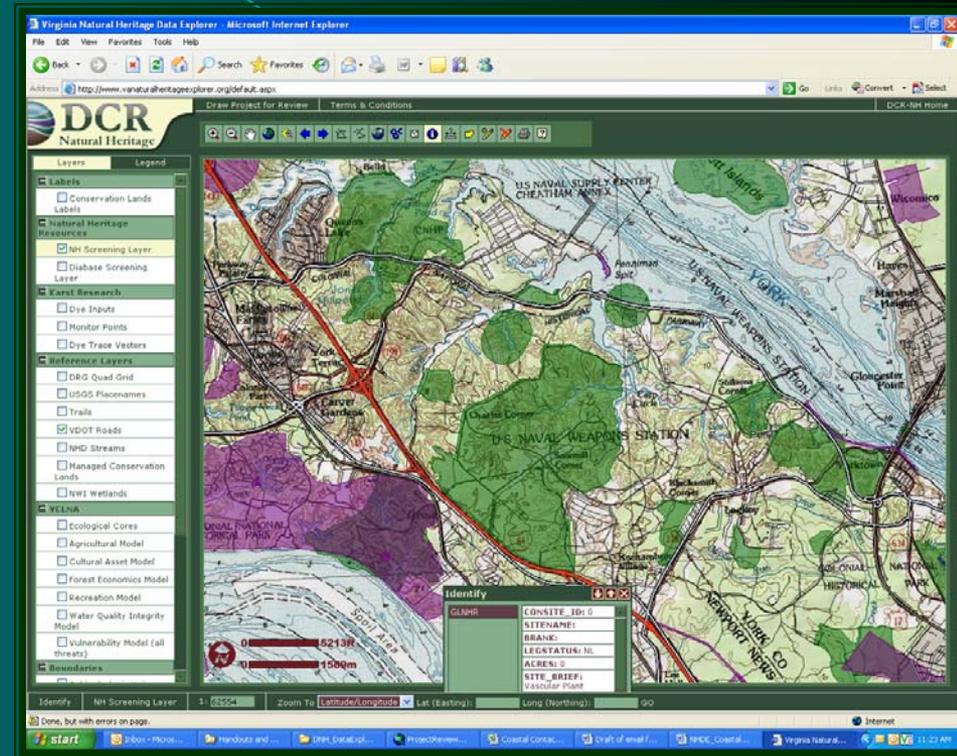
- VBMP Imagery
- Elevation

 Map  Results



Natural Heritage Data Explorer

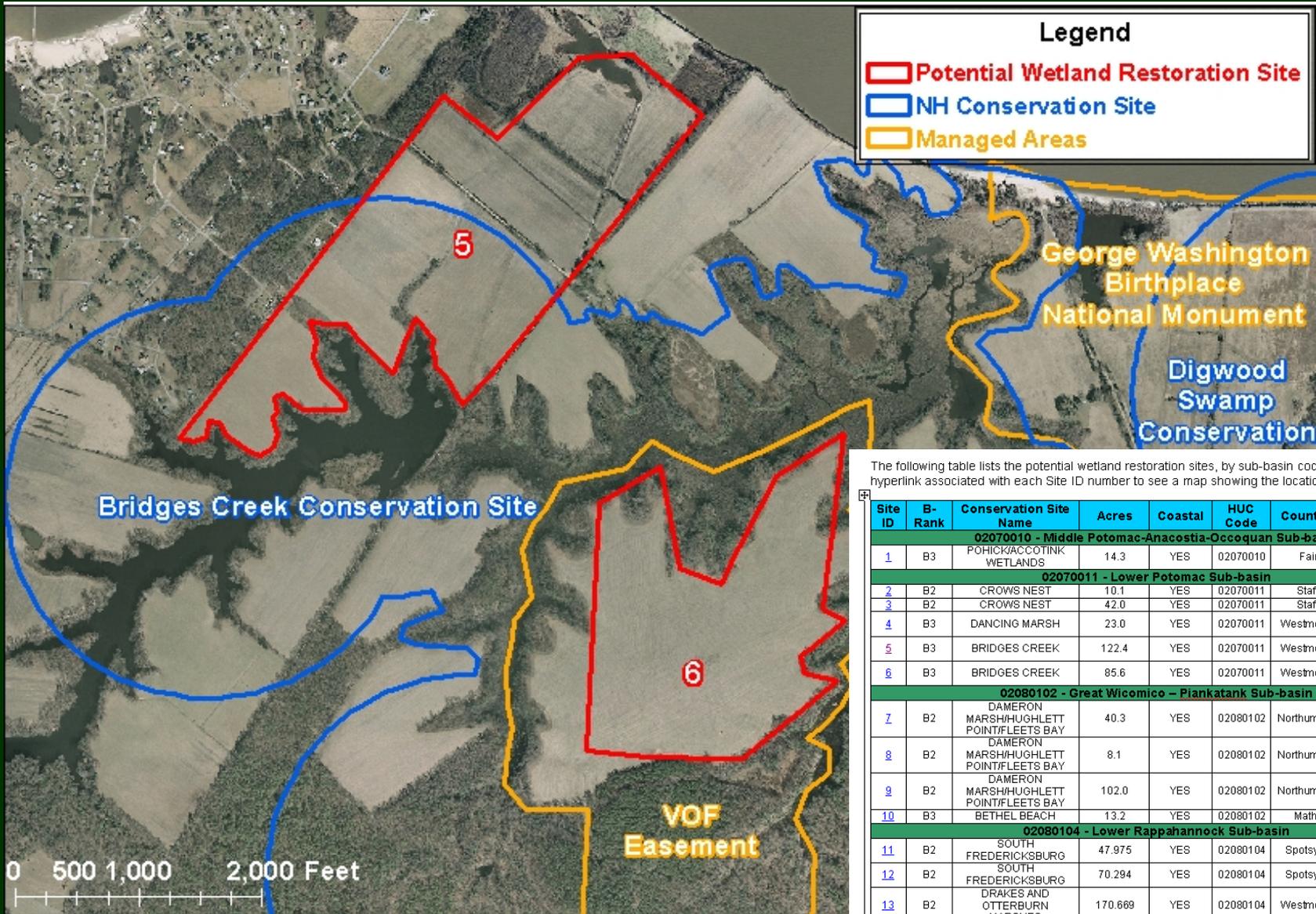
- an internet website (<http://www.vanaturalheritageexplorer.org>) that allows users to conduct basic GIS functions remotely.
- helpful for identifying natural area conservation sites and evaluating easement or land acquisition projects.
- Available to PDCs, localities, organizations and companies by subscription only



Wetland Restoration Catalog

- Online PDF organized by HUC code
- Potential wetland restoration sites within or adjacent to NH conservation sites
- Sites have not been field verified
- Updated at the end of 2008 w/2006-2007 aerial photography
- http://www.dcr.virginia.gov/natural_heritage/locality_liaison.shtml





Legend

- Potential Wetland Restoration Site
- NH Conservation Site
- Managed Areas

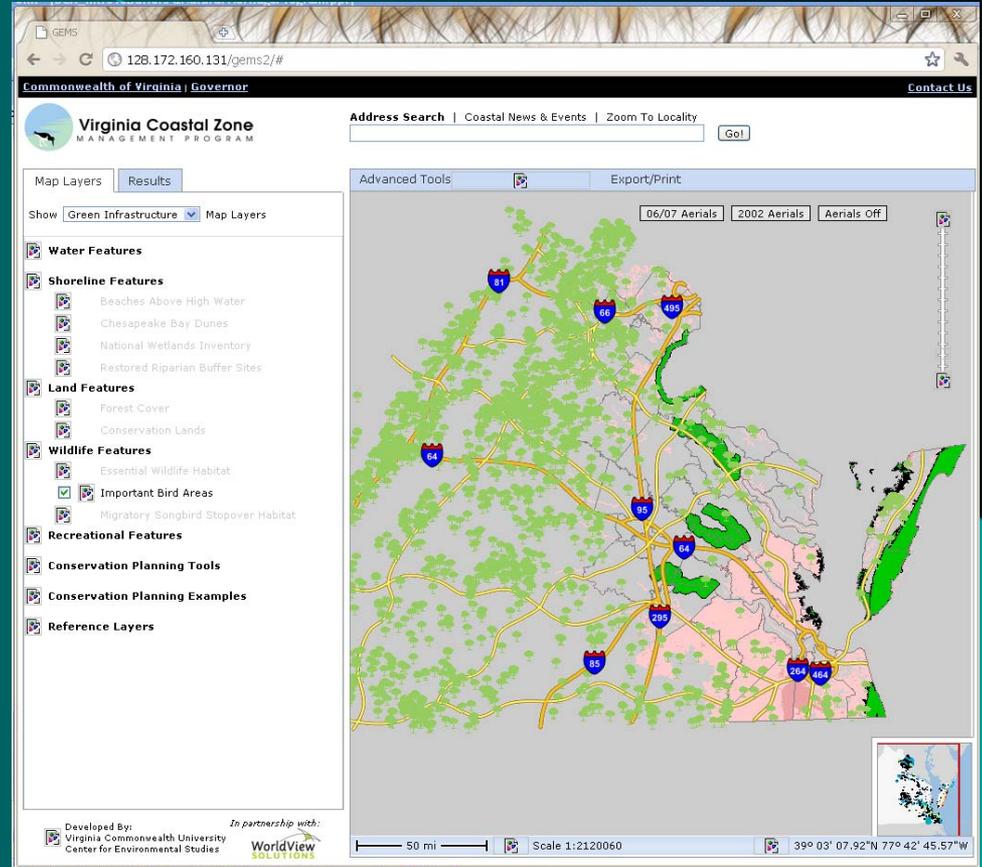
The following table lists the potential wetland restoration sites, by sub-basin code. Click on the hyperlink associated with each Site ID number to see a map showing the location of the sites.

Site ID	B-Rank	Conservation Site Name	Acres	Coastal	HUC Code	County/City	USGS Quad Name
02070010 - Middle Potomac-Anacostia-Occoquan Sub-basin							
1	B3	POHICK/ACOTINK WETLANDS	14.3	YES	02070010	Fairfax	Fort Belvoir
02070011 - Lower Potomac Sub-basin							
2	B2	CROWS NEST	10.1	YES	02070011	Stafford	Passapatanzy
3	B2	CROWS NEST	42.0	YES	02070011	Stafford	Fredericksburg
4	B3	DANCING MARSH	23.0	YES	02070011	Westmoreland	Colonial Beach South
5	B3	BRIDGES CREEK	122.4	YES	02070011	Westmoreland	Colonial Beach South
6	B3	BRIDGES CREEK	85.6	YES	02070011	Westmoreland	Colonial Beach South
02080102 - Great Wicomico - Piankatank Sub-basin							
7	B2	DAMERON MARSH/HUGHLETT POINT/FLEETS BAY	40.3	YES	02080102	Northumberland	Reedville
8	B2	DAMERON MARSH/HUGHLETT POINT/FLEETS BAY	8.1	YES	02080102	Northumberland	Fleets Bay
9	B2	DAMERON MARSH/HUGHLETT POINT/FLEETS BAY	102.0	YES	02080102	Northumberland	Reedville
10	B3	BETHEL BEACH	13.2	YES	02080102	Mathews	Mathews
02080104 - Lower Rappahannock Sub-basin							
11	B2	SOUTH FREDERICKSBURG	47.975	YES	02080104	Spotsylvania	Fredericksburg
12	B2	SOUTH FREDERICKSBURG	70.294	YES	02080104	Spotsylvania	Fredericksburg
13	B2	DRAKES AND OTTERBURN MARSHES	170.669	YES	02080104	Westmoreland	Loretto
14	B2	FONES CLIFFS	84.919	YES	02080104	Westmoreland	Champlain
15	B2	OCCUPACIA MARSHES	56.287	YES	02080104	Essex	Champlain
16	B2	OCCUPACIA MARSHES	77.955	YES	02080104	Essex	Champlain
17	B2	OCCUPACIA MARSHES	338.003	YES	02080104	Essex	Champlain
18	B2	OCCUPACIA MARSHES	104.810	YES	02080104	Essex	Champlain

Coastal GEMS

A gateway to Virginia's coastal resource data and maps; coastal laws and policies; facts on coastal resource values; and direct links to **collaborating agencies** responsible for current data.

A growing inventory of water and land based natural resources, conservation planning tools, and planning examples that can help us to protect Virginia's coastal ecosystems



<http://www.deq.virginia.gov/coastal/coastalgems.html>



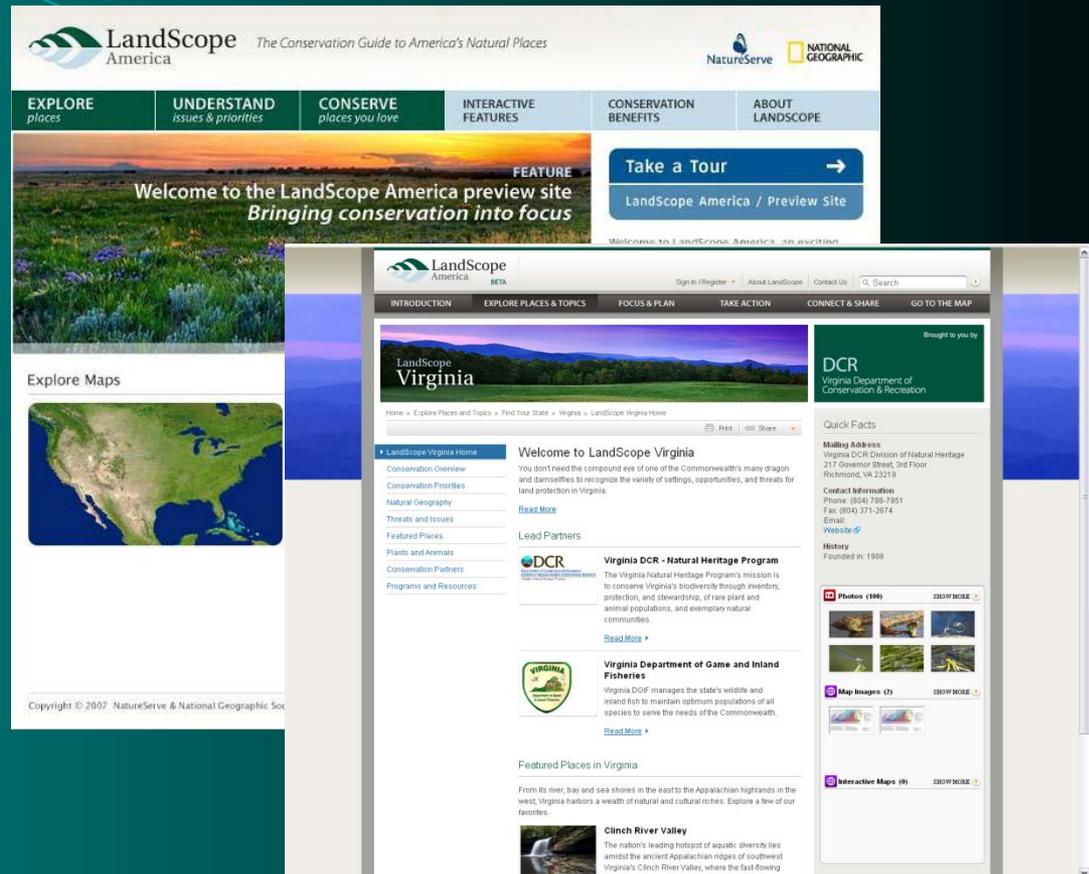
- A collaborative effort among NatureServe, the National Geographic Society and natural heritage programs.

- The website will offer fascinating stories, photos, video and satellite imagery about the nation's lands.

- Showcases conservation priorities, maps and other rich scientific data from authoritative sources, helping the public to understand conservation issues and the need to take action.

- Scheduled for full launch in Spring 2009.

- Beta site now available at: www.landscape.org.



Goal: To inspire and inform collaborative place-based conservation in the U.S. by increasing the pace and effectiveness of land protection nationwide.





Alice.baird@dcr.virginia.gov 804-692-0984



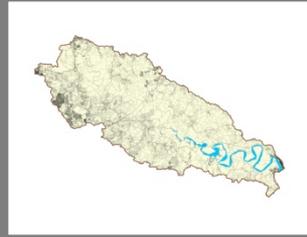
Department of Conservation and Recreation



Appendix L

Wetland Restoration Catalog

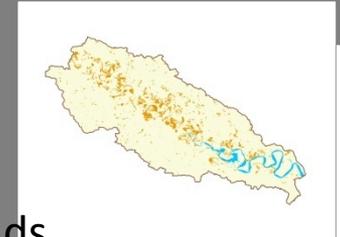
Methods



Parcel Layer



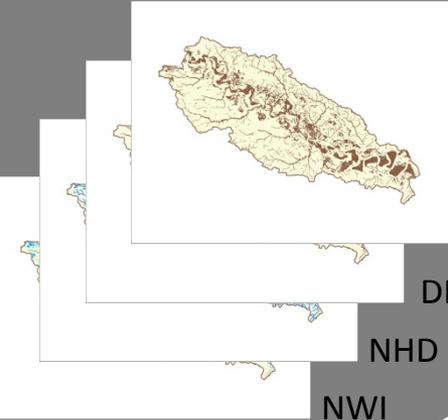
Subwatershed Layer



Farmed Wetlands
Healthy Waters
RIBITS
303d
PCS
VaNLA
Prioritization Source
Layers

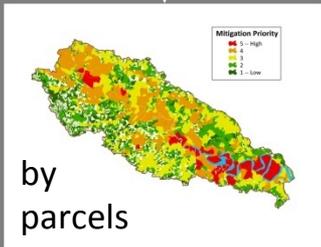
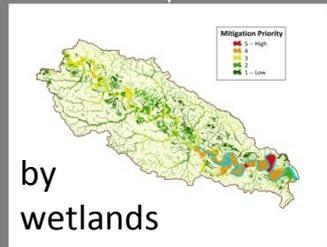
Union Overlay

Calculations



Wetland Source
Layers

SSURGO
DFIRM
NHD
NWI

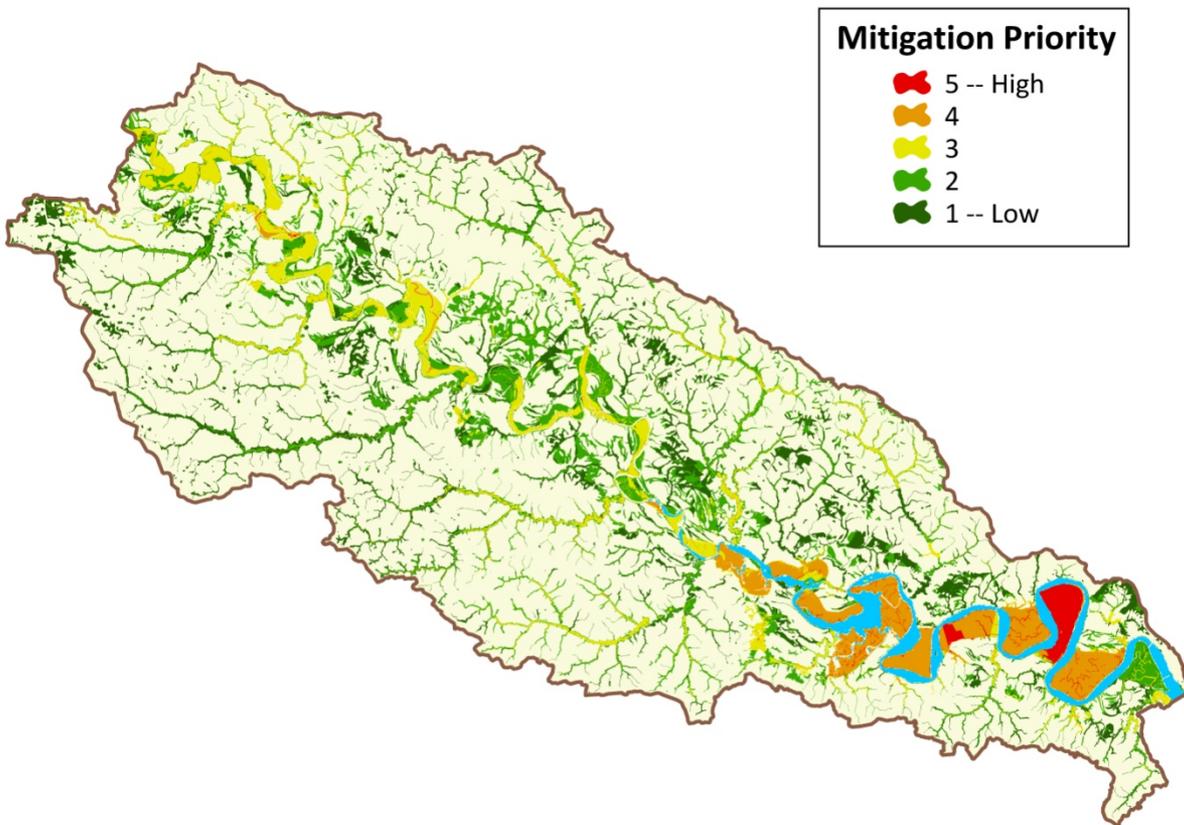


Map Products

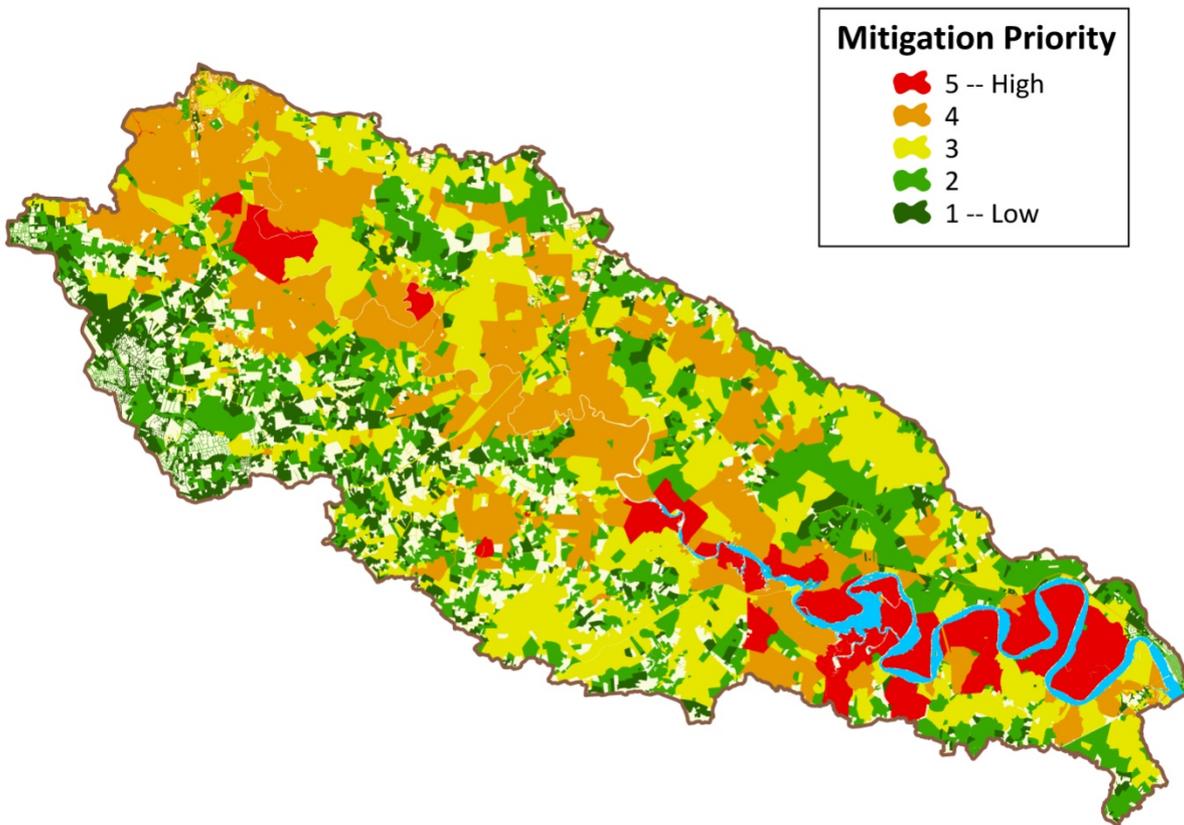
ParID	WSID_1	WSID_2	WSID_3	WSID_4	PS1W	PS2W	PS3W	PS4W	PS5W	WetOver	MitPrior	CompPrior	Reclass5
127-584	NW199332	NHD02080106006070	DFIRM2134	SSURGO21133	2	3	1	0	3	4	9	13	5
127-584	NW199332	NHD02080106006075	DFIRM2134	SSURGO21133	2	3	1	0	3	4	9	13	5
127-584	NW199332	NHD02080106006076	DFIRM2134	SSURGO21133	2	3	1	0	3	4	9	13	5
127-584	NW199332	NHD02080106006070	DFIRM2134	SSURGO21133	2	3	1	0	3	4	9	13	5
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127-584	NW199332	NHD02080106006070	DFIRM2134	SSURGO21133	2	3	1	0	3	4	9	13	5
127-584	NW199332	NHD02080106006075	DFIRM2134	SSURGO21133	2	3	1	0	3	4	9	13	5
127-584	NW199332	NHD02080106006076	DFIRM2134	SSURGO21133	2	3	1	0	3	4	9	13	5
127-584	NW199332	NHD02080106006070	DFIRM2134	SSURGO21133	2	3	1	0	3	4	9	13	5
127-584	NW199332	NHD02080106006075	DFIRM2134	SSURGO21133	2	3	1	0	3	4	9	13	5
127-584	NW199332	NHD02080106006070	DFIRM2134	SSURGO21133	2	3	1	0	3	4	9	13	5
127-584	NW199332	NHD02080106006075	DFIRM2134	SSURGO21133	2	3	1	0	3	4	9	13	5
127-584	NW199332	NHD02080106006076	DFIRM2134	SSURGO21133	2	3	1	0	3	4	9	13	5

Tabular Product

Catalog Displayed by Wetlands



Catalog Displayed by Parcels

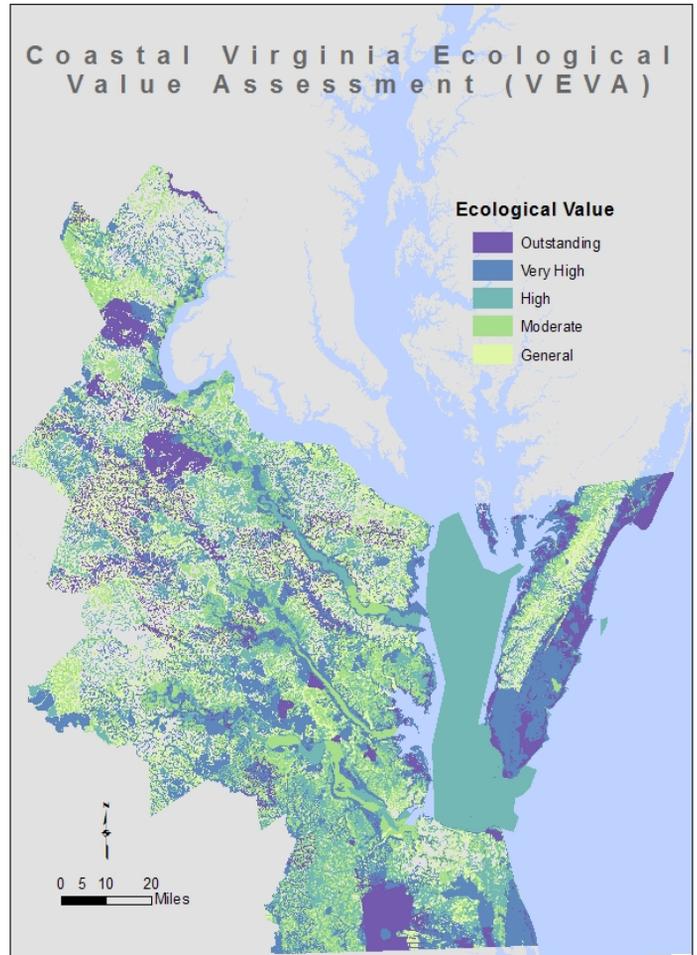


Appendix M

Coastal Virginia Ecological Value Assessment (VEVA)

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.



For more information visit these websites:

<http://www.deq.state.va.us/coastal/coastalgems.html>

http://ccrm.vims.edu/resources/conservation_planning/index.html

<http://www.dgif.virginia.gov/gis/gis-data.asp>

Data Sources

Priority Wildlife Diversity Conservation AreasVA Dept. of Game and Inland Fisheries
Natural Heritage Conservation Sites LayerVA Dept. of Conservation and Recreation, Natural Heritage
Natural Lands NetworkVA Dept. of Conservation and Recreation, Natural Heritage
Aquatic Resource Integrity LayerVCU Center for Environmental Studies
Aquatic Priority Conservation AreasVIMS Center for Coastal Resources Management
Virginia's Healthy WatersVA Dept. of Environmental Quality

Project Partners

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Virginia Coastal Zone
MANAGEMENT PROGRAM



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

