Natural Heritage – Habitat Conservation/Locality Liaison

Final Report for FY2023 Virginia CZM Grant No. NA23NOS4190152 (Task #5)

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Virginia Department of Conservation and Recreation –
Division of Natural Heritage

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Executive Summary

During the FY2023 grant year, the Department of Conservation and Recreation-Division of Natural Heritage (DCR-DNH) reviewed 1,214 projects for impacts to natural heritage resources in the coastal zone (37% of the projects reviewed statewide) as defined by the Virginia Coastal Zone Management Program (Virginia CZM). During FY2023, 737 coastal projects were submitted through the Natural Heritage Data Explorer (NHDE), 61% of all the projects submitted for review in the coastal zone. 32 of the projects reviewed in the coastal zone were solar projects, representing a continuing trend of solar development in Virginia. Specific project highlights within this report represent the diversity of projects reviewed including a campground review with concerns for a natural area preserve in Stafford County, a sand mining operation in City of Suffolk, collaboration on a State of the York watershed report, review of a vegetation management plan for a solar facility, and a stormwater management pond upgrade.

Coastal localities and other conservation partners participated in 7 training sessions for the NHDE website (https://vanhde.org) including 21 from state agencies, 16 from local governments, 30 from consulting companies, 10 from Soil and Water Conservation Districts, 3 from land trusts, 1 from Planning District Commissions, 2 from federal agencies, 1 from a Virginia Indian Tribe, and 1 from an educational institution. At the end of FY2023, there were 44 coastal localities, 8 Planning District Commissions and 18 land trusts within the coastal zone with access to NHDE, digital shapefile data, and/or a combination of these tools. This equates to 100% of coastal zone localities having Natural Heritage data, 100% of the Planning District Commissions and 78% of the Land Trusts as of September 30, 2024. The Locality Liaison and project review staff renewed or initiated 53 data licenses throughout this year within the coastal zone, including localities, consultants, land trusts, and state and federal agencies. The Locality Liaison posted quarterly coastal species highlights to the Locality Assistance webpage (http://www.dcr.virginia.gov/natural-heritage/localityliaison).

Presentations included an overview of DCR-DNH's Natural Heritage Program, the Locality Assistance Program and data and functionality of the NHDE website, which includes ConserveVirginia Version 3.0, the Predicted Suitable Habitat Summary layers and ConservationVision models. Additional information was provided about the Virginia Wetlands Catalog and the Coastal Virginia Ecological Value Assessment (VEVA), part of DEQ's Coastal GEMS website application. Natural Heritage information was updated quarterly on the NHDE website and shapefiles including the updated information are also distributed to licensed users. The Locality Liaison also attended multiple meetings, presentations, and workshops throughout the year.

Introduction

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 Natural Heritage Locality Liaison Program seeks to establish natural heritage resource information as part of fundamental locality decision-making criteria through tools such as project review, comprehensive planning, project sitings, zoning amendments, and open space planning.

Virginia CZM and the Virginia Department of Environmental Quality (DEQ)'s Chesapeake Bay Program have developed flood risk management and climate change initiatives generating interest in land use issues within the coastal zone defined by Virginia CZM. In addition, the Bay Total Maximum Daily Load (TMDL) program has

encouraged localities to incorporate green infrastructure into their land planning. Coastal localities are developing conservation objectives, identifying potential areas for protection, and looking at innovative approaches in making land use decisions that will improve water quality and develop long-range planning for local resiliency. The Locality Assistance Program continues to work to have natural heritage resources play a larger role in decision making including the problems and opportunities they face in development and protecting their natural heritage resources.

Staffing

Tyler Meader serves as the Natural Heritage Locality Liaison (Locality Liaison) and reviews projects within the coastal zone with assistance from other environmental review staff. René Hypes (Natural Heritage Environmental Review Coordinator) provides input for higher profile projects reviewed within the coastal zone. Numerous other DCR-DNH staff members also support the Locality Liaison program, including Information Management staff, Project Review Assistants, and various Natural Heritage biological inventory, protection, and stewardship 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 and provides oversight for the Project Review staff assisting in the review process. Barbara Gregory (Project Review Assistant, Senior) conducts reviews for the Virginia Department of Transportation (VDOT) projects statewide, which during FY2023 included 102 transportation projects in the coastal zone. During this grant year, DCR-DNH reviewed a total of 1,214 projects in the coastal zone. This represents 37% of the projects reviewed statewide by DCR-DNH. 32 of the projects reviewed in the coastal zone were solar projects, representing a continuing trend of solar development in Virginia.

Through environmental review, the Locality Liaison provides service in connecting clients directly to needed information about natural heritage resources. With the state's most comprehensive database for rare, threatened, and endangered species and significant natural communities, environmental review provides an opportunity for cooperating with other organizations. Many private consultants routinely and voluntarily coordinate with DCR-DNH before taking development project applications to regulatory agencies. Though DCR-DNH does not have regulatory authority, it has agreements with regulatory agencies that rely on our natural heritage resource data. The United States Army Corps of Engineers (USACE) and DEQ's Virginia Water Protection Permit Program (VWPP) screen wetland development projects against the DCR-DNH database and forward potential conflicts for our comment. The DEQ Virginia Pollutant Discharge Elimination System (VPDES) program also screens issuance and re-issuances of permits for point source discharges to surface waters against the DCR-DNH database and the Virginia Department of Health (VDH) screens for issuance or re-issuance of pump-out facilities as part of their permitting process. The Virginia Marine Resource Commission (VMRC) relies on the DCR-DNH to review Joint Permit Applications (JPAs) for subaqueous bottomlands impacts and the DEQ Renewable Energy Program relies on DCR-DNH to review permit by rule applications for solar and wind energy projects for potential impacts to natural heritage resources. In addition, the State Corporation Commission (SCC) through DEQ coordinates utility projects with DCR-DNH to inform SCC certification regarding impacts to natural heritage resources and avoidance measures both in written format and through in-

person testimony. The Virginia Department of Forestry (DOF) submits forest management plans for review and incorporates natural heritage resource recommendations that will help the landowner with forest management decisions for their property. Virginia Soil and Water Conservation Districts, which coordinate local natural resource protection programs, rely on DCR-DNH for information to include in local agricultural conservation planning. The United States Fish and Wildlife Service (USFWS) also relies heavily on DCR-DNH data for their own regulatory responses including 5-year assessments of species listed under the federal Endangered Species Act. The USFWS Information, Planning, and Conservation (IPaC) System website on-line screening process includes DCR-DNH predicted suitable habitat models. Additionally, DCR-DNH provides information on natural heritage resources to the Virginia Outdoors Foundation and Virginia land trusts as they work on developing conservation easements and applying for grants.

The DCR-DNH has a Memorandum of Agreement (MOA) with the Virginia Department of Wildlife Resources (DWR) for sharing of data and species coordination between the two agencies. The DCR-DNH /VDOT data exchange MOA was updated in February 2020 which outlines the integration of Natural Heritage data into their internal database for environmental screening purposes. Based on that internal screening process, projects needing further coordination are submitted by VDOT using the NHDE. Also, under an MOA established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR-DNH represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species.

Specific Projects

Habitat Preservation

Campground Development – Stafford County

In August 2024, DCR-DNH received two projects for review from Stafford County regarding the planned development of a campground and pier on the south side of the Potomac River, directly across from the Crow's Nest Natural Area Preserve. After ascertaining the correct limits-of-disturbance for each project, the Locality Liaison coordinated the projects for review with staff biologists and the regional steward who manages the Crow's Nest Natural Area Preserve. DCR-DNH provided comments for the projects, including that the pier location was within the Crow's Nest Conservation Site built around occurrences of River bulrush (*Bolboschoenus fluviatilis,* G5/S2/NL/NL) Marsh pea (*Lathyrus palustris,* G5/S1/NL/NL and a Tidal Freshwater Marsh (Mixed High Marsh Type) significant natural community. DCR-DNH recommended a survey for Sensitive joint-vetch based on an intersect with a predicted suitable habitat model and biologist review, as well as River bulrush, Marsh pea, other rare plants that may occur in tidal freshwater marshes and additional occurrences of significant natural communities. DCR-DNH also recommended the development of an invasive species management plan with special focus on *Phragmites australis,* provided information about ways to minimize impacts to a C4 ecological core within the project site. DCR-DNH also provided comments about the concern that development of the proposed pier will further increase visitation at the Crow's Nest Natural Area Preserve. Visitation increased dramatically during the pandemic and the preserve parking lot off Raven Road often reaches capacity during weekends between October and May, leading to visitors waiting or coming back later to visit the preserve. In addition, there is concern that construction of the pier could lead to increased visitation of the natural area preserve outside of posted hours increasing potential impacts to natural heritage resources requiring an increase in staffing resources. The comment letter for the proposed campground pier can be found in **Appendix A**.

Sand Mining Operation-City of Suffolk

In February 2024, DCR-DNH received notice of a request for rezoning of a property bordering the South Quay Natural Area Preserve, that had once been slated for a park and land conservation. The rezoning was to facilitate a sand mining operation that would likely remove the substrate upon which the documented natural heritage resources in the area occur, including Frosted elfin (*Callophrys irus, G3, S1S2, NL, NL*), a rare butterfly that is only documented from four locations in Virginia. DCR-DNH provided comments to the City of Suffolk Planning Department on the ~50 species that occur within the South Quay Conservation Site, and recommended a survey for natural heritage resources in the project site. In late April, DCR-DNH biologists joined the landowner for a limited survey for Frosted elfin and its primary host plant, Wild lupine (*Lupinus perennis).* The City of Suffolk Planning Commission recommended against the rezoning permit and DCR staff reiterated agency comments at a City of Suffolk City Council meeting. Ultimately, the City Council voted to approve the rezoning application to allow the sand mining operation. The comment letter for this project is included in **Appendix B**.

State of the York Report- Albemarle, Caroline, Essex, Fluvanna, Gloucester, Goochland, Hanover, James City, King and Queen, King William, Louisa, Mathews, Middlesex, New Kent, Orange, Spotsylvania, Williamsburg, and York Counties

From May-August 2024, the Locality Liaison worked to provide information for inclusion in the upcoming "State of the York Report" (SOTY), an environmental snapshot of the York River System, comprised of three main watersheds, or basins: the Mobjack Bay, Piankatank River, and York River basins. DCR-DNH initially reviewed the draft SOTY and noticed that the report did not include any information about natural heritage resources. The Locality Liaison provided a sample format for inclusion of natural heritage data in the report. The Locality Liaison also attended a SOTY feedback session virtual meeting hosted by Green Fin Studio and expressed the lack of biodiversity information in the report. DCR again offered to help include information about documented natural heritage resources within the study area. Through multiple follow-up meetings with Cirse Gonzalez at the Virginia Institute for Marine Science, the Locality Liaison provided tabular information, text suggestions, edits, and review, to increase the amount of information in the report about natural heritage resources and biodiversity within the report's study area. An example of the text review and editing process is included in **Appendix C**.

Energy - Solar Project

Chester Solar Technology Park-Chesterfield County

In August 2019, DCR-DNH first provided comments on a planned 120 MW solar facility in Chesterfield County. The planned solar facility is within the Chester Seeps Conservation Site, and has the potential to negatively impact natural heritage resources including globally rare species. In addition, it would fragment over 100 acres of a C2 ecological core, as well as potentially fragment C3 and C4 ecological cores. Since the initial review, DCR-DNH has reviewed the proposed solar project six more times including testifying at a SCC hearing, and most recently in August 2024. Over the course of this review period, DCR-DNH has participated in ongoing coordination and data sharing with the project proponents and environmental consultants to minimize potential adverse impacts to natural heritage resources. Based on the final order issued by the SCC on September 18, 2023, the project proponent was required to conduct a rare plant survey and coordinate the draft vegetation management plan for the project with DCR-DNH staff to avoid and minimize impacts to documented natural heritage resources. On March 24, 2024, DCR-DNH received the draft Chester Solar

Technology Park Vegetation Management Plan for review. DCR-DNH staff extensively reviewed the plan and provided detailed comments and recommendations to better protect documented natural heritage resources within the project site. On June 13, 2024, DCR-DNH staff including the Locality Liaison met in person with the project proponents and environmental consultants to further discuss the recommendations and comments for the vegetation management plan. DCR-DNH provided follow-up written comments based on the meeting to the project proponent on July 12, 2024. DCR-DNH staff are awaiting an updated layout for the project and another opportunity to review the final draft of the vegetation management plan with suggested edits. The first eight pages of the vegetation management plan are included in **Appendix D**.

In addition, DCR-DNH reviewed the project as part of the DEQ Virginia Water Protection (VWP) permitting process in August 2024. The comment letter can also be found in **Appendix D**.

Facilities Development

Difficult Run-Cinnamon Ridge Pond Improvement & Channel Restoration-Fairfax County

In September 2024, DCR-DNH was contacted by the Fairfax County Park Authority (FCPA) about a Fairfax County stormwater management pond that was out of compliance and would need a retrofit and repair. The work would include an upgrade to the existing stormwater management pond, the repair of two stormwater management channels, and adding a new access road within the FCPA's Difficult Run Stream Valley Park. Unfortunately, two documented occurrences of Purple fringeless orchid (*Platanthera peramoena*, G5/S1/NL/NL), a state critically imperiled rare plant species, occur within the planned footprint of the stormwater management pond upgrade. DCR provided information about the plant species to the county, and recommended avoidance of the resource. Further conversation about attempts to minimize impacts to the species are ongoing between DCR-DNH, FCPA and the Fairfax County-Department of Public Works-Stormwater Division.

Natural Heritage Data and Natural Heritage Data Explorer

The heart of DCR-DNH's service to localities is the set of databases and information tools that indicate what is rare, where the rarities are, and how they can be protected. As of September 30, 2024, DCR-DNH databases contain information about 10,752 specific occurrences of natural heritage resources**,** 2,747 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. Conservation sites are 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 required for their survival. DCR-DNH currently tracks over 2,441 conservation sites, of which 741 are in the coastal zone. These sites are continuously being updated by DCR-DNH staff.

The Virginia Natural Heritage Data Explorer (NHDE) allows internet users to access Natural Heritage data through the DCR website (https://www.dcr.virginia.gov/natural-heritage/nhdeinfo) or directly at vanhde.org. This ArcGIS informational tool last updated in October of 2024 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. In addition, licensed users may submit projects for review through NHDE. The natural heritage data on NHDE is updated quarterly, as updates are released to subscribers for digital screening coverage shapefiles.

Approximately 2,282 projects have been submitted through NHDE during FY2023 with 737 occurring in the coastal zone. Improvements to internal project review efficiency have been achieved through enhanced database query functions including the tracking of predicted suitable habitat models intersects in project review tracking database, and working to increase the number of projects reviewed electronically through NHDE. During this grant year, 451 projects within the coastal zone (37% of all projects reviewed in the coastal zone) were identified as "no comment/no conflict" projects for natural heritage resources through the NHDE automated reporting system within minutes of project submittal. This type of screening saves time for DCR-DNH staff and allows project proponents to move forward quickly without additional coordination with Natural Heritage.

NHDE includes the Species and Community Search function which allows users to search for a list of natural heritage resources by various large scale filters including localities, coastal zone and planning district commissions. The Virginia ConservationVision models are also accessible through the website, which help target conservation efforts by guiding comprehensive planning.

In October 2023 and February 2024, the Locality Liaison and other environmental review staff continued to participate in the testing of Stream Conservation Sites in NHDE including the functionality of major and minor ground disturbance categories, and the automation of appropriate language in the NHDE report depending on the layers intersected and the project type. NHDE functionality was updated to include filters to set up a bulk project export instead of just a date range.

NHDE training was updated in June 2024 to include an explanation of the new Potential Freshwater Mussel Richness layer, which models the diversity of predicted habitats for the 19 known, native, freshwater mussel species of the Virginia Chesapeake Bay Watershed. The NHDE training presentation was also updated to include multiple choice questions using the Polls feature in Microsoft Teams, to gauge trainee understanding and reinforce key concepts, as well as receive feedback on training usefulness. The training presentation was also updated multiple times throughout the grant period to keep information contained in the presentation up-to-date, and to refine talking points, flow, and information provided.

Several different levels of NHDE access are available, from a public access level to a paid subscription with increasing information made available to different tier level users. NHDE also includes the ConserveVirginia layer and a Predicted Suitable Habitat Summary (PSHS) layer. The PSHS layer summarizes 179 individual species Predicted Suitable Habitat (PSH) layers into one layer, including species listed as threatened and endangered and globally rare species. An individual species PSH layer is a raster layer, which identifies areas most likely to have suitable habitat for that species. PSH layers were developed using known occurrences, a Species Distribution Model, and expert opinion. During this grant cycle, 3 species models were updated, including Sensitive joint-vetch (*Aeschynomene virginica*, G2/S2/LT/LT), Seaside thoroughwort (*Eupatorium maritimum*, G2?/S1/SOC/NL) and Raven's seedbox (*Ludwigia ravenii*, G1G2/S1/SOC/LE).

The DCR-DNH project review process continued to incorporate the PSHS layer updates as made by the information management section during the grant year. Projects boundaries are screened against the PSHS layer and are buffered by 100 feet for screening against documented natural heritage resource layers. Projects that intersect with the PSHS layer are further reviewed by inventory biologists to determine whether a survey is needed for the resource(s). The use of the PSHS has resulted in a more informed screening process including recommendations for natural heritage resource surveys and reduced the number of projects submitted to Natural Heritage by partners that are unlikely to impact natural heritage resources.

ConserveVirginia is a statewide land conservation strategy and is based on a data driven process for identifying

Virginia's highest priority lands for protection. Research and spatial analysis of many conservation values are summarized into seven categories and mapped as: Agriculture & Forestry, Natural Habitat & Ecosystem Diversity, Floodplains & Flooding Resilience, Cultural & Historic Preservation, Scenic Preservation, Protected Landscapes Resilience, and Water Quality Improvement. The "ConserveVirginia Map" is a summary of all seven category inputs and can be used as an initial screening to determine if a potential land protection project qualifies as a ConserveVirginia priority. The process to update ConserveVirginia to version 4.0 started in September 2024.

Training sessions for the NHDE were held virtually through Microsoft Teams platform on an every-other-month basis. NHDE training is provided by the environmental review staff, primarily the Locality Liaison. The general training sessions are open to all organizations. During this grant year, 7 separate training sessions for NHDE were held for coastal zone participants. The Environmental Review Coordinator also presented an overview of NHDE to Soil and Water Conservation District staff on October 17, 2023.

Participants in Locality Liaison Presentations

Presentations included an overview of DCR-DNH's Natural Heritage Program, the Locality Assistance Program and data and functionality of the NHDE website, which includes ConserveVirginia, the PSHS layers and ConservationVision models. Additional information was provided about the Virginia Wetlands Catalog and the Coastal Virginia Ecological Value Assessment (VEVA), part of DEQ's Coastal GEMS website application.

Coastal participants in the virtual training sessions included 21 from state agencies, 16 from local governments, 30 from consulting companies, 10 from Soil and Water Conservation Districts, 3 from land trusts, 1 from Planning District Commissions, 2 from federal agencies, one from a Virginia Indian tribe, and one from an educational institution. A list of the organizations that participated in these training sessions can be found in **Appendix E**.

Locality Partnerships with DCR-Natural Heritage

The Locality Liaison has worked with localities within the coastal zone to encourage comprehensive use of natural heritage data and DCR-DNH services for conservation planning. DCR-DNH reviewed 27 projects for localities within the coastal zone; this does not include projects submitted by consultants on behalf of localities. Positive working relationships with localities have led to the inclusion of language in comprehensive plans that provides additional consideration and protection of natural heritage resources. Over the course of many months during the grant cycle, the Locality Liaison worked with City of Chesapeake on incorporating DCR-NDH data in a Land Use Map update, part of a larger comprehensive plan update, with multiple discussions about different DCR-DNH data layers and their potential inclusion in the map update, and how proposed rezoning within environmental screening layers that would include DCR-DNH data might be evaluated. A screenshot from one of the ongoing meetings can be found in Appendix F. These positive relationships have also led to DCR-DNH's involvement during early planning stages of proposed projects, when recommendations to avoid and minimize impacts to natural heritage resources are often the most effective. The Locality Liaison continues to update contact information for locality staff as well as comprehensive plan update timelines. During this grant cycle, DCR-DNH continued copying the relevant county administrators when sending comment letters for solar projects, so that the localities can be better informed about potential solar developments.

At the end of FY2023, there were 44 coastal localities, 8 Planning District Commissions and 18 land trusts within the coastal zone with access to NHDE, digital shapefile data, and/or a combination of these tools. This equates to 100% of coastal zone localities with documented occurrences of natural heritage resources having access to DCR-DNH data, 100% of the Planning District Commissions and 78% of the Land Trusts as of September 30, 2024. The current status of localities with access to Natural Heritage information is contained within the website map at (http://www.dcr.virginia.gov/natural-heritage/localitiesmap). Please also see **Appendix G** for a map of the Virginia localities with Natural Heritage information. The Locality Liaison and project review staff renewed or initiated 53 data licenses throughout this grant cycle within the coastal zone, including localities, consultants, land trusts, and state and federal agencies.

The Locality Liaison attended the NatureServe Northeast Regional Conference from October 17-20, 2023, the DEQ Coastal Partners Workshop on November 16-17, 2023, provided a short presentation on NHDE at the Environmental Protection Agency (EPA) Region 3 Regional Tribal Operations Committee meeting on January 9, 2024, attended the USACE's Hampton Roads Beneficial Use Feasibility Study on April 25, 2024 and July 18, 2024, the USACE's Virginia Beach Coastal Storm Risk Management Feasibility Study on September 18, 2024, the Sovereign Nations of Virginia Conference on September 19, 2024, and the Peninsula Regional Coastal Storm Risk Management Virtual Interagency Kick-off Meeting on September 24, 2024. The Locality Liaison also participated in the Virginia Natural Resources Leadership Institute (VNRLI) McCarthy Award Committee Meeting on April 18, 2024.

Habitat Restoration and Protection Initiatives

DCR State Parks Planning Review

DCR-DNH staff review the park's resource information to consider appropriate park development. This process continues to provide state park planners with natural heritage resource information early in the planning stages to avoid impacts to resources. Natural heritage information was also incorporated into a state park ArcGIS HUB to provide state park managers and resource managers resource information to inform development and management activities at their individual park.

During this grant year, DCR-DNH reviewed proposed projects at Westmoreland State Park, First Landing State Park, Widewater State Park, Machicomoco State Park, Caledon State Park, and Lake Anna State Park. Information and recommendations were provided about documented occurrences of natural heritage resources and/or the potential for natural heritage resources within the parks to avoid impacts to these resources during development.

Virginia Aquatic Resources Trust Fund Interagency Review Team

The USACE-Norfolk District and DEQ chair the Virginia Aquatic Resources Trust Fund (VARTF) Interagency Review Team that reviews and approves wetland and stream mitigation projects/banks. Once approved these projects serve as an acceptable form of compensatory mitigation (preservation, creation and enhancement) for impacts to state waters, including wetlands, permitted under Virginia Water Protection individual and general permits. The DCR-DNH environmental review coordinator is a member of the interagency review team reviewing proposed wetland mitigation projects in the coastal zone as well as the other parts of the state. DCR reviewed and provided comments for the Cedar Creek Mitigation Bank in Chesterfield County, Joyner Mitigation Bank and Cloverland Farm Mitigation Bank in Prince William County, Horseshoe Mitigation Bank

in Charles City, Rising Waters Mitigation Bank in Richmond County, and Woodford Mitigation Bank in Caroline County within the coastal zone this grant cycle.

Virginia Solar Pollinator- Smart and Virginia Native Seed Industry

The Environmental Review Coordinator and other Heritage staff continued to promote the Pollinator Smart Program (https://www.dcr.virginia.gov/natural-heritage/pollinator-smart). The webpage was updated with a new logo and a slideshow of certified pollinator smart sites. In addition, new pollinator smart signs were developed to recognize those facilities that achieved pollinator smart certification (**Figure 1, Appendix H**). To increase awareness of the Virginia Pollinator-Smart Program, the Environmental Review Coordinator and other Heritage staff continue to participate in multiple presentations/webinars during the grant period including the Bee Better Program, the Virginia Solar Summit and discussions with the Virginia Department of Transportation.

Several localities have included pollinator friendly habitat requirements for solar development in their ordinances with some localities requiring the facilities to be Pollinator Smart certified as identified in the updated Virginia Localities Solar Ordinances and Native Vegetation 2023 Report https://www.dcr.virginia.gov/natural-heritage/document/va-solarordin-natveg.pdf (**Figure 2, Appendix H**).

DCR along with other Pollinator Smart agencies /organizations including DEQ, DWR, the College of William & Mary and the Flora of Virginia presented a Pollinator Smart Sign and certificate for the James Madison University (JMU)'s East Campus Hillside Solar Facility. JMU is the first university in the Commonwealth to achieve the Virginia Pollinator Smart designation. (**Figure 3, Appendix H**)

The Clifton Institute, Virginia State University, The Nature Conservancy, and other partners including DCR-DNH were awarded a Natural Resource Conservation Service (NRCS) $200,000 multi-year grant in 2022 to hire a native seed project coordinator and provide technical assistance for farmers to grow native species in Virginia. Following the Pollinator Smart Business Plan (https://www.dcr.virginia.gov/natural-heritage/document/solar-site-business-plan.pdf), the Pollinator Smart Ecotype group targeted a second group of 15 native species for collections in the fall of 2023 to serve as the basis of foundational ecotype seed source for Virginia. Collections were shipped to Ernst Conservation Seeds for grow out and these seedlings were provided to farmers as part of the Native Seed Pilot Project. As a deliverable for the grant, a best management practices for growing of native plants was developed and posted on the Clifton's Institute's website (https://cliftoninstitute.org/restoration/virginia-native-seed-pilot-project/).The NRCS grant was completed in September 2024 and the native Seed Pilot Project is actively seeking funding to continue the project. **Figure 4** in **Appendix H** includes a list of project highlights.

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 such as the partnerships with James City County and Fairfax County. 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 through coordination with other Heritage regional and agency staff. The Locality Liaison continues to identify when coastal zone localities comprehensive plans are due for review and will contact these localities at the appropriate time to offer assistance.

The Locality Liaison will continue to reach out to localities in the coastal zone to update information for a current point of contact for each locality due to potential staffing changes. The Locality Liaison will provide assistance to localities in the development of ordinances or regulations necessitating the review of Natural Heritage information for certain projects, including renewable energy projects. Land trusts and Virginia Indian tribes will also be targeted that do not currently have access to natural heritage information.

NHDE subscriber training will continue to be available every other month to provide interested users with the ability to access natural heritage information and submit projects for environmental screening.

44 coastal zone localities with documented natural heritage resources currently have access to the NHDE or digital shapefile of Natural Heritage data. License agreements with localities are valid for a period of two years. The Locality Liaison will continue to ensure that all license agreements with coastal localities are valid and up to date.

The Locality Liaison web page will be updated with the quarterly coastal species highlight section (**Appendix I**) and the map of localities with Natural Heritage data (**Appendix G**). The Locality Liaison along with the project review staff will continue to work to improve the environmental review process including review efficiencies through coordination with internal and external partners.

Appendix A

Letter for Campground Pier in Stafford County

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

September 20, 2024

Joseph Fiorello
Stafford County
2126 Jefferson Davis Highway, Suite 203
Stafford, VA 22554

Re: Campground Pier

Dear Mr. Fiorello:

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 as referenced in the Joint Permit Application 24-0216. 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 in our files, the Crow's Nest Conservation Site is located within the project area, including a 100 foot buffer. 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 (B-rank) based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. The Crow's Nest Conservation Site has been assigned a B-rank of B2, which represents a site of very high significance. The natural heritage resources of concern associated with this site are:

Bolboschoenus fluviatilis	River bulrush	G5/S2/NL/NL
Lathyrus palustris	Marsh pea	G5/S1/NL/NL
Tidal Freshwater Marsh (Mixed High Marsh Type)		G3/S3/NL/NL

River bulrush, a state-rare plant species, primarily inhabits freshwater tidal marshes of the coastal plain of Virginia, and is known from intertidal zones on the Potomac, Rappahannock, Piankatank, and James rivers, with a disjunct population in

the New River in Giles County. 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 (Weakley, et al., 2012). As of 2024, 17 occurrences of this state rare plant were documented by the Virginia Natural Heritage Program, 15 extant and 2 historic.

Marsh pea is a state rare perennial with erect to sprawling stems and leaves with well-developed, branched tendrils and 4 – 10 leaflets. It occupies calcareous fens and marshes in the western part of Virginia and freshwater tidal marshes in the eastern part of the state (Weakley, et al., 2012). As of 2024, 9 occurrences of this state rare plant were documented by the Virgina Natural Heritage Program, 7 extant and 2 historic.

The Tidal Freshwater Marsh (Mixed High Marsh Type) (*Impatiens capensis-Peltandra virginica-Polygonum arifolium-Schoenoplectus fluviatilis-Typha angustifolia* Tidal Herbaceous Vegetation) occupies the higher elevation zone of freshwater to slightly oligohaline marshes on the Atlantic Coast from Maine to Virginia. From Delaware to northern Virginia, this is the principal mixed freshwater tidal marsh community and forms extensive patches along many tidal rivers. This community is composed of mixed, dense, and often diverse marsh vegetation with highly variable species composition and patch dominance. The soils are highly variable, varying from silts and silty mucks to peats and sands across the range (NatureServe, 2010). In Virginia, this community occurs most extensively in estuarine reaches of the Potomac River drainage, but has also been documented along the Rappahannock, Pamunkey, Mattoponi, and James Rivers. Freshwater tidal marshes are naturally dynamic systems that are best developed where there is a major input of freshwater, daily tidal range of at least 0.5 m, and a geomorphology that tends to constrict and magnify tidal influence in the upper reaches of the estuary. These marshes are subject to diurnal flooding by tides and river discharge (NatureServe, 2010). Principal threats include chronic sea-level rise leading to increasing upstream salinity, pollutants, and invasive exotic plants such as marsh dewflower (*Murdannia keissak*) (Fleming et al. 2021).

Furthermore, according to DCR's predicted suitable habitat modeling and review by a DCR biologist, there is a potential for Sensitive joint-vetch (*Aeschynomene virginica*, G2/S2/LT/LT) to occur in the project area if suitable habitat exists on site. Sensitive joint-vetch is an annual bushy-branched herb that grows to 3 meters tall. It has pinnately-divided leaves with 20-56 leaflets each to 25 millimeters long. The racemes bloom from July to October with up to 6 greenish-yellow flowers with dark red veins. The plants are found in freshwater to slightly oligohaline tidal marshes and adjacent wet ditches and disturbed areas, along freshwater reaches of the James, Chickahominy, Mattaponi, Pamunkey, Rappahannock, and Potomac Rivers and their major tributary creeks (Weakley et al., 2012). As of 2024, 22 occurrences of this rare plant were documented by the Virginia Natural Heritage Program, 12 extant and 10 historic. Threats include loss of habitat (often from docks and shoreline erosion control) as well as from competition with invasive species (particularly common reed, *Phragmites australis*). Sea-level rise threatens this species as all populations are at or near sea-level. Surveys for Sensitive joint-vetch should be conducted from August 15 to October 15. At this time the plant is in flower or fruit and has attained some stature making it more visible during the surveys typically conducted from a boat.

Due to the potential for this site to support populations of River bulrush, Marsh pea, Sensitive joint-vetch and other rare plants that may occur in tidal freshwater marshes as well as additional significant natural communities, DCR recommends an inventory for the resources in the study area. 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 to conduct inventories for rare, threatened, and endangered species. Please contact Anne Chazal, Natural Heritage Chief Biologist, at anne.chazal@dcr.virginia.gov or 804-786-9014 to discuss availability and rates for field work. For a list of USFWS-approved surveyors for Sensitive joint-vetch in Virginia visit https://www.fws.gov/media/collection-approved-surveyor-lists-project-review-process-virginia.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. Survey results should be coordinated with DCR-DNH and USFWS. Upon review of

the results, if it is determined the species is present, and there is a likelihood of a negative impact on the species, DCR-DNH will recommend coordination with VDACS to ensure compliance with Virginia's Endangered Plant and Insect Species Act.

DCR also recommends the development and implementation of an invasive species management plan. Please note, ground disturbance in wetlands of the eastern United States can often lead to the establishment of the common reed (*Phragmites australis*), an aggressive, exotic invasive plant species that spreads rapidly. Phragmites literally crowds out other plant species due to its rapidly spreading rhizomes and, once established, prevents sunlight from reaching understory species. Thus, through interspecific competition, Phragmites threatens the native plant community and reduces plant diversity. Phragmites spreads regionally by means of its wind dispersed seeds, but more commonly the vector is vegetative. As pieces of rhizomes break off and enter watercourses, they are carried by currents and deposited in other areas. When the rhizome fragments settle on a suitable substrate, they take root and send up new shoots. To prevent the establishment of Phragmites in a disturbed area, DCR recommends a program of revegetation immediately following disturbance, monitoring, and eradication (if necessary).

For ground disturbance at the site of the proposed project, we recommend that de-vegetated areas be seeded with rapidly growing annuals as soon as possible. In subsequent growing seasons, the original species composition should return, drawing on the local seed bed. During the time before the original species composition is fully re-established, the disturbed area should be monitored for colonization by Phragmites. DCR recommends that disturbed areas be inspected twice during each growing season for a period of not less than five years. Site inspections should take place in June (when new shoots are detectable) and again in mid to late September (when fruiting plumes are visible). If Phragmites is detected during monitoring efforts, it should be eradicated as soon as possible. Appropriate control measures vary but typically incorporate treatment with either imazapyr or glyphosate based herbicides approved for wetlands.

In addition, the proposed project will impact an Ecological Core **(C4)** as identified in the Virginia Natural Landscape Assessment (https://www.dcr.virginia.gov/natural-heritage/vaconvisvnla). Mapped cores in the project area can be viewed via the Virginia Natural Heritage Data Explorer, available here: http://vanhde.org/content/map.

Ecological Cores are areas of at least 100 acres of continuous interior, natural cover that provide habitat for a wide range of species, from interior-dependent forest species to habitat generalists, as well as species that utilize marsh, dune, and beach habitats. Interior core areas begin 100 meters inside core edges and continue to the deepest parts of cores. Cores also provide the natural, economic, and quality of life benefits of open space, recreation, thermal moderation, water quality (including drinking water recharge and protection, and erosion prevention), and air quality (including sequestration of carbon, absorption of gaseous pollutants, and production of oxygen). Cores are ranked from C1 to C5 (C5 being the least significant) using nine prioritization criteria, including the habitats of natural heritage resources they contain.

Impacts to cores occur when their natural cover is partially or completely converted permanently to developed land uses. Habitat conversion to development causes reductions in ecosystem processes, native biodiversity, and habitat quality due to habitat loss; less viable plant and animal populations; increased predation; and increased introduction and establishment of invasive species.

DCR recommends avoidance of impacts to cores. When avoidance cannot be achieved, DCR recommends minimizing the area of impacts overall and concentrating the impacted area at the edges of cores, so that the most interior remains intact.

The Virginia Natural Area Preserves System was established in the late 1980's to protect some of the most significant natural areas in the Commonwealth with some of the rarest natural communities and rare species habitats in Virginia. The Crow's Nest Natural Area Preserve is located on the north side of Potomac Creek in Stafford County across from the proposed project site. The 3,056-acre Crow's Nest Natural Area Preserve supports:

- 956 acres of tidal and non-tidal wetlands. The wetlands on the Crow's Nest peninsula account for 60 percent of all the marshes in Stafford County, and represent some of the best examples of diverse and intact wetland habitats in the Potomac River drainage;
- 23 miles of stream, riparian and wetland buffer;
- 2,360 acres of mature hardwood forest including two forest types that are recognized as globally rare by DCR's Natural Heritage Program;
- nesting bald eagles, king rails, habitat for the federally listed short-nose sturgeon, and habitat for twenty-three plant species that are significant for the Coastal Plain of Virginia;
- habitat for about 60 species of neotropical migratory songbirds, nearly 60 percent of which are experiencing population declines, including ten species that are high global priority species of Partners In Flight;
- spawning, nursery and/or feeding habitat for 49 species of interjurisdictional fish and seven species of mussels and commercially valuable shellfish;
- lands and waters that have played important roles in the Native American, Colonial and Civil War histories of Virginia.

DCR is concerned that development of the proposed pier will further increase visitation at the Crow's Nest Natural Area Preserve. Visitation increased dramatically during the pandemic and the preserve parking lot off Raven Road often reaches capacity during weekends between October and May, leading to visitors waiting or coming back later to visit the preserve. In addition, there is concern that construction of the pier could lead to increased visitation of the natural area preserve outside of posted hours requiring an increase in staffing resources and potential impacts to natural heritage resources.

New and updated information is continually added to Biotics. Please re-submit project information and map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

The Virginia Department of Wildlife Resources (VDWR) 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 at https://services.dwr.virginia.gov/fwis/ or contact Hannah Schul at Hannah.Schul@dwr.virginia.gov.

Should you have any questions or concerns, please contact me at 804-225-2429. Thank you for the opportunity to comment on this project.

Sincerely,

Tyler Meader

Tyler Meader
Natural Heritage Locality Liaison

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Appendix B
Letter for Sand Mining Operation

March 1, 2024

Grace Braziel
City of Suffolk
442 West Washington Street
Suffolk, VA 23434

Re: CUP2023-025, Proposed Borrow Pit, 12000 Wyanoke Trail

Dear Ms. Braziel:

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 in our files, the South Quay Conservation Site is located within the project area, including a 100 foot buffer. 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 (B-rank) based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. The South Quay Conservation Site has been assigned a B-rank of B1, which represents a site of outstanding significance. The natural heritage resources associated with the conservation site and documented within the project site are:

Callophrys irus	Frosted Elfin	G3/S1S2/NL/NL
Morella pumila	Dwarf wax myrtle	GNR/S1/NL/NL
Carphephorus bellidifolius	Sandy-woods Chaffhead	G4/S1S2/NL/NL
Kalmia angustifolia	Sheep laurel	G5/S2/NL/NL

The additional natural heritage resources associated with the conservation site are:

Anaxyrus quercicus	Oak Toad	G5/S2/NL/NL
Asclepias tuberosa var. rolfsii	Sandhills butterfly-weed	G5TNR/S1/NL/NL
Calycanthus floridus	Sweet-shrub	G5/S1/NL/NL
Campylopus carolinae	A moss	G2/S1/SOC/NL
Campylopus surinamensis	A moss	G4G5/S1/NL/NL
Carex decomposita	Cypress-knee sedge	G3G4/S1/NL/NL
Carphephorus bellidifolius	Sandy-woods Chaffhead	G4/S1S2/NL/NL
Cicindela abdominalis	Orange-bellied Tiger Beetle	G3/S1/NL/NL
Cicindela gratiosa	A Tiger Beetle	G3G4/S1/NL/NL
Corynorhinus rafinesquii macrotis	Eastern Big-eared Bat	G3G4T3/S2/NL/LE
Cuthbertia graminea	Grasslike roselings	G5/S1/NL/NL
Cyperus plukenetii	Plukenet's flatsedge	G5/S2/NL/NL
Desmodium strictum	Pineland Tick-trefoil	G4/S2/NL/NL
Digitaria serotina	Dwarf Crabgrass	G5?/S1/NL/NL
Epitheca semiaquea	Mantled Baskettail	G5/S1/NL/NL
Ilex coriacea	Big gallberry	G5/S1/NL/NL
Juncus pelocarpus	Brown-fruited Rush	G5/S2/NL/NL
Kalmia angustifolia	Sheep laurel	G5/S2/NL/NL
Ludwigia pilosa	Hairy Seedbox	G5/S1/NL/NL
Micranthemum umbrosum	Shade Mudflower	G5/S2/NL/NL
Morella pumila	Dwarf wax myrtle	GNR/S1/NL/NL
Myotis austroriparius	Southeastern Myotis	G4/S2/NL/NL
Myotis septentrionalis	Northern long-eared Myotis	G2G3/S1S3/LE/LT
Penstemon australis	Southern beard-tongue	G5/S1?/NL/NL
Perimyotis subflavus	Tricolored bat	G3G4/S1S3/PE/LE
Pinus palustris	Longleaf pine	G5/S1/NL/NL
Platanthera blephariglottis	Small white fringed orchid	G5/S2/NL/NL
Pyxidanthera barbulata	Common pyxie-moss	G4/S1/NL/NL
Quercus incana	Bluejack oak	G5/S2/NL/NL
Rhexia petiolate	Fringed meadow beauty	G5?/S1/NL/NL
Rhynchospora fascicularis	Fasciculate Beaksedge	G5/S2/NL/NL
Scleria minor	Slender Nutrush	G4/S2/NL/NL
Seymeria cassioides	Senna seymeria	G5/S1S2/NL/NL
Spermolepis divaricate	Rough-fruit scale-seed	GNR/S1?/NL/NL
Stipulicida setacea	Pineland scalypink	G4G5/S1/NL/NL
Taxodium ascendens	Pondcypress	G5/S1/NL/NL
Vaccinium crassifolium	Creeping Blueberry	G4G5/S1/NL/NL
Wisteria frutescens var. frutescens	American Wisteria	G5TNR/S1/NL/NL
Xyris caroliniana	Carolina yellow-eyed grass	G4G5/S1/NL/NL
Xyris platylepis	Tall yellow-eyed grass	G5/S2/NL/NL
Zenobia pulverulenta	Dusty Zenobia	G4?/S1/NL/NL
	Loblolly Pine / Scrub Oak Sandhill Woodland	G3/SU/NL/NL
	Longleaf Pine / Scrub Oak Sandhill Woodland	G1/S1/NL/NL
	Non-Riverine Swamp Forest (Mixed Evergreen Type)	G2G3/S1/NL/NL

In addition, according to DCR biologists, there is a potential for other natural heritage resources including additional rare plants and rare bees, butterflies, moths and beetles to occur in the project area if suitable habitat exists on site. Due to the documented occurrences of natural heritage resources on the project site and the potential for this site to support additional populations of natural heritage resources, DCR recommends an inventory for the resources in the study area.

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 to conduct inventories for rare, threatened, and endangered species. Please contact Anne Chazal, Natural Heritage Chief Biologist, at anne.chazal@dcr.virginia.gov or 804-786-9014 to discuss availability and rates for field work.

Furthermore, according to predicted suitable habitat modeling, there is potential for Eastern big-eared bat (*Corynorhinus rafinesquii macrotis*, G3G4T3/S2/NL/LE) to occur in the project site if suitable habitat exists on site. The Eastern big-eared bat is named for its enormous ears twice the length of its head, is extremely rare in Virginia and is currently known only from the southeastern portion of the state. Although widespread throughout the southeast, they are never found in large numbers. These bats roost singly or in small groups in hollow trees or abandoned buildings. They forage only after dark primarily in mature forests of both upland and lowland areas along permanent bodies of water (NatureServe, 2009). The details of this bat's feeding behavior and much of its natural history remain a mystery. Lack of information regarding the ecology of the Eastern big-eared bat, and their sensitivity to disturbance, make them particularly vulnerable to destruction of roost sites and feeding areas where their presence goes undetected (Handley and Schwab 1991, Harvey 1992).

Threats to this species include forest destruction, particularly hollow tree removal, decreasing availability of abandoned buildings, and possibly, insecticides. Please note that this species is currently classified as endangered by the Virginia Department of Wildlife Resources (VDWR).

DCR recommends avoiding tree removal in bottomland habitats and assessing any large potential roost trees and/or abandoned structures on the property for bat presence/absence. DCR also recommends coordination with DWR if removal of potential roost habitat for the Eastern big-eared bat becomes necessary to ensure compliance with the Virginia Endangered Species Act **(**VA ST §§ 29.1-563 – 570).

In addition, the proposed project will impact an Ecological Core **(C4)** as identified in the Virginia Natural Landscape Assessment (https://www.dcr.virginia.gov/natural-heritage/vaconvisvnla). Mapped cores in the project area can be viewed via the Virginia Natural Heritage Data Explorer, available here: http://vanhde.org/content/map.

Ecological Cores are areas of at least 100 acres of continuous interior, natural cover that provide habitat for a wide range of species, from interior-dependent forest species to habitat generalists, as well as species that utilize marsh, dune, and beach habitats. Interior core areas begin 100 meters inside core edges and continue to the deepest parts of cores. Cores also provide the natural, economic, and quality of life benefits of open space, recreation, thermal moderation, water quality (including drinking water recharge and protection, and erosion prevention), and air quality (including sequestration of carbon, absorption of gaseous pollutants, and production of oxygen). Cores are ranked from C1 to C5 (C5 being the least significant) using nine prioritization criteria, including the habitats of natural heritage resources they contain.

Impacts to cores occur when their natural cover is partially or completely converted permanently to developed land uses. Habitat conversion to development causes reductions in ecosystem processes, native biodiversity, and habitat quality due to habitat loss; less viable plant and animal populations; increased predation; and increased introduction and establishment of invasive species.

DCR recommends avoidance of impacts to cores. When avoidance cannot be achieved, DCR recommends minimizing the area of impacts overall and concentrating the impacted area at the edges of cores, so that the most interior remains intact.

Please note this project is within a section of the Blackwater River that has been designated as a scenic river in the state of Virginia. Please visit https://www.dcr.virginia.gov/recreational-planning/srmain for more information about the Virginia Scenic Rivers Program.

The South Quay Sandhills Natural Area Preserve is adjacent to the project site. For further information, please contact Darren Loomis, Southeast Region Steward at darren.loomis@dcr.virginia.gov.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species.

New and updated information is continually added to Biotics. Please re-submit project information and map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

The Virginia Department of Wildlife Resources (VDWR) 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 https://services.dwr.virginia.gov/fwis/ or contact Amy Martin at 804-367-2211 or amy.martin@dwr.virginia.gov.

Should you have any questions or concerns, please contact me at 804-225-2429. Thank you for the opportunity to comment on this project.

Sincerely,

Tyler Meader

Tyler Meader
Natural Heritage Locality Liaison

Cc: Amy Martin, VDWR
Darren Loomis, VDCR

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Appendix C

State of the York Report Working Documents

The resources we steward 58 - R

In addition to dams, invasive species can contribute to habitat alteration and fisheries populations [and native habitats].

DYK: **Invasive species** are intentionally or accidentally introduced by human activity into a region in which they did not evolve and cause harm to natural resources, economic activity, or humans. Invasive species differ from **naturalized species**, which are also introduced, but unlike invasives, have harmonized with the native ecosystem and do not cause it harm.

Within the York River System, ***Phragmites australis***, an invasive plant species, has altered marsh ecosystems through shifts in native marsh vegetation species. Marshes are a critical regional resource for a variety of reasons, including but not limited to their essential role as fish habitat (spawning, breeding, feeding and growing!), their ability to filter nutrients and sediments, their ability to temper wave energy and erosion, and their capacity for storing carbon (for more on marshes, see **page 3**). Shifts from native marsh vegetation to ***Phragmites*** have altered these marsh roles, in addition to changing food source dynamics and increasing fire potential.

CASE STUDY

The introduction and expansion of the invasive Common reed, ***Phragmites australis***, throughout the York River System has been one cause of significant change in tidal marsh plant composition. Whereas non-native Common reed community types were absent or in trace amounts in a 1970s historic survey, more recent wetland surveys indicate that ***Phragmites*** is distributed throughout the York River System. In fact, it's becoming dominant within some marshes (a dominant species within 70 acres of the System's tidal marshes) and is present in more than 10,000 acres of tidal marsh. These trends in ***Phragmites*** expansion occurred in all surveyed [illegible] included in this report (see Table 5).

Table 5. Presence of the Common reed, *Phragmites australis* in the York River System as of 2022.

[illegible]	PHRAGMITES (acres)			
	Dominant (>=50%)	Present (<50%)	Not Observed (0%)	(not recorded)
Mattaponi River	2.8	1,928.6	1,430.4	1,421.0
Pamunkey River	13.5	3,983.6	1,079.1	2,101.6
York River	16.9	4,123.9	446.9	2,752.5
Mobjack Bay	23.9	1,053.5	-	5,377.6
Dragon Run	-	-	-	78.0
Chickahominy River	13.0	385.0	-	843.1
TOTALS	70.2	11,474.6	2,956.4	12,573.8

CALL TO ACTION: Don't invite the invader in! Avoid disturbing or clearing land along shores. Doing so invites phragmites to invade and establish, making it extremely challenging to manage.

End Case Study

The resources we steward **NEW 59 - L**

Established invasives, like the plant species ***Phragmites australis***, threaten a variety of native species populations and biodiversity on the whole. Emerging invasives are of concern for similar reasons. For example, Nutria, rodents native to South America, are a destructive invasive species capable of altering, if not converting, valuable marsh habitat.

PHOTO Marsh surrounding Captain Sinclair's a recreational area in Mobjack Bay. Credit: Consociate Media.

DYK: Virginia's Department of Wildlife Resources (DWR) has taken a proactive approach to nutria in the York River System. By regularly monitoring for the presence of nutria in the neighboring Chickahominy watershed, and taking action on nutria sightings within our System itself, DWR works to prevent the establishment of nutria and avoid their potential impacts.

PHOTO A sign along the York River encourages nutria spotters to report their sightings. Credit: Abril Hunter.

CALL TO ACTION: See something, say something! Report any nutria you see to: https://cmi.vt.edu/ReportNutria.html If possible, try to get a photograph of the animal before sending in the report.

The resources we steward **NEW 60 - R**

PHOTO: Two-horned [illegible] in Virginian waters. Credit: Kevin Heffernan. [side-by-side with this one and this one]

Of increasing concern in the York River System, is Two-horned [illegible] (*Trapa* [illegible]), a new aquatic invasive plant that is spreading rapidly across ponds and other waterbodies in northern Virginia. A cousin of the infamous European water chestnut that once choked the Potomac River, Two-horned [illegible] infests freshwater ponds, lakes, and slow-moving waterways, forming mats that shade out native vegetation and making waterways hard to navigate. Two-horned [illegible] has recently been documented within the System in Orange County. Early detection and eradication will be critical to controlling continued spread throughout the System.

RESOURCE: Visit the Trapa [illegible] Dashboard App for information on confirmed sites with Two-horned [illegible] and information on identified waterbodies within danger zones.

RESOURCE: More information on invasive plant species occurring within the York River System can be found on the Virginia Department of Conservation and Recreation's Natural Heritage portal dedicated to Invasive Plant Species of Virginia.

RESOURCE: Additional information about invasive species, including links to the 2018 Virginia Invasive Species Management Plan currently in revision, can be found on the Commonwealth's Virginia Invasive Species website.

CALL TO ACTION: Help map and track invasive species! Online mapping tools and smartphone apps for reporting invasive species info can be found on the Virginia Invasive Species website here.

The resources we steward 6159 - L

On occasion, an invasive's negative impact on populations and habitat can be accompanied by ancillary benefits. Managing these threats in light of any benefits is a nuanced challenge for resource managers.

PHOTO Sampling blue catfish Credit: Joe Schmitt.

CASE STUDY: Blue Catfish

Blue catfish ([illegible] *furcatus*) are a somewhat complicated species within the Chesapeake Bay Watershed. Native to the Mississippi, Missouri, Ohio, and Rio Grande river basins, Blue catfish were introduced to the Chesapeake Bay Watershed in the 1970's. Since then, they have established populations in various Chesapeake Bay tributaries, including the York River. While in general they are a freshwater fish, they have a tolerance for brackish waters that bolsters their potential for range expansion. Deep, off-channel holes or river bends in mainstems and tributaries provide their ideal habitat.

Blue catfish are a valuable fish to the commercial and recreational fishing industries. Interest in this species commercially has increased within the last two decades. Catfish serve different purposes, including being a tasty and nutritious food source. As an expanding fishery, from 2010-2021 commercial fishermen collected 1,669,368 pounds of Blue catfish and generated $842,011 (see pages **53-54**). Likewise, Blue catfish are a popular recreational species sought by anglers and have become established as a trophy fish. In Virginia they are the second most popular recreational fishery in the state.

At the same time, Blue catfish pose a potential threat to native species within the York River. Studies have shown that the growth rates (in size) of Blue catfish are higher in the York River than any other tributary in the Chesapeake Bay. Their ranges have expanded and there is a growing concern about their effects on native species. Blue catfish can potentially outcompete native fish species as well as directly affect native species through predation. As generalist predators, Blue catfish feed on what is available to them, which can include Blue crabs, Shad, and River herring, among other native species. Moreover, they are able to tolerate higher salinity levels and produce large quantities of offspring during their spawning season, making their impact widespread.

The resources we steward 620 - R

Fisheries managers are faced with the difficult task of balancing native fish populations and the needs of commercial and recreational anglers. The Invasive Catfish Workgroup (I.C.W) was established to address concerns about potential negative effects of invasive Blue catfish, while ensuring that different stakeholders (commercial/recreational fishermen) still had a voice in management decisions. The I.C.W consists of state/federal managers, academics, recreational and commercial anglers, and other members of the public.

Blue catfish presence in the Chesapeake Bay are a challenge as they serve as both a valuable commercial/recreational fish, but also a potential threat to native biodiversity. However, as a well-established population in the large Bay system, eradication is impossible. Focus on population reduction through increased fishing may represent the most effective means of management moving forward. **FLAG** It is important that studies be conducted to better understand the effects and reach of invasive Blue catfish within the York River and the Chesapeake Bay Watershed. Likewise, it is important to continue to develop methods of reducing numbers of Blue catfish while allowing for a recreational and commercial fishery to remain. By working with a variety of stakeholders in groups like the I.C.W, we can find common ground and develop mutually beneficial strategies to manage the spread of these invasive fish.

FLAG: Presence of the invasive Northern Snakehead has been confirmed in the Pamunkey River, though as of this report's printing, not yet in the Mattaponi River. Further study of these two river systems and the impact of the snakehead's presence/absence in respective waters is merited.

CALL TO ACTION: Don't move fish around! We know the allure is strong, but the potential damage may be severe. The implications can lead not only to environmental problems, but may also upset recreational and commercial uses. If you're returning a fish to a body of water, make sure it's the one it came from!

PHOTO George Trice is one of several commercial fishers licensed to catch blue catfish through low-frequency electrofishing. This method delivers a nonlethal stun to catfish and does not affect protected species in Virginia waters. Credit: Aileen Devlin | Virginia Sea Grant

~~*end case study*~~

*Sources: Blue Catfish, NOAA Fisheries; Blue Catfish, Chesapeake Bay Program; Nepal and Fabrizio 2019; Blue Catfish: Invasive and Delicious; Fabrizio et al. 2020; Schmitt et al. 2018; The Invasive Catfish Workgroup (I.C.W) Connelly 2001

end case study

The resources we steward **NEW 63 - L**

Resource managers in Virginia consider a suite of threats to System species and habitats when identifying native or naturalized species (**page X**) as Species of Greatest Conservation Need (SGCN). Species classified as SGCN have low and declining populations and are threatened by invasive species, land development, habitat loss and degradation, or nonpoint source pollution (**page X**), among other factors like disease and illegal harvest. All of these factors are interconnected and exacerbated by climate change. Designation as an SGCN species reflects conservation need and opportunity, and helps inform conservation actions (e.g. management, monitoring, acquisition) that can stabilize populations, avoid extinction, and preserve distribution.

DYK The illegal collection and transport of turtles from Virginia is currently one of the Commonwealth's highest priority law enforcement issues when it comes to wildlife. Turtles are not only a high commodity in the pet trade, but are also harvested for cultural purposes, like food and medicine. Of the 8 turtle SGCN species in the York River System, 2 are designated as species of "Collection Concern," indicating illegal harvest has been documented: Northern Diamond-Backed Terrapin, and the Spotted Turtle.

Table X. Species and habitats of conservation interest and concern within the York River System and its [illegible]. Sources: *Virginia Department of Wildlife Resources and **Virginia Department of Conservation and Recreation's Natural Heritage Program.

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SGCN*	78	67	31	73	33	37	100
Rare species**	TBD	TBD	TBD	TBD	TBD	TBD	140
Significant Natural Communities (Aquatic)**	TBD	TBD	TBD	TBD	TBD	TBD	41 (38)

RESOURCE: Virginia's 2015 Wildlife Action Plan addresses threats to species with recommended conservation actions in local summaries. Dig into this plan to learn what conservation actions in your area may help keep SGCN from becoming endangered.

RESOURCE: Visit the Virginia Fish and Wildlife Information Service ([illegible]) of the Virginia Department of Wildlife Resources (DWR) for information on York River System species. Discover what conservation designations they have received, and what conservation opportunities may be afforded them.

FLAG: Development of a guide for the York River System's rare and threatened species is needed to help in outreach efforts. With increased awareness, residents and visitors alike can help turn the tide for these species of concern.

The resources we steward **NEW 64 - R**

Among, and in addition to the System's SGCN, exist **rare species**. The Commonwealth identifies species as rare to help prioritize monitoring and protection efforts. Rare species are not necessarily threatened or endangered, though their designation helps prioritize SGCN classifications. As with SGCN, rare species association does not offer additional legal protection, but helps inform conservation actions.

FAST FACT: Among the 140 rare species that have been documented in the York River System, 28 are rare animals and 59 are rare plants.

PHOTOS. Examples of rare species documented in the York River system: King rail ([illegible]), Barking treefrog (*Hyla* [illegible]), Sensitive joint-vetch ([illegible] *virginica*), and Northeastern beach tiger beetle ([illegible] *dorsalis dorsalis*).

Habitats, like species, can also be identified as rare. Rare habitats exhibiting key characteristics that merit inventory and tracking, are recognized by the Commonwealth as **significant natural communities**. Natural communities are habitats defined by a suite of features (e.g., vegetation, fauna, landforms) demonstrating interconnectedness in a given place.

RESOURCE: Discover more information on the biodiversity of the York River System using the DCR Natural Heritage Data Explorer. Use the Species/Communities Search tool to generate lists of rare species that occur in your watershed, and visit the Map tool to view a suite of biodiversity and conservation information layers.

Though threatened in a variety of ways, habitat loss and degradation are the greatest threats to the conservation of our rare and threatened species. Within the York River System, these threats are on the rise as our population increases and development is traded for habitat. The most meaningful actions we can take to combat these threats and preserve biodiversity are through habitat protection.

Call to Action: Support your local land conservancy. Protected areas help ensure habitat is preserved for the species that depend on it. Land conservancies operating in the York River System (e.g. [illegible]) purchase properties that can help secure habitat for valued species.

CALL to ACTION: *Be a conscious collector.* https://dwr.virginia.gov/permits/guide/

Appendix D

Pages from Chester Solar Vegetation Management Plan and VWP Comment Letter

Chester Solar Technology Park Vegetation Management Plan, Chesterfield County, Virginia

APRIL 2024

PREPARED FOR

Chester Solar Technology Park, LLC

PREPARED BY

SWCA Environmental Consultants

Chester Solar Technology Park
Vegetation Management Plan,
Chesterfield County, Virginia

Prepared for

Chester Solar Technology Park, LLC
575 Fifth Avenue, 24th Floor
New York, New York 10017

Prepared by

SWCA Environmental Consultants
200 West 22nd Street, Suite 220
Lombard, Illinois 60148
(630) 705-1762
www.swca.com

SWCA Project No. 00082881-000-DEN

January 2024

CONTENTS

Appendices

Figures

Tables

Acronyms and Abbreviations

BMPs	Best management practices
Chester	Chester Solar Technology Park, LLC
ECDs	Erosion control devices
IVM	Integrated vegetation management
Project	Chester Solar Technology Park Project
Project area	Approximately 1,725 acres in Chesterfield County, Virginia
SWCA	SWCA Environmental Consultants
SWPPP	Stormwater Pollution Prevention Plan
VMMP	Vegetation monitoring and maintenance program
VMP	Vegetation management plan
VDACS	Virginia Department of Agriculture and Consumer Services
VDACS – OPS	Virginia Department of Agriculture and Consumer Services – Office of Pesticide Services
VADCR	Virginia Department of Conservation and Recreation
VADEQ	Virginia Department of Environmental Quality

1 INTRODUCTION

Chester Solar Technology Park, LLC (Chester) plans to construct a 160-megawatt solar energy facility with 1.5 miles of overhead 115-kilovolt transmission line in Chesterfield County, Virginia. The Project area is based on the preliminary Project layout which covers approximately 1,725 acres (Figure 1).

The Project area is approximately 0.9 miles south of Iron Bridge Road and approximately 1.4 miles west of Harowgate Road. The Project area is bound by Bradley Branch Road to the north, residential development to the east and west, and Swift Creek and Beach Branch to the south.

The Project area is within the Appomattox watershed (Hydrologic Unit Code 02080207) and is drained by Beach Branch and unnamed tributaries of Swift Creek and Tumsbury Creek.

Chester Solar Technology Park, LLC is committed to minimizing negative impacts to soil on the Project site. This Vegetation Management Plan (VMP) will, among other things: assist in maintaining, and even improving good soil conditions; aid in appropriate drainage of the site; provide food for wildlife; prevent wind and water erosion; and otherwise stabilize the soil. The Project has identified native plant species to be used at the site to accomplish the foregoing list of items and will take precautions to preserve and protect the limited native rare plant species within the Project area.

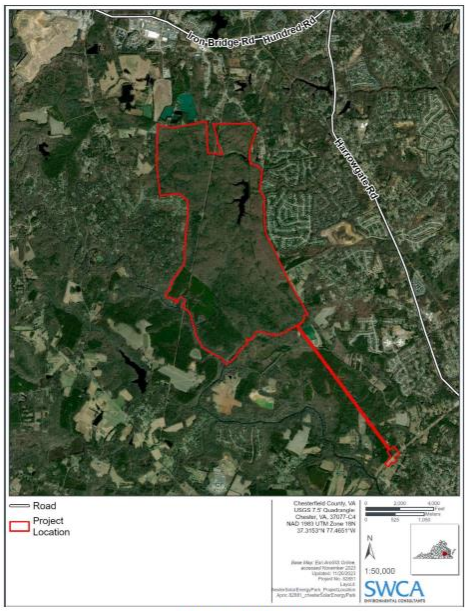


Figure 1. Project location.

1.1 Site Overview & Conditions

The Project area lies in the Level III Rolling Coastal Plain ecoregion. The Rolling Coastal Plain is mostly underlain by unconsolidated Tertiary sand, silt, clay, and gravels of the Bacons Castle Formation and the Chesapeake Group (Woods et al. 1999). They are generally very deep (greater than 60 inches), somewhat excessively drained to poorly drained, and loamy. Surface soil textures range from fine sandy loam to loam and silt loam. The soils are primarily nonhydric and have a moderate wind erosion potential and slight water erosion potential.

The land cover consists predominantly of forested areas with early successional and mixed hardwood species. The primary land use within the region is pine plantations. Natural vegetation consists of oak-hickory-pine forest, including hickory (*Carya* spp.), longleaf pine (*Pinus palustris*), shortleaf pine (*Pinus echinata*), loblolly pine (*Pinus taeda*), white oak (*Quercus alba*), and post oak (*Quercus stellata*).

The region is characterized by moderate climes with warm summers and moderate winters with mean annual temperatures ranging from 52 to 75°F. The average annual precipitation in most of this area ranges from 40 to 63 inches.

1.1.1 Wetlands

The Project's construction limits avoid most of the wetland habitat, and Chester has established resource protection areas that extend 100 feet upland from most of the wetlands and streams within the Project area (including the riparian and wetland-upland interface within them). Chester will avoid impacts to wetlands and associated resource protection area buffers to the extent practicable. Wetland impacts are only occurring where roads or electric lines must cross existing wetland resources.

Timmons Group conducted wetland delineations in the fall of 2016 to identify jurisdictional waters of the United States and wetlands (Timmons Group 2018). The following table provides an overview:

Palustrine Forested Wetlands	212.40 acres
Palustrine Scrub-Shrub Wetlands	2.21 acres
Palustrine Emergent Wetlands	2.54 acres
Palustrine Open Water	23.01 acres
Perennial Streams	25,133 linear feet
Intermittent Streams	16,033 linear feet
Ephemeral Streams	40 linear feet
Ditches	1,656 linear feet

1.1.2 Rare Plant Species

The VADCR identified 10 rare plant species that may be present within the Chester Seeps Conservation site, part of the Project area. Although rare in Virginia, the five identified during the survey are not listed as endangered or threatened at the federal or state levels.

These species and their bloom period are listed in Table 1.

Table 1. Virginia Department of Conservation and Recreation Rare Plant Species with Documented or Potential Occurrence within the Project Area

Common Name	Scientific Name	Bloom Period*
Cuthbert's turtlehead	*Chelone cuthbertii*	July – October
Fascicuate beakrush	*Rhynchospora fascicularis*	Year-round
Lance-leaved rose-gentian	*Sabatia difformis*	May – November
Large spreading pogonia	*Cleistesiopsis divaricata*	April – August†
Purple pitcher plant	*Sarracenia purpurea*	May – August
Red milkweed	*Asclepias rubra*	May – August
Sheep laurel	*Kalmia angustifolia*	May – July
Small white fringed orchid	*Platanthera blephariglottis*	June – September
Squarehead	*Tetragonotheca helianthoides*	April – June
Velvet sedge	*Carex vestita*	May – June

* Lady Bird Johnson Wildflower Center (2023).
† North American Orchid Conservation Center (2023).

Seedbox Consulting and Timmons Group completed seven rare plant surveys to verify the existence and locations for the Project area between May 30 and July 20, 2023 (Seedbox Consulting 2023). The species encountered during the surveys are:

- Cuthbert's turtlehead (*Chelone cuthbertii*)
- Purple pitcher plant (*Sarracenia purpurea*)
- Red milkweed (*Asclepias rubra*)
- Small white fringed orchid (*Platanthera blephariglottis*)
- Squarehead (*Tetragonotheca helianthoides*)

The identified plants within the project area were documented and mapped (Figure 2). There were no rare plants found within the gen-tie route and is therefore not included on the map.

Of the five identified plants, only squarehead and Cuthbert's turtlehead were found within the construction limits of the Project area. Squarehead was encountered in the southwestern portion of the Project area (37.31203, -77.47379) in a dry, sandy, wooded area and at the edge of a power line corridor. Cuthbert's turtlehead was observed in the northern portion of the Project area (37.33039, -77.46926) in a dry wooded area. The Project will provide a 25-foot construction buffer around the Squarehead. Additionally, Chester will ensure that no noxious or invasive species management efforts, specifically herbicide application, will take place within 100 feet of the identified rare plant species within the Project area.

Travis A. Voyles
Secretary of Natural and Historic Resources

Matthew S. Wells
Director

Andrew W. Smith
Chief Deputy Director

Frank N. Stovall
Deputy Director for Operations

Darryl Glover
Deputy Director for Dam Safety, Floodplain Management and Soil and Water Conservation

Laura Ellis
Deputy Director for Administration and Finance

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

September 3, 2024

James Merten
DEQ-PRO
4949-A Cox Road
Glen Allen, VA 23060

Re: WP4-24-0157, Chester Solar

Dear Mr. Merten:

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 previously provided comments on the proposed Chester Solar project on August 29, 2019, March 10, 2020, December 2, 2020, June 5, 2021, November 24, 2021, and June 17, 2022, and the "Application of Chester Solar Technology Park, LLC" to the State Corporation Commission (SCC) on December 6, 2022.

According to the information currently in our files, the Chester Seeps Conservation Site is located within 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. The Chester Seeps Conservation Site has a significance biodiversity ranking of B3 and is one of Virginia's Essential Conservation Sites (ECS) that is considered irreplaceable for achieving statewide biodiversity conservation goals. The following natural heritage resources associated with this conservation site listed below includes at least one significantly rare species found nowhere else in the Commonwealth:

			Extant Occurrences Outside of the Project Area
Asclepias rubra	Red milkweed	G4G5/S2/NL/NL	24
Carex vestita	Velvet sedge	G5/S2/NL/NL	9
Chelone cuthbertii	Cuthbert's turtlehead	G3/S2/NL/NL	21
Cleistesiopsis divaricata	Large Spreading pogonia	G4/S1/NL/NL	11
Kalmia angustifolia	Sheep laurel	G5/S2/NL/NL	11
Platanthera blephariglottis	Small white fringed orchid	G5/S2/NL/NL	10

Rhynchospora fascicularis	Fasciculate beakrush	G5/S2/NL/NL	6
Sabatia difformis	Lance-leaved rose-gentian	G4G5/S1/NL/NL	2
Sarracenia purpurea	Purple pitcher plant	G5/S2/NL/NL	24
Tetragonotheca helianthoides	Squarehead	G5/S1/NL/NL	0

Red Milkweed is a showy perennial that grows up to 1.2 meters tall. Its red flowers bloom in June and July. The plant occurs in bogs, sphagnous power-line swales and seeps in the Coastal Plain and outer Piedmont (Weakley et al., 2012). In 2014, 28 documented occurrences of this state rare plant were documented in Virginia, 26 extant and 2 historic. Like many wetland species, this species has suffered a loss of habitat due to conversion and/or draining of wetlands. In addition, this plant has declined as a result of active fire suppression, which has eliminated significant herbaceous-dominated wetlands. As of 2022, 30 occurrences of this state rare plant have been documented statewide by the Virginia Natural Heritage Program, 26 extant and 4 historic.

Velvet sedge, a state rare sedge species, occurs in low forests (Weakley, in prep.), seepage wetlands and seasonally wet conditions. It has been documented in such disturbed areas as powerline rights-of-way (TNC, 1996). This plant blooms during April and May (Weakley, in prep). As of 2022, 10 extant occurrences of this state rare plant have been documented statewide by the Virginia Natural Heritage Program.

Cuthbert turtlehead, a showy, perennial herb, grows in acid water seeps. It has also been documented in such disturbed areas as powerline rights-of-way. Cuthbert turtlehead has bright magenta flowers resembling the shape of a turtle's head that bloom from July through September (Radford et al., 1968) and can grow to be four feet tall (Ludwig, 1996). Due to its restricted distribution, Cuthbert turtlehead is threatened by even the smallest elimination of wetland habitat within its range. Drainage and timbering within wetlands have eliminated much essential habitat. Cuthbert turtlehead is currently known from Virginia's coastal plain, piedmont and Blue Ridge regions, some of those occurrences historical. Surveys for this species should be conducted during the flowering period, with late August – September being optimal in Virginia. As of 2022, 34 occurrences of this state rare plant have been documented statewide by the Virginia Natural Heritage Program, 23 extant and 11 historic.

Large spreading pogonia is a perennial with purplish stems and somewhat nodding magenta to white or brownish flower, and petals pink to white with tips sharply recurved. Large spreading pogonia habitat includes sphagnous bogs and pocosin openings, however it is now confined largely to artificially maintained powerline clearings (Weakley et al., 2012). As of 2022, 17 occurrences of this state rare plant have been documented statewide by the Virginia Natural Heritage Program, 12 extant and 5 historic.

Sheep laurel is a shrub that grows up to 1.2 meters tall. The branches ascend strongly upwards, and the leaves are whorled, semi-evergreen, and dull. The flowers vary from reddish purple to deep pink. In Virginia, it flowers during mid-summer and is found in dry to mesic, acidic woodlands, sandhills, and borders of seeps and seepage swamps in the Coastal Plain from Caroline County south to upper Gates County, North Carolina. Like so many of Virginia's rare plants, the major threats to this species are being out-competed by non-native invasive plant species or loss of habitat altogether due primarily to development/conversion. As of 2022, 13 occurrences of this state rare plant have been documented statewide by the Virginia Natural Heritage Program, 12 extant and 1 historic.

Small white fringed orchid is a state rare plant that inhabits savannas, seepages and sandhill-pocosin ecotones (Weakley, in prep.). It has also been documented in such disturbed areas as powerline rights-of-way (TNC, 1996). This plant blooms from July to September (Weakley, in prep.). As of 2022, 14 occurrences of this state rare plant have been documented statewide by the Virginia Natural Heritage Program, 11 extant and 3 historic.

Fasciculate beakrush, a state rare plant species, inhabits sands and peats of interdunal swales, depressions in savannas, open flatwoods, limesink ponds, ditches, and seepage bog edges (Flora of North America Editorial Committee 2002; Weakley, in prep.). This plant blooms from June to September (Weakley, in prep.). As of 2022, 8 occurrences of this

state rare plant have been documented statewide by the Virginia Natural Heritage Program, 6 extant and 2 historic. The Chester Seeps Conservation Site represents the northernmost known population of fasciculate beakrush.

Lance-leaved rose-gentian is a state rare perennial herb that inhabits pine savannas, bogs and pocosins (Weakley, in prep.). It has also been documented in such disturbed areas as powerline rights-of-way (TNC, 1996). This plant produces white flowers from May to September that usually turn pinkish-brown upon dying (Radford et. al., 1968). As of 2022, 4 occurrences of this state rare plant have been documented statewide by the Virginia Natural Heritage Program, 2 extant and 2 historic.

The Purple pitcher-plant, a state rare perennial, inhabits bogs, pinelands and such disturbed areas as powerline rights-of-way (TNC, 1996). This species blooms from April to July (Weakley, in prep.). As of 2022, 40 occurrences of this state rare plant have been documented statewide by the Virginia Natural Heritage Program, 25 extant and 15 historic.

Squarehead, or Pineland nerveray, is a state rare perennial taprooted herbaceous species in the sunflower family. Squarehead blooms with yellow flowers from April until July. Chester Seeps contains the last known population of squarehead in Virginia, which also marks the northernmost reach of the species. It is found in a dry, sandy open wooded area and at the edge of a powerline corridor. As of 2022, 5 occurrences of this state rare plant have been documented statewide by the Virginia Natural Heritage Program, all of which are historic except for the extant population at Chester Seeps Conservation Site.

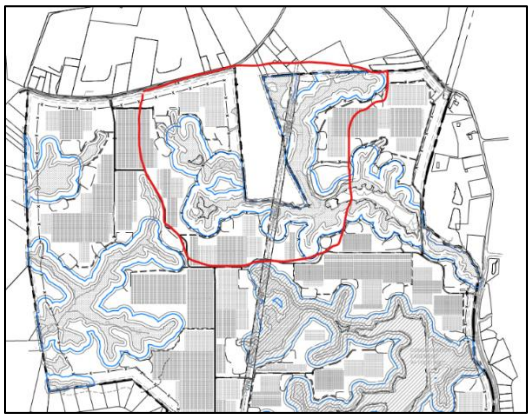
The Chester Seeps Conservation Site contains an ecosystem that is thought to have once been more widespread south of Richmond in Chesterfield and surrounding counties. This ecosystem is characterized by dry sandy acidic uplands and boggy wetlands driven by groundwater seepage hydrology. Such habitats contain a plethora of unique species including rare carnivorous plants, fire-loving orchids, and plants at the very edge of their geographic range limits. Historically this area would likely have been prone to natural periodic forest fires, which would have supported the many rare species populations growing there as well as the large area of oak-dominated hardwood forest. Much of the geographic area which may have contained similar ecosystems has been lost to development before the formation of the Natural Heritage Program, and thus before scientists had an opportunity to systematically inventory such habitats.

Based on the documented natural heritage resources within the project site, the potential for additional populations of natural heritage resources to occur, and the need to ascertain up-to-date species locations, DCR requested a rare plant survey for the project site in previous comments. Between May 30, 2023, and July 20, 2023, Seedbox Consulting and Timmons Group conducted seven site visits as part of a rare plant survey, titled "Rare Plant Survey: Chester Solar Site" and included as Attachment F-6 per the submitted project information. The following state rare species were documented within the project site during the survey: Red milkweed *(Asclepias rubra*, G4G5/S2/NL/NL*)*, Cuthbert's turtlehead (*Chelone cuthbertii*, G3/S2/NL/NL*)*, Small white fringed orchid *(Platanthera blephariglottis*, G5/S2/NL/NL*)*, Purple pitcher plant (*Sarracenia purpurea*, G5/S2/NL/NL*)*, and Squarehead *(Tetragonotheca helianthoides*, G5/S1/NL/NL*)*. Based on the results of the rare plant survey, SWCA Environmental Consultants prepared the draft Chester Solar Technology Park Vegetation Management Plan in April 2024.

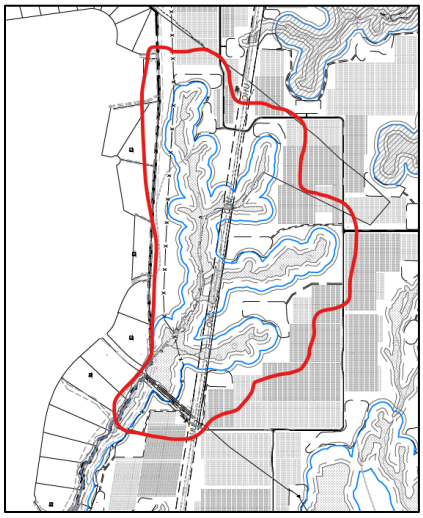
In Attachment F-1, "Threatened and Endangered Species Analysis and Agency Coordination Summary", the project proponent states on page 1: "This survey did not identify any of the rare plant species within the proposed area of disturbance from the Project and, as such, the Project is not anticipated to impact these species." DCR does not concur that the potential for adverse impacts to the documented rare plant populations has been eliminated at this stage of the site plan development. DCR is currently in consultation with the project proponents to avoid and minimize impacts to the natural heritage resources documented within the project site during the rare plant survey. DCR has reviewed the draft 2024 Vegetation Management Plan and provided comments on the plan during an in-person meeting on June 13, 2024, and in writing on July 12, 2024.

DCR has identified areas of highest concern for impact to rare plants within the project area including wetland areas (see images below). Additional engineering and construction detail for those areas has been requested from the project proponents to better assess potential impacts.

Northern Rare Plant Concentration



Southern Rare Plant Concentration



DCR has also provided recommendations and suggested changes to the draft 2024 Vegetation Management Plan to strengthen protective best management practices, including but not limited to larger buffers around documented locations of rare plants, reducing tillage near rare plant populations, measures to reduce soil compaction, letting temporarily cleared areas revegetate naturally rather than seeding, supporting the development and implementation of an adaptive invasive species management plan for the project, and implementing protective measures for any additional rare plant populations documented within the project area other than those identified in the 2023 rare plant survey.

In addition, the proposed project will impact Ecological Cores **(C2, C3, C4)** as identified in the Virginia Natural Landscape Assessment (https://www.dcr.virginia.gov/natural-heritage/vaconvisvnla). Mapped cores in the project area can be viewed via the Virginia Natural Heritage Data Explorer, available here: http://vanhde.org/content/map.

Ecological Cores are areas of at least 100 acres of continuous interior, natural cover that provides habitat for a wide range of species, from interior-dependent forest species to habitat generalists, as well as species that utilize marsh, dune, and beach habitats. Interior core areas begin 100 meters inside the nearest core edges and continue to the deepest parts of cores. Cores also provide natural and economic benefits of open space, recreation, water quality (including drinking water recharge and protection, and erosion prevention), and air quality (including carbon sequestration and oxygen production).

Cores are ranked from C1 to C5 (C5 being the least significant) using nine prioritization criteria, including the habitats of natural heritage resources they contain.

Impacts to cores occur when their natural cover is partially or completely converted permanently to developed land uses. Habitat conversion to development results in changes that reduce ecosystem processes, biodiversity, population viability and habitat quality due to limited recolonization, increased predation, and increased introduction and establishment of invasive species.

Therefore, avoiding or minimizing core impacts is a key mitigation measure that will reduce deleterious effects and preserve the area and connectivity of habitats that are key components of biodiversity. DCR recommends efforts to minimize edge in remaining habitat fragments, retain natural corridors that allow movement between fragments and design the intervening landscape to support native wildlife (natural cover versus lawns).

Based on the map (Figure 1) and shapefile regarding estimated tree removal provided by Torch Clean Energy as part of the review of the application, DCR has conducted an ecological core impact analysis in order to provide estimates of direct and indirect impacts to the C2, C3 and C4 cores within the project site. This analysis estimates 709.7 acres of direct impact and 1955.7 acres of indirect impact to the C2 core; 183 acres of direct impact and 469 acres of indirect impact to the C3 core; and 28 acres of direct impact and 42 acres of indirect impact to the C4 core (Figure 2). Based on these acreage estimates; mitigation activities of afforestation, avoided deforestation, and/or forest enhancement; and mitigation ratios, DCR estimates a total mitigation acreage of 13,302.9 (Figure 3).

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

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

New and updated information is continually added to Biotics. Please re-submit project information and map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

The Virginia Department of Wildlife Resources (VDWR) 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 at https://services.dwr.virginia.gov/fwis/ or contact Hannah Schul at Hannah.Schul@dwr.virginia.gov.

Should you have any questions or concerns, please contact me at 804-225-2429. Thank you for the opportunity to comment on this project.

Sincerely,

Tyler Meader

Tyler Meader
Natural Heritage Locality Liaison

Figure 1. Tree Clearing Analysis Map created by Torch Clean Energy

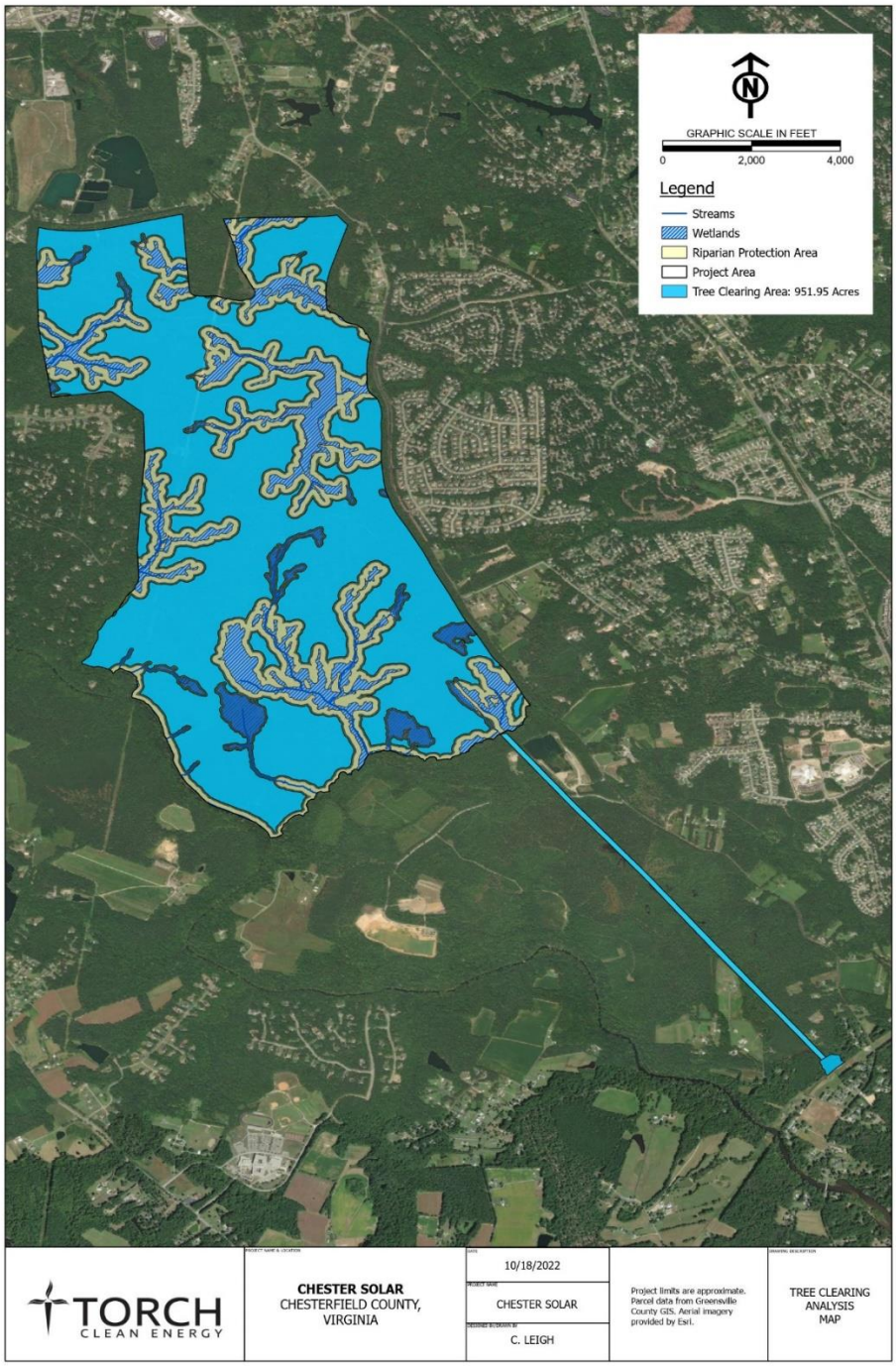


Figure 2. Ecological Core Impact Analysis Map conducted by DCR

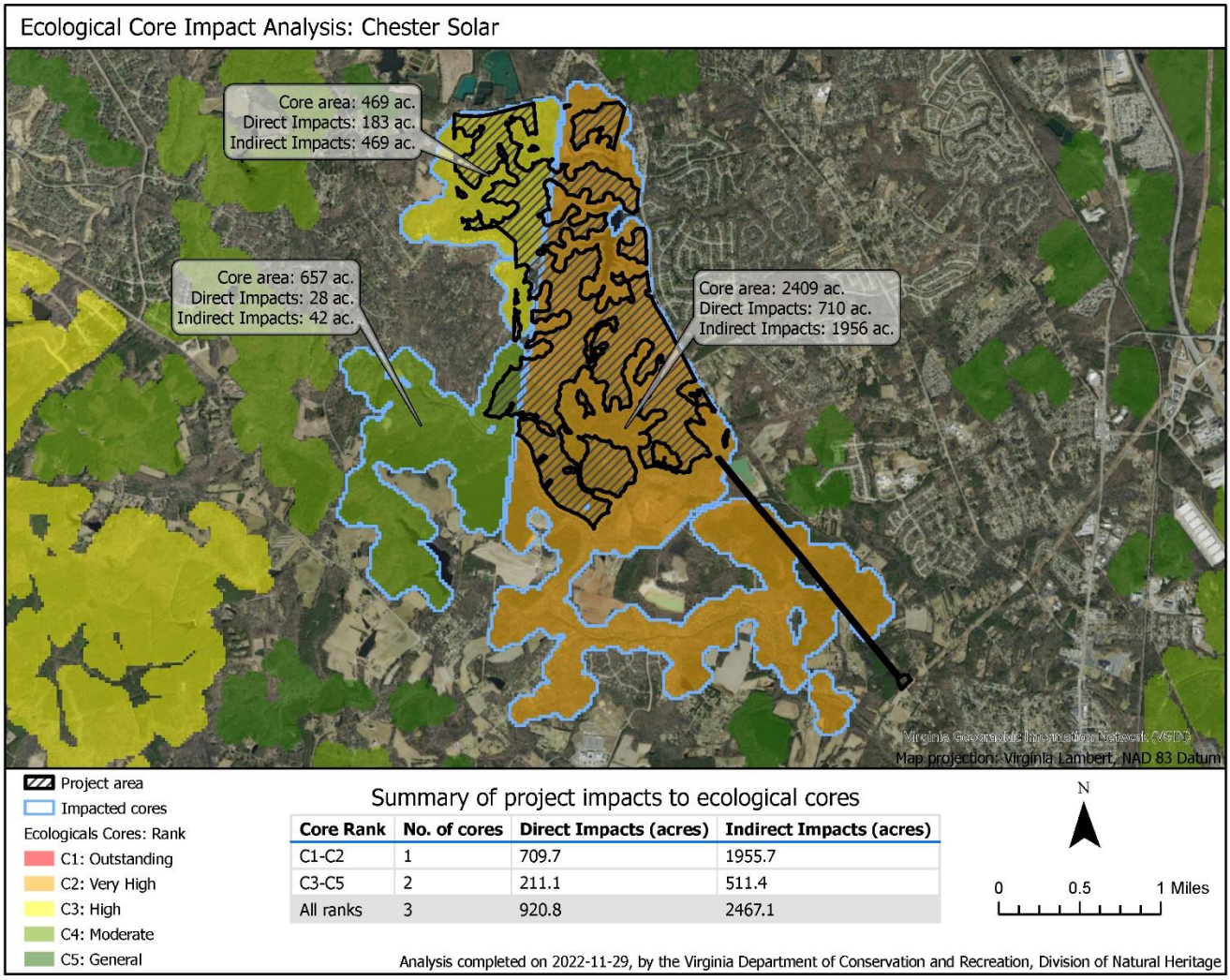


Figure 3. Ecological Core Impact Analysis Chart by DCR

Impact Type	Core Type	Impact Acres	Afforestation Mitigation			Avoided Deforestation Mitigation			Forest Enhancement Mitigation			Total Mitigation Adjusted Acres
			Adjustment Percentage	*Adjustment Ratio*	*Adjusted Acres*	*Adjustment Percentage*	*Adjustment Ratio*	*Adjusted Acres*	*Adjustment Percentage*	*Adjustment Ratio*	*Adjusted Acres*	
Direct Impacts	C1 and C2 Cores	709.7	25%	5.0	887.1	75%	7.0	3,725.9	N/A	N/A	N/A	5,562.9
	C3 - C5 Cores	211.1	25%	3.0	158.3	75%	5.0	791.6	N/A	N/A	N/A	
	Non-core Forest Blocks	0.0	25%	1.5	0.0	75%	3.0	0.0	N/A	N/A	N/A	
Indirect Impacts	C1 and C2 Cores	1,955.7	N/A	N/A	N/A	50%	4.0	3,911.4	50%	3.0	2,933.6	7,740.0
	C3 - C5 Cores	511.4	N/A	N/A	N/A	50%	2.0	511.4	50%	1.5	383.6	
	Non-core Forest Blocks	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Totals	3,387.9			1,045.4			8,940.3			3,317.2	13,302.9

VaNLA Core Impact Analysis

Input project file: Chester_Buildable_Area

Analysis completed: 2022-11-29

Note: Adjustment Percentages for each mitigation activity are theoretical for the purposes of DCR's ecological core impact analysis. In practice, actual percentages of each mitigation activity may vary, leading to a different value for Total Mitigation Adjusted Acres.

Literature Cited

Flora of North America Editorial Committee. 2002. Flora of North America North of Mexico. Vol. 23: Magnoliophyta: Commelinidae (in part): Cyperaceae. Oxford University Press, New York. 608 pp.

Ludwig, J. Christopher. 1996. Personal communication. Virginia Department of Conservation and Recreation, Division of Natural Heritage.

Radford, A.E., H.A. Ahles, C.R. Bell. 1968. Manual of the Vascular Flora of the Carolinas. University of North Carolina Press, Chapel Hill. p. 836, 854.

The Nature Conservancy. 1996. Biological and Conservation Data System. Arlington, Virginia, USA.

Weakley, A.S, J. C. Ludwig, and J.F. Townsend 2012. Flora of Virginia. Bland Crowder, ed. Foundation of the Flora of Virginia Project Inc., Richmond. Fort Worth: Botanical Research Institute of Texas Press. p. 404, p. 535, p. 258, p. 1172.

Weakley, A.S. In prep. *Flora of the Carolina's and Virginia*. The Nature Conservancy, Southeastern Regional Office. p. 14-8, 9-8.

Weakley, A.S. In prep. Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas. University of North Carolina Herbarium, Chapel Hill, N.C. 1026 pp.

Appendix E

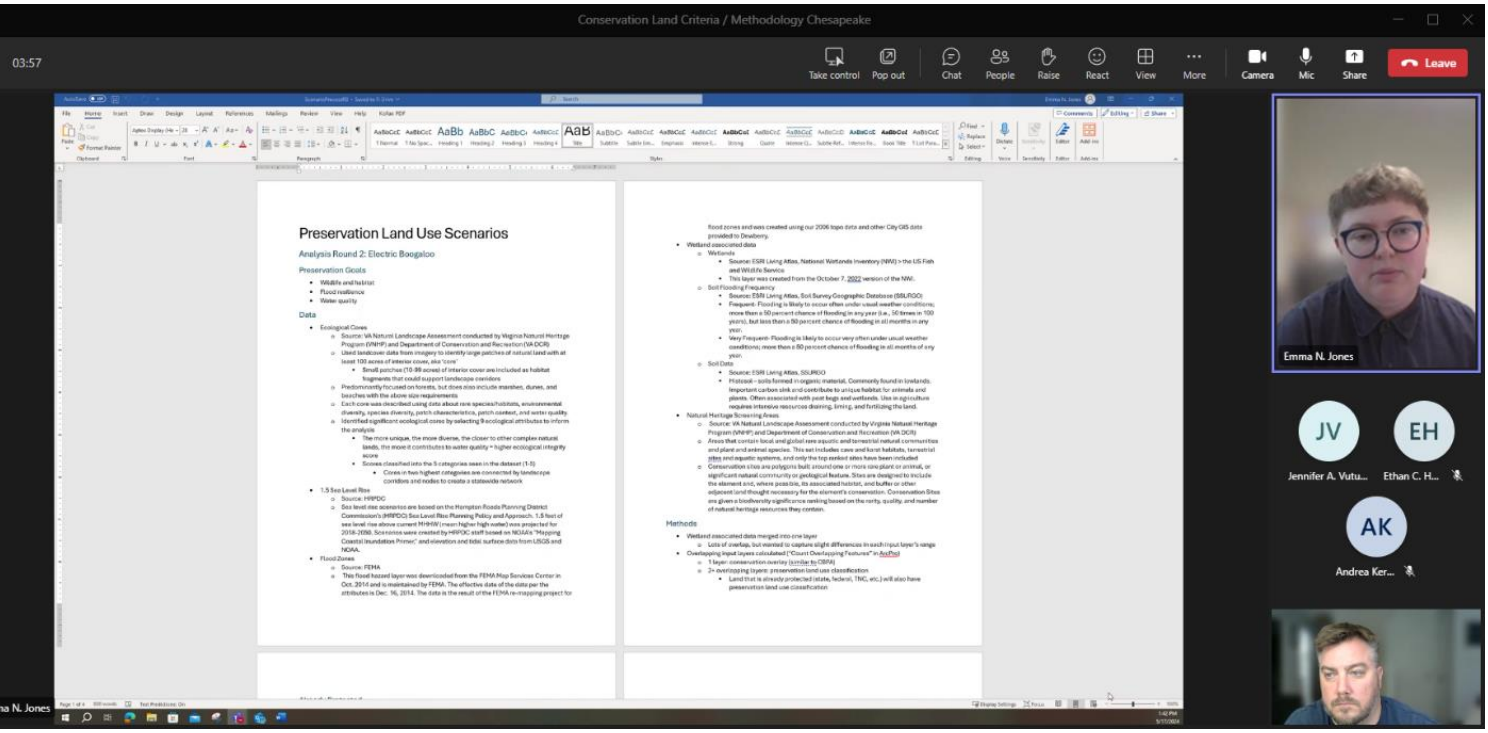
List of Coastal NHDE Training Participants for FY23

BL Companies
BOW Renewables
City of Chesapeake
City of Petersburg
Coastal Virginia Conservancy
Davey Tree Company
Dewberry
Dramby Environmental
Enercon
Environmental Resources Management
Fairfax County
Fairfax County Park Authority
Fairfax County-Department of Public Works and Environmental Services
Federal Highway Administration-Eastern Federal Lands
Hanover County
Hawkins Law PLC
Henricopolis Soil and Water Conservation District
James City County
Joint Legislative Audit and Review Commission
James River Park System
Labella
Mattern & Craig
Northern Neck Soil and Water Conservation District
Pamunkey Indian Tribe
Peanut Soil and Water Conservation District
PlanRVA
Prince William County
Resource Environmental Solutions
Rummel, Klepper and Kahl
Schnabel Engineering
Spotsylvania County-Environmental Codes
Stantec
The Nature Conservancy
Three Oaks Engineering
Three Rivers Soil and Water Conservation District
The Nature Conservancy-Richmond
Townes Engineering
TRC Companies
Tri County City Soil and Water Conservation District
US Department of Agriculture-Natural Resources Conservation Service
Virginia Department of Agriculture and Consumer Services
Vanasse Hangen Brustlin

Virginia Institute of Marine Science-Chesapeake Bay National Estuarine Research Reserve
Virginia Association of Soil and Water Conservation Districts
Virginia Department of Conservation and Recreation-State Parks Resource Management
Virginia Department of Conservation and Recreation-Division of Natural Heritage
Virginia Department of Conservation and Recreation-Real Property
Virginia Department of Environmental Quality
Virginia Department of Environmental Quality-Piedmont Regional Office
Virginia Department of Environmental Quality-Tidewater Regional Office
Virginia Department of Forestry-Eastern Region
Virginia Department of Forestry-Forest Legacy Program
Virginia Department of Forestry-Sentinel Program
Virginia Department of Health
Virginia Department of Wildlife Resources
Wetlands & Waters
Wildlands Engineering
WSP
Wetland Studies and Solutions

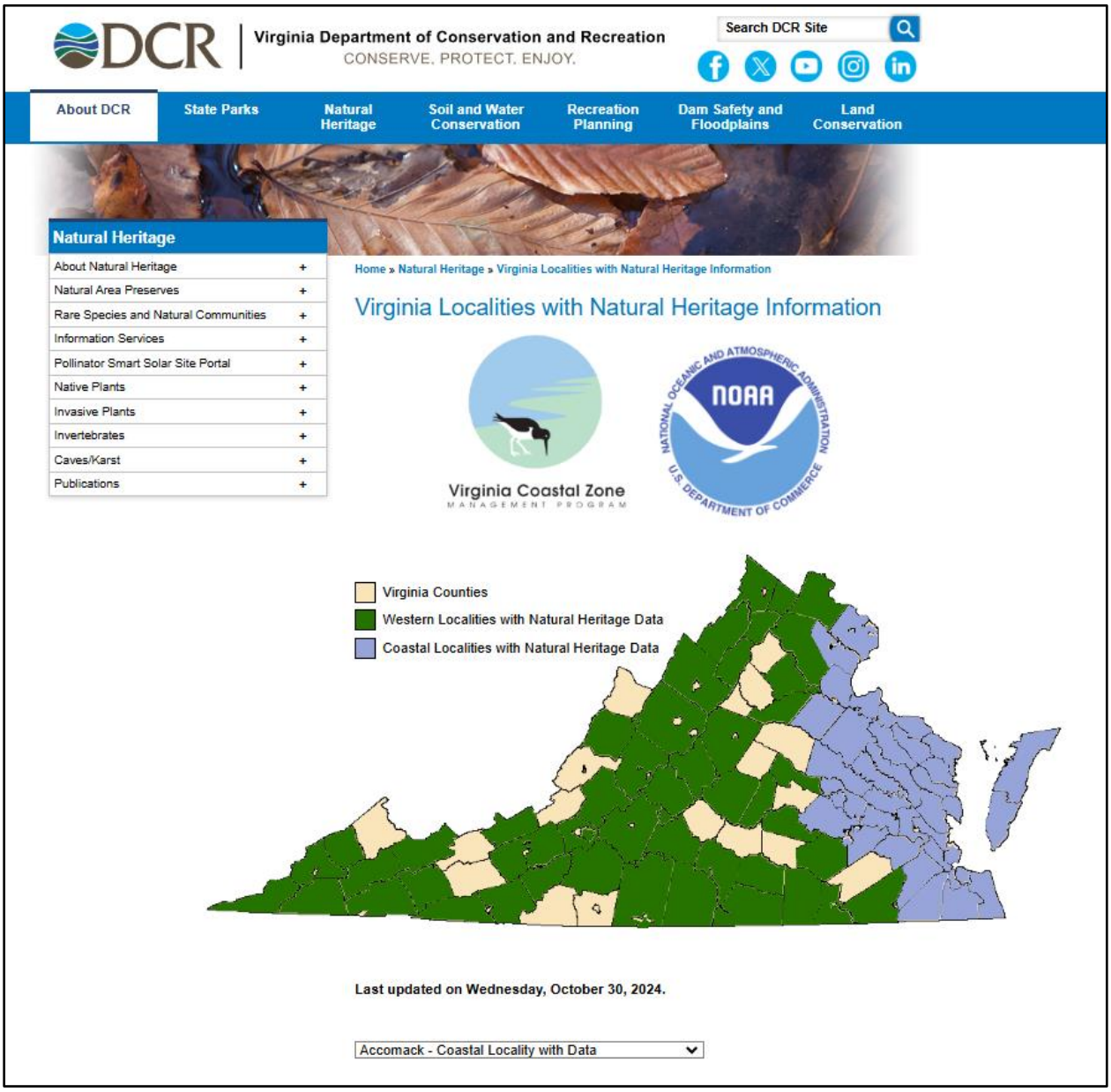
Appendix F

DCR-DNH Information Meeting for City of Chesapeake Land Use Map Update



Appendix G

Map of Localities with Natural Heritage Information



Appendix H

Virginia Solar Pollinator-Smart Program and Native Seed Pilot Project

Figure 1. Pollinator Smart Sign

Figure 2. Virginia Localities Solar Ordinances and Native Vegetation Report

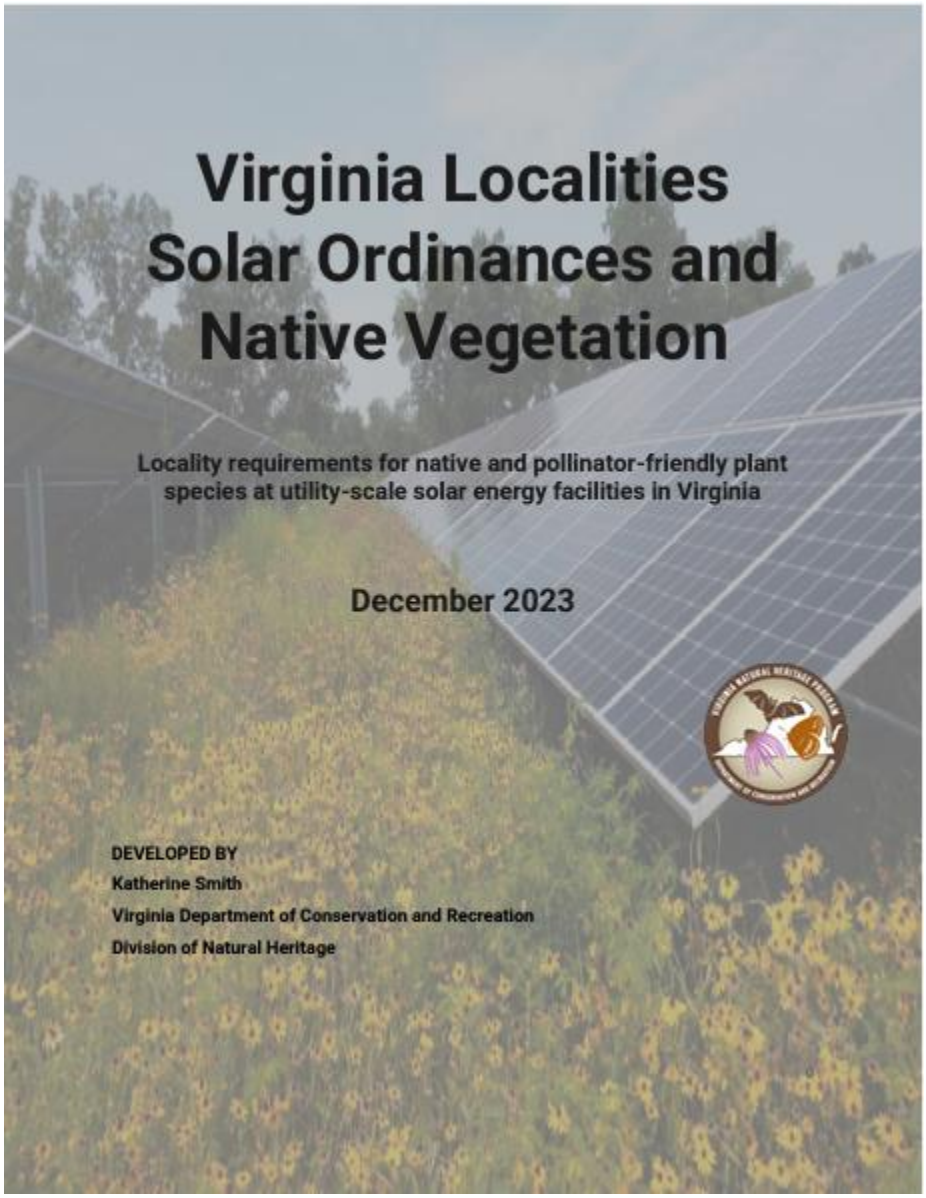
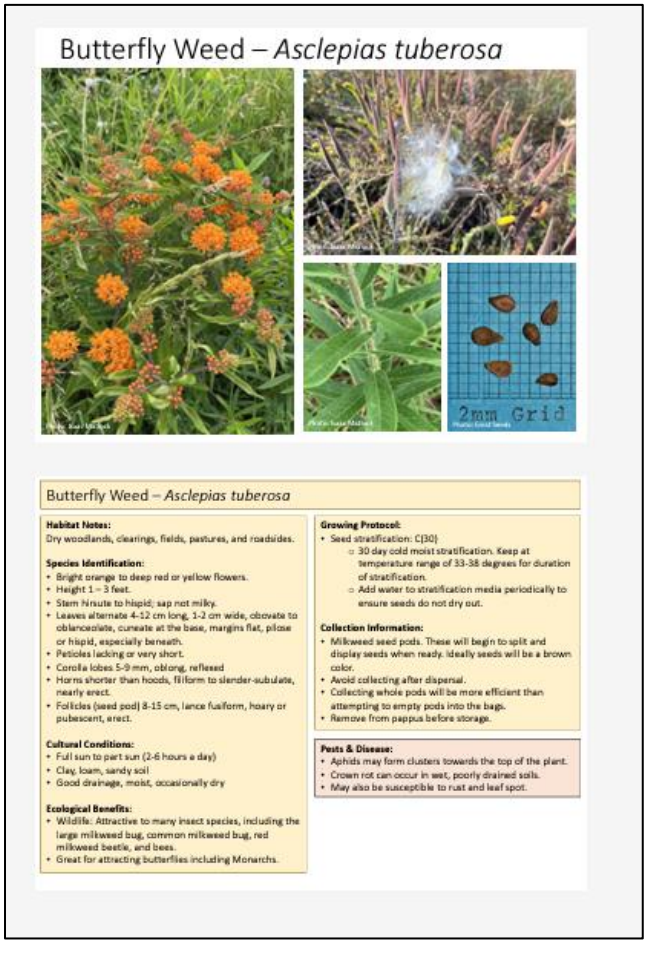
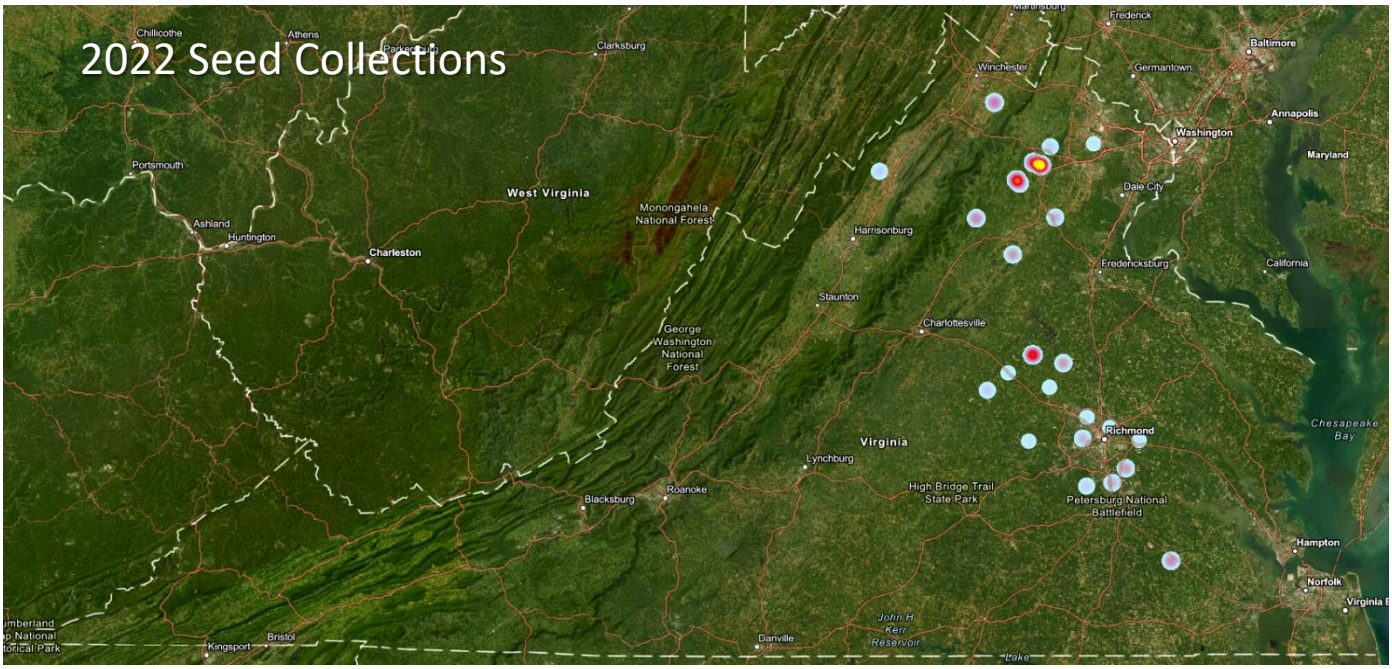
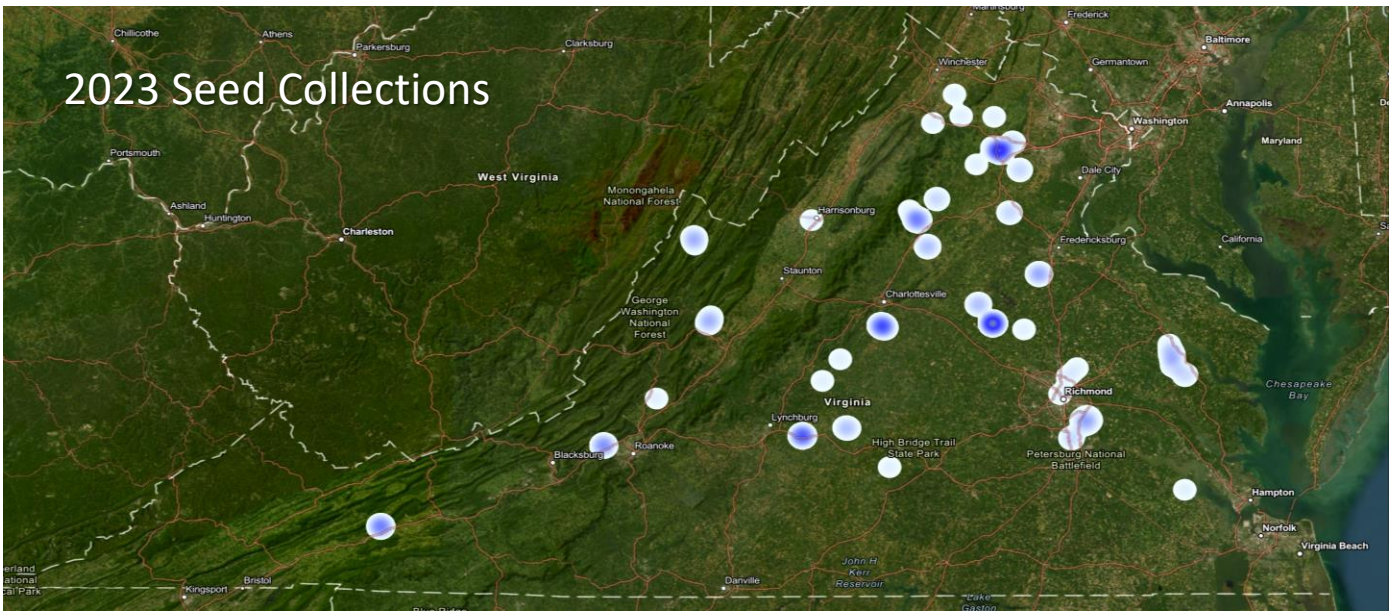


Figure 3. James Madison University Pollinator Smart Sign Presentation

Figure 4. Native Seed Pilot Project- Year 2 Highlights




2022 Seed Collections
Chillicothe
Athens
Parkersburg
Clarksburg
Frederick
Baltimore
Winchester
Germantown
Annapolis
Washington
Maryland
Portsmouth
West Virginia
Monongahela National Forest
Dale City
Ashland
Huntington
Charleston
Harrisonburg
Fredericksburg
California
Staunton
Charlottesville
George Washington National Forest
Richmond
Chesapeake Bay
Virginia
Lynchburg
Blacksburg
Roanoke
High Bridge Trail State Park
Petersburg National Battlefield
Hampton
Norfolk
Kingsport
Bristol
Danville
John H Kerr Reservoir


2023 Seed Collections
Chillicothe
Athens
Parkersburg
Clarksburg
Frederick
Baltimore
Winchester
Germantown
Annapolis
Washington
Maryland
Portsmouth
West Virginia
Monongahela National Forest
Dale City
Ashland
Huntington
Charleston
Harrisonburg
Fredericksburg
California
Staunton
Charlottesville
George Washington National Forest
Richmond
Chesapeake Bay
Virginia
Lynchburg
Blacksburg
Roanoke
High Bridge Trail State Park
Petersburg National Battlefield
Hampton
Norfolk
Virginia Beach
Kingsport
Bristol
Danville
John H Kerr Reservoir

Appendix I

Quarterly Coastal Species Highlights

Natural Heritage Resource Highlight: Narrow-leaved Spatterdock (*Nuphar sagittifolia*)

Global Rarity Rank: G5T2- Globally Secure **State Rarity Rank**: S1-Critically Imperiled

Legal Status: Federal Listing-None / State Listing-Threatened

© DCR-DNH

Narrow-leaved spatterdock is a rare member of the water-lily family (Nymphaeaceae) and is distinguished by narrow leaves floating above a mass of filmy submerged foliage and topped by yellow flowers. Unlike the more common spatterdock (*Nuphar advena*), which forms thickets along marsh edges, narrow-leaved spatterdock generally grows mid-current, its narrow leaves pointing upstream during the incoming tide and aiming downstream as the tide moves out. This species main range is restricted to eastern North Carolina, though it is also known from a few sites in South Carolina (Fernald 1942). In Virginia, narrow-leaved spatterdock is considered extremely rare and occurs only in marshes bordering the Chickahominy River. Threats to the species include water pollution and activities that threaten natural river currents. Surveys for this species can be conducted during the entire time its distinctive leaves are visible from April – October (Weakley, 2012). Please note that this species is listed as threatened by the Virginia Department of Agriculture and Consumer Services (VDACS).

As of 2024, 1 extant occurrence consisting of multiple populations of this state rare plant was documented in the Chickahominy River and its tributaries Diascund Creek and Mill Creek, in the coastal zone counties of Charles City, James City and New Kent.

Literature Cited

Fernald, M.L. 1942. The seventh century of additions to the flora of Virginia: contributions from the Gray Herbarium of Harvard University CXLV:396-398.

Weakley, A. S., J. C. Ludwig, and J. F. Towsend. 2012. Flora of Virginia. Bland Crowder, ed. Foundation of the Flora of Virginia Project Inc., Richmond. Fort Worth: Botanical Research Institute of Texas Press. p. 736.

Natural Heritage Resource Highlight: Frosted Elfin (*Callophrys irus*)

Global Rarity Rank: G3- Vulnerable **State Rarity Rank**: S1S2-Critically Imperiled/Imperiled

Legal Status: Federal or State Listing-None

© DCR-DNH

The Frosted elfin is a state rare butterfly that is gray-brown on the dorsal side. The ventral side is red-brown or gray-brown with a large gray patch at the outside and trailing edge of the hind wing. A black spot is usually evident in the center of this patch. They are most often found in dry areas, especially oak woods, shale barrens, pine forests, sandhills and coastal scrub. The elfin is a host plant specialist species and their larvae feed on Wild Lupine (*Lupinus perennis*) and Wild Indigo (*Baptisia tinctoria*). There may be different management approaches for Frosted elfin populations which feed on Lupine versus Wild Indigo. In both cases, open habitat should be preserved and promoted; however, the use of fire, herbicides, and summer mowing might be detrimental if not applied correctly. Habitat destruction and poor land management are likely causes of the decline of this species (DCR-DNH et al. 2013).

As of 2024, 4 extant occurrence of this state rare butterfly were documented in the coastal zone counties of Isle of Wight, Caroline, and City of Suffolk. Historically, they were also known from the ridge and valley region of Virginia.

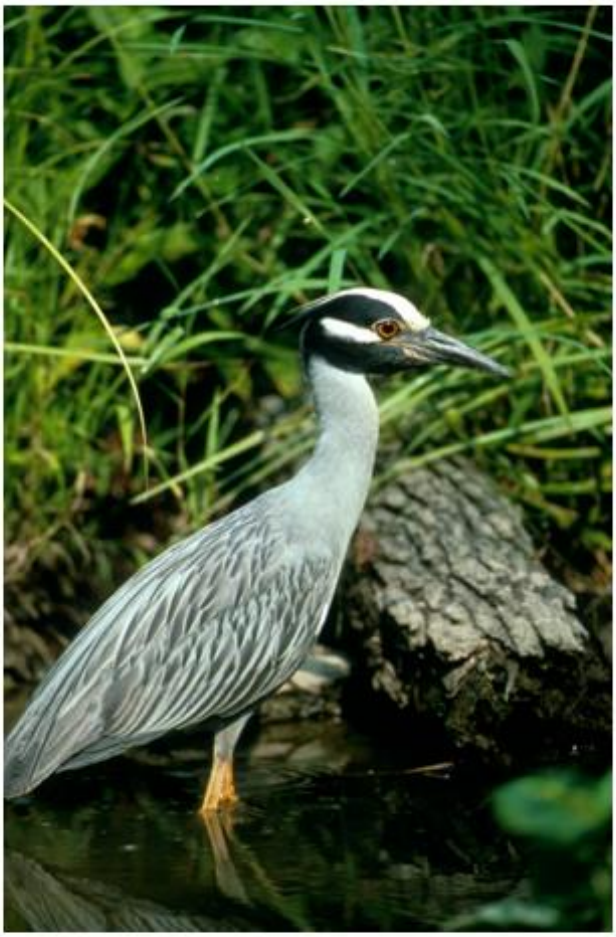
Literature Cited

Virginia Department of Conservation and Recreation - Division of Natural Heritage and Virginia Department of Wildlife Resources. 2013. Atlas of Rare Butterflies, Skippers, Moths, Dragonflies, and Damselflies of Virginia. Accessed at www.vararespecies.org on March 7, 2024.

Natural Heritage Resource Highlight: Yellow-crowned Night heron (*Nyctanassa violacea*)

Global Rarity Rank: G5- Globally secure **State Rarity Rank**: S2S3 Breeding-Imperiled/Vulnerable

Legal Status: No federal or state legal protection status



© DCR-DNH

The Yellow-crowned Night heron breeds from central and southeastern United States to northern and eastern coastal areas of South America (Watts, 1991). In Virginia, it breeds primarily within the coastal plain, however, there are scattered breeding records across the state, always associated with wetland areas. It forages in marshes, swamps, lakes, lagoons, tidal mud flats, rocky shores, and mangrove swamps (Watts, 1991).

Threats to this species in Virginia include loss of foraging habitat due to development, the displacement of remnant urban breeding populations, and disturbance of breeding activities (Watts, 1991).

As of 2024, 10 occurrences (each occurrence may contain multiple nesting pairs) of this state rare bird were documented in Virginia, 8 extant and 2 historic, including from the coastal zone counties of Gloucester and Northampton, as well as the City of Norfolk and the City of Virginia Beach.

Literature Cited

Watts, Bryan D. 1995. Yellow-crowned Night-Heron (Nyctanassa violacea), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/161doi:10.2173/bna.161 Accessed 24 June 2010.

Watts B. D., 1991. Yellow-crowned Night-heron. In Virginia's Endangered Species: Proceedings of a Symposium. K. Terwilliger ed. The McDonald and Woodward Publishing Company, Blacksburg, Virginia.

Natural Heritage Resource Highlight:

Wind-Tidal Oligohaline Marsh (Creeping Spikerush - Bull-Tongue Arrowhead Type)

Global Rarity Rank: G1/G2-Critically Imperiled/Imperiled **State Rarity Rank**: S1- Critically Imperiled

Legal Status: Not Listed

The Creeping Spikerush – Bull-Tongue Arrowhead type of a Wind-Tidal Oligohaline Marsh occurs primarily in wind-tidal estuarine systems of the Embayed Region in southeastern Virginia and northeastern North Carolina, but occasionally occurs in the upper reaches of lunar-tidal estuaries in northeastern Virginia and Maryland. It occurs in marshes underlain by poorly decomposed, fibric peat, typically away from tidal channels that experience frequent sediment and nutrient inputs. The vegetation is characterized by dense colonies of creeping spikerush (*Eleocharis fallax*), with beaked spikerush (*Eleocharis rostellata*) a common associate. Other characteristic associates include twig rush (*Cladium mariscoides*), Olney three-square (*Schoenoplectus americanus*, = *Scirpus americanus*), bull-tongue arrowhead (*Sagittaria lancifolia ssp. media*), pickerelweed (*Pontederia cordata*), dotted smartweed (*Persicaria punctata*), Canada rush (*Juncus canadensis*), and a large number of minor associates. (NatureServe, 2011). This community has a very limited geographic range, and occurs as relatively small patches (often several acres or smaller) in a complex with other (taller) marsh vegetation. Dynamics related to fire are poorly understood. Lack of fire could be a serious threat, responsible for the current limited extent of this community and encouraging the invasion of remaining examples by black needle rush (*Juncus roemerianus*) and other more aggressive marsh graminoids (M. Schafale pers. comm. 2004). Rising sea level and shifts in water salinity that come with it are also threats (Fleming, et al., 2021). As of 2024, 6 extant occurrences of this significant natural community type were documented in the coastal zone from City of Chesapeake and City of Virginia Beach.

Literature Cited

Fleming, G.P., K.D. Patterson, and K. Taverna. 2021. The Natural Communities of Virginia: Classification of Ecological Community Groups and Community Types. Third approximation. Version 3.3. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond, VA.

NatureServe. 2011. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: March 27, 2012).