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Refining Program Capacity to Enhance and Protect Wetland Resources in Virginia: 2020 Final Report to EPA (#BG983925-06-0)

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FINAL REPORT

Grant Title: REFINING PROGRAM CAPACITY TO ENHANCE AND PROTECT
WETLAND RESOURCES IN VIRGINIA

EPA Assistance # BG983925-06-0

DEQ #: Project 51419; Task 14

Date: December 7, 2020

Reporting Period Dates: October 1, 2018 to September 30, 2020

Budget/Project Period Dates: October 1, 2018 to September 30, 2020

Grantee's Contact Name and Phone number: Michelle Henicheck / 804-698-4007

Total project cost: \$464,864

Federal dollars: \$348,648

Federal dollars expended: \$348,648

Cost share/match: \$116,216

Cost share/match expended: \$116,216

Submitted To: Environmental Protection Agency (EPA) Region 3, Wetland Development
Program Grant

Submitted From: Virginia Department of Environmental Quality (DEQ)
1111 East Main Street, Suite 1400, Richmond, Virginia 23219

In Collaboration with: Virginia Institute of Marine Science
Center for Coastal Resources Management



Introduction

Virginia continues to make significant progress in the development of a comprehensive wetland regulatory program and continued refinement of our wetland monitoring and assessment tools for use in management decision-making and integration within our water quality programs. This project focused on development of strategies to integrate management of wetlands across the landscape and among different jurisdictions sharing the same waterways. This project will increase the potential for protection and restoration of wetlands, but also include the added value of potentially improving impaired waters in Virginia. Project activities specifically addressed all of the priority elements in Virginia's approved Wetlands Program Plan (2015-2020). The project extended the current online Virginia Wetlands Condition Assessment Tool (WetCAT) to include both tidal and nontidal wetlands, as well as nontidal wetlands vulnerable to changing participation patterns. The project established coordinated bi-State wetland management by providing comprehensive watershed level maps of wetlands in waterways shared by both Virginia and North Carolina. It provided a statewide floristic quality assessment tool for better analysis of wetlands in the field. Finally, the project provided continued landuse/wetland calibration for wetland condition models and developed strategies to increase sampling accuracy while reducing sampling costs. Finally, existing outreach strategies continued targeting local government decision makers and the public.

A. Project Goals

Project Background/Need

The primary goal of this project was to improve the ability of DEQ to identify, regulate, and protect wetlands in Virginia. Despite no net loss policies and specific guidance for mitigation of wetland impacts, Virginia continues to lose wetlands and ecosystem service capacity through both permitted activities and natural processes. The Commonwealth's Wetland Program Plan (WPP) speaks directly to these threats, and includes a number of actions intended to both enhance regulatory efforts and promote more effective voluntary actions. A keystone in this effort was continued development and enhancement of the online tools such as the Virginia Wetland Condition Assessment Tool (WetCAT) and the Floral Quality Assessment Indicator (FQAI) calculator tool and promoting their widespread use. WetCAT (Fig. 1) is an online tool for use by regulatory personnel, consultants, businesses, and the general public which incorporates EPA E-Enterprise Lean components, such as *i*) mobile or field data collection and reporting, *ii*) automated online processes, and *iii*) easier ways to access information stored in databases. The WetCAT goal is to provide easily accessible, comprehensive information for decision-makers, and to deliver that information in locality-specific formats, designed to address the needs of planners, regulators, and the regulated public. The FQAI calculator gives researchers, regulators, managers, consultants, and the regulated public access to the most up-to-date and accurate information on plant species conservatism in Virginia. Improving performance of the management programs will require continuing coordination efforts, and more attention to pre-application guidance for property owners, developers, local planners, and land use managers.

This type of coordination is essential in waterways shared by different State jurisdictions. Presently, wetlands are managed separately within each State's regulatory program. Integrating wetlands from both North Carolina and Virginia into WetCAT and providing tools for a common framework for comprehensive and cumulative analysis will allow better communication and coordination regarding wetland management in the shared waterways.

The desired outcome is a reduction in impacts to wetland areas and functions resulting from permitted projects in and around wetlands. This is particularly true for high ecological value aquatic resources, such as headwater systems, where development decisions have significant water quality implications. The Commonwealth developed WetCAT as a step in addressing this issue as a comprehensive, spatially explicit data viewer to provide information and guidance for DEQ wetlands permit review staff. Utilization of the tool by DEQ and other regulatory staff has provided significant insight into additional data needs and the need to develop protocols and guidance for use of the tool by other regulatory agencies as well as local government planners and property owners.

B. Project Objectives

The objective of this project is to provide easily accessible, comprehensive information for permit decision-makers and the public, and to deliver that information in locality-specific formats, designed to address the needs of planners, regulators, and the regulated public. We have determined that improving performance of the management programs will require continuing coordination efforts, and more attention to pre-application guidance for property owners, developers, local planners, and land use managers in a manner that increases transparency for stakeholders.

One unique aspect of WetCAT is its online interactive user interface, which allows users to overlay data, such as previously permitted impacts, impaired waters, parcel data, land use, wetland habitat condition, water quality condition, and run various geoprocessing tools to visualize cumulative impacts, downstream flow, and upgradient drainage areas. Enabling and promoting the desired type of informed planning and decision making requires (i) incorporation of tidal wetlands and shoreline data in comprehensive wetland management, (ii) continued and efficient wetland surveys for regular calibration of the WetCAT models to build reliable data; (iii) collaboration between states that share waterways, (iv) enhanced flora analysis, and (v) continued training and outreach materials for localities and the public.

This project directly addressed the EPA Region 3 priority for evaluation of success and monitoring progress on the ecological performance of wetland/stream restoration projects and incorporated the information into the Commonwealth's online tool. The project specifically targeted improvements in both regulatory and voluntary practices on a site specific basis in an effort to sustain acreage and function of Virginia's wetland resources, both natural and restored. The project builds on existing program elements, expanding and extending existing strategies for monitoring and assessment, and developing new strategies for planning and outreach/education.

C. Results and Discussion

The project continued work on previous and ongoing analyses of wetland conditions and management performance. It specifically focuses on building capacity to enhance the Commonwealth's ability to protect wetland resources, including wetland resources shared with North Carolina.

Objective/Task 1. Integrated Wetland Management – tidal wetlands and tidal shoreline condition

WetCAT presently allows a high level of analytical power for resource managers and the public in regard to nontidal wetlands. However there is a strong interest from managers and EPA (R3 Regional Monitoring Network Workshop) to integrate management of wetlands along a watershed from tidal to nontidal. This project incorporated the Virginia Shoreline (Figure 1) and Tidal Marsh Inventory into the WetCAT online tool (Figure 2). The VS/TMI was started in the 1970's and describes the condition of tidal shorelines for individual localities in the Commonwealth of Virginia. By providing the tidal marsh and shoreline information in conjunction with nontidal wetlands, managers can comprehensively assess wetland condition and potential cumulative impact. Incorporation of sea level rise into WetCAT was investigated and the addition of sea level rise scenarios, tidal marsh vulnerability can be assessed (Figure 3).

This is increasingly important as the Governor of Virginia has released the Virginia Coastal Resilience Master Planning Framework which references the Tidal Marsh Inventory and Shoreline Management Model

<https://www.governor.virginia.gov/media/governorvirginiagov/governor-of-virginia/pdf/Virginia-Coastal-Resilience-Master-Planning-Framework-October-2020.pdf>.

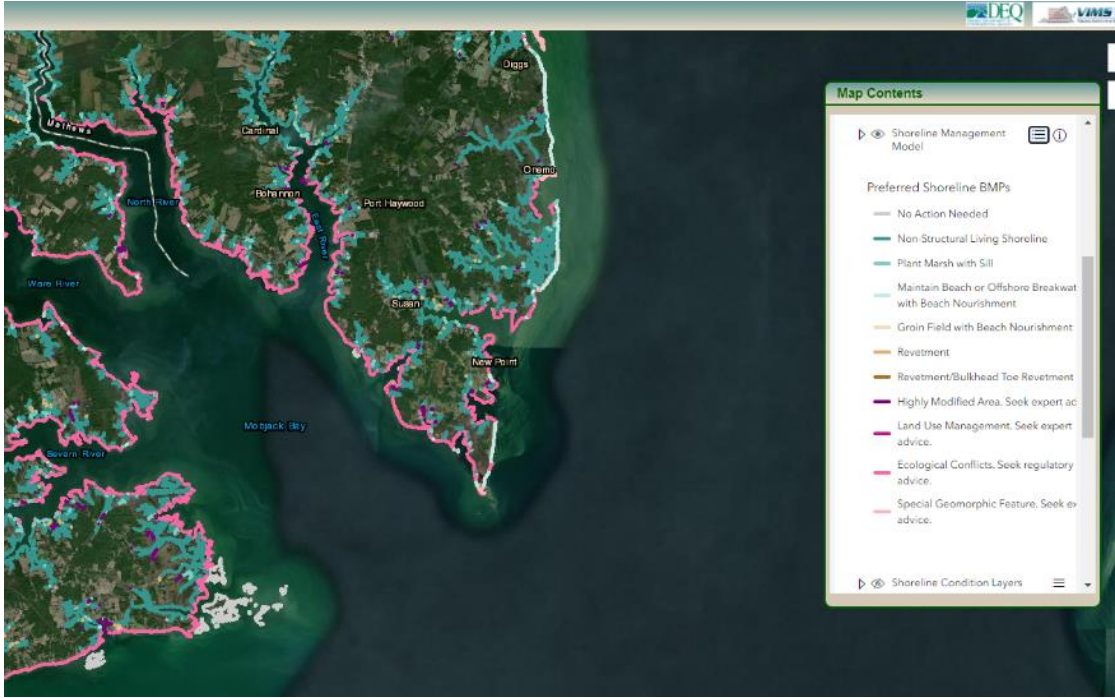


Figure 1. Shoreline Management Model / shoreline inventory in WetCAT.

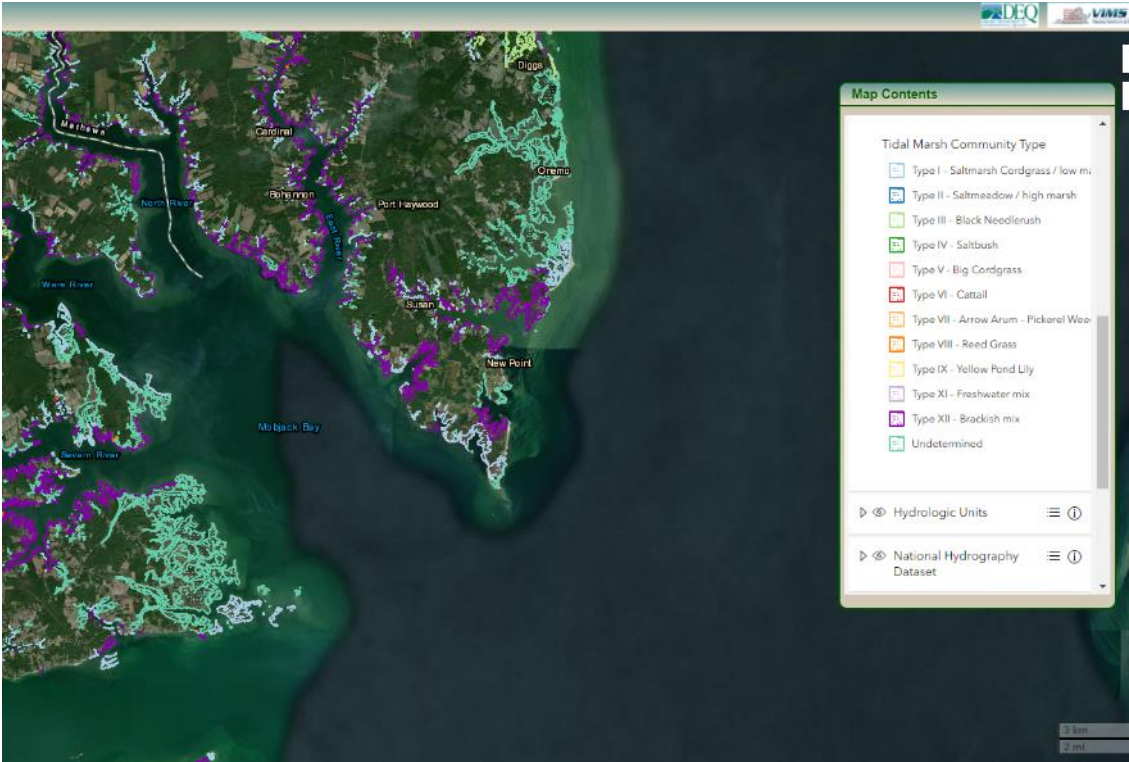


Figure 2. Tidal marsh inventory in WetCAT differentiated by tidal wetland type.

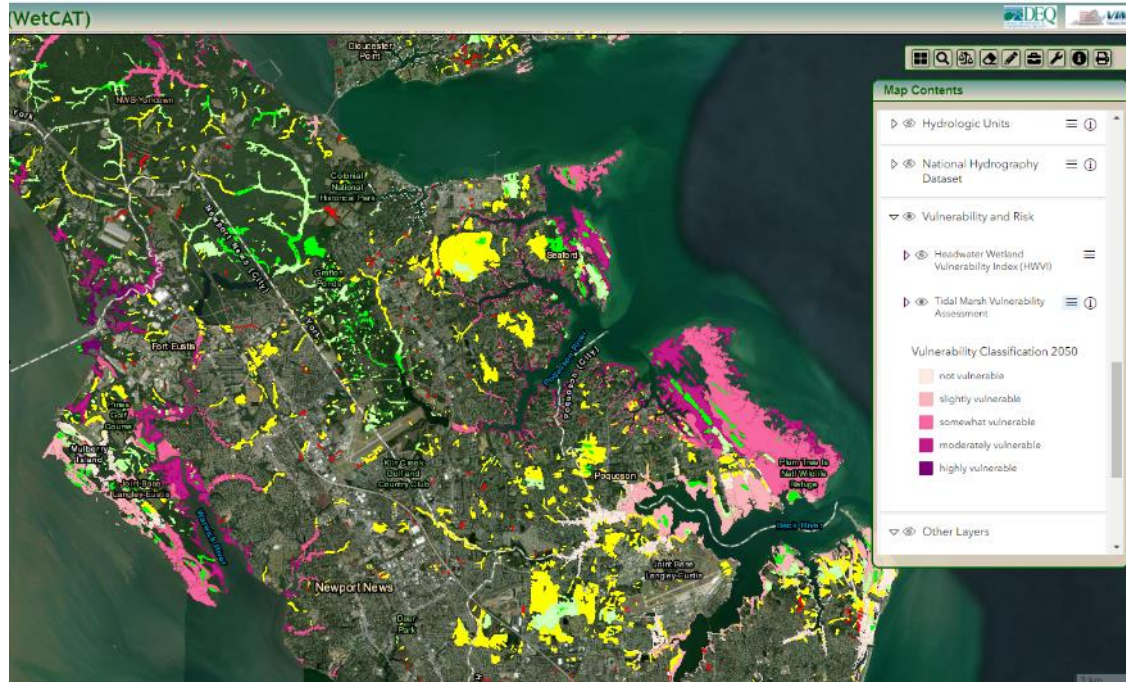


Figure 3. Tidal marsh vulnerability classification for sea level rise by 2050.

To integrate management of wetlands along a watershed from tidal to nontidal, the wetland connectivity analysis uses a 5m buffer around the selected wetland to determine neighboring wetlands. The tool is accessed using the Wetland Identification icon and then clicking on the Wetland Connectivity tool (Figure 4). It searches upstream and downstream within a 2km buffer to find potentially connected wetlands and provides information on the number of wetlands intersected (Table 1). The upstream and downstream paths have been generated from the National Elevation Dataset (NED) and do not necessarily represent actual streams or correspond to the National Hydrography Dataset. The paths, displayed in blue, show the easiest route based on the elevation data (Figure 5).

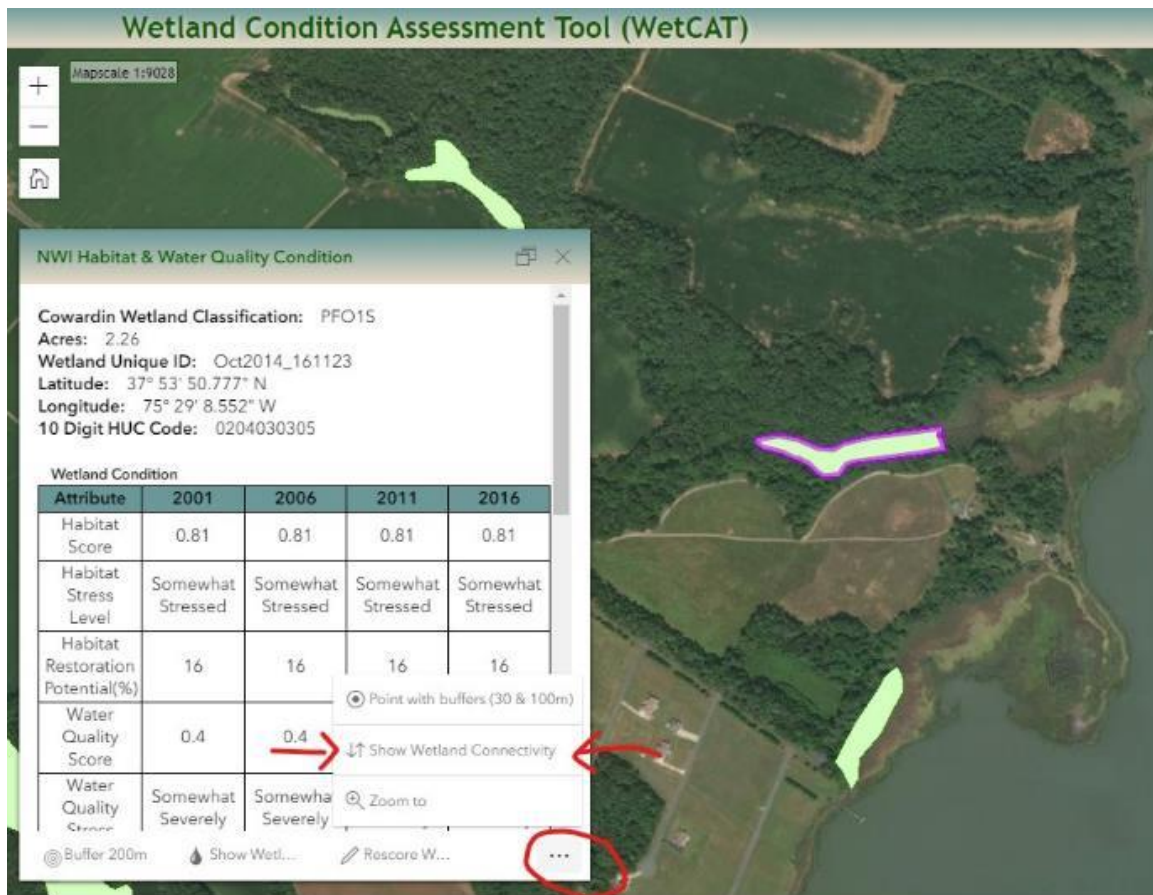


Figure 4. Wetland connectivity tool in WetCAT.

Downstream Analysis:

Wetlands downstream of selected wetland. Measurements are taken in 50m segments. The downstream path is shown in blue on the map.

Approximate Distance Downstream (m)	Wetland Origin	Wetland Type	Wetland Attribute	Unique ID	Habitat Stress Level	Water Quality Stress Level	Selected Wetland
50	NWI	Freshwater Forested/Shrub Wetland	PFO1S	Oct2014_161123	Somewhat Stressed	Somewhat Severely Stressed	selected wetland
100	TMI	Tidal Marsh	Undetermined	001-2297			
1250	TMI	Tidal Marsh	Undetermined	001-2265			
1650	TMI	Tidal Marsh	Undetermined	001-2267			

Upstream Analysis:

Wetlands upstream of selected wetland. Measurements are taken in 50m segments. The upstream path is shown in bright blue on the map.

Path Number	Approximate Distance Upstream (m)	Wetland Origin	Wetland Type	Wetland Attribute	Unique ID	Habitat Stress Level	Water Quality Stress Level	Selected Wetland
1	700	NWI	Freshwater Forested/Shrub Wetland	PSS1E	Oct2014_160932	Somewhat Stressed	Somewhat Severely Stressed	
1	50	NWI	Freshwater Forested/Shrub Wetland	PFO1S	Oct2014_161123	Somewhat Stressed	Somewhat Severely Stressed	selected wetland
2	700	NWI	Freshwater Forested/Shrub Wetland	PSS1E	Oct2014_160932	Somewhat Stressed	Somewhat Severely Stressed	
2	50	NWI	Freshwater Forested/Shrub Wetland	PFO1S	Oct2014_161123	Somewhat Stressed	Somewhat Severely Stressed	selected wetland
3	50	NWI	Freshwater Forested/Shrub Wetland	PFO1S	Oct2014_161123	Somewhat Stressed	Somewhat Severely Stressed	selected wetland

Table 1. Wetlands downstream and upstream of the selected wetland.

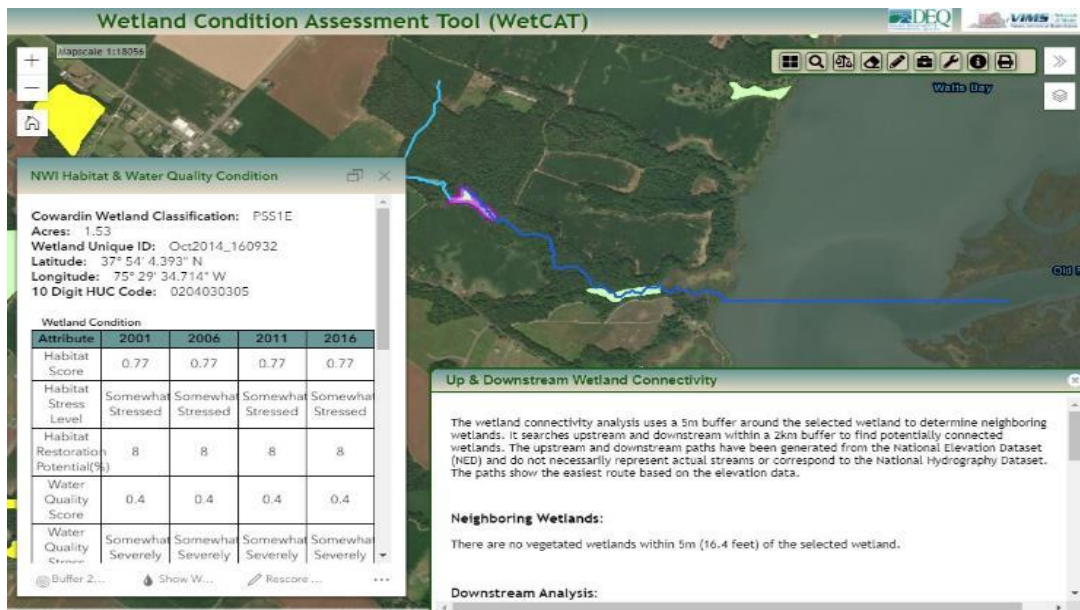


Figure 5. Wetlands connectivity.

WetCAT is presently being reviewed by the Interagency Review Team for use in Mitigation Site Selection Criteria to create a base structure of the “Final Mitigation Site Selection Report” (See Appendix A).

Summary Table Objective/Task #1 – *Integrated Wetland Management – tidal wetlands and tidal shoreline condition*

		VA Wetlands Program Plan Supported	Meets the following WPP Objectives: MA3, MA4, R7, PS5
Goal Statement	<i>Integrated Wetland Management – tidal wetlands and tidal shoreline condition</i>		
Description	This project incorporates the Virginia Shoreline and Tidal Marsh Inventory into the WetCAT online tool. The VS/TMI was started in the 1970’s and describes the condition of tidal shorelines for individual localities in the Commonwealth of Virginia. Providing the tidal marsh and shoreline information in conjunction with nontidal wetlands will allow managers to comprehensively assess wetland condition and potential cumulative impact.		
Tasks	<ol style="list-style-type: none"> 1) Incorporate the Virginia Shoreline and Tidal Marsh Inventory into WetCAT. Complete. 2) Incorporate the Shoreline Management Model into WetCAT. Complete. 3) Program cumulative impact analysis for tidal wetlands. Complete. 4) Program analysis by contributing watershed. Complete. 5) Program analysis by designated buffers. Complete. 6) Program upstream trace for wetland continuum analysis. Complete. 7) Investigate incorporation of sea level rise into WetCAT. Complete. 		
Outputs – Project Deliverables	<ul style="list-style-type: none"> • Integration of shoreline inventory and shoreline management model into WetCAT. Complete. • Capacity for cumulative analysis of wetlands along continuum from nontidal to tidal. Complete. • Additional Output. Sea level rise / tidal marsh vulnerability incorporated into WetCAT for 2050 sea level rise prediction. 		
Outcomes	<ul style="list-style-type: none"> • Improved wetland inventories and baseline condition assessments. • Improved wetland protection based on cumulative impact analysis. • Increased understanding of the impacts of flooding on wetlands. • Increased inter and intra agency coordination in wetlands protection and assessment. • Increased use of WetCAT to avoid high ecological value aquatic resources in pre-application planning. 		
Metrics	<ul style="list-style-type: none"> • 1,304 visits to VADEQ Wetlands Monitoring and Assessment page (Oct 2019-Oct 2020) • 4,738 visits to WetCAT from May 2018 to September 30, 2020. • Inclusion of wetlands in the 2020 Virginia Coastal Resilience Master Planning Framework • Incorporated into the US Army Corps of Engineers Norfolk District Wetland Attribute Form • Utilized in Federal Energy Regulatory Commission (FERC) relicensing 		

	<ul style="list-style-type: none"> Utilized in Virginia Department of Transportation Environmental Assessments Statewide agency recognition of WetCAT with Governor’s Technology Award.
Link to EPA’s Strategic Plan	Refocusing on core mission (ii) conduct monitoring and assessment so we know the status of the nation’s waters. 2) Empowering states to create tangible environmental results i.e. increased statewide wetland assessment capacity. 3) Improved processes i.e. enhanced transparency and consistency for regulated public.

Objective/Task 2. Upgrading re-calibration process for Coastal Plain physiographic province to increase efficiency

The Virginia assessment model hinges on an assumption of the stressors created by land development patterns. As agricultural practices and urban/suburban development practices evolve, it is essential that the model relationship be regularly recalibrated. Virginia has worked to develop a monitoring and assessment strategy for nontidal wetlands that can support regulatory decision making at the state level. The purpose of the recalibration effort is to capture changes in surrounding landcover – stressor relationships at 3-5 year intervals to ensure that the condition assessment model remains statistical valid. The initial Level II Coastal Plain calibration field sample was 1,200 sites with the recalibration of 120 sites (10%), the Piedmont calibration sample was 600 sites with the re-calibration of 60 sites and the Ridge & Valley calibration sample of 300 sites with re-calibration of 30 sites. Recent advances in remote sensing technology, particularly in LIDAR coverage, has provided the opportunity to increase sample sizes while reducing field effort and expense. The project randomly selected 600 sites in the Coastal Plain (Figure 6).

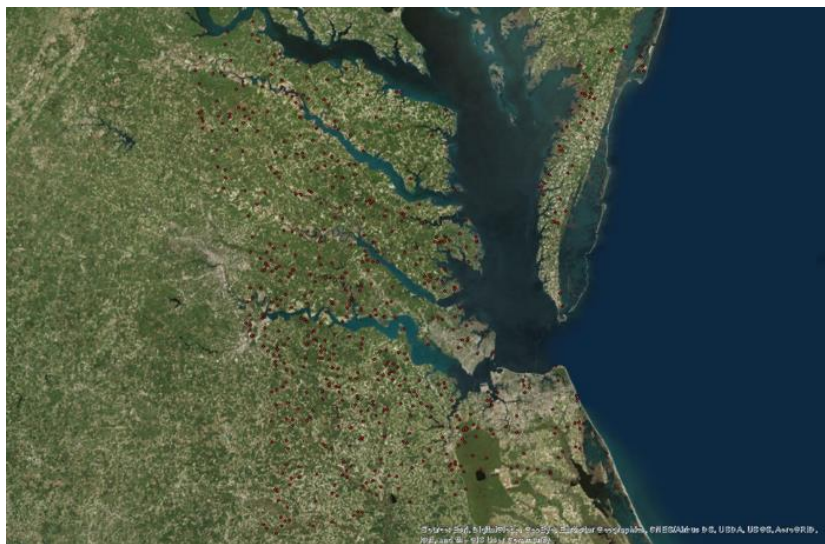


Figure 6. Desktop stressor review of 600 randomly selected wetlands sites (dots) within the coastal plain.

A desk top remote review using aerial photographs of the wetland assessment sites was completed using ArcGIS and Google Earth imagery to look for stressors in randomly chosen wetlands. Once the remote review was complete the sites were compared with the visited field

sites to check the accuracy of the remote review. These sites were reviewed remotely utilizing the stressor Level II protocol. Of the sites reviewed, 10% were randomly selected to test the accuracy of the remote review process. In addition, a hind cast protocol was conducted on 30 sites that were visited and subsequently analyzed using the remote review (Table 2).

Some differences were noted. Most differences were due to stressor definitions and a few sites had changes that occurred between the time they were visited and the time the aerial photograph was taken, i.e. forest that have been clear cut. With minimum modification to some definitions, remote reviews are a practical way to cover many sites in a short period of time with good accuracy.

It was determined that some of the existing stressor definitions will need to be modified for the remote review process, for example, it is difficult to distinguish between gravel and dirt roads in the aerial photographs (Table 3). It is also very difficult to pick out invasive plant species unless there is a drone fly-over assessment. We also noticed that in some instances the remote review was more accurate than the field visit. In some of the field locations poor GPS coverage resulted in the 30m and 100m buffers and even the center point not being as accurate as the remote review, leading to missed (or added) stressors on the edges of the buffers. There are also some field sites, due to time constraints and location, where the entire site cannot be walked and sometimes a small stressor may be missed in which an aerial photograph may allow detection of the stressor. Another benefit with the remote review is availability of historic images that provide a time series in order to see how the site has changed, i.e. conversion from a farm field to a forest or a forest to a development. In addition, using USA Topo Maps in ArcGIS Pro helped with Hydrogeomorphic (HGM) classification. Some field data collection will remain necessary for suburbanizing areas, but it is anticipated that moving to more inclusion of remote review could reduce field stressor data collection by as much as 50 percent.

The task identified some stressors that warrant consideration for modification or change in collection strategies to help in data collection clarity. For example, it was identified that the stressor “Active Plowing” should be changed to “Active Farming” to better reflect the stressor and provide for more consistent data collection. In addition “Dirt Road” and “Gravel Road” should be combined into “Dirt/Gravel Road” as well as combining all paved roads into “Paved Road” and “Livestock Access” with “Unfenced Cattle”. Updates to the Nontidal Wetlands Assessment App will be made to reflect these modifications (Figure 7).

A review of relevant stressor frequency of field collected stressors and remote collected stressors, revealed similar patterns in stressor frequency (Figure 8). This suggests that the use of remote collection of stressors, with some modification in stressor definitions and combined with some limited field sampling, can reduce the cost of stressor data collection by 50% without affecting data quality.

Table 2. Field and remote reviewed sites.

Physiographic province	# of Field sites visited (year)	# of Desk top review
Coastal Plains	60 (2019)	600
Piedmont	60 (2017)	60
Ridge and Valley	36 (2018)	34

Table 3. Stressor definitions requiring modification for remote review.

Stressors	
Ditch/ Drain	
Dam/Dike Weir	
Beaver Dam	
Filling/Grading	
Stormwater input	Hard to identify in aerial photographs
1 lane paved	Combine with 2 lane paved
2 lane paved	
Gravel Road	Gravel and dirt roads could be combined hard to distinguish between the two in aerial photographs
Dirt Road	
Railroad	
Other Road	Parking lots
Active construction	
Unfenced cattle	Combine with livestock access
Timber harvest within 1 year	
Clear cut within 1 year	
Timber harvest within 5 year	
Clear cut within 5 year	
Active Plowing	Change to Active farming
Mowing	Residential grass mowing
Brush Cutting	Commercial mowing
Timber 1-5 yr	
Livestock access	
Excess herbivory	Hard to identify in aerial photographs
Herbicide appl	Hard to identify in aerial photographs

Point Discharge	
Non point discharge	
Eroding Banks	Hard to identify in aerial photographs
Invasive species	Hard to identify in aerial photographs
Sediment deposits	Hard to identify in aerial photographs

Virginia Nontidal Wetland Assessment

Site Name *

Date and Time of Assessment *

Name *

Community Type *

HGM Classification *

Forest Age Class *

Hydrologic Modification

Virginia Nontidal Wetland Assessment

Roadbeds

	30 Meters	30 to 100 meters	Both
None	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Greater than or equal to 4 Lane Paved	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2 Lane Paved	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1 Lane Paved	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gravel Road	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dirt Road	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Railroad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Roadbeds Comments

Figure 7. Virginia Nontidal Wetlands Assessment App.

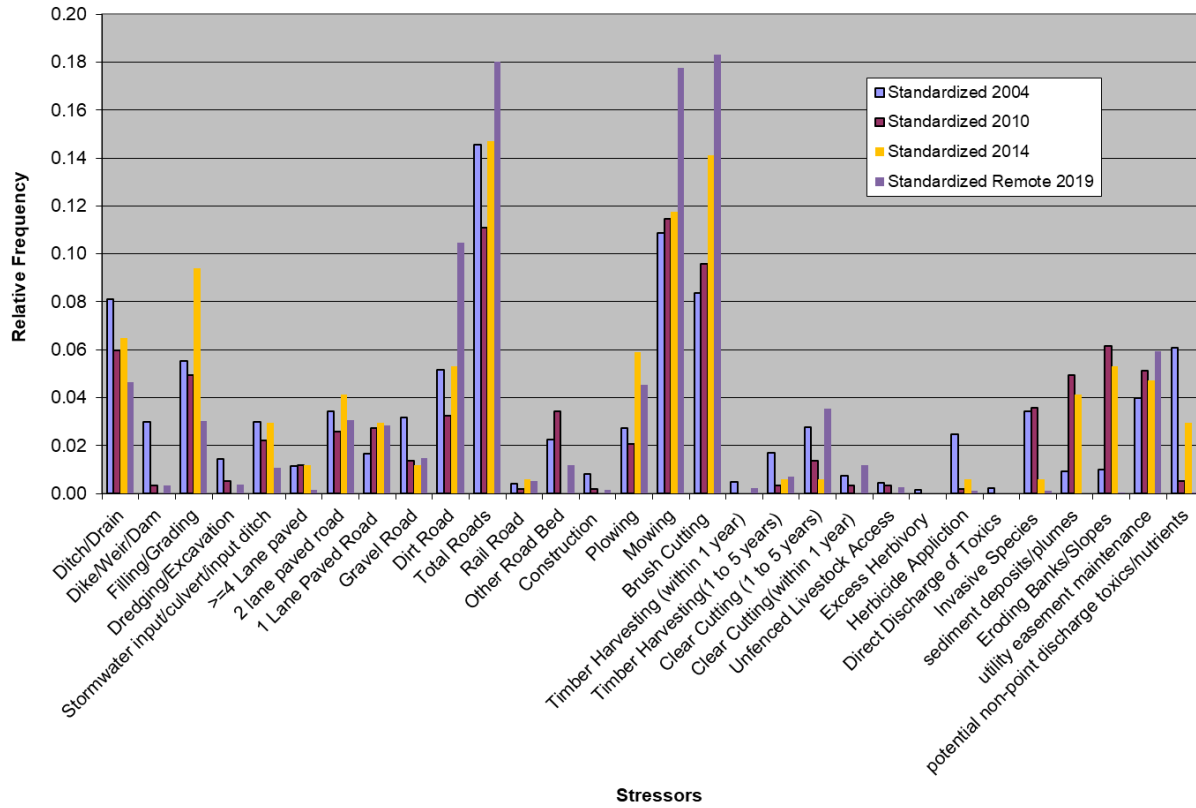


Figure 8. Stressor frequency (standardized) for years 2004, 2010, 2014 for field collected stressors, and remote collection of stressors in 2019.

Summary Table Objective/Task #2 – *Upgrading Re-calibration Process for Coastal Plain stressors.*

		VA Wetlands Program Plan Supported	Meets the following WPP Objectives: MA1
Goal Statement	Upgrading re-calibration process for Coastal Plain physiographic province to increase efficiency		
Description	Virginia has worked to develop a monitoring and assessment strategy for nontidal wetlands that can support regulatory decision making at the state level. The purpose of the recalibration effort is to capture changes in surrounding landcover – stressor relationships at 3-5 year intervals to ensure that the condition assessment model remains statistical valid. Recent advances in remote sensing technology, in particularly LIDAR coverage, has provided the opportunity to increase sample sizes while reducing field effort and expense. This task will involve randomly selecting 600 sites in the Coastal Plain. These sites will be reviewed remotely utilizing the stressor Level II protocol.		
Tasks	<ol style="list-style-type: none"> 1) Randomly select and review 600 wetland sites in Coastal Plain. Completed. 2) Randomly select 60 sites for field validation of remote review process. Completed. 3) For hind cast review, randomly select 30 previously field visited sites and test remote review process. Completed. 4) Field visit any sites where discrepancy occurs between remote review and field review. Completed. 		
Outputs – Project Deliverables	<ul style="list-style-type: none"> • Update stressor – landuse relationships for Coastal Plain wetlands. Completed. • Test remote review versus field review for assessment efficiency. Completed. • Make adjustments to wetland condition model if appropriate. Completed. • Additional Output. Update to Nontidal Wetlands Assessment App. 		
Outcomes	<ul style="list-style-type: none"> • Improved wetland inventories and baseline condition assessments. • Improved wetland protection based on cumulative impact analysis. • Increased understanding of wetland condition. • Enhanced knowledge of wetland location, extent, type and change. • Increased understanding of wetland ecologic condition (habitat and water quality) at different scales. • Increased understanding of how to ensure “no net loss” in quality and quantity of wetlands. • Increased use of WetCAT in permit decisions across agencies • Increased coordination between local, state, and federal agencies in wetlands management. • Increased use of WetCAT to avoid high ecological value aquatic resources in pre-application planning. 		
Metrics	<ul style="list-style-type: none"> • Anticipated 50% cost savings by reducing in-the-field sampling in assessing coastal plain wetlands stressors. 		
Link to EPA’s Strategic Plan	Refocusing on core mission (ii) conduct monitoring and assessment so we know the status of the nation’s waters. 2) Empowering states to create tangible environmental results i.e. increased statewide wetland assessment capacity. 3) Improved processes i.e. enhanced transparency and consistency for regulated public (i) Outline exactly what is		

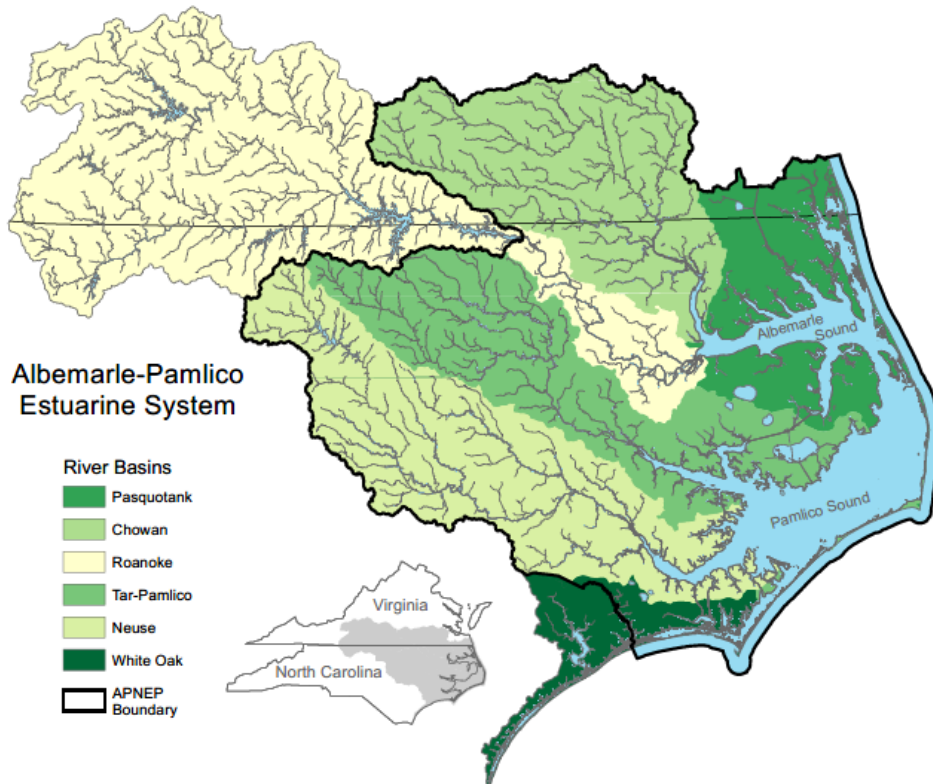


Figure 10. APNEP Watershed Map. Credit Tim Ellis

This project involved the incorporation of wetlands from the shared waterways into WetCAT to allow bi-State coordinated assessment, protection, and restoration of wetlands (Figure 11). Integrating wetlands from both North Carolina and Virginia into WetCAT and providing tools for a common framework for comprehensive and cumulative analysis will allow better communication and coordination regarding wetland management in the shared waterways. VADEQ staff, NCDEQ staff, and the Albemarle-Pamlico National Estuary Partnership staff (a bi-state partnership), met and coordinated the incorporation of the WetCAT condition assessment within the shared waterways (Figure 12) with some additional datapoints such as North Carolina 401 Water Quality Certification permits (Figure 13, 14) and North Carolina confirmed algal blooms (Figure 15).

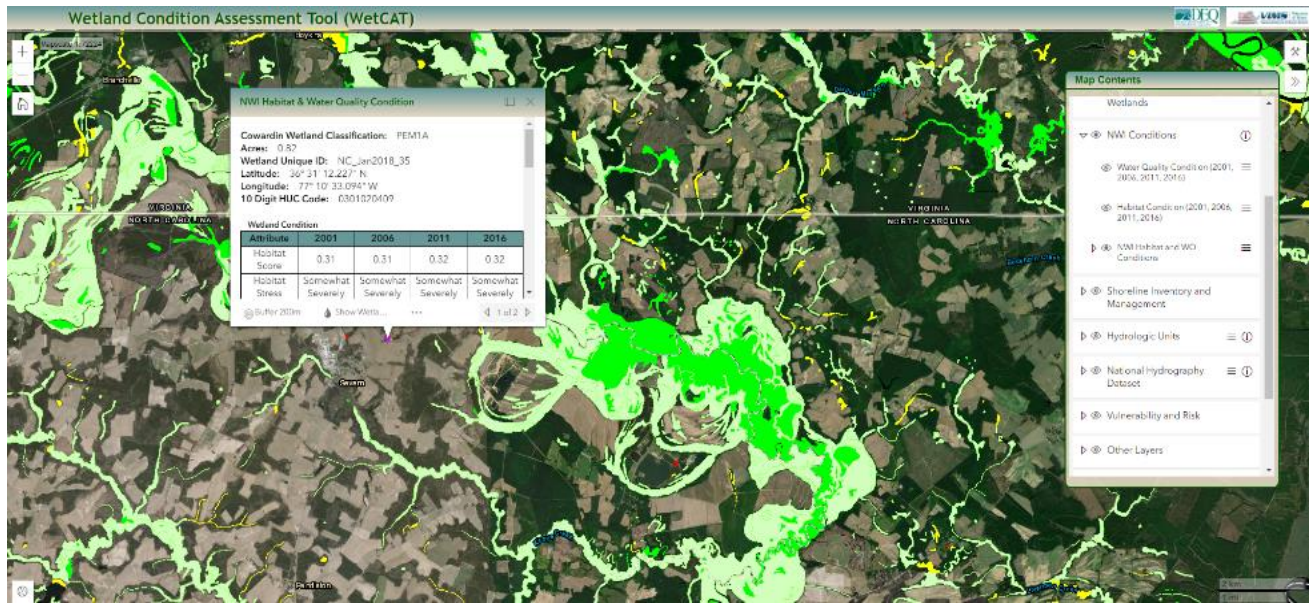


Figure 11. Wetland condition assessment in the shared Roanoke watershed of Virginia and North Carolina.



Figure 12. Meeting with NC DEQ, VA DEQ, and APNEP (clockwise around the table): Michelle Henicheck, Senior Wetland Ecologist, VA; DEQ Dean Carpenter, Program Scientist, Albemarle-Pamlico National Estuary Partnership; Tim Ellis, Quantitative Ecologist, Albemarle-Pamlico National Estuary Partnership; Rick Savage, President, Carolina Wetlands Association; Kimberly Matthews, Senior Manager, Environmental Sciences & Engineering, RTI International; Amanda Mueller, Environmental Senior Specialist, Division of Water Resources: Water Sciences Section, NC DEQ.

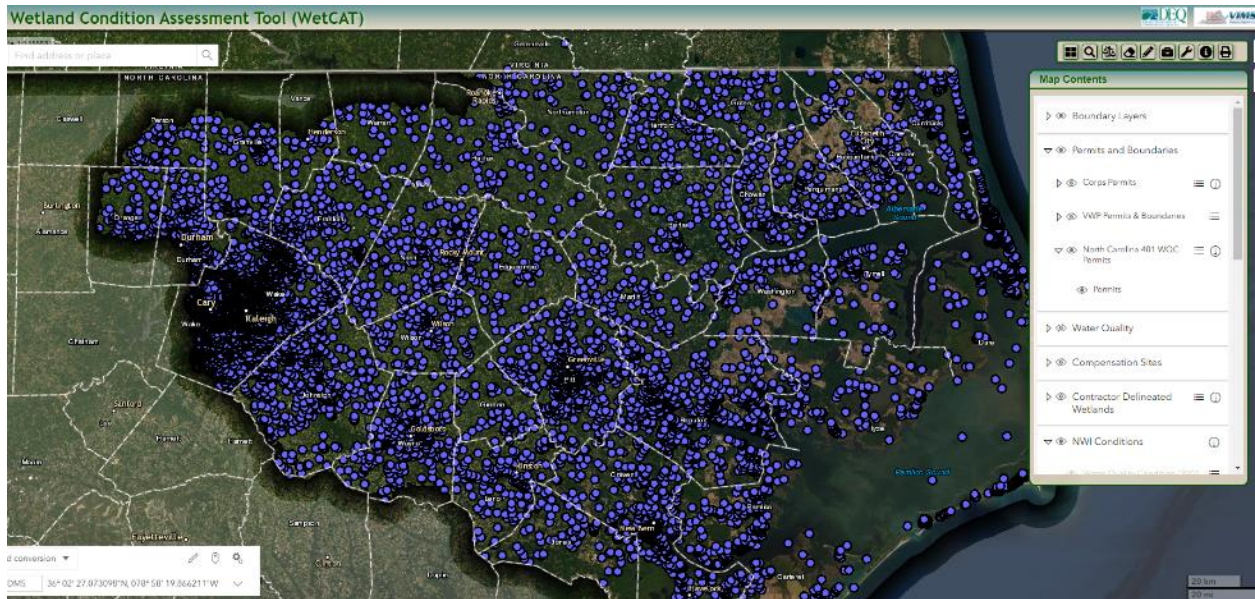


Figure 13. North Carolina 401 WQC permits.

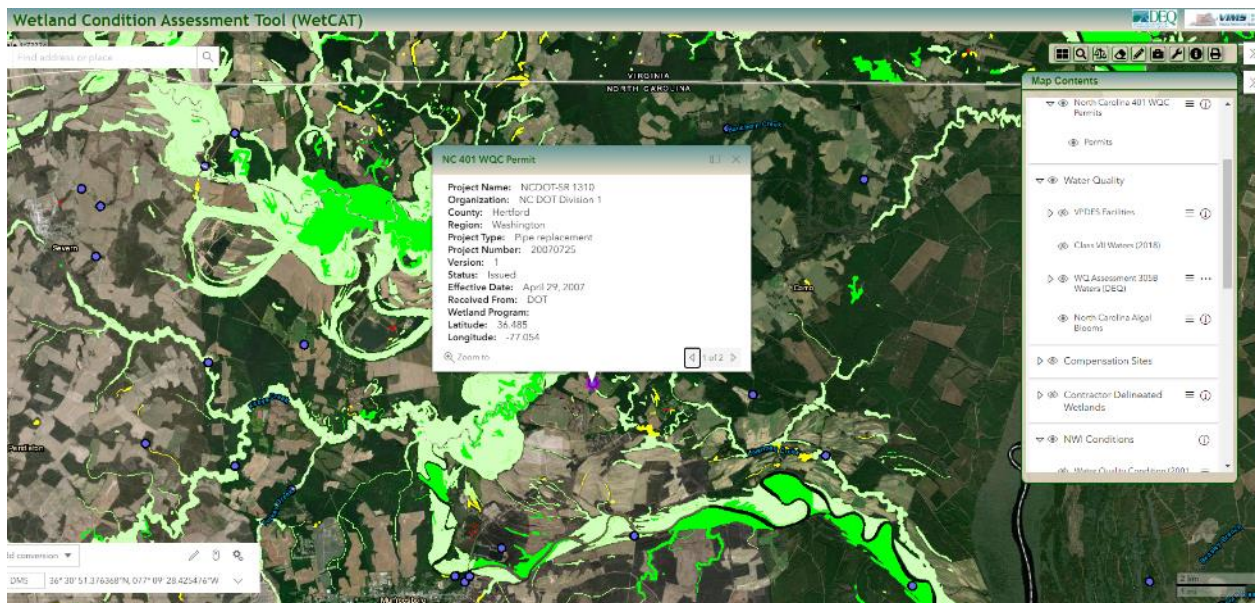


Figure 14. North Carolina 401 WQC permit with table descriptor for selected site.

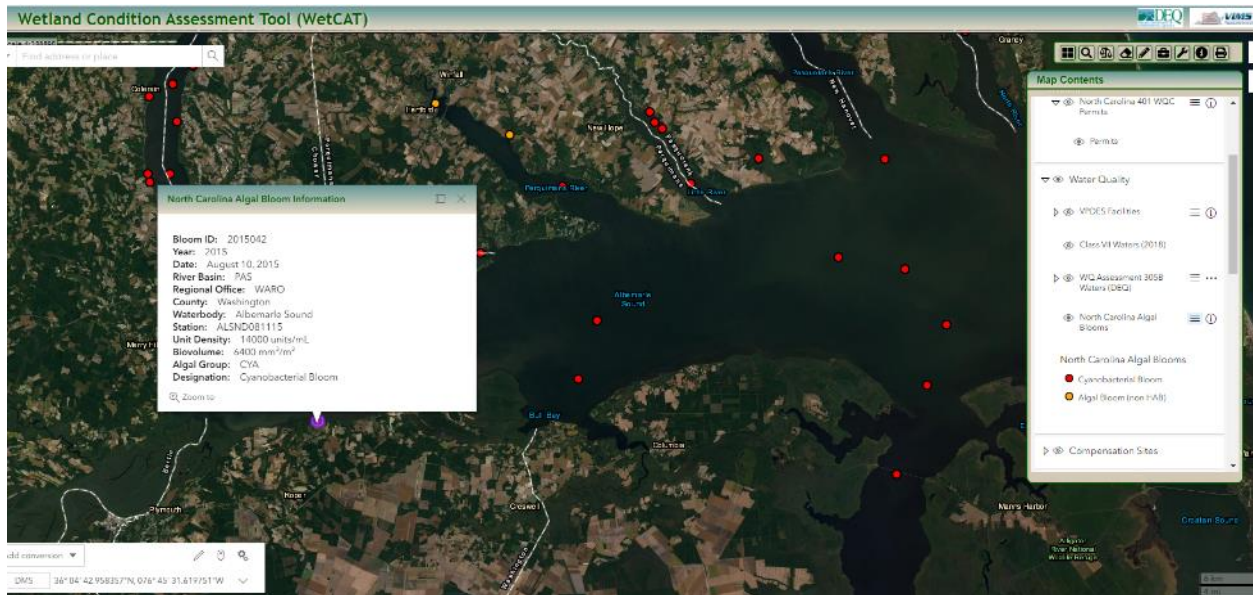


Figure 15. North Carolina algal blooms.

In addition, a second MOU was signed on August 31, 2020 between Virginia and North Carolina coordinating efforts within the shared system (News Release link <https://www.dcr.virginia.gov/pr-relz-detail?id=2020-09-23-14-26-26-611785-0uh>). The MOU specifically states that Virginia and North Carolina will “Assess joint management strategies and activities resulting from the 2017 MOU a) to protect and restore significant resources, b) to improve spawning habitats in shared river basins, c) to protect areas identified as ecologically healthy, and d) to incorporate resilience to climate change impacts and sea level rise in local, state and regional planning needs;”.

Summary Table Objective/Task #3 – Building Wetland Capacity in Virginia’s Southern Watersheds.

		VA Wetlands Program Plan Supported	Meets the following WPP Objectives: PS2, O/E3
Goal Statement	<i>Building Wetland Capacity in Virginia’s Southern Watersheds.</i>		
Description	Virginia and North Carolina agreed to a coordinated effort to develop and implement strategies to protect, restore, and maintain the chemical, physical, and biological integrity of the three constituent shared watersheds (Chowan, Pasquotank, and Roanoke) within the Albemarle-Pamlico watershed. Integrating wetlands from both North Carolina and Virginia into WetCAT and providing tools for a common framework for comprehensive and cumulative analysis will allow better communication and coordination regarding wetland management in the shared waterways. VADEQ staff will coordinate with NCDEQ and the Albemarle-Pamlico National Estuary Partnership, a bi-state partnership,		

	<p>and VIMS-CCRM to develop a common wetland condition assessment that can be used within the shared watershed. This will entail discussion and coordination between NC and VA on wetland condition assessment methods (i.e. Virginia Wetland Condition Assessment Tool and NC Coastal Region Evaluation of Wetland Significance). Development of a common wetland condition assessment is the precursor to development of shared waterways wetland condition GIS layers for incorporation into WetCAT to allow bi-State coordinated assessment, protection, and restoration of wetlands.</p>
Tasks	<ol style="list-style-type: none"> 1) Multiple meetings between NCDEQ and VADEQ wetland managers. Completed. 2) Review of existing NC and VA wetland condition assessment methodologies. Completed. 3) Development of a wetland condition assessment methodology for shared waterways. Completed. 4) GIS testing of assessment protocol in WetCAT. Completed.
Outputs – Project Deliverables	<ul style="list-style-type: none"> • Common wetland condition assessment for shared waterways Completed. • Prototype inclusion of a subset of wetlands into WetCAT Completed. • Additional output. Incorporation of NC Algal blooms into WetCAT. • Additional output. Incorporation of NC 401 WQC permits into WetCAT. • Additional output. Signing of a MOU between VA and NC regarding mutual protection of water resources in the shared waterways.
Outcomes	<ul style="list-style-type: none"> • Improved wetland inventories and baseline condition assessments. • Improved wetland protection based on cumulative impact analysis. • Increased understanding of wetland condition. • Enhanced knowledge of wetland location, extent, type and change. • Increased understanding of wetland ecologic condition (habitat and water quality) at different scales. • Increased understanding of how to ensure “no net loss” in quality and quantity of wetlands. • Increased use of WetCAT in permit decisions across agencies • Increased coordination between local, state, bi-state, and federal agencies in wetlands management. • Increased use of WetCAT to avoid high ecological value aquatic resources in pre-application planning.
Metrics	<ul style="list-style-type: none"> • Successful incorporation of WetCAT condition assessment in North Carolina shared waterways. • Incorporation of NC Algal Bloom data into WetCAT • Incorporation of NC WQC permits into WetCAT • 2020 MOU between NC & VA regarding natural resources of shared waterways.
Link to EPA’s Strategic Plan	<p>Refocusing on core mission (ii) conduct monitoring and assessment so we know the status of the nation’s waters. 2) Empowering states to create tangible environmental results i.e. increased statewide wetland assessment capacity. 3) Improved processes i.e. enhanced transparency and consistency for regulated public (i) Outline exactly what is expected of the regulated community to ensure stewardship and positive environmental outcomes.</p>

Objective/Task 4. Statewide Flora Coefficients of Conservatism (C-value) Assignment.

In 2004, the Virginia Department of Environmental Quality (DEQ) secured a Wetland Development Grant (WDG) to empanel a group of botanical experts with the singular goal of creating a Coefficient of Conservatism (C-value) list for a subset of species occurring in the State of Virginia.

The C-value list provides a foundation for Floristic Quality Assessment (FQA), the term given to the calculation and subsequent analysis of weighted metrics originally developed in the Chicago region for evaluating the “quality” of native plant communities. Quality is a relative term used to approximate similarity of a particular plant species assemblage to pre-settlement conditions in a similar habitat type. Implicit in its application is the notion that areas with species assemblages closer to those of pre-settlement times (i.e., prior to European colonization of North America) are more reflective of high quality habitat, and the assumption that anthropogenic disturbance represents a mode of introduction for “non-conservative” (e.g., invasive or cosmopolitan) species. It is important to note that “disturbance” is in itself a relative term that could be used to describe the types of disturbances known to occur during pre-settlement times, such as incendiary fires set by Native Americans to clear patches of ground – activities that would also be categorized as “anthropogenic”. However, the concept of disturbance as it relates to FQA is most often associated with post-settlement; that is, anthropogenic disturbance following European occupation of the North American continent.

At the time, the 1131 species included on that list represented roughly 1/3 of Virginia’s total number of native and naturalized species. In the intervening years, the first comprehensive manual of Virginia’s flora since the 1700s was compiled and published in 2012, providing updated taxonomic treatments, diagnostics keys, and descriptions for all the state’s 3164 species and sub-specific plant taxa. The publication of the *Flora*, along with recent technology innovations such as the release of the web-available *Flora of Virginia* mobile application, have strengthened the resolve among wetland practitioners to use floristic quality as an assessment tool in Virginia.

Recent reviews on the use of Floristic Quality Assessment (FQA) to evaluate wetland ecosystem integrity have highlighted the conservatism concept – the theoretical basis for C-value assignments – as the most valuable aspect of the FQA approach. A key to the success of this concept is developing a *comprehensive* C-value list for all species within a region. Although the C-value list developed for Virginia has been used in multiple studies, its full utility has yet to be realized due to the 2000+ native and naturalized species not yet assigned C-values in Virginia.

This project re-convened a panel of experts to complete the C-value list for the remaining unassigned species in Virginia. This work completed the original effort from the 2004 WDG to be used as a resource for assessment of wetlands and other natural areas in Virginia, and it will allow DEQ to update its interactive floristic quality assessment tool (the Virginia FQAI Calculator). Additionally, the current list (1131 species already assigned) was updated with appropriate taxonomic/nomenclatural treatments vis-à-vis the *Flora of Virginia*. This will give

researchers, regulators, managers, consultants, and the regulated public access to the most up-to-date and accurate information on species conservatism in Virginia.

Out of the 1529 taxa initially ranked by the Panel, the majority of species met Decision Rule 1 leaving only 124 taxa to review at the arbitration meeting in January 2020. During that meeting, all 124 remaining taxa were assigned successfully based on group consensus. An additional 39 taxa from the original 2004 list were flagged for further consideration, and these were addressed via email in May 2020. The final list was delivered on May 29, 2020, with all 3164 native and naturalized species and subspecific plant taxa accounted for and updated with current C-values.

The mean C-value for the entire Virginia flora is 5.05, and the mean C-value for the native Virginia flora is 6.37. This native flora result compares favorably with other state lists, particularly in the northeast region (e.g., CT=6.60, MA=5.45, NH=4.85, RI=5.17, VT=6.09; Bried et al. 2012). The distribution of Virginia C-values is shown in Figure 15 below. The most frequently assigned value was 7, followed by 0 for non-native, non-invasive taxa. See Appendix B for a more detailed description with references.

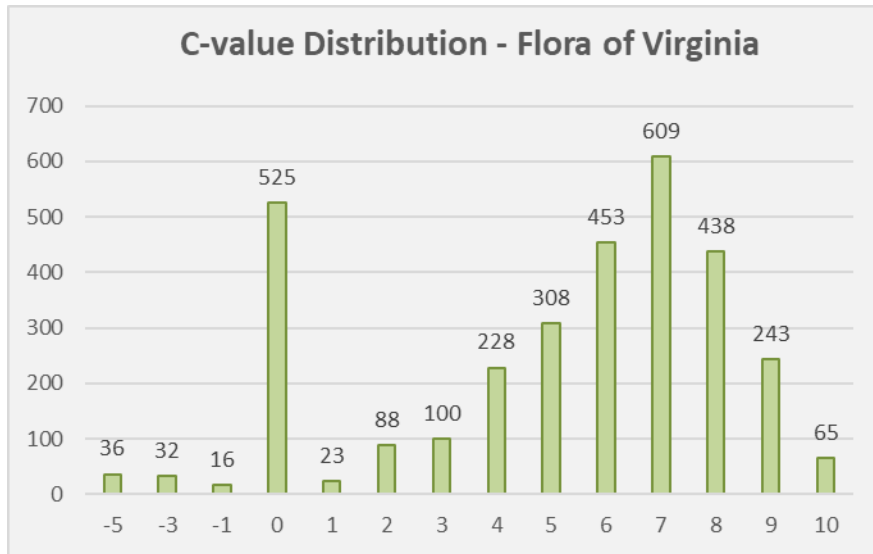


Figure 15. C-value Frequency Distribution – 2020 Flora of Virginia C-value list.

Summary Table Objective/Task #4 – *Statewide Flora Coefficients of Conservatism (C-value) Assignment.*

		VA Wetlands Program Plan Supported	Meets the following WPP Objectives: R11
Goal Statement	<i>Statewide Flora Coefficients of Conservatism (C-value) Assignment.</i>		
	The Virginia Department of Environmental Quality (DEQ) empaneled a group of botanical experts with the singular goal of creating a Coefficient of Conservatism (C-value) list for a subset of species occurring in the State of Virginia. At the time (2004),		

Description	the 1131 species included on that list represented roughly 1/3 of Virginia’s total number of native and naturalized species. Recent reviews on the use of Floristic Quality Assessment (FQA) to evaluate wetland ecosystem integrity have highlighted the conservatism concept – the theoretical basis for C-value assignments – as the most valuable aspect of the FQA approach. A key to the success of this concept is developing a <i>comprehensive</i> C-value list for all species within a region. Although the C-value list developed for Virginia has been used in multiple studies, its full utility has yet to be realized due to the 2000+ native and naturalized species not yet assigned C-values in Virginia.
Tasks	<ol style="list-style-type: none"> 1) Convene a panel of experts to complete the C-value list for unassigned species in Virginia (two meetings). Completed. 2) Update the current list (1131 species already assigned). Completed. 3) New C-values completed for incorporation into the Virginia DEQ FQAI Calculator. Completed.
Outputs – Project Deliverables	<ul style="list-style-type: none"> • Comprehensive Coefficient of Conservatism (C-values) for Virginia flora to better define wetland quality. Completed • Updated Virginia DEQ FQAI for inclusion into calculator Completed.
Outcomes	<ul style="list-style-type: none"> • Improved wetland inventories and baseline condition assessments. • Improved wetland protection based on cumulative impact analysis. • Increased understanding of wetland condition. • Enhanced knowledge of wetland location, extent, type and change. • Increased understanding of wetland ecologic condition (habitat and water quality) at different scales. • Increased understanding of how to ensure “no net loss” in quality and quantity of wetlands. • Increased use of WetCAT in permit decisions across agencies • Increased coordination between local, state, and federal agencies in wetlands management. • Increased use of WetCAT to avoid high ecological value aquatic resources in pre-application planning.
Metrics	<ul style="list-style-type: none"> • 1,304 visits to VADEQ Wetlands Monitoring and Assessment page (Oct 2019-Oct 2020). Will be tracked in the future as FQAI calculator is updated.
Link to EPA’s Strategic Plan	Refocusing on core mission (ii) conduct monitoring and assessment so we know the status of the nation’s waters. 2) Empowering states to create tangible environmental results i.e. increased statewide wetland assessment capacity. 3) Improved processes i.e. enhanced transparency and consistency for regulated public (i) Outline exactly what is expected of the regulated community to ensure stewardship and positive environmental outcomes.

Objective/Task 5. Outreach for local governments and general public.


DEQ and VIMS-CCRM have developed tutorials and curriculum on how to use WetCAT effectively:






- Navigating the Website
https://cmap2.vims.edu/WetCAT/documents/Module_1_Navigating_the_website_FINAL_2018.pdf
- Getting Started and Assessing a Wetland
<https://www.youtube.com/watch?v=4L6JypMZndQ&feature=youtu.be>
- Adding Layers & Using Geoprocessing Tools
<https://www.youtube.com/watch?v=Rn5qCEXX03w&feature=youtu.be>

Additional Help and Metadata:

Help/Information

Map Contents (Layer List) with Legend and Metadata -




To open the Map Contents, click the  button located near the upper right side of the map.

- Click the eye symbol to show or hide the layer ( = layer is visible;  = layer is not visible)
- Click the  to expand the list of layers.
- Click the  to view a layer's legend.
- The  reveals a link to the layer metadata and/or buttons to increase or decrease the layer opacity (transparency) by 0.25 increments.
- A gray layer name indicates that the layer is not visible at the current map scale.
- If a checked sub-layer is not displaying and it is not greyed out, verify that the parent layers are also checked on.





Help/Information

Interacting with Map & Icons in Popups -

To interact with the map...

- Navigate to an area of interest in Virginia. (See Navigation title below for help)
- Open the Map Contents and activate some layers. (For help see Map Contents (Layer List) title above)
- Click on a graphic for attribute information.
- Selected graphic will highlight with a purple outline.
- Click the  to dock the popup or click the  to undock the popup. These icons are on the right side of the popup header.
- If more than one feature has been selected, the popup will show page numbers and arrows. The user can page through the selection by clicking on the arrows or by clicking the  to select a feature to view from a menu.


Selected layers have extra icons in their popup window...


- NWI Habitat & Water Quality Condition
 -  = Buffer wetland 200m (red outline).
 -  = Show wetland's drainage (purple polygon with white dotted outline).
 -  = Open panel to Recalculate wetland scores.
 -  = Add a point within the wetland and show 30m and 100m buffers around the point (purple square point with red outlines for buffer rings).

Instruction on accessing, downloading, and printing data layers:

Help/Information

Print

The Print Tool can be found in the tool bar. Click the  button located on the upper right side of the map to expand the tool bar.

- Click the  to open the Print widget.
- Options are presented to export a layout or map only.
 - Layout options are: add a map title, choose landscape or portrait on 8.5 x 11 paper, and save to a pdf or other format.
 - Map Only options are: add a file name, choose a file format (pdf, jpg, etc), specify a width and height.
- Click the Export button and the exported map file will be returned at the bottom of the Print widget panel.

WetCAT was presented at the following meetings:

- Society of Wetland Scientist in Baltimore (May 2019).
- North Carolina Department of Environment Quality, Albemarle-Pamlico National Estuary Partnership Wetlands Workgroup (October 2019)
- WetCAT presented at Virginia Master Naturalist meeting (December 2019)
- Chesapeake Bay Program Wetlands Workgroup (December 2019)
- Delaware Wetlands Conference (January 2020)
- EPA Region III and Headquarters meeting (March 2020)

WetCAT utilization by Federal Agencies:

- The US Army Corps of Engineers Norfolk District Wetland Attribute Form for Wetlands: Procedures Manual version 1.0 (March 2020).
<https://usace.contentdm.oclc.org/utis/getfile/collection/p16021coll7/id/14233>
- The Federal Energy Regulatory Commission (FERC) relicensing. No 2514, 2019
http://www.aephydro.com/Content/documents/2019/ByllesbyBuckProjectPSPFERCNo2514_20190621.pdf
- Virginia Department of Transportation Environmental Assessment, Indirect and Cumulative Effects Technical Report 495 Express lanes Northern Extension, February 2020. http://www.495northernextension.org/documents/pim032020/i-495_next_6_indirect_cumulative_effects_tech_report_final.pdf

- **DEQ WINS 2019 GOVERNOR'S TECHNOLOGY AWARD**
Innovative GIS tool evaluates Virginia wetlands

RICHMOND, Va. – The Virginia Department of Environmental Quality (DEQ) was recently awarded a 2019 Governor’s Technology Award in the category of “IT as Efficiency Driver – Government to Citizen,” for its online Wetland Condition Assessment (WetCAT) tool. DEQ was among 21 other government organizations recognized for innovative achievement in making government services more efficient to benefit the people of Virginia.

Developed in collaboration with the Virginia Institute of Marine Science, WetCAT is designed to evaluate wetland conditions over time through monitoring and assessment. Its purpose is to avoid and assist with the mitigation of wetland losses, and evaluate the overall effectiveness of DEQ’s regulatory program in meeting the commonwealth’s no net loss goal.

<https://www.deq.virginia.gov/ConnectWithDEQ/NewsReleases/DEQWinsTechnologyAward.aspx>



Dave Davis (VADEQ), Michelle Henicheck (VADEQ), Tami Rudnický (CCRM/VIMS), Kirk Havens (CCRM/VIMS)

- **WetCAT added to Wetland Management page**
https://www.vims.edu/ccrm/wetlands_mgmt/index.php

CCRM

- About CCRM
- Comprehensive Coastal Resource Management Portals
- Outreach & Education
- Research
- Wetlands Management
 - Shoreline Management Handbook
 - Wetlands Boards Contacts
 - Shoreline Permit Records
 - WetCAT
- Publications
- Tools

Home > CCRM > Wetlands Management

Wetlands Management

The Center for Coastal Resources Management supports the Commonwealth of Virginia's tidal and nontidal wetlands management programs. These efforts include policy and guidance development, mapping tools and participation in regional and national wetlands management networks. Connecting wetland managers with current scientific research findings and providing public access to wetland information are also part of the Center's wetlands management programs.

- **Comprehensive Coastal Resource Management Portals (CCRMP)** shoreline guidance for Virginia
- **Shoreline Management Handbook** decision-making guidance for local wetlands boards
 - **Local Wetlands Boards** contacts and meeting times
 - **Local Wetlands Board Permit Fees** (pdf) permitting, advertising, and in-lieu fees charged
 - **Shoreline Permit Records**
- **Shoreline & Tidal Marsh Inventory**
- **Virginia State Wetlands Program Plan** (pdf)
- **Wetlands Condition Assessment Tool (WetCAT)** for non-tidal wetlands

INFOGRAPHIC

WETLAND PRESERVATION IN VIRGINIA: History, action, and tools highlighted in graphs, pictures, and numbers. More...

VIDEO

What makes a wetland a wetland?

WATER
SOILS
PLANTS

FIND THE ANSWER in this short video explanation... created by Denise Bell, CCRM graduate student. More...

Home > CCRM > Wetlands Management > WETCAT

Wetland Condition Assessment Tool (WetCAT)

Photo Staff & Bill Caplin

The Virginia Institute of Marine Science, in collaboration with the Virginia Department of Environmental Quality (DEQ), developed the science-based (assessment model) that is available for the individual wetland in the entire state. The Wetland Condition Assessment Tool (WetCAT) is a specially-specific, interactive, online tool that provides a water quality and habitat condition assessment for each individually mapped nontidal wetland in Virginia (approximately 196,000 polygons and over 1.2 million acres). WetCAT also includes some tidal marsh and shoreline condition information. It provides VA DEQ staff and others a scientifically-based GIS process for evaluating projects that could impact wetlands. The goal of WetCAT is to support decision-making, allow reporting of wetland conditions, and provide information for policy development.

- **WetCAT received a 2019 Governor's Technology Award for "IT as Efficiency Driver - Government to Citizen"**, recognizing online tools that use IT to improve citizen access to and service from governmental entities.

Objective/Task #5 – Outreach for local governments and general public.

		VA Wetlands Program Plan Supported	Meets the following WPP Objectives: O/E3
Goal Statement	<i>Outreach for local governments and general public</i>		
Description	DEQ Wetland staff will provide policy documentation for local government and public use of WetCAT. Generating all of the information and guidance to facilitate better decision-making at the local level is only part of the process. DEQ and VIMS-CCRM have developed tutorials and curriculum on how to use WetCAT effectively.		
Tasks	<ol style="list-style-type: none"> 1) Refinement of guidance documentation. Completed. 2) Update and refinement of tutorials. Completed. 3) Presentation of material at meetings. Completed. 		
Outputs – Project Deliverables	<ul style="list-style-type: none"> • Enhanced protocols and training materials to help local decision makers utilize WetCAT and integrate wetland protection and restoration into watershed planning. Completed. 		
Outcomes	<ul style="list-style-type: none"> • Increased understanding of wetland condition. • Enhanced knowledge of wetland location, extent, type and change. • Increased understanding of wetland ecologic condition (habitat and water quality) at different scales. • Increased understanding of how to ensure “no net loss” in quality and quantity of wetlands. • Increased use of WetCAT in permit decisions across agencies • Increased coordination between local, state, and federal agencies in wetlands management. • Increased use of WetCAT to avoid high ecological value aquatic resources in pre-application planning. 		
Metrics	<ul style="list-style-type: none"> • 3 new tutorials added • 6 presentations delivered • Metadata and Help sections enhanced • Utilization by USACE, FERC, and VDOT documented • WetCAT recognized by Governor’s Technology Award • WetCAT added to Wetlands Management page and will be tracked in the future. 		
Link to EPA’s Strategic Plan	<p>Refocusing on core mission (ii) conduct monitoring and assessment so we know the status of the nation’s waters. 2) Empowering states to create tangible environmental results i.e. increased statewide wetland assessment capacity. 3) Improved processes i.e. enhanced transparency and consistency for regulated public (i) Outline exactly what is expected of the regulated community to ensure stewardship and positive environmental outcomes.</p>		

Strategic Priorities Addressed by the Work Accomplished in the PPG:

The overall outcome of this multi-year grant is the continued progress in the development of a comprehensive nontidal wetland regulatory program and continued refinement of our wetland monitoring and assessment tools for use in management decision-making and integration within our water quality programs.

Benefits Derived from the PPG Process:

The wetland monitoring and assessment program has benefited from streamlined reporting.

Better project/program coordination has been an asset.

Any problems, delays or conditions which materially affected the recipient's ability to meet the PPG objectives:

All tasks under this work plan have been completed. Spring/Summer field visits were temporarily suspended due to COVID 19 field research restrictions. Sampling shifted to Summer/Fall and was completed.

Improved Environmental Results and Improved EPA-Recipient relations that Resulted from the PPG:

Outputs

- Integration of shoreline inventory and shoreline management model into WetCAT. **Complete.**
- Capacity for cumulative analysis of wetlands along continuum from nontidal to tidal. **Complete.**
- **Additional Output. Sea level rise / tidal marsh vulnerability incorporated into WetCAT for 2050 sea level rise prediction.**
- Update stressor – landuse relationships for Coastal Plain wetlands. **Completed.**
- Test remote review versus field review for assessment efficiency. **Completed.**
- Make adjustments to wetland condition model if appropriate. **Completed.**
- Common wetland condition assessment for shared waterways **Completed.**
- Prototype inclusion of a subset of wetlands into WetCAT **Completed.**
- **Additional output. Incorporation of NC Algal blooms into WetCAT.**
- **Additional output. Incorporation of NC 401 WQC permits into WetCAT.**
- **Additional output. Signing of a MOU between VA and NC regarding mutual protection of water resources in the shared waterways.**
- Comprehensive Coefficient of Conservatism (C-values) for Virginia flora to better define wetland quality. **Completed**
- Updated Virginia DEQ FQAI for inclusion into calculator **Completed.**
- Enhanced protocols and training materials to help local decision makers utilize WetCAT and integrate wetland protection and restoration into watershed planning. **Completed.**

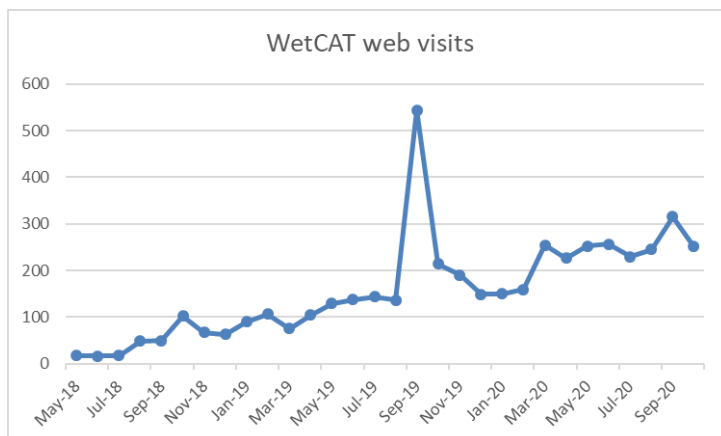
Outcomes

- Improved wetland inventories and baseline condition assessments.
- Improved wetland protection based on cumulative impact analysis.
- Increased understanding of the impacts of flooding on wetlands.
- Increased inter and intra agency coordination in wetlands protection and assessment.
- Increased use of WetCAT to avoid high ecological value aquatic resources in pre-application planning.
- Increased understanding of wetland condition.
- Enhanced knowledge of wetland location, extent, type and change.
- Increased understanding of wetland ecologic condition (habitat and water quality) at different scales.
- Increased understanding of how to ensure “no net loss” in quality and quantity of wetlands.
- Increased use of WetCAT in permit decisions across agencies
- Increased coordination between local, state, bi-state, and federal agencies in wetlands management.

Website Metrics

1,304 visits (Oct 2019-Oct 2020) to the DEQ Wetland Monitoring and Assessment Strategy webpage which hosts the WetCAT link and the Flora of Virginia C-Value Calculator.

<https://www.deq.virginia.gov/programs/water/wetlandsstreams/monitoringassessmentstrategy.aspx>



WetCAT web visits. Total since May 2018 = 4,738. Note WetCAT received the Governor’s Technical Award on September 11, 2019.

VIMS has identified an issue regarding web page visit tracking. Employees working from home can not be identified to an agency and are ignored by programs that identify who is accessing

web pages. This is an issue as more and more employees are working from home. VIMS will continue to investigate web page tracking options.

Project Quality Assurance Report:

Project Data Collection Problems

Task 1. No issues.

Task 2. Spring/Summer field visits were temporarily suspended due to COVID 19 field research restrictions. Sampling shifted to Summer/Fall and was completed under VIMS COVID 19 guidelines (https://www.vims.edu/docs/vims_phased_expansion_plan_7_22_2020.pdf).

Task 3. No issues.

Task 4. No issues.

Task 5. No issues.

Quality Assurance

Quality Assurance Project Plan Approved January 2016

Quality Management Plan Approved March 2018

https://www.vims.edu/ccrm/about/qaqc/vims_epa-qmp-2018-2022-final.pdf

Timeline	Task Schedule
October 1, 2018	Project initiation; Tasks 1, 2, 3, 4, 5 initiated
March 15, 2018	Task 2 site selection completed , Task 3 meetings scheduled, Task 4 expert panel members contacted.
<i>April 15, 2019</i>	<i>Semi-annual status report to EPA</i> , Task 2 Coastal Plain field sampling begins
<i>September 15, 2019</i>	<i>Semi-annual status report to EPA</i> , Task 1 integration of inventory & model completed .
September 30, 2019	Task 4 completed , New FQA C-values completed for incorporation into VADEQ online calculator
October 1, 2019	Task 2 completed , Task 3 meetings completed
<i>April 15, 2020</i>	<i>Semi-annual status report to EPA</i>
<i>September 15, 2020</i>	<i>Semi-annual status report to EPA</i>
October 1, 2020	All remaining tasks (1, 5) completed ; all draft products reviewed; begin final report preparation
December 31, 2020	Final report prepared and submitted to EPA within 90 days of grant closing. completed

Appendix A.

WetCAT for Mitigation Site Selection Criteria (Interagency Review Team) VADEQ, USACE

Meeting notes (Updated May 5, 2020)

RED text indicates answers immediately necessary to assess hours needed for Primary Implementation.

Primary Implementation

Tasks: Integrate analysis for the following criteria into WetCAT. Create base structure of “Final Mitigation Site Selection Report.”

- 3) Site is contiguous or connected to other aquatic Resources
 - Buffer site and examine for “aquatic resources”
- 5) Site has not been logged in the past five years
 - VGIN
- 6) Site adjacent an existing preservation/conservation area, etc.
 - Conservation lands, easements from DCR, mitigation sites
 - DEQ Hannah Schul should have VDOT mitigation sites to include.
Jeanne/Sarah – The word “Adjacent” can be used for any proximity word that is otherwise listed in this document (ex. Abuts, etc) – All properties touching or having a common boundary with the proposed mitigation bank.
- 8) Immediately adjacent land is less than 10% impervious cover
 - VGIN
- 13) Site activities will remove pollutants from waters
 - 303(d) listed waters within 2 miles downstream, site is currently in agriculture, AND/OR impervious cover in drainage area
- 14) Site activities will remediate inputs of substantial amounts of sediments waters
 - See number 13
- 15) Site will contribute to habitat connectivity
 - VGIN, VNLA, and examine proximity of existing landscape covers (forest and others)
- 18) Site will address watershed needs for water quality improvement as identified through the 303(d) list
 - 303(d) listed streams within a 2 mile radius of the proposed site
- 19) Site will address watershed needs for reduction of sediment loads as identified through the 303(d) list
 - 303(d) listed streams within a 2 mile radius of the proposed site

- 20) Less than 50% of land use within the watershed is residential/commercial/industrial
- VGIN
- 21) Less than 50% of land use within the watershed is agricultural
- VGIN
- 23) No water withdrawal permits issued within the vicinity of the site
- WWP Permits within a 2 mile radius of the proposed site
- 24) No point source permits within the vicinity of the site
- VPDES Permits within a 2 mile radius of the proposed site
- 25) Site is likely to contribute to improved water quality within the watershed and not solely within the site boundaries
- Examine VGIN land cover for contributing watershed, if anything other than natural or forested, site may have the potential to improve downstream water quality.
- 28) Site will improve water quality conditions of existing wetlands identified by VDEQ (WetCAT) as "Somewhat Severely Stressed" or "Severely Stressed"
- WetCAT includes existing resources and scores
 - Kirk - Is this a proximity exercise, or do we need to fill in proposed land use within the bank? What if the Sponsor has performed a delineation of existing resources onsite that shows more existing wetlands than NWI / WetCAT?
- 30) Site is not likely to be affected by current activities occurring on adjacent lands
- WetCAT calculates probably impacts of surrounding land use on site
- 33) Site is not adjacent to residential, commercial, or industrial development
- VGIN
- 35) Site is not adjacent to agricultural land
- VGIN
- **VIMS will confirm which layers WetCAT may already have to satisfy Criteria 37-47 involving wildlife and historic resources – Some of these criteria may move to Primary Implementation, but are currently in Secondary Implementation.****
- 49) Site will improve habitat conditions of existing wetlands identified by VDEQ (WetCAT) as “Somewhat Severely Stressed” or “Severely Stressed”
- 54) Site’s receiving waters are 303(d) listed
- 303(d) list

Secondary Implementation

Tasks: Integrate analysis for the following criteria into WetCAT. Finalize structure of “Final Mitigation Site Selection Report.”

12) Site activities will contribute to habitat diversity

- VGIN, VNLA
- Define habitat types, based on these layers

16) Site will address watershed needs for habitat protection as identified in the state wildlife action plan, compensation planning framework, Habitat Conservation Plan, etc.

- VNLA, VEVA
- Contact DCR regarding ability to use RTE or Habitat Conservation Plan information
- Jeanne/Sarah will go through CPF to evaluate for additional criteria

17) Site will address watershed needs for flood management as identified in the state wildlife action plan, compensation planning framework, Habitat Conservation Plan, etc.

- VNLA, VEVA, VFRIS (flood zones), watershed analysis for runoff producing lands
- Contact DCR regarding ability to use RTE or Habitat Conservation Plan information
- Jeanne/Sarah will go through CPF to evaluate for additional criteria

27) No downstream impoundments (excluding drinking water) that would limit the watershed benefits derived from site activities

- Michelle noted that most recent VGIN UPDATES INCLUDE DAMS, RAILROADS
- VDOT EXISTING BARRIERS as well?

29) Site is within an area identified as meriting conservation in an approved watershed management plan, state wildlife action plan, national forest management plan, or conservation plan.

- VNLA, VEVA
- Would need GIS coverage for other plans mentioned (watershed plans. Etc.).
- Jeanne/Sarah – Talk with Rene, Amy, Ed

37) Site activities will conserve/restore habitat for species identified as rare by VDCR

- Criteria 37-47: VIMS HAS SOME OF THESE LAYERS, KIRK WILL CONFIRM
- JEANNE/SARAH - CORPS AND DEQ WILL REQUEST OF IRT CONTACTS TO REQUEST DATA, IF VIMS DOES NOT HAVE

38) Site activities will conserve/restore natural communities identified by VDCR as imperiled

39) Site activities will conserve/restore karst resources identified by VDCR as imperiled

40) Site activities are within areas that have been identified by VDGIF as meriting improvement

41) Site activities will conserve/restore areas designated by VDGIF as wild trout streams

- 42) Site activities will conserve/restore areas designated by VDGIF as anadromous fish use areas
- 43) Site activities will restore/preserve/enhance areas designated by VDGIF as Threatened and Endangered Species Waters
- 44) Site activities will protect state or federal threatened and/or endangered species
- 45) Site contains historical cultural resources that will be preserved
- 46) Site activities will establish new or expand existing wildlife corridors
- 47) Site activities will result in removal of barriers to fish passage
 - Jeanne will talk with American Rivers regarding database coverage of dams
 - DCR dams list? VGIN information for ponds?

Project Proposal Only

(No implementation into WetCAT, unless user interaction/input option or other GIS layers are created in future)

- 1) Site activities will result in at least 80% of wetland credits obtained through wetland restoration/ establishment/re-establishment
- 2) Site activities will result in at least 50% of stream credits obtained through stream restoration/ enhancement/re-establishment/rehabilitation
- 4) Site contains minimal or no invasive/undesirable/ nuisance species
- 7) Site has no known encumbrances (ie easements, liens, rights of way, reserved timber, severed surface or subsurface mineral or natural gas rights, etc.) on the site, on adjacent properties or within the watershed of the site that will negatively affect the compensation goals
- 9) Site does not contain any impoundments that are not proposed for removal
- 10) Site is able to be protected long-term through the recordation of an appropriate site protection instrument or other mechanism that will support the long-term protection of the site
- 11) Site is expected to provide in-kind compensation (similar hydrologic regime)
- 22) Future land use plans (i.e. local comprehensive plans, conservation plans) show minimal or no change
- 26) Site will include preservation/establishment/ rehabilitation of the entire watershed upstream of the project to the drainage divide
- 31) Site will not be affected by likely future activities occurring on adjacent properties
- 32) Site activities will not affect adjacent properties
- 34) Site is not adjacent to silvicultural operations
- 36) Properties adjacent to the site do not have the potential to spread invasive, nuisance, or undesirable species to the site
- 48) Site results in score of 1 or greater for potential wetland, riparian, or upland restoration or preservation as identified by the Watershed Resource Registry (WRR)
- 50) Site activities do not consist of wetland creation in the uplands unless adjacent to existing streams or wetlands
- 51) Site Activities do not consist of stream creation

- 52) Site activities do not entail impounding or diverting water from other areas to the project site
- 53) Site activities do not entail excavation to reach groundwater
- 55) Site qualifies for preservation only, as 1) the resources provide important physical, chemical, or biological functions to the watershed, 2) the resource contribute significantly to the ecological sustainability of the watershed, 3) the IRT has determined that preservation is appropriate and practicable, 4) the resources are under threat of destruction or adverse modification, and 5) the site will be permanently protected through an appropriate real estate instrument
- 56) Site activities will not result in the construction of artificial or unnatural wetlands that will have limited opportunity to provide the desired functions
- 57) Past land use was PC crop or ditched wetlands
- 58) Past land use was agriculture/silviculture
- 59) Past land use was commercial or industrial
- 60) No impoundments exist upstream of the site that will cause thermal increases in water temperature, decreases in dissolved oxygen, erosion and degradation of the channel downstream from the impoundment, or dam failure from a storm event
- 61) Site activities will result in all onsite impoundments being removed and streams re-established/ rehabilitated