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Virginia Wetland Program Plan 2021-2025

Prepared by Virginia Department of Environmental Quality – Office of Wetland and Stream Protection
and
Virginia Institute of Marine Science
Center for Coastal Resources Management

Pursuant to the U.S. Environmental Protection Agency's Enhancing State and Tribal Wetland Programs Initiative

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The Virginia Wetlands Program Plan 2020-2025 is the third iteration of the planning process to advance Virginias' wetlands programs. As in the previous two planning periods (2010-2015 and 2015-2020), the current plan addresses the four core elements identified by the Environmental Protection Agency for a robust effective program, plus two additional elements that have been identified by Virginia as critical for a successful program.

The elements in the Virginia Plan are:

Monitoring and Assessment (Core element)

Regulatory (Core element)

Voluntary Restoration and Protection (Core element)

Water Quality Standards (Core element)

Planning and Sustainability (VA element)

Outreach and Education (VA element)

The first two WPP were ambitious in the identification of objectives for the Core and Virginia elements. The plan had 16 objectives for 2010-2015 and 28 for 2015-2020. These objectives lead to significant work accomplishments. While significant accomplishments followed the 2015-2020 program plan, the 2015 objectives list was so extensive that focused efforts on specific objectives may have been less than intended. Accomplishments from the 2015-2020 Plan period are in Table 1.

Objectives for 2020-2025

In this plan, 18 objectives were identified; 11 ranked high and four ranked moderate and three ranked low. The highest priorities, building on the successes and strengths of previous plans and accomplishments, are placed on three elements and several objectives, summarized here (with complete list of objectives below):

Monitoring and Assessment

- Commitment to continuation of our robust, and nationally recognized, wetlands monitoring program is of highest priority. The data collected and derived from this effort enables science-based decision-making for wetland resources.

Regulatory

- Commitment to our state innovation award winning Wetland Condition Assessment Tool (WetCAT). Ensure data currency, including wetland monitoring and assessment data, value-add analytical capacity to address management needs and serve relevant information for regulators, planners, NGOs and the public.
- Commitment to investigations on the effects of shorescape (defined by Isdell et. Al, 2018 as "shoreline zone that includes riparian, intertidal and the littoral areas of the nearshore waters") development and management. Develop guidance to address the cross-shore management construct to allow adaptive management of tidal wetlands resources within a climate change and sea level rise lens. (Objectives R9, R10, R16, PS5, PS6, PS7)

Planning and Sustainability

- Commitment to investigation of the effects of sea level rise and climate on wetland resources.
- Commitment to the maintenance and value-added analytical capabilities of the Shoreline Management Model and the provision of guidance and decision-support tools.

Wetlands and Climate Change

In the fall of 2019, Virginia unveiled the Virginia Coastal Master Planning Framework. The framework acknowledged the risks to Virginia of coastal flooding and noted "Virginia needs a unified and comprehensive strategy to identify critical assets and areas of concern, and preferred approaches to improve resilience." The framework laid out goals to address the risk moving forward. Notably, goal #3 speaks to the incorporation of climate projections into all Commonwealth programs. This includes the Wetland Program Plan, as it represents Virginia's planning for wetland resource. In addition, wetlands are identified as one important nature-based solution to address climate change and coastal flood risk and must thereby be considered in that context within the plan given Virginia's commitment to natural and nature based solutions (Guiding principle 3 from the framework: Recognize the importance of protecting and enhancing green infrastructure like natural coastal barriers and fish and wildlife habitat by prioritizing nature-based solutions.)

Master Planning Framework Primary Goals: https://www.dcr.virginia.gov/crmp/plan

1. Identify priority projects to increase the resilience of coastal communities, including both built and natural assets at risk due to sea level rise and flooding

2. Establish a financing strategy, informed by regional differences and equity considerations, to support execution of the plan

3. Effectively incorporate climate change projections into all of the Commonwealth's programs addressing coastal zone built and natural infrastructure at risk due to sea level rise and flooding

4. Coordinate all state, federal, regional, and local coastal adaptation and protection efforts in accordance with the guiding principles of this Framework.

Wetlands as a landscape are dependent upon water to persist. Too little water, and the wetlands will become upland, too much water and they become open water, ponds, lakes or rivers. Virginia has about 1 million acres of wetlands, mostly in the coastal plain. Tidal marshes occupy a very specific elevation in relationship to the tides, and coastal nontidal wetlands are connected to shallow groundwater and rainwater. Scientific understanding is expanding in regard to the effects of climate, and particularly hydrology/ sea level changes on wetland extent, distribution and services. Given the anticipated changes in the timing and intensity of storms, with expected stronger storms with greater rainfall followed by longer periods of drought, coastal wetlands (nontidal wetlands in particular) are at risk of becoming too wet or too dry to survive. As wetland ecological services, such as nutrient and sediment removal, aquatic and terrestrial habitat provision, flood mitigation and recreation are linked to the wetland type and landscape position, changes in hydrology will potentially impact not only habitat, water quality, flood mitigation and blue carbon, but the acreage and distribution of the wetlands.

With a projected sea level rise of about 2.2 feet by 2050 and 6.6 feet by 2100 (Adaptva.com NOAA Intermediate High Curve), tidal wetlands extent and distribution are expected to change significantly with large losses. Large marsh complexes may persist, but fringe marshes likely will not. According to the Virginia Coastal Resilience Master plan (pg11) "an estimated 170,000 acres, or 89%, of existing tidal wetlands and 3,800 acres, or 38%, of existing dunes and beaches may be permanently inundated, effectively lost to open water ". The long-term persistence of the marshes will depend upon the opportunity for the marshes to move landward, or "uphill" as the sea levels do the same. Less understood are the impacts of tidal wetland losses on the provision of ecological services such as fisheries production, water quality and habitat for terrestrial and aquatic species. There are also opportunities to improve the resilience of existing tidal marshes through shoreline management practices and restoration activities including living shorelines, sediment management, and practices to increase surface elevations such as thin layer sediment applications, vegetation management, and hydrology management as some examples. Since the last WPP, living shorelines have been codified in

state law as the required shoreline erosion approach wherever suitable. The newest Wetlands Guidelines, promulgated in 2021, specifically identify criteria for determination of suitability, and point to the CCRM Shoreline Management Model and other CCRM and VIMS decision-support products to inform decision-making (Wetlands Guidelines). Additionally, advance planning and land conservation to facilitate and allow for the landward migration of existing marshes, and/or establishment of new marshes on low-lying coastal lands will be critical to address projected marsh loss to sea level rise.

Nontidal wetlands resilience is an area of scientific research growing in interest. Understanding the effects of climate on these systems can inform management actions that can increase the resilience of nontidal wetlands. Hydrology management, in the form of ditch plugs, water control structures, flow control devices, water supply systems and more and already being applied for nontidal wetlands restoration and creation projects. These activities will likely be critical to the overall health, extent and distribution of wetlands and the ecosystem services they provide.

Tidal and nontidal wetlands are two landforms considered natural and nature-based features (NNBF), also known as natural infrastructure, which provide multiple benefits for coastal communities, including storm protection, soaking up floodwaters, improving water quality, providing recreation areas and maintaining important habitats (others include beaches, dunes, submerged aquatic vegetation, forest, trees and reefs). **Natural Features** evolve over time through processes operating in nature and **Nature-Based Features** are created by human design, engineering and construction for specific services such as coastal hazard risk reduction, water quality improvement, or a combination of benefits. Given that NNBFs provide so many resilience benefits, they have been specifically incorporated into the Virginia Coastal Resilience Master Plan Framework with implementation of NNBF priorities via the ranking criteria for the Community Flood Preparedness Fund (Administered by the Virginia Department of Conservation and Recreation) with NNBF projects receiving additional points. Additionally, many Federal programs (Federal Emergency Management Agency Building Resilient Infrastructure and Communities (BRIC), US. Army Corps of Engineers Engineering with Nature, Federal Highways Administration and others) have created incentives for NNBF implementation though incentives such as funding and provision of technical support. Incorporation of wetland projects into Virginia resilience planning enables access to many of the funding and technical assistance from these programs.

In addition, both tidal and nontidal wetlands restoration and creation are approved as best management practices (BMP) for water pollution reductions that can qualify for credits toward the Chesapeake Bay Total Maximum Daily Load. Wetlands projects have been included in both the Virginia State Lands Watershed Implementation Plan and the Virginia Watershed Implementation Plan Phase III as BMPs to meet the Virginia water quality goals. Virginia has a five-year timeline for re-assessing water quality conditions via the Final 2020 305(b)/303(d) Water Quality Assessment Integrated Report. The report and additional information can be found here: https://www.deq.virginia.gov/water/water-quality/assessments/integrated-report

Notable accomplishments that address the interplay between wetlands and coastal resilience within the last Program Plan cycle (2015-2020) include the passage of Living Shorelines legislation (2020) and 2021 Wetlands Guidelines. The 2020 Living Shorelines law states "*The Commission (*Marine Resources) *shall permit only living shoreline approaches to shoreline management unless the best available science shows that such approaches are not suitable. If the best available science shows that a living shoreline approach is not suitable, the Commission shall require the applicant to incorporate, to the maximum extent possible, elements of living shoreline approaches into permitted projects."*

Of the 18 objectives identified for the 2020-2025 plan period, 8 are specifically linked to climate issues including sea level rise (see MA1, MA3, MA4, R9, R10, R16, VR2 and PS6) and climate is implicitly incorporated into all objectives given the wetlands hydrology and the linkage between climate and hydrology. This reflects the import of climate impacts on wetlands and conversely, the role of wetlands to moderate climate processes and provide climate related benefits such as flood storage, flood buffering, erosion abatement, water quality improvement and more.

Objective IDs

Virginia has been tracking objectives and accomplishments for the Wetland Program Plan and using a continuous labeling nomenclature to identify each objective over the 3 plans to date. This means that the objective ID (e.g. MA3) is unique to each plan. As an objective is accomplished, the ID number is removed from the list. If an objective continues, or is ongoing, the ID will remain the same for succeeding plans. This is why IDs may not appear to be consecutive for the later plans, including this one. We have initiated a tracking process to track all objectives from this, and both previous, program plans. The objectives, objective states, and where available associated outcomes, for the 2015-2020 program plan are included at the end of this report.

Monitoring and Assessment

MA1: Continue to Re-Calibrate models

Priority: High

This activity is funding dependent and, at present, funding has be appropriated for this activity through 2023 for wetland stressor calibration in the Piedmont and Ridge & Valley geomorphic provinces. This is a continued objective from 2010-2015 & 2015-2020.

MA3: Enhance tidal wetlands monitoring and track cumulative effects of development and climate change

Priority: High

VIMS/CCRM conducts the Virginia Tidal Marsh Inventory. Continue and enhance monitoring. Explore new technologies and approaches (e.g., artificial intelligence). This is a continued objective from 2015-2020.

MA4: Track and Assess nature-based shoreline best management practices, living shorelines, shoreline enhancements and emerging approaches, for ecosystem service provision and adverse and beneficial effects

Priority: High

Continue to investigate ecosystem services and trade-offs for various structural and non-structural approaches to shoreline management with a focus on living shorelines. Assess the use of oyster structures as a component of living shorelines including evaluation of the efficacy of the use of these structures and advancing scientific understanding of shellfish populations associated with living shorelines whether they are intentionally part of the plan design or wild recruits. Assess new technologies and approaches to shoreline management relative to climate change, sea level rise and erosion control processes and co-benefits of flood mitigation, water quality, habitat, socio-economic and cultural services. Track the progression of ecosystem development for living shoreline marshes over time to inform ecosystem service provision. Develop decision support model for computing nutrient and sediment removals from living shorelines. This is a continued objective from 2015-2020.

MA6: Develop and institute a process for integrated wetland status and trends tracking

Priority: Low

Virginia needs this data for reporting progress on 2014 Bay Agreement goals. DEQ has an effective regulatory permitting database process in place to track impact amounts of non-tidal wetlands and a new process has been initiated by VMRC to track tidal impacts. However, voluntary restoration, natural losses and unpermitted losses tracking efforts are non-existent or hugely inaccurate. This is a new objective for 2020-2025.

Regulatory

R7: Mitigation bank tracking, evaluation and guidance development

Priority: Moderate

Continue to enhance WetCAT application for mitigation decision-making. Build on previously funded and completed efforts to enhance use of WetCAT for mitigation targeting with an emphasis on TMDLs and water quality. WetCAT allows recalculation of WQ scores if the surrounding landscape is modified so placement of a mitigation bank could improve downstream wetlands water quality stress levels depending on the type landcover change. In addition, WetCAT provides a calculation of the amount of impaired waters within a HUC for mitigation banking targeting decisions. Incorporate Interagency Review Team processes. This is a continued objective from 2015-2020 with new elements.

R9: Continue to assess the effectiveness of tidal wetland management activities. Focus on Living shorelines, shoreline enhancement and other shorescape climate adaptation measures

Priority: High

Follow-on to previous assessments. Track LS implementation to evaluate effectiveness of new legislation mandating their use where suitable (2021). Assess the incorporation of the 2021 guidelines in the local and state decision-making process. This is a continued objective from 2015-2020 with new elements based on 2021 legislation and guidance.

R10: Develop Integrated Guidance for Tidal Shorelines

Priority: High

Virginia has made little progress on this mandated task from 2011 legislation. This effort requires consideration and incorporation of regulatory programs falling under several different agencies, notably VMRC, the Department of Environmental Quality, and Local Wetland Boards. An integrated management framework for decision-making is particularly critical given anticipated losses of coastal wetlands due to sea level rise. New guidance (2021) from the VMRC and DEQ would be the foundation for this effort. This is a continued objective from 2015-2020.

R11: Continue access to the Corps ORMS database for use in WetCAT

Priority: High

Having established the process successfully in the 2015-2020 plan period, this remains a priority to assure that regulatory wetlands gains and losses are accurately tracked and reported. This is a continued objective from 2015-2020.

R16: Continue to improve and value add data currency, outputs and analytical capacity in WetCAT for use in regulatory and advisory programs by DEQ and VDOT

Priority: Moderate

Produce a summary report for wetland condition results for use by VDOT and DEQ to assess preliminary impacts and conditions for NEPA reviews. Incorporate the most current data including climate relevant information. Follow on to Objective R7 from 2015-2020 (see accomplishments table at the end of the report)

R17: Enhance neighboring jurisdictional (interstate) wetlands programs

Priority: Moderate

Coordinate with adjacent jurisdictions. Collaboration/ Agreements/ Research with Maryland and North Carolina. Building on the partnerships via the Chesapeake Bay Program and the NC/ VA MOA on the Albemarle Pamlico Sound. New Objective for 2020-225.

Voluntary Restoration and Protection

VR2: Develop protocols, methods and tools to assess and promote wetland restoration and protection practices to maximize co-benefits (i.e. load reduction benefits, coastal resiliency, habitat, social considerations, etc.)

Priority: Moderate

There are ecosystem processes common to site suitability for both wetlands restoration and compensatory mitigation. Virginia will seek to maximize the integration of these two processes into decision-making tools developed to address either regulatory or non-regulatory wetlands projects. Identify, map and prioritize opportunities to maximize multiple benefits from restoration/ creation projects. Incorporate considerations identified in the Coastal Resilience Master Plan and the Virginia State Lands Watershed Implementation Plan and the Virginia Watershed Implementation Plan Phase III. Continued from 2015-2020 with new elements.

Water Quality Standards

WQ1: Assess the relationship between wetlands and ambient water quality and provision of pollutant load reduction

Priority: Low

Field and modeled analyses to inform management actions such as nutrient banks and TMDL implementation. Continued from 2015-2020.

Planning and Sustainability

PS1: Continue to develop data and tools for the community-scale comprehensive coastal resource management portals (CCRMP) and assess use of products

Priority: Low

CCRM has created a CCRMP for each coastal locality in Virginia. As data such as landuse/ landcover and LiDAR have improved in precision, we are evolving this process into a Coastal Virginia scale rather than locality specific portals. The existing portals are still available on-line, but CCRM is shifting the focus of this effort to PS5: Continue to enhance the VIMS-CCRM Shoreline Management Model.

PS5: Continue to enhance the VIMS-CCRM Shoreline Management Model (SMM)

Priority: High

During the 2015-2020 plan period, significant upgrades were made to the SMM. Continue the required Tidal Marsh Inventory and Comprehensive Coastal Inventory as input data for the shoreline management model. Continued focus on model updates and refinement is needed as new data becomes available. Incorporate new remotely sensed data as available. Explore new technologies and approaches for tools and data analyses and delivery. As necessary, modifications to support changes in management preferences, such as new legislation, regulation or guidance, will be

incorporated as appropriate. Possible app development. Apply model outputs and information to inform shorescape management and decision-making. Continued from 2015-2020.

PS6: Identify effects of climate change (sea level rise and hydrology) and development on wetland extent/location and provision of habitat services and mitigative approaches

Priority: High

Investigate the impacts of development activities such as transportation infrastructure, shallow water dredging, commercial, residential and agricultural development on wetlands, assess marsh migration opportunities and implications for habitat provision for terrestrial and aquatic marsh associated species. Assess the wetlands restoration potential of projects such as water control, ditch plugs, beneficial use and thin layer application. This is a new objective for 2020-2025.

PS7: Improve communication among state, neighboring jurisdictions, federal, local non-governmental and governmental partners managing or working in wetlands

Priority: High

Virginia has multiple parties engaged in wetlands preservation and management, including state (including North Carolina via VIMS and DEQ engagement in APNEP), federal (USACE), and local agencies, as well as numerous local, state, and regional nongovernment organizations (NGOs). The lack of an effective method of consistently sharing information among these groups has been problematic in obtaining common goals because of funding sources, individual agency goals and agency resources. This is an expanded objective with new goals for 2020-2025.

Outreach and Education

O/E2: Maintain and update DEQ Wetlands website to incorporate new reports, data, and programs

Priority: High

Modify existing website content to keep current as reports, data, and outreach materials are updated. Continued from 2015-2020.

O/E3: Maintain outreach for decision-makers

Priority: High

Continue effort to provide presentations to explain the use of WetCAT to localities for their comprehensive land use planning. Continue workshops, trainings and print/ digital publications to support shoreline decision making. Continued from 2015-2020.

Timeline for 2021-2025 Objectives

OBJECTIVE	PRIORTY		WHO	Progress 2021	Progress 2022	Progress 2023	Progress 2024	Progress 2025
MA1: Continue to Re-Calibrate models	**High**	This activity is funding dependent. Funding has been appropriated for this activity through 2023 for wetland stressor calibration in the Piedmont and Ridge & Valley geomorphic provinces. This is a continued objective from 2010-2015 & 2015-2020.	DEQ/ CCRM	Coastal Plain	Piedmont	Ridge and Valley	Pending Funding	Pending Funding
MA3: Enhance tidal wetlands monitoring and track cumulative effects of development and climate change. TMI	**High**	VIMS/CCRM conducts the Virginia Tidal Marsh Inventory. Continue and enhance monitoring. Explore new technologies. This is a continued objective from 2015-2020.	CCRM	In progress	In progress	In progress	Pending Funding	Pending Funding
MA4: Track and Assess nature-based shoreline best management practices, living shorelines, for ecosystem service provision and adverse and beneficial effects	**High**	Investigate ecosystem services and trade-offs for structural and non-structural approaches to living shorelines. Assess the LS use of oyster structures including the efficacy of the use of these structures and advancing scientific understanding of shellfish populations associated with living shorelines whether they are included in the plan design or wild recruits. Track the progression of ecosystem development for living shoreline marshes over time to inform ecosystem service provision. Develop decision support model for computing nutrient and sediment removals from living shorelines. This is a continued objective from 2015-2020.	CCRM	in progress (ecosystem development assessment completed and being used to inform valuation of shoreline marshes for ecosystem services, NSF Coastal SEES); current funding from Honda Foundation and NOAA for 2 years	In progress	nutrient and sediment decision support model to be completed (Honda Foundation funding). living shoreline marsh restoration benefits calculator completed for Middle Peninsula (NOAA funding)	Pending Funding	Pending Funding

MA6: Develop and institute a process for integrated wetland status and trends tracking	**Low**	Need this data for reporting progress on 2014 Bay Agreement goals. DEQ has an effective regulatory permitting database process in place to track impact amounts of non-tidal wetlands and a new process has been initiated by VMRC to track tidal impacts. However, voluntary restoration, natural losses and unpermitted losses tracking efforts are non-existent or hugely inaccurate. This is a new objective for 2020-2025.	CCRM DEQ	Pending Funding				
R7: Mitigation bank tracking, evaluation and guidance development	**Moderate**	Continue to enhance WetCAT and build on previously funded and completed efforts to enhance use of WetCAT for mitigation targeting with an emphasis on TMDLs and water quality. Incorporate Interagency Review Team processes. This is a continued objective from 2015-2020.	CCRM / DEQ	In progress	In progress	In progress	To be completed	
R9: Continue to assess the effectiveness of tidal wetland management activities. Focus on Living shorelines	**High**	Follow-on to previous assessments. Track LS implementation to evaluate effectiveness of new legislation mandating their use where suitable (2021). This is a continued objective from 2015-2020.	CCRM	in progress (no funding)	in progress	in progress	to be completed (updating CCRM permit database to facilitate tracking and LS verification)	
R10: Develop Integrated Guidance for Tidal Shorelines	**High**	The Virginia Marine Resources Commission has made little progress on this mandated task. This effort requires consideration and incorporation of regulatory programs falling under several different agencies, notably VMRC, the Department of Environmental Quality, and Local Wetland Boards. This is a continued objective from 2015-2020.	VIMS, VMRC DEQ	Pending Funding				

R11: Continue access to the Corps ORMS database for use in WetCAT	**High**	Having established the process successfully in the 2015-2020 plan period, this remains a priority to assure that regulatory wetlands gains and losses are accurately tracked and reported. This is a continued objective from 2015-2020.	CCRM	In progress	In progress	In progress		
R16: Continue to improve and value add data currency, outputs and analytical capacity in WetCAT for use in regulatory and advisory programs by DEQ and VDOT.	**Moderate**	Produce a summary report for wetland condition results for use by VDOT and DEQ to assess preliminary impacts/conditions for NEPA reviews. Follow on to Objective R7 from 2015-2020	CCRM / DEQ	In progress	In progress	In progress		
R17: Enhance neighboring jurisdictional (interstate) wetlands programs. Coordinate with adjacent jurisdictions.	**Moderate**	Collaboration/ Agreements/ Research with Maryland and North Carolina. New Objective for 2020-2025.	CCRM / DEQ	In progress	In progress	In progress		
VR2: Develop protocols, methods and tools to promote wetland restoration practices to maximize co-benefits (i.e. load reduction benefits, coastal resiliency, social considerations, etc.).	**Moderate**	There are ecosystem processes common to site suitability for both wetlands restoration and compensatory mitigation. CCRM will seek to maximize the integration of these two processes into decision-making tools developed to address either regulatory or non-regulatory wetlands projects. Continued from 2015-2020.	CCRM	Pending Funding				

WQ1: Assess the relationship between wetlands and ambient water quality and provision of pollutant load reduction.	**Low**	Nutrient Banks, impaired waters, TMDL implementation. Continued from 2015-2020.	DEQ/ CCRM	Pending Funding				
PS1: Continue to develop community-scale comprehensive coastal resource management portals (CCRMP). Assess use of products.	**Low**	CCRM has created a CCRMP for each coastal locality in Virginia. As data such as landuse/ landcover and LiDAR have improved in precision, we are evolving this process into a Coastal Virginia scale rather than locality specific portals. The existing portals are still available on-line, but CCRM is shifting the focus of this effort to PS5: Continue to enhance the VIMS-CCRM Shoreline Management Model.	CCRM	Finished first round of CCI/ TMI				
PS5: Continue to enhance the shoreline management model. Continue to improve shoreline data currency by conducting the Comprehensive coastal inventory.	**High**	During the 2015-2020 plan period, significant upgrades were made to the SMM. Continue the required Tidal Marsh Inventory and Comprehensive Coastal Inventory as input data for the shoreline management model. Continued focus on model updates and refinement is needed as new data becomes available. Incorporate new remotely sensed data as available. Explore new technologies and approaches for tools and data analyses and delivery. As necessary, modifications to support changes in management preferences, such as new legislation, regulation or guidance, will be incorporated as appropriate. Possible app development. Apply model outputs and information to inform shorescape management and decision-making. Continued from 2015-2020	CCRM	Pending Funding				

PS6: Identify effects of climate change (sea level rise and hydrology) on wetland extent/location and provision of habitat services and mitigative approaches.	**High**	Beneficial use, thin layer, water control, ditch plugs, transportation infrastructure and adaptation impacting wetlands, assess marsh migration opportunities and implications for habitat provision for terrestrial and aquatic marsh associated species. This is a new objective for 2020-2025.	CCRM	In progress	In progress	In progress	In progress	In progress
PS7: Improve communication among state, neighboring jurisdictions, federal, local non-governmental and governmental partners managing or working in wetlands.	**High**	Virginia has multiple parties engaged in wetlands preservation and management, including state (including North Carolina via VIMS engagement in APNEP), federal (USACE), and local agencies, as well as numerous local, state, and regional nongovernment organizations (NGOs). The lack of an effective method of consistently sharing information among these groups has been problematic in obtaining common goals because of funding sources, individual agency goals and agency resources. This is an expanded objective with new goals for 2020-2025.	CCRM / DEQ	In progress	In progress	In progress	In progress	In progress
O/E2: Maintain and update DEQ Wetlands website to incorporate new reports, data and programs	**High**	Modify existing website content to keep current as reports, data, and outreach materials are updated. Continued from 2015-2020.	DEQ	In progress	In progress	In progress	Pending Funding	Pending Funding
O/E3: Maintain outreach for decision-makers	**High**	Continue effort to provide presentations to explain the use of WetCAT to localities for their comprehensive landuse planning. Continue workshops, trainings and print/ digital publications to support shoreline decision making. Continued from 2015-2020.	CCRM DEQ	In progress	In progress	In progress	Pending Funding	Pending Funding

ACCOMPLISHMENTS FROM 2015-2020

Table 1 Status and Outcome from 2015-2020 Wetland Program Plan Objectives

OBJECTIVES 2015-2020	**Actions/ Rationale**	**Status and Project Elements**	**Output: URL/ Report/ etc.**	**Funding Agency(ies)**
MA1: Continue to Re-Calibrate models	This activity is funding dependent, and, at present, funding has been appropriated for this activity through 2023 for wetland stressor calibration in the Piedmont and Ridge & Valley geomorphic provinces.	On-going and Completed. This Objective is addressed by the Monitoring and Assessment Program coordinated by DEQ and VIMS. Each year selected wetlands are monitored by physiographic province. The report provides details on which areas were sampled during the 2015-2020 time period.	Building Capacity for Protection of Wetland Resources in Virginia - Track One	EPA/ DEQ
MA2: Enhance Tidal wetlands monitoring and track cumulative effects of development and climate change	CCRM/VIMS conducts the Tidal Marsh Inventory. CCRM/VIMS will develop a protocol to use the inventory in order to assess effects due to development and sea level rise. Develop protocols to identify wetlands at risk for conversion due to sea level rise.	Tidal Marsh Vulnerability Model for coastal Virginia wetlands incorporated into WetCat. Development of an advanced open-source Tidal Marsh Model able to hind cast and forecast marsh evolution under different climate scenarios.	WetCat: http://cmap2.vims.edu/WetCAT/WetCAT_Viewer/WetCAT_VA_2D.html http://ccrm.vims.edu/schismweb/	EPA
MA3: Assess nature-based shoreline best management practices, living shorelines, for ecosystem services adverse and beneficial effects, for example oyster and mussel structures	CCRM/VIMS intends to investigate ecosystem services and trade-offs for various structural and non-structural approaches to living shorelines. CCRM/VIMS will seek to assess the use of oyster structures as a component of living shorelines and the efficacy of the use of these structures and to advance the research on shellfish populations associated with living shorelines whether they are intentionally part of the plan design or volunteers.	On-going and Complete. Quantification of ecosystem benefits provided by living shorelines including habitat provision, carbon storage, nutrient removal and shore protection. Identification of factors influencing human decision on shoreline modification.	ongoing - peer-review publications and reports	NSF

MA4: Assess the efficacy of crowd-sourcing a wetland condition assessment program. Develop a protocol for citizens to report on relative "health" of assessed wetlands to inform selection and priorities for site visits	CCRM will investigate process and protocols for use of citizen science to inform wetland condition assessment. We have had preliminary conversations on the development and use of a mobile app and the need for and likely success of crowd-sourced data collection. Continued commitment, but not a current priority for the WPP.	Master Naturalist Chapter, Training. Northern Neck Shoreline Assessment. King Tide crowd sourcing CCRM is Agency Sponsor for the Virginia Master Naturalists Middle Peninsula Chapter. CCRM provides expertise and training on Shoreline Management assessments to the Northern Neck Master Gardens Shoreline Assessment Program.	CCRM is Agency Sponsor for the Virginia Master Naturalists Middle Peninsula Chapter. CCRM provides expertise and training on Shoreline Management assessments to the Northern Neck Master Gardens Shoreline Assessment Program.	CCRM/ Others
R1: Mitigation bank tracking, evaluation and guidance development	DEQ and CCRM/VIMS will continue to enhance WetCAT and build on previously funded and completed efforts to enhance use of WetCAT for mitigation targeting with an emphasis on TMDLs and water quality.	Integrate management of wetlands along a watershed from tidal to nontidal.	WetCAT http://cmap2.vims.edu/WetCAT/WetCAT_Viewer/WetCAT_VA_2D.html	EPA
R2: Develop a VMRC general permit for living shorelines	Mandated by 2011 legislation	Group 1 Permit Group 2 Permit	https://mrc.virginia.gov/regulations/MRC_Scanned_Regs/Habitat/FR1330_11-01-17.pdf https://mrc.virginia.gov/regulations/MRC_Scanned_Regs/Habitat/FR1300_09-01-15.pdf	Virginia (unfunded)
R3: Continue to assess the effectiveness of tidal wetland management activities. Focus on the implementation of the Virginia policy	Build upon the findings of the original assessment to modify VIMS guidance. Track decision-making to assess implementation of living shorelines policies and general permit.	CCRM VIMS has committed to assessment of tidal wetlands management to support an adaptive management process for tidal wetlands. During this program period, notable legislative and regulatory changes to tidal wetlands management have occurred. CCRM will seek to track to impacts of these changes on the resource over time.	Implementing Sustainable Shoreline Management in Virginia: Assessing the Need for an Enforceable Policy,	NOAA Project of Special Merit (National Competition)

on Living shorelines				
R4:Develop Integrated Guidance for Tidal Shorelines	Development and promulgation of guidance to simplify and codify the State's preferences for shoreline management is a high priority. Requires consideration and incorporation of regulatory programs falling under several different agencies, notably VMRC, the Department of Environmental Quality, and Local Wetland Boards. CCRM/VIMS has done some work in development of updates guidelines for the Tidal Wetlands Act and Beaches and Dunes which could be incorporated into an integrated guidance document.	CCRM/VIMS developed draft of integrated guidance. VMRC developed and approved updated Wetlands Guidelines 2021. The Wetlands Guidelines are not shorescape comprehensive as they do not cross walk the Tidal wetlands, nontidal wetlands and Chesapeake Bay Preservation Act Features in one guidance document	Wetlands Guidelines https://mrc.virginia.gov/Regulations/Final-Wetlands-Guidelines-Update_05-26-2021.pdf	Original efforts funded by NOAA/ DEQ Coastal Zone Management
R5: Access the Corps ORMS database for use in WetCAT	This remains a priority to assure that wetlands gains and losses are accurately tracked and reported.		Building Capacity for Protection of Wetland Resources in Virginia - Track One	EPA/DEQ
R6: Tie outcomes of living shorelines NPS load reduction study to regulatory process.	Use findings from study to modify and/or develop policy on the options for incorporation of living shorelines for local and State TMDL implementation.	Updated SMM to V 5.1. Calculated BMP load reductions for living shoreline implementation. Presented at CCRM/VIMS wetlands workshop 2020 and VA Interagency Chesapeake Bay Team	Expanding the use of natural and nature-based infrastructure to enhance coastal resiliency: Forecast and hind-cast load reductions from Living shoreline BMPs : Project Report (Year 2 of 3),	NOAA/ DEQ CZM
R7: Develop the capacity to produce a report from WetCAT for	DEQ and CCRM/VIMS produce a summary report for wetland condition results for use by VDOT to assess	Completed	WetCAT http://cmap2.vims.edu/WetCAT/W	EPA/DEQ

use by DEQ and VDOT.	preliminary impacts/conditions for NEPA reviews.		etCAT_Viewer/WetCAT_VA_2D.html	
R8: Expand data collection capabilities of DEQ water quality staff during site visits	This objective is intended to maximize data collection capabilities of field personnel.	Tablets have been distributed to DEQ monitoring staff and training conducted. DEQ staff have been uploading information and continuation of data collection.		EPA
R9: Assess barriers to use of dredge material to address wetland vulnerability	The Virginia Marine Resources Commission has expressed interest in better understanding of the science of beneficial use of dredge material and the policy context guiding decisions on projects	Assessment of dredging needs conducted with NOAA Coastal Zone Management funds by VIMS.		NOAA/DEQ CZM
VR1: Develop and implement a voluntary wetland restoration tracking system	The development of a geo-referenced database and accounting system for tracking credits of voluntary wetland restoration efforts. CCRM has submitted 3 proposals to the National Oceanic & Atmospheric Administration (NOAA) - Coastal Program to perform this activity. This proposal was not funded.	No significant progress. This objective has dropped to a lower priority and is not included in the current plan.		

VR2: Develop a multi-criteria targeting tool for wetland restoration using an integrated perspective (i.e. load reduction benefits, coastal resiliency, etc.).	There are ecosystem processes common to site suitability for both wetlands restoration and compensatory mitigation. CCRM/VIMS will seek to maximize the integration of these two processes into decision-making tools developed to address either regulatory or non-regulatory wetlands projects	Coastal NNBFs mapped with inundation pathways connecting buildings. All NNBFs ranked for 3 parameters: flood benefit based on capacity and opportunity, FEMA NFIP Community Rating System credit opportunity and water quality benefits. Restoration targets were identified and described for any coastal building with no NNBFs. Also created an CBPA RPA buffer layer for localities lacking this data.	Data layers incorporated into AdaptVA interactive mapper. CCRM/VIMS webpage https://www.vims.edu/ccrm/research/climate_change/adaptation/nnbfs/index.php www.Adaptva.com	NOAA Coastal Resilience
VR3: Develop and institute a process for integrated wetland status and trends tracking including regulatory and non-regulatory gains and losses	Data needed for reporting progress on 2014 Bay Agreement goals. Previous efforts to report on the status and trends have been problematic. DEQ has an effective regulatory permitting database process to track impacts of non-tidal wetlands and a new process has been initiated by VMRC to track tidal impacts. However, voluntary restoration, natural losses and unpermitted losses tracking efforts are non-existent or hugely inaccurate.	This effort could proceed, follow, or be concurrent with tasks VR1 and R5 and would need to be integrated with status and trends efforts.	No progress	
WQ1: Begin a process to assess the relationship between non-tidal wetlands in the watershed and ambient water quality	DEQ and CCRM/VIMS have begun compiling various existing data sets to do this assessment.	No significant progress		CCRM (unfunded)

WQ2: Track and assess storm water impacts on wetlands	At this time, it is too preliminary to determine tracking and assessment needs that are necessary until the Chesapeake Bay Agreement for BMPS has been completed.	No significant progress. This objective is of less priority as other State and CBP processes are tracking BMP crediting and impacts.		
WQ3: Develop capacity within WetCAT to target wetland restoration for TMDL implementation	DEQ and CCRM/VIMS will seek funding to develop a wetland restoration targeting tool for wetlands as Best Management Practices and beneficial land use conversion. This effort would be coordinated with targeting for all ecosystem services. (see Objective VR2).	No significant progress. Intend to seek funding for this objective		
PS1: Continue to develop community-scale comprehensive coastal resource management portals (CCRMP)	A schedule projects completion of 15-20 new portals for the next 5 years.	Last localities to have completed inventories in 2021. All of Virginia is now completed.	http://www.vims.edu/ccrm/ccrmp/index.php	NOAA/DEQ CZM
PS2: Establish and maintain a process for improved communication among state, federal, local non-governmental and governmental partners managing or working in wetlands.	Virginia has multiple parties engaged in wetlands preservation and management, including state (including North Carolina via DEQ and VIMS engagement in APNEP), federal (USACE), and local agencies, as well as numerous local, state, and regional nongovernment organizations (NGOs). The lack of an effective method of consistently sharing information among these groups has been problematic in obtaining common goals because of funding sources,	On- going. Efforts underway. Part of JRA Living Shorelines Collaborative. Participation (and chairing) or the CBP Wetlands Workgroup	https://www.dcr.virginia.gov/pr-relz-detail?id=2020-09-23-14-26-26-611785-0uh	NFWF and unfunded

	individual agency goals and agency resources.			
PS3: Assess climate-induced changes to tidal and non-tidal wetlands with an emphasis on headwater wetlands and connectivity to downstream wetland systems	CCRM/VIMS will develop a protocol to assess relative risks of wetlands from climate change with an initial focus on the York River system.	Headwater wetlands vulnerability to climate change - data layer in WetCat	WetCat http://cmap2.vims.edu/WetCAT/WetCAT_Viewer/WetCAT_VA_2D.html	EPA
PS4: Develop atlas of natural shoreline features to identify opportunities for beneficial use of dredge material to address wetland vulnerability	Develop an on-line map viewer that incorporates information on natural coastal features, land use, land ownership, wetland status, navigational channels and working waterfronts, to identify potential wetland sites for dredge material application to promote wetland resilience.	This objective has been partially approached by entities other than CCRM/ VIMS or DEQ. Not aware of any outcomes at this time.		

PS5: Enhance the existing shoreline management model which identifies preferred management options to maximize ecosystem services of management actions	The CCRMP includes a GIS analytical model which identifies the preferred shoreline management option (SMM). Continued model refinement is needed to ensure the model output is consistent with the management preferences. Develop end-user real time decision tools to identify preferred management approaches.	Updated SMM to V 5.1. Incorporated existing erosion control structures. Refined and added recommendation categories, Updated data.	The Shoreline Best Management Practices Model can be viewed here: http://cmap.vims.edu/CCRMP/HamptonCCRMP/Hampton_CCRMP.html	NOAA/DEQ CZM
IA1: Obtain iterative land cover data set	Required for data development and ongoing analysis of WetCAT over time.	Access to land cover data has improved with the Virginia Geographic Information Agency as the lead.	https://www.deq.virginia.gov/Programs/Water/WetlandsStreams.aspx	
O/E1: Maintain and update DEQ Wetlands website to incorporate new reports, data and programs	Modify existing website content to keep current as reports, data, and outreach materials are updated.	Website has been updated.	https://www.deq.virginia.gov/Programs/Water/WetlandsStreams.aspx	EPA
O/E2: Maintain outreach for local government decision-makers	Continue effort to provide presentations to explain the use of WetCAT to localities for their comprehensive land use planning. Continue workshops, trainings and print/ digital publications to support shoreline decision making.	WetCAT was presented at the following: 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)	Sea-Level Rise & Virginia's Coastal Wetlands	EPA

		Delaware Wetlands Conference (January 2020) EPA Region III and Headquarters meeting (March 2020)		
O/E3: Develop and apply a protocol to assess use of CCRMP guidance by coastal managers and target and enhance efforts to ensure effective use	Develop a set of metrics and process to determine if and how CCRMP guidance is used by decision makers.	No significant progress.		