

Healthy Waters in the Coastal Zone

FY21 Task 8 Final Report

Grant Period October 1, 2021 to September 30, 2022

Grant# NA21NOS4190207

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Virginia Department of Conservation and Recreation,

Program of Natural Heritage

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Virginia Coastal Zone
MANAGEMENT PROGRAM

Executive Summary

The Environmental Scientist/Program Manager with the Virginia Commonwealth University (VCU) Department of Life Sciences (LS), Rice Rivers Center (RRC), was retained by the Virginia Department of Conservation and Recreation (DCR), Natural Heritage Program (NHP), served as the Program Manager of the Virginia Healthy Waters Program (HWP) at the DCR NHP. The HWP Manager maintains access to the facilities and expertise of the DCR and continued to integrate the skills and abilities of the VCU LS/RRC. The position serves as a liaison between DCR and the VCU LS/RRC to promote a coordinated, collaborative approach to integrating field capacity, applied research and outreach to inform the protection of ecologically healthy aquatic systems. This includes the oversight of programs, projects, grants and grant budgets, providing technical support to the DCR NHP and the Virginia Coastal Zone Management Program (VCZM), as it relates to coastal zone ecology, management, and restoration. Additionally, this grant supported the VA Oyster Shell Recycling Program (VOSRP) at the VCU RRC as an effort of Healthy *Estuarine* Waters to reclaim waste oyster shell and return it to the Chesapeake Bay as part of community engagement activities. Despite the continued impacts associated with the COVID-19 pandemic altering the ability to fully implement on-site, in-person activities, considerable effort was made to meet and exceed progress on the advancement of the HWP and the complete the work on time, as per the contract.

Product #1: Program Growth and Administration Report (50%)

The HWP is supported through funding from several grant sources including the NOAA Section 306, United States Environmental Protection Agency (EPA) Section 319 Nonpoint Source Program, the US EPA Chesapeake Bay Program, Chesapeake Bay Implementation Grant (CBIG) and the US Forest Service (USFS). These sources fund various aspects of the Program including the administration and oversight, program growth and expansion, improvement in capacity, site assessment and characterization, acquisition and analysis of new data and data integration.

Programmatically, the identification of funding, maintenance of and development of the models and tools, data development and increasing capacity have been the foci of the HWP. The Program, at the DCR Natural Heritage Program continues to be challenged with limited capacity to realize significant growth, however, during the reporting period, the Program Manager made progress to gain momentum to develop new capacity that will implement the existing tools, models, data and utilize the expertise at the NHP toward conserving ecologically healthy waters. Prior to this grant cycle, the greatest hurdle had been the ongoing process of discussions with senior staff regarding limited staff resources and inadequate statewide data collection which are foundational to growth of the program. While these challenges continue to hinder the potential to develop a more robust program, the 2025 goals outlined in the Chesapeake Bay Agreement and change in Virginia Administration were an opportunity to seize upon.

Several meetings were held with VCU and NHP senior and section level management to characterize the challenges and opportunities ahead of the HWP. Focused conversations outlined the resources that could be leveraged to support the development of field capacity, integration of the HWP into the conservation strategies at the NHP and those goals that should be considered for conserving ecologically healthy waters in VA. Throughout the discussions, the conclusions

were that the models, tools and resources within the NHP had reached an apex and the most reasonable next step was to take those tools into the community. As the program is supported through such a diverse funding stream, those EPA sources were the primary focus to inform the vision for such improvements. Within the DCR NHP, conversations were further focused with the NHP Land Conservation Section, Information Management and NHP Director since the outcome of the 2025 Bay Agreement goal includes, “100% conservation of State identified healthy waters/watersheds” and the mechanisms to integrate those into a strategic process are critical for achievement. A concurrent effort was implemented by the Program Manager to communicate the proposed changes in direction to expand the program to the VCZM Director since a quarter of the program costs are recovered by support from those NOAA sources. The VCZM has been foundational in the development of the administration of the program and the delivery of on-the-ground technical assistance continues to leverage those resources through a novel approach. Agreement was reached where the VCZM funding would be decreased for overall administration and the allocation would be directed toward the new field position in the upcoming grant cycle.

Acknowledging that the change in administration at the DCR and at the Commonwealth could drive the mechanisms to achieve the goal, the Program Manager requested and conducted a meeting with the newly appointed DCR Director, DCR Deputy Director, NHP Director to communicate the overall goal of the HW program, background, funding, drivers including the Chesapeake Bay Agreement, achievements and opportunities. A PowerPoint presentation was provided on April 13 to management demonstrating how HW fits within DCR and it bridges those requirements managed and maintained at DEQ (Appendix 1). Feedback during the meeting encouraged the approach to expand into local capacity development and advance those tools and resources in the Division. DCR management communicated appreciation for the initiative to create field capacity for the HWP utilizing existing federal sources as opposed to seeking state monies. The Director of DCR requested a follow-up document that outlines and summarized the meeting for future reference (Appendix 2).

Grant applications for CBIG funding for FY24-26, US EPA Section 319 Nonpoint Source Pollution FY22-24, and VCZM were developed to support the development of field capacity. As those grant work plan descriptions were developed, guiding principles included that the CBIG tasks directly advance the Chesapeake Bay Watershed Implementation Plan Phase 3. The HWP is identified in the FY20-23 and FY24-26 CBIG Workplan as Objective 9 with the output: *Provide information to facilitate improved resource protection in the Commonwealth, and to advance the identification and protection of those ecologically healthy sites, referred to as: Healthy Waters. Develop technical assistance tools and publications regarding the health and restoration of the Chesapeake Bay.*

However, neither the US EPA CBIG nor the US EPA Section 319 were awarded during the reporting period and both contributed to the delay in ability to execute steps toward the advertising and hiring to build the position. Ongoing discussions about availability of EPA funding to award in a timely manner have continued with new staff within the DCR Division of Soil and Water. Yet, delays of up to six to eight months in award do not permit the program to sustain consistency for ongoing confidence. This situation poses a challenge for the VCU as it requires considerable confidence in the subawards from those partners and to bridge the gap

forces the VCU to take the financial risk for an unknown period. That risk being to be financially responsible for funding a position absent contracted or grant-supported funding. Given that unacceptable risk, the position is on hold until the agreements between the USEPA and VA, and between the DEQ and DCR are ratified.

The HWP Manager also continued to participate in the Chesapeake Bay Program, Goal Implementation Team (GIT) for Healthy Watersheds. As part of this GIT, the HWP Manager put considerable effort toward the Chesapeake Bay Management Strategy development process, including continued coordination with DCR and DEQ. The HWP Manager continued to advance Healthy Waters Bay Agreement Goal of 100% conservation of the identified 2014 HW sites in the Chesapeake Bay by 2025. The HWP Manager continued to represent Virginia, staffing the HW GIT and remaining consistent in the approach that the Commonwealth will set their own course for long-term conservation action, which includes adding local capacity. It is still unclear how the Bay Agreement outcome will guide how the Commonwealth advances conservation. However, given the response from the DCR management, the goals may be more than suggestions since Virginia will be advancing an approach that integrates the proximity to ecologically valuable terrestrial features, as identified by NHP, in the weighting of criteria. NHP approach will be integrated into the ongoing targeting of conservation and preservation as it relates to those needs under DCR.

Product #2: Program Capacity Development Report (25%)

As mentioned in the previous section, the HWP Manager was able to garner support from the DCR and NHP Management, VCZM and from the VCU Rice Rivers Center to redistribute the existing funding to increase field capacity for the Program. The outcome is one which VCU would host and hire an HWP Field Coordinator to be housed at the DCR NHP and have all the resources and expertise available within the agency. The HW Field Coordinator would represent both the DCR NHP and the VCU in a similar manner as the HW Program Manager but work primarily in the field with private landowners and field partners such as the Conservation Districts. The HW Field Coordinator would take those tools created at the NHP and work closely with conservation partners to advance those conservation actions from planning tools into tangible implementation. The position would be supported through resources from VCZM, USEPA Section 319 and Chesapeake Bay Implementation Grant.

The HWP Manager was able to garner support from the DCR Director, NHP Manager, VCZM Director and VCU to create the position that would be focused on the following:

- Take those tools created at the NHP and work closely with conservation partners to advance those conservation actions from planning tools into tangible implementation.
- Be supported through resources from VCZM, USEPA Section 319 and Chesapeake Bay Implementation Grant (and other sources if available).
- Would leverage the application of agricultural or forestry best management practices to meet local TMDL WIP measures in impaired but ecologically healthy waters.
- Will likely leverage the work of the eight (8) Coastal Planning District Commissions (PDCs) to assist coastal communities, Conservation Districts, VDOF, Land Trusts,

Nature Conservancy and coordinate with other agencies on HWP community-based natural resource identification and protection.

- Will primarily target areas in the Chesapeake Bay Watershed both upper and coastal areas.
- Work with private land-owners to maximize the benefit of existing publicly available financial and technical resources to advance conservation of ecologically healthy waters.

To guide the focus of the position a prioritization of critical criteria that would define the work tasks was undertaken. The HWP Manager, in coordination with the NHP Information Management section began an evaluation and development of a final targeting approach that utilized the existing Watershed Model and ConserveVirginia tools. Additional guiding factors are the designation of HW sites and those watersheds identified as impaired on the 303d Impaired Waters List. The effort explored the value of ranking total listed impairments to those most similarly impaired based on criteria in the Aquatic Life Use Standard. The overlap between those state identified ecologically healthy waters that are also impaired provides for access to those financial resources for achieving Implementation under those waters with approved Total Maximum Daily Loads (TMDLs) and Watershed Implementation Plans (WIPs).

As a means to increase the capacity prior to the implementation of the position, the HWP attempted to leverage the resources within the VCU from existing faculty and graduate level students. Currently, the HWP is benefiting from an intern that is working toward improved communication tools in areas outside the Coastal Zone and reach of this award. That intern has been developing an ArcGIS StoryMap for communicating the ecological health of the Upper Tye, Piney and Rockfish Rivers with support from private, charitable donations. The use of the StoryMap helps simplify the communication as well as reach a broader audience than the program currently maintains. The final StoryMap would be hosted in the DCR NHP web with information on the upper watersheds of the Tye, Piney and Rockfish Rivers. At time of reporting, that StoryMap was in final edits and unavailable for sharing.

The workplan identified that in-house DCR and VCU capacity would be expanded to for the revision of and updating of the database for the INSTAR data. Life Sciences, Center for Environmental Studies and Rice faculty continued to advance on refining a method to automate aspects of the INSTAR database. Currently, each phase (data entry, analysis, post-analysis processing, etc) have to be done in a linear manner requiring each individual responsible for that respective step to notify the following responsible party before they can proceed with their role. Database housing is split between several servers and the mechanics of resolving the integration into a singular database has continued beyond the anticipated timeline.

Product #3: Healthy Waters Data Analysis, Evaluation and revision of models (20%)

Data analysis, evaluation and model revisions had the lowest effort during the reporting period since the majority of effort was direct toward the development of the field-based capacity. However, as mentioned above those existing data and tools were introduced into the programmatic discussions to advance the program both statewide and for the new position to be established.

The HWP Manager continued to work with the NHP staff refine the prioritizing of statewide Stream Conservation Units (SCUs) and the possible redefinition of those areas draining to aquatic and riverine EOs. The proposed approach is based on the NHD+HR catchment areas, instead of a linear buffer as currently employed for SCUs and referred to as a Stream Conservation Catchment (SCC). The process will assist in the repackaging of those polygons the Commonwealth applies for designation of “Healthy Watersheds” as submitted to the CB Program for the CB Program HW Goal. That polygon is consistent with the scale proposed by the Bay Program. The HWP Manager continued to serve as the VA representative on the HW Goal team remaining consistent that the Commonwealth will set their own course for long-term protection action. The staffing of the GIT was supported by NHP Landscape Ecologist. The HWP Manager attending the Chesapeake Bay Goal Team meetings on 10/21, 12/13, 2/14/22, 4/11/2022. As the Virginia Administration changed, the HWP indicated that a briefing with the new DCR Management and Cabinet was being planned and to determine the direction and level of support for meeting those CB Goals. However, the intent from the Commonwealth is to submit new shapefile to be considered for revision toward a more manageable target.

The challenge posed by the new polygon (SCU to SCC) is that conservation planning on a watershed basis would be divergent from the opportunistic approach under which some conservation actions are achieved and that the effort for Project Review would significantly change. Project Review at the HWP would see an increase in projects that would be included as part of Environmental Review for the Division because the area under consideration would increase. The HWP Manager, staff from the Data Management, Biotics and Project Review discussed the challenges and opportunities. No resolution was reached during the reporting period. However, revised language was proposed for Project Review to consider as a means to address those sites that would be added to their workload. No timeline is possible to develop the finalized SCC due to the complexity of changing workloads for each section. This grant has not supported the development of SCCs, directly but has been a contributor as it will inform the outcome of conservation-based actions on the ground. The HWP Manager has discussed the possible outcome whereby the SCCs would inform HW conservation and planning actions but not directly affect those actions under the Environmental Review Section.

As mentioned in the previous section, the HWP Manager leveraged the resources within the VCU from both faculty and graduate students. The previously referenced graduate student sought a continuation of their internship toward applied skills for aquatic resource conservation. The intern, with additional guidance and input from faculty, began the process to integrate those tools, data of ecological health, 303d listed Impaired waters with TMDLs and WIPs. The intended approach was to prioritize those data to inform the geographic areas the new HWP Field Coordinator would focus their efforts. Due to student and faculty commitments, the project was abandoned before significant progress was made toward that prioritization and data analysis phase, leaving that effort to be conducted by the new HWP Field Coordinator as a first task

Product #4: Estuarine Healthy Waters, Oyster replenishment in the Coastal Zone (5%)

A small portion of this grant from CZM directly supports Virginia Oyster Shell Recycling Program (VOSRP). The goals are to reclaim waste oyster shell and return it to the Virginia portion of the Chesapeake Bay and it directly connects to VCU and the Rice Rivers Center foci

of education, research and community engagement. During the reporting period, the effort was to continue to expand the geographic reach of VOSRP and develop additional communication materials for public outreach. The majority of support sustaining the VOSRP is from an anonymous charitable contribution, but also is supported through assistance from the VCU Foundation, Universal Leaf, Toadfish Coalition, and other small donations.

During the reporting period, a new community recycling location was established in Deltaville. Support for this location was developed in previous grant cycle but the final installation was completed with a ribbon cutting event in 2022. Ambrose Waste generously donated the container and offered a discounted hauling fee to the VOSRP. Signage was included in the container recognizing all the partners involved including; VCZM, NOAA, Middlesex County, Middle Peninsula Planning District Commission, VPPSA and the local Master Naturalists



Photo 1: Ribbon Cutting at Deltaville Installation



Photo 2: Ceremonial dumping of recycled shell at Deltaville container



Photo 3: Signage on the Deltaville shell recycling container

VOSRP's partnerships with the commercial fishing industry continues to realize benefits to collecting and returning shell to the ecosystem. The partnership with J&W Seafood continues to include support from EJ Wade Construction to assist in bulk movement of recycled shell from the RRC to Gwynn's Island. The 2022 field season permitted only hands-on field activity in the middle peninsula which focused on the continued research on the larval strike success on fossil shell. As in the previous reporting period, the Virginia Marine Resources Commission (VMRC) approached VOSRP with the opportunity to compare the larval strike rate on fossil shell, shuckhouse and recycled shell. The study evaluated the strike success by analyzing if there was variability in setting based on a random, stratified design. Both the fossil shell and the shuckhouse shell was stratified and randomly collated into the recycled shell. Two tanks were

used with 230 bags of recycled shell, 10 bags of fossil and 10 bags of shuckhouse shell per tank. Methods were developed and a QA/QC process was identified to permit the process to have precision, accuracy, repeatability and consistency. An entire weeklong field event was based around the quantification of strike success on the types of shell. The conclusion from that study has not yet been published nor made publicly available at the time of grant reporting. However, statistically significant differences were noted between the type of shell and rate of success. The VMRC requested the analysis be summarized in strike per liter of shell material but the analysis included strike per shell material and by surface area. The opportunity for the volunteers to participate in the research aspect was an additional benefit from this year’s efforts. The hands-on experience with fossil shell was recognized as a special event for all participants.

The VOSRP hosted hands-on educational and experiential opportunities for the public at the RRC. Shell bagging at the RRC continued on a monthly basis during the fall-winter with full capacity events.

| Event | Date | Details | # of Vols | Hours | Total Hours Effort | Volume |
|------------|--------------|-----------------------------|-----------|-------|--------------------|--------|
| Bagging | 1/23/2021 | | 7 | 3 | 21 | |
| Event | 1/23-31/2021 | Kilmarnock Bin | 10 | 2 | 20 | 14300 |
| Bagging | 3/18/2021 | | 15 | 3 | 45 | |
| Bagging | 4/1/2021 | | 12 | 3 | 36 | |
| Bagging | 4/6/2021 | | 15 | 3 | 45 | |
| Bagging | 4/15/2021 | Rivanna Waste | 9 | 3 | 27 | |
| Bagging | 5/1/2021 | | 9 | 3 | 27 | |
| Tank Prep | 5/22/2021 | | 4 | 4 | 16 | |
| Larvae Set | 5/24/2021 | | 1 | 2 | 2 | |
| Event | 5/27/2021 | MN Presentation | 0 | 0 | 0 | |
| Hauling | 6/6/2021 | Blizzard | | | | 40000 |
| Planting | 6/14-18/21 | | 82 | 2 | 164 | |
| Planting | 7/12-16/21 | | 75 | 2 | 150 | |
| Planting | 8/2-4/21 | | 69 | 2 | 138 | |
| Bagging | 10/2/2021 | | 8 | 3 | 24 | |
| Event | 10/4/2021 | Covenant Woods Presentation | 0 | 0 | 0 | |
| Bagging | 10/16/2021 | | 11 | 3 | 33 | |
| Bagging | 11/13/2021 | | 16 | 3 | 48 | |
| Event | 11/13/2021 | VLM | 8 | 6.5 | 52 | |
| Bagging | 12/11/2021 | | 12 | 3 | 36 | |
| | | | 363 | | 884 | 54300 |

Table 1: 2021 Total Events and Hauling

| Event | Date | Details | # of Vols | Hours | Total Hours Effort | Education Hrs | Volume |
|---------|-----------|---------|-----------|-------|--------------------|---------------|--------|
| Bagging | 2/5/2022 | | 12 | 3 | 36 | 0.25 | |
| Bagging | 2/19/2022 | | 13 | 3 | 39 | 0.25 | |
| Event | 3/5/2022 | Kiwanis | 5 | 2 | 10 | | |

| | | | | | | | |
|---------|------------|-----------------|----|-----|----|------|-------|
| Event | 3/19/2022 | MN Field trip | 11 | | | 1.5 | |
| Bagging | 3/19/2022 | | 12 | 1.5 | 18 | | |
| Bagging | 3/26/2022 | | 8 | 3 | 24 | 0.25 | |
| Bagging | 4/10/2022 | | | | | | |
| Hauling | 7/7/2022 | TFC Richmond | | | | | 13560 |
| Hauling | 7/7/2022 | TFC Richmond | | | | | 14160 |
| Hauling | 10/10/2022 | Cville | | | | | 11000 |

Table 2: 2022 Combined Events and Hauling

While shell recycling continues to be impacted by lingering effects of the COVID-19 pandemic on restaurants and businesses the VORSP program was able to recycle significant volumes of shell in 2022 with three containers moved from both Richmond and Charlottesville totaling 38,720lb.



Photo 5: Emptying recycled shell of 20yd Richmond can



Photo 4: Emptying recycled shell of the 20yd Richmond Can



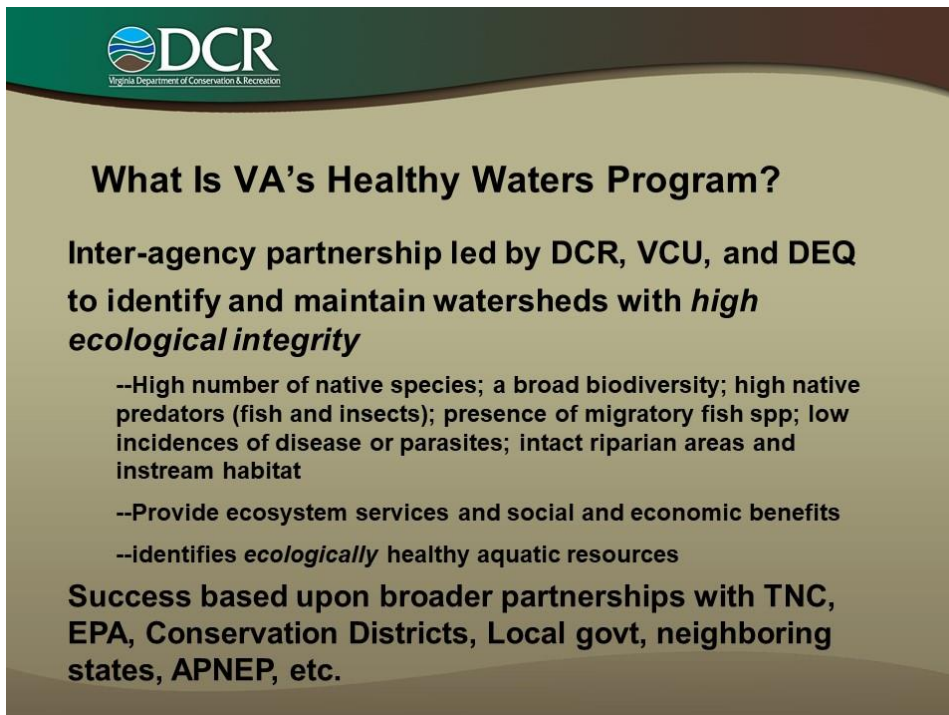
**Healthy Waters Program
at
VDCR Natural Heritage Program**

Todd V. Janeski
VCU RRC and VADCR, Natural
Heritage

Greg Garman, McIninch, S., Shuart, W.,
VCU RRC



Logos for VCU, EPA, NOAA, and DCR are displayed at the bottom of the slide.



DCR
Virginia Department of Conservation & Recreation

What Is VA's Healthy Waters Program?

Inter-agency partnership led by DCR, VCU, and DEQ to identify and maintain watersheds with *high ecological integrity*

- High number of native species; a broad biodiversity; high native predators (fish and insects); presence of migratory fish spp; low incidences of disease or parasites; intact riparian areas and instream habitat
- Provide ecosystem services and social and economic benefits
- identifies *ecologically* healthy aquatic resources

Success based upon broader partnerships with TNC, EPA, Conservation Districts, Local govt, neighboring states, APNEP, etc.

What Is VA's Healthy Waters Program?

- Began 2002 as an aquatic living resources inventory, initiated by Virginia DCR & VCU
- Expanded to a stream and river bioassessment program with support from DCR, VCZMP, DEQ, and EPA
- Objective, quantitative, and statistically-valid approach to identify healthy waters and watersheds based on ecological integrity
- Currently, VCU database has 30,000 records, 4,500K collections, and 4,000K streams
- A blue/green conservation program that benefits water quality but is non-regulatory

Why Healthy Waters?

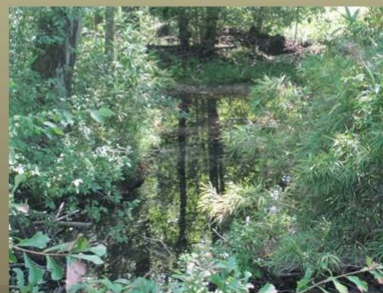
- Population growth and development, land conversion, loss of riparian buffers, and more impervious surface area
- Thousands of known WQ impairments and weak anti-degradation rules
- Restoration is a daunting and expensive challenge... and frequently fails to restore the Biology, which provides ecosystem services
- Declining aquatic ecological health overall
- Healthy Waters = Healthy Chesapeake Bay
- We need to identify and conserve those surface water systems that remain relatively high-function

Interactive Stream Assessment Resource (INSTAR)

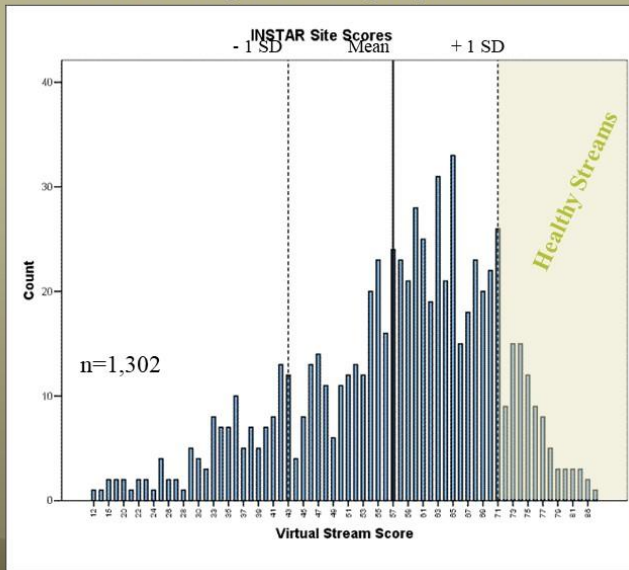
- Multi-metric ecological assessment - physical condition of streams, habitat, fish and macro invertebrate assemblages
- It uses high quality archival and field collected data through a probabilistic sampling approach
- All data and the assessment methodology is available on an interactive, searchable website housed by VCU:
<http://instar.vcu.edu/>

Reference Model Metrics

- Species Richness (native spp.)
- Ecological Diversity (Shannon index)
- Ecological Evenness
- Number of species in taxonomic guilds (darters, sunfishes)
- Functional guilds (cyprinid insectivores, benthic insectivores, apex predators, benthic cryptics)
- Tolerance guilds (sediment, chemical, biological; coastal plain specialists)



Stream Ecological Integrity Classes



'Healthy'
defined as
>71%
comparable to
appropriate
regional
reference
condition

Comparison of Approaches to Stream Assessment

RBP/IBI/VSCI

- 8 to 12 metrics
- fish or bugs or habitat
- physical reference sites
- reliance on BPJ
- one size fits all...
- targeted or probmon
- trend analysis

INSTAR

- >50 potential metrics
- integrative
- model reference conditions
- reliance on statistics and BPJ
- eco-region/ basin models
- probmon
- trend analysis

How might Healthy Waters data be used?

- Targeting healthy watersheds for Agricultural BMP Cost-Share Program funding
- Updating conservation mapping and disseminating healthy watershed information to localities through NHP Locality Liaison
- Building partnerships for similar outcomes
- Implement land conservation strategies—acquisition, easements, livestock exclusion, forested buffers, etc

How might Healthy Waters data be used?

- Streams identified as "healthy" or "outstanding" are integrated into the Biotics database at DCR-Natural Heritage as Element Occurrences (EOs) and Stream Conservation Units (SCUs).
- These data products help guide conservation partners:
 - Create, maintain, or expand riparian buffers
 - Protect headwater streams and natural stream channels
 - Maintain natural stream flow to ensure aquatic habitat consistent with healthy ecosystems
 - Targeting healthy watersheds for Agricultural BMP Cost-Share Program funding
 - Leverage other funding programs for conservation

Healthy Waters Program Field Coordinator

The HWP Manager was able to garner support from the NHP Manager, VCZM Director and VCU to increase field capacity for the Program to establish a HWP Field Coordinator (FC).

The HWP FC will:

- Take those tools created at the NHP and work closely with conservation partners to advance those conservation actions from planning tools into tangible implementation.
- Advance VA toward achieving the Healthy Watershed Goal by 2025
- Be supported through resources from VCZM, USEPA Section 319 and Chesapeake Bay Implementation Grant.
- Would leverage the application of agricultural or forestry best management practices to meet local TMDL WIP measures in impaired but ecologically healthy waters.
- Will likely leverage the work of the eight (8) Coastal Planning District Commissions (PDCs) to assist coastal communities, Conservation Districts, VDOF, Land Trusts, Nature Conservancy and coordinate with other agencies on HWP community-based natural resource identification and protection.
- Will primarily target areas in the Chesapeake Bay Watershed both upper and coastal areas.

EPA Key Elements for Watershed Implementation Plan (“a.-i.”)

- A. Identify and quantify causes and sources of impairments
- B. Estimate expected load reductions
- C. ID BMPs and critical areas to achieve load reductions
- D. Estimate needed technical and financial resources
- E. Provide info, education and public participation component
- F. Include schedule for implementing NPS management measures
- G. ID interim measurable milestones for implementation
- H. Establish criteria to determine if load reductions are achieved
- I. Provide a monitoring component to evaluate effectiveness

A-I Criteria for Ecologically Healthy Watershed Consv

- A. Quantify and verify the empirical basis for aquatic communities identified with high ecological integrity
- B. Identify the conditions needed to maintain existing ecological integrity
- C. Identify the best management practices and other preventative actions to achieve and maintain the system with high ecological integrity
- D. Estimate needed technical and financial resources
- E. Provide info, education and public participation component
- F. Include schedule for implementing NPS management measures
- G. ID interim measurable milestones for implementation
- H. Establish criteria to determine high ecological integrity is maintained, at baseline conditions
- I. Provide a monitoring component to evaluate effectiveness



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Healthy Waters Program Overview

The Healthy Waters Program (HWP) is an inter-agency program led by DCR and the Virginia Commonwealth University (VCU) in partnership with DEQ to identify and maintain watersheds with high ecological integrity. The Commonwealth of Virginia defines ecologically healthy waters and watersheds as those that maintain high ecological integrity when viewed in a holistic assessment approach that addresses in-stream habitat, stormwater inputs, invasive species and natural flows.

HWP began 2002 as an aquatic living resources inventory, initiated by Virginia DCR and was expanded to a stream and river bioassessment program which uses an objective, statistically-valid approach to identify ecologically healthy waters and watersheds based on ecological integrity. The HWP is a non-regulatory blue/green conservation program that benefits water quality.

The HWP has included a multiagency partnership from its inception. NHP manages the HWP and provides program administration; data management and tool development; assistance with field data collection; programmatic oversight; and coordination with land trusts, local governments and others toward conservation of identified Healthy Waters. DEQ has provided significant data and funding from USEPA Section 319, CBIG and NOAA CZM to support the Program with ongoing partnerships with VDOF, NGOs and the private sector assisting in broadening the applicability of the Program. VCU has provided the majority of the significant technical, field data collection, model development and data management services. This partnership continues to grow a comprehensive aquatic resource assessment program to identify and protect the most biologically diverse and valuable aquatic resources in the Commonwealth. The HWP continues to collaborate with the DEQ, VCU, EPA, the Albemarle-Pamlico National Estuary Program, the Nature Conservancy, the North Carolina Department of Natural Resources and private land brokers to advance the identification and conservation of natural resources. The Healthy Waters Program is continually self-evaluating to fine tune the direction of the Program.

The Natural Heritage Program's (NHP) mission is conserving Virginia's biodiversity through inventory, protection, and stewardship. The Virginia Natural Area Preserves Act, 10.1-209 through 217 of the *Code of Virginia*, was passed in 1989 and codified DCR's powers and duties related to statewide biological inventory: maintaining a statewide database for conservation planning and project review, land protection for the conservation of biodiversity, and the protection and ecological management of natural heritage resources.

Traditionally, water quality-based programs have emphasized the assessment of streams to determine if water bodies meet water quality standards with a subsequent restoration plan to improve degraded surface waters. While this is a critical activity to provide the Commonwealth a healthy ecosystem, it is equally as important to seek viable opportunities for best management practices to protect streams that are already considered to have high aquatic, ecological integrity. It is economically and ecologically preferable to conserve and protect healthy ecosystems than to

restore them after they have been damaged. Agricultural BMPs may serve a key role in the protection of healthy waters and healthy watersheds. The health of streams is tightly linked to the watersheds of which they are a part. There is a direct relationship between land cover, key watershed processes and the health of streams. Therefore, the Healthy Waters program operates from a basic understanding: the conservation and protection of healthy waters is ecologically and economically prudent and deserves consideration over expending often exorbitant resources in attempts to restore streams after they have been damaged.

Healthy streams in Virginia have been identified and ranked through a stream ecological integrity assessment known as the [Interactive Stream Assessment Resource \(INSTAR\)](#), as “outstanding”, “ecologically healthy”, “restoration candidate” or “compromised.” INSTAR is designed to assist individuals with planning and land use decisions by identifying healthy streams in their communities and encouraging their protection. *ConserveVirginia* has been identified in the Chesapeake Bay Watershed Implementation Plan Phase III (WIP III) to play an important role in meeting water quality goals. The Healthy Waters Program is identified in the FY20-23, 24-25 CBIG Workplans as Objective 9 with the output: *Provide information to facilitate improved resource protection in the Commonwealth, and to advance the identification and protection of those ecologically healthy sites, referred to as: Healthy Waters. Develop technical assistance tools and publications regarding the health and restoration of the Chesapeake Bay.* The *ConserveVirginia* tool will be used to maximize the benefits derived from land conservation efforts within the State and is designed to include regular updates as new data are available and priorities refined, such as the inclusion of ecologically healthy waters.

The Virginia HWP has continued to represent the Commonwealth in the Chesapeake Bay Program Goal Implementation Team Four (GIT4; Healthy Watersheds). The HWP Manager has begun tracking the Fish Passage, Habitat, Brook Trout, and Stream Health Goal Teams. Virginia has committed to a Chesapeake Bay Program goal of 100 percent of state-identified, currently healthy waters and watersheds to remain healthy, as identified in 2014, by 2025. This goal was set by the Healthy Watersheds GIT and, for Virginia, is based on VCU collected INSTAR data, and the identified Healthy Waters and subsequent SCUSs in the Chesapeake Bay watershed.

A-I Criteria for Conserving Ecologically Healthy Waters

Adapting Watershed Planning Elements to a Conservation Plan

A deliverable of this project is the adaptation of EPA's Nine Key Elements of Watershed Planning to create Healthy Watersheds Implementation Plan. The Project Team used an iterative and cooperative approach to adapt the planning elements with a focus on protection. As the lead nonpoint source agency, VDEQ was directly engaged in the development of these planning elements.

In 2004, EPA issued Federal Guidelines for the Award of Section 319 Nonpoint Source Grants to States and Territories. This guidance identified nine key elements that are critical for achieving improvements in water quality. EPA requires that these nine elements be addressed in watershed plans funded with incremental Clean Water Act section 319 funds and strongly recommends that they be included in all other watershed plans intended to address water quality impairments. For purposes of this project, the nine key elements are not directly applicable because the project is designed to proactively protect aquatic integrity rather than restore impaired waters. The deliverable of this project was to recommend conservation-based planning elements that would be applicable to future conservation-based watershed plans.

The planning team developed these conservation-based watershed planning elements considering how each element could be adapted to a Healthy Watershed Plan. To guide this effort the team identified fundamental differences between conservation-based planning and restoration-based planning. One consistent difference was the need to integrate ecosystem-based principles into the elements. This approach moves beyond physical and chemical water quality parameters and considers a holistic systems-based approach.

The team also considered differences between monitoring, resource assessment and that the actions typically taken to conserve natural resources may differ from corrective actions taken to restore degraded water quality. Protection measures such as land conservation and land use plan and ordinance development are strong factors for consideration. While code and ordinance conservation provisions were not the highest priority for conserving Healthy Waters in the Chowan Basin, they may be the most important components for other watersheds. Typically, the *A-I Criteria* is used as part of a watershed restoration strategy identifying the following points:

- A. Identify and quantify causes and sources of impairments
- B. Estimate expected load reductions
- C. Identify BMPs and critical areas to achieve load reductions
- D. Estimate needed technical and financial resources
- E. Provide information, education and public participation component

F. Include schedule for implementing NPS management measures

G. Identify interim measurable milestones for implementation

H. Establish criteria to determine if load reductions are achieved

I. Provide a monitoring component to evaluate effectiveness

This iterative approach resulted in the following A-I Elements that were applied in developing the watershed-based plans in the Chowan Basin, referred to as the *A-I Criteria for Ecologically Healthy Watershed Conservation*:

A. Quantify and verify the empirical basis for aquatic communities identified with high ecological integrity

The watershed plan should include detailed description of assessments and those data that characterize an ecological basis for conservation, accompanied by a detailed map identifying those specific features and conditions. The plan should identify those aquatic community assessments, terrestrial assessments; National Land Cover Data; VA Department of Forestry Forest Conservation Values; catalogue of existing ownership and other relevant information quantify ecological health and aquatic integrity and inform prioritization. The conclusions are based on aquatic and terrestrial data and assessments that clearly identify ecological health. For Virginia, initial assessments utilize a remote assessment to identify prioritizations based on a modified Index of Terrestrial Integrity (mITI), to classify all 12-digit HUCs and to identify a prioritized subset of HUCs with high terrestrial integrity *prior to* on-the-ground stream and site assessment. By focusing on HUCs with relatively high terrestrial integrity, the ability to more effectively leverage the limited resources available for fieldwork improves the ability identify new Healthy Waters locations for conservation and protection activities. A field-based VA Department of Conservation and Recreation, Natural Heritage Division INSTAR assessment is the basis for identifying aquatic integrity to inform the development of Healthy Waters sites. This element will include an accounting of the significant terrestrial and aquatic natural resources within the basin.

B. Identify conditions needed to maintain existing ecological

On the basis of the assessed existing ecological condition and characterization the plan will identify the area that would most likely be recommended for protection. Those areas will be variable based on the previous assessments but will be informed by National Land Cover Data, VA Natural Heritage Division data relevant to maintaining the ecological condition, existing conservation easements, and INSTAR data. An assessment that concludes with an indication of ecological aquatic health is based on the existing

baseline conditions, therefore it is implied that those current conditions, if maintained, will ensure that classification.

- C. Identify best management practices, preventative and protective actions to achieve and maintain the system with high ecological integrity

The plan should identify those specific actions required to ensure the assessed ecological condition is maintained. These might include such practices as direct acquisition of land, conservation easements with specific language relevant to the protection of aquatic integrity or the application of increased standards for water quality protection or improvement such as those identified in the Sustainable Forestry Initiative.

- D. Estimate needed technical and financial resources

The plan should estimate the financial and technical assistance needed to implement the entire plan. This includes implementation and long-term operation and maintenance of management measures, I/E activities, monitoring, and evaluation activities. The plan should also document which relevant authorities might play a role in implementing the plan. Plan sponsors should consider the use of federal, state, local, and private funds or resources that might be available to assist in implementing the plan. Shortfalls between needs and available resources should be identified and addressed in the plan.

- E. Provide information, education and public participation component

The plan should include an I/E component that identifies the education and outreach activities or actions that will be used to implement the plan. These I/E activities may support the adoption and long-term operation and maintenance of management practices and support stakeholder involvement efforts.

- F. Include schedule for implementing best management measures

You should include a schedule for implementing the management measures outlined in your watershed plan. The schedule should reflect the milestones you develop in section G.

- G. Identify interim measurable milestones for implementation

The plan will include interim, measurable milestones to measure progress in implementing the management measures for your watershed plan. These milestones will measure the implementation of the management measures, such as whether they are being implemented on schedule, whereas element h (see below) will measure the effectiveness of the management measures, for example, by documenting those actions to protect aquatic integrity.

H. Establish criteria to determine high ecological integrity is maintained at baseline conditions

As projects are implemented in the watershed the plan should include specific benchmarks to track progress. The criteria in element h (not to be confused with water quality criteria in state regulations) are the benchmarks or waypoints to measure against through monitoring. These interim targets can be direct measurements or indirect indicators of resource protection. The plan should also indicate how to determine whether the watershed plan needs to be revised if interim targets are not met. These revisions could involve changing management practices, updating the loading analyses, and reassessing the time it takes for pollution concentrations to respond to treatment.

I. Provide a monitoring component to evaluate effectiveness

The watershed plan should include a monitoring component to determine whether progress is being made toward attaining or maintaining the applicable characterization based on the outcome of the assessments. The monitoring program should be fully integrated with the established schedule and interim milestone criteria identified above. The monitoring component should be designed to track the progress of protecting those critical resources and maintaining the existing conditions as assessed. Watershed-scale monitoring can be used to measure the effects of multiple programs, projects, and trends over time. Instream monitoring does not have to be conducted for individual BMPs unless that type of monitoring is particularly relevant to the project.