# Outcomes Estimation Tools Training Webinar Series

**Featuring:** Chesapeake Assessment

Scenario Tool (CAST)

June 5, 2024 Noon to 1:30 pm eastern Aysha Tapp Ross Water & Soil Health Scientist

Jen Tillman Research Scientist

**American Farmland Trust** 

## Agenda



- Welcome, Poll (10 min)
- CAST presentation (15 min)
- CAST demonstration (40 min)
- Q&A (25 min)







## **Zoom Webinar Reminders**

- Use Q&A Box last 15 minutes (Vote up!)
- Use Zoom Direct Message feature to Jen if having technical difficulties
- Email with resources to follow each webinar
- Recordings posted on the webinar series site the following Monday
- Evaluation survey in the Chat Box
  - Complete to be entered to win a \$25 gift card!!





## Time for 3 polls!



### Tools in 2023 Trainings\*

May 3: Webinar Launch & PCOC (recording)

June 7: Model My Watershed (recording)

July 12: Nutrient Tracking Tool (NTT) (recording)

August 2: NRCS Cover Crop Economics Tool (economic) (recording)

September 6: FieldPrint Platform (recording)

October 4: EPA PLET (water quality) (recording)

<u>November 1: PTMApp Web Tool (water</u> <u>quality)</u> (recording)

December 6: AFT Retrospective-Soil Health Economic Calculator (R-SHEC) Tool (recording)

### Tools in 2024 Trainings\*

January 10: SIPES Method/SIDMA Tool (recording)

February 7: Fast-GHG (climate) (recording)

March 6: Cool Farm Tool (climate) (recording)

<u>April 3: Critical Source Area Identification and</u> <u>Management</u> (recording)

<u>May 1: COMET-Farm & COMET-Planner</u> (climate) (recording)

### June 5: CAST Tool (water quality)

July 10: NEW!! Agriculture Conservation Planning Framework (ACPF)





Data + Research + Analysis + Strategy

June 5, 2024

## Chesapeake Assessment Scenario Tool and Associated Data Resources



## Hello!

My name is Olivia Devereux and I use she/her pronouns.

I am here to talk about quantifying water quality outcomes. I work at Devereux Consulting where I help develop linked management and watershed models.

My Masters of Science in Soil Science helps to ensure our work is applicable to conservation project managers.

Devereux Consulting performs work with USGS, Delaware Department of Natural Resources and Environmental Control (DNREC), and conservation districts. We also are contractor to the Chesapeake Bay Program, where our role is developing and supporting CAST. 2

### Agenda



### **Nitrogen and Phosphorus Sources**

Show the Trends Over Time graphs and discuss the types of questions these can answer

https://cast.chesapeakebay.net/Home/TMDLTracking#trendsOverTimeSection



### **Scenarios**

How to create and compare your own, unique scenarios using climatesmart practices as examples Log in to <u>https://cast.chesapeakebay.net</u>



### Project Level Outcomes

How to generate various types of reports at different geographic scales and how to assess ecosystem benefits of practices <u>https://cast.chesapeakebay.net/ecohealth/index</u>

## **4**

### Resources

How to get additional information and support from the CAST Team

| Snapshot of Features            | CAST   |
|---------------------------------|--|
| Scale & level of<br>specificity | Output represents the sub-county fate and transport of nutrients and sediment<br>from the land to the water and vary with land use and management practices.<br>Project or farm-specific scales can be modeled by using the loading rate (pounds<br>per acre) for each land use.<br>Hydrology is an average hydrological period and does not reflect the actual rainfall<br>in a wet, dry, or other specific year. This provides an estimate of expected load in the<br>future.  |
| Outcome                         | <b>Data to inform decision making</b> for establishing water quality improvement plans<br>and translate BMPs into ecosystem benefits, maps, and graphs. Specific numeric<br>output is the <b>pounds</b> or <b>pounds per acre</b> of nitrogen, phosphorus, and sediment.   |
| Conservation<br>practices       | Various types of: Cover Crops, Manure Transport, Land Retirement, Ammonia<br>Emissions Reductions, Denitrifying Ditch Bioreactors, Nutrient Management, Feed<br>Additives, Forest Buffers, Animal Waste Management Systems, Water Control<br>Structures, Tillage, Pasture Management, Blind inlets, Animal Mortality, Carbon<br>Sequestration/Alternative Crops, Access Area, Manure Incorporation, Feeding Space<br>Management, Crop Irrigation Management, Wetland Restoration, Wetland Creation,<br>Grass Buffer, Saturated Buffers, Tree Planting, Ag Stormwater Management, Ditch<br>Filter, Off Stream Watering without Fencing, Conservation Plans, Irrigation Water<br>Capture Reuse |

| Snapshot of Features  | CAST   |
|---|--|
| Land uses & production systems  | Agricultural land uses include Permitted and Non-Permitted Feeding Space, Grain<br>with and without Manure, Specialty Crop High, Small Grains and Grains, Full Season<br>Soybeans, Specialty Crop Low, Double Cropped Land, Silage with and without<br>Manure, Other Agronomic Crops, Leguminous Hay, Other Hay, Riparian Pasture<br>Deposition, Pasture, and Ag Open Space<br>Developed, natural, septic, and wastewater are also included. |
| States & territories  | <b>Chesapeake Bay</b> states including New York, Pennsylvania, West Virginia, Delaware, Maryland, Virginia, and the District of Columbia.  |
| How much time,<br>data, & skills needed<br>to generate an<br>outcome estimate | CAST is designed to be used by <b>any person familiar with conservation practices</b> .<br>The amount of time depends on the type of question being asked and ranges from 5 minutes to hours if working through development of a plan to meet a specific planning goal of pounds reduced.  |
| Targeting maps  | BMP Targeting maps have been created using CAST delivery factors and 2022<br>Progress loads to communicate which land-river segments in the watershed would<br>be <b>most effective for BMP targeting</b> .<br>https://experience.arcgis.com/template/1dab55bd52e843d0a619f52b86e0c663/  |

## Is CAST right for you? $\equiv$

Geography: Working in a state that drains to the Chesapeake Bay

Time period: Land use is available for 1985 to 2025. BMP history is available for 1985 to the present(ish)

**Scale**: County, project, state, watersheds of various sizes from the Chesapeake Bay watershed down to HUC-12s

Runoff concerns: Total nitrogen, total phosphorus, and total suspended sediment

### Benefits:

- No need to download or maintain any special software
- Free
- Official tool used by the Chesapeake Bay Program for evaluating the Bay TMDL, which is why it was originally developed in 2011

## Is CAST right for you? ===

Scale of Inputs: Most agricultural inputs are from the USDA data and are at the county scale.

**Time period**: While we include data back to 1985, the management practice data is better in years after 2006. The model is an annual average predictive model, so uses average hydrology—wet/dry years not reflected in estimates.

Maps: GIS features for explicit planning are not yet incorporated, but maps will be added in the next year or two.

Runoff concerns: Does not yet include carbon, bacteria, or any other co-benefits to nutrient and sediment reduction

#### Limitations:

- Does not model the nutrient balance on a farm or field. Users can consider the nutrient applications as if an entire county were a farm. Variations within counties are only estimated in terms of landscape and stream characteristics.
- Management practice data is more limited in years prior to 2006.
- Does not vary load predictions by wet/dry years.
- GIS functionality not yet incorporated and even when it is, we will not be able to show USDA PII data of common land units (CLUs)
- Modeled pollutants limited to TN, TP, and TSS.

### Projects CAST Has Been Used for

| Group   | Location   | Project Description   |
|---|--|---|
| Sustainable<br>Chesapeake (NGO)                                       | Chesapeake Bay Watershed                                       | Used CAST to run an analysis to demonstrate the value of manure injection on farms and advocate for wider adoption of this practice   |
| Conservation<br>Innovation Fund<br>(NGO)                              | Various projects throughout<br>the Chesapeake Bay<br>Watershed | Uses CAST to value Mid-Atlantic Climate Smart Commodities<br>and MD Clean Water Commerce Act projects undertaken by<br>agricultural producers. This pay-for-performance approach<br>generates scope three supply chain insets for corporations. |
| RES (for-profit company)  | Chesapeake Bay Watershed                                       | Ecological restoration company using CAST to estimate nutrient<br>and sediment reductions for proposed stream restoration<br>projects   |
| Susquehanna River<br>Basin Commission                                 | NY, PA, MD   | Requires all Conowingo WIP grant applicants to submit CAST<br>load reduction estimates to justify the impact of their proposed<br>projects  |
| Forestry Workgroup<br>of the Chesapeake<br>Bay Program<br>Partnership | Chesapeake Bay Watershed                                       | Updating the <u>Chesapeake Progress Forest Buffers Indicator</u>  |



## Nitrogen and Phosphorus Sources

Show the Trends Over Time graphs and discuss the types of questions these can answer

#### **RESOURCES** —





#### Generate the graph

Nitrogen Edge of Stream by Source and Year

1,200,000-Load Source Agriculture 900,000-Developed Forests, wellands oreline, and streams 600,000+ Non-Tidal Water Septic and RIB 300,000-30-20-10-2015 2018 2021 Velar

### **Track Progress**

View helpful information on verification, river trends, how to submit progress via NEIEN, and modeling Federal Facilities.

View trends for loads, nutrients, animal units and septic systems for Bay jurisdictions from 1984 through 2025.

- BMPs implemented
- Loads delivered to the streams and the Bay
- Wastewater
- Nutrients applied to the land
- Animal numbers
- Septic systems
- Manure transport
- Tidal water quality trends



#### **Chesapeake Assessment Scenario Tool**

HOME NEWS PUBLIC REPORTS LEARNING ABOUT CONTACT US

#### Manure Transport

#### Manure Transport - Dry Tons

View the net dry tons of manure transported for each county (Negative values represent net outflows). Select states/counties, animals, and a range of years from 2001 through 2025.

#### Manure Transport - Percent

View the total dry tons of manure transported for a county as a percent of that county's yearly total. Select a range of years from 2001 through 2025.

#### Manure Transport Map

View the net dry tons of manure transported for each county. Select a year between 2000 and 2025. Results are displayed by county. Hover the cursor over a county to view county name and tons of manure transported. To animate the map, select a starting year and press the 'play' button under the year slider.



#### Manure Transport: Percent of Yearly Frederick (MD) Total



#### Chesapeake Assessment Scenario Tool

#### HOME NEWS PUBLIC REPORTS LEARNING ABOUT CONTACT US

#### Animals

3

#### Animal Units

View the number of animal units by animal group and load source. Select a range of years from 1984 through 2025.

#### Animal Units Per Acre

View the number of animal units and animal units per acre (i.e., feed space acres and acres eligible to receive manure). Select a range of years from 1984 through 2025.

#### Animal Map

View the number of animal units by animal groups (i.e., livestock and poultry). Select a year from 1984 through 2025. Results are displayed by county. Hover the cursor over a county to view county name and number of animal units. To animate the map, select a starting year and press the 'play' button under the year slider.

Note: An animal unit is 1,000 pounds of live animal.

| Subset the data  |                  |              |             |              |          |           | Ch  | oose th  | • Y av | rie                      |
|--|------------------|--------------|-------------|--------------|----------|-----------|-----|----------|--------|--------------------------|
| Stato  |                  | Ani          | imal Groun  |              |          |           | Va  | vic      | e 1-a/ | 45                       |
| MD   |                  |              | ivesteck [  | ,<br>Doultor |          |           |     | nimal II | nito   |                          |
| WD   |                  | •            | IVESIOCK, I | ouluy        |          | •         |     | Animai U | niits  |                          |
| County   |                  | Loa          | ad Source   |              |          |           |     |          |        |                          |
| Frederick (MD)   |                  | -            | lon-Permit  | ted Feed     | ding Spa | ace, Pr - |     |          |        |                          |
| Years  |                  |              |             |              |          |           |     |          |        |                          |
| 985  |                  | 2025         |             |              |          |           |     |          |        |                          |
| $\bigcirc$ $\cdot$ |                  | $\mathbf{O}$ |             |              |          |           |     |          |        |                          |
| 1985 1993 2001   | 2009 2017        | 2025         |             |              |          |           |     |          |        |                          |
|  |                  |              |             |              |          |           |     |          |        |                          |
| Generate the grap  | bh               |              |             |              |          |           |     |          |        |                          |
|  |                  |              |             |              |          |           |     |          |        |                          |
| Animal Units   | by Year and Anim | al           |             |              |          |           |     |          |        |                          |
|  |                  |              |             |              |          |           |     |          | Anima  | Name                     |
| 80,000-  | in a sel         | 1            |             |              |          |           |     |          |        | beef                     |
|  |                  |              |             |              |          |           |     |          |        | broilers                 |
|  |                  |              |             |              |          |           |     |          |        | dairy                    |
| 60,000-  |                  |              |             |              |          |           |     |          |        | goats                    |
|  |                  |              |             |              |          |           |     |          |        | hogs and pigs for breedi |
| ste  |                  |              |             |              |          |           | h., |          |        | hogs for slaughter       |
| 10,000-  |                  |              |             |              |          |           |     |          |        | horses                   |
| Ψ.   |                  |              |             |              |          |           |     |          |        | lavers                   |
|  |                  |              |             |              |          |           |     |          | Ξ.     | other cattle             |
| 20.000-  | ▝▀▀╼▃▔▁▁         |              |             |              |          |           |     |          | Ξ.     | other carcie             |
| 20,000   |                  |              |             |              |          |           |     |          |        | pullets                  |
|  | ╶╾╾╸╴            |              |             |              |          |           |     |          |        | sheep and lambs          |
|  |                  |              |             |              |          |           |     |          |        | turkeys                  |
|  |                  |              |             |              |          |           |     |          |        |                          |

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## **Scenarios**

## How to create and compare your own, unique scenarios using climatesmart practices as examples



#### Climate-Smart Agriculture and Forestry (CSAF) Mitigation Activities List for FY2024



Highlighted activities have been added to the list in FY2024. \*Noted activities are added to the list as "provisional."

| Mitigation<br>Categories <sup>(5)</sup> | Code       | Conservation Practice<br>Standard Name <sup>[2] [3]</sup><br>(practice unit) | Code                            | Conservation Stewardship Program (CSP)<br>Enhancement Activities                            |  |  |  |  |
|---|------------|--|---------------------------------|---|--|--|--|--|
| Soil Health                             | <u>327</u> | Conservation Cover (acres)   | E327A                           | Conservation cover for pollinators and beneficial insects <sup>[2]</sup>                    |  |  |  |  |
|   |            |  | E327B                           | Establish Monarch butterfly habitat   |  |  |  |  |
|   | <u>328</u> | Conservation Crop Rotation   | E328A                           | Resource conserving crop rotation   |  |  |  |  |
|   |            | (acres)  | E328B                           | Improved resource conserving crop rotation  |  |  |  |  |
|   |            |  | E328E                           | Soil health crop rotation   |  |  |  |  |
|   |            |  | E328F                           | Modifications to improve soil health and increase soil organic matter                       |  |  |  |  |
|   |            |  | E328N                           | Intercropping to improve soil health  |  |  |  |  |
|   |            |  | E3280                           | Perennial grain crop conservation rotation  |  |  |  |  |
|   | <u>329</u> | Residue and Tillage  | E329A                           | No till to reduce soil erosion  |  |  |  |  |
|   |            | Management, No Till (acres)  | E329B                           | No till to reduce tillage induced particulate matter  |  |  |  |  |
|   |            |  | E329C                           | No till to increase plant-available moisture  |  |  |  |  |
|   |            |  | E329D                           | No till system to increase soil health and soil organic matter content                      |  |  |  |  |
|   |            |  | E329E                           | No till to reduce energy  |  |  |  |  |
|   | <u>332</u> | Contour Buffer Strips (acres)  | ) None Available None Available |   |  |  |  |  |
|   | <u>336</u> | Soil Carbon Amendment<br>(acres)*  |                                 |   |  |  |  |  |
|   | <u>340</u> | Cover Crop (acres)   | E340A                           | Cover crop to reduce soil erosion   |  |  |  |  |
|   |            |  | E340B                           | Intensive cover cropping to increase soil health and soil organic matter content            |  |  |  |  |
|   |            |  | E340C                           | Use of multi-species cover crops to improve soil health and increase soil<br>organic matter |  |  |  |  |
|   |            |  | E340D                           | Intensive orchard/vineyard floor cover cropping to increase soil health                     |  |  |  |  |
|   |            |  | E340E                           | Cover crop to minimize soil compaction  |  |  |  |  |
|   |            |  | E340G                           | Cover crop to reduce water quality degradation by utilizing excess soil<br>nutrients        |  |  |  |  |
|   |            |  | E340H                           | Cover crop to suppress excessive weed pressures and break pest cycles                       |  |  |  |  |
|   |            |  | E3401                           | Using cover crops for biological strip till   |  |  |  |  |
|   |            |  | E340J                           | Cover crop to improve moisture use efficiency and reduce salts                              |  |  |  |  |
|   | 345        | Residue and Tillage  | E345A                           | Reduced tillage to reduce soil erosion  |  |  |  |  |
|   |            | Management, Reduced Till   | E345B                           | Reduced tillage to reduce tillage induced particulate matter                                |  |  |  |  |
|   |            | (acres)  | E345C                           | Reduced tillage to increase plant-available moisture  |  |  |  |  |
|   |            |  | E345D                           | Reduced tillage to increase soil health and soil organic matter content                     |  |  |  |  |
|   |            |  | E345E                           | Reduced tillage to reduce energy use  |  |  |  |  |

### NRCS Climate-Smart Agricultural Practices

<u>https://www.nrcs.usda.gov/sites/defa</u> <u>ult/files/2023-10/NRCS-CSAF-</u> <u>Mitigation-Activities-List.pdf</u>

FARMERS.GOV/CLIMATE-SMART







#### **BMP** Calculations

Understanding how BMPs are calculated will help the user maximize their load reductions. The following topics are addressed in Section 6 Best Management Practices of the Model Documentation: BMP types, BMP groups and sequence of calculation, overlapping and mutually exclusive BMPs, calculation steps with example calculations, and tips for maximizing load reductions.

#### Reports

Each BMP is developed following a Protocol that was approved by the Chesapeake Bay Program Partnership. The Protocol and detailed reports for each BMP are available at the links below. A quick reference guide for BMPs provides general information about some BMPs and how they function within the Chesapeake Bay Program reporting and modeling structure. This Guide provides a single place to learn key information about a selection of BMPs.

- Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model.
- · Expert Panel reports. Click on the publications tab for published reports.
- · Pasture Management/Grazing Report
- · Simpson Weammert-Lane 2009 Report with detailed documentation of many BMPs.
- BMP Reference Guide
- Manure BMP Fast Facts
- Manure Treatment Techologies Fast FAQs
- Credit for Conservation Landscaping

#### Stream Restoration Protocols 2 and 3-Legacy Sediment and Raising the Streambed

We are providing a calculator to assist with determining the load reduced for the Stream Restoration Protocol 3. This calculator provides the pounds of TN, TP, and TSS with inputs provided by you from the flow duration curves, baseflow discharge, channel discharge at the maximum treatable floodplain depth. You can then enter these pounds into your scenario using Add BMPs or uploading a file.

#### Stream Calculator

Unified Stream Restoration Guide

#### **NRCS Practice Names and Codes**

A crosswark of NRCS practice names and codes to the CAST BMP name may be helpful in selecting the CAST BMP that best represents your management action.

USDA Practices, NEIEN, and CAST BMPs

| 1   | A B C D E F G H I J K L M N O P Q R S T U V  | 1  |
|-----|--|----|
| 1 2 | For deliberative purposes only. These may be helpful in selecting the CAST BMP that best represents your management action   |    |
| 3   |  |    |
| 4   | Data Sources   |    |
| 5   | NRCS data shared with USGS through a Memorandum of Understanding dated 2020 through 2025. NRCS data were taken from the National Planning and Agreements Database  |    |
| 6   | (NPAD). Data include those BMPs cost-shared by NRCS, funded by FSA but administered by NRCS technical staff, and NRCS conservation technical assistance. Conservation  |    |
| 7   | Technical Assistance is any practice that is recommended by NRCS, meets NRCS technical standards, and is not funded by USDA.   |    |
| 8   |  |    |
| 9   | FSA data are shared with USGS through a separate Memorandum of Understanding.  |    |
| 10  |  |    |
| 11  | All FSA and NRCS practices are included. Not all FSA and NRCS practices provide a water quality benefit or are accepted by the Chesapeake Bay Program for the Annual Progress  |    |
| 12  | Report. The practice names are those that were present in the Chesapeake bay watershed from the year 2006 to the present.  |    |
| 13  | The NEIEN data were downloaded from CAST and is the version used for the 2021 Progress Assessment. The CAST RMP data were conied from the CAST Source Data table   |    |
| 14  |  |    |
| 15  | Tables   | -1 |
| 16  | There is one table that shows the relationship among NRCS conservation practices, NEIEN BMP names, and CAST BMP names. A similar table exists for FSA data. The NRCS and   |    |
| 17  | FSA information is color-coded pink, NEIEN is color-coded green, and CAST is color-coded blue. Each table includes the following:  |    |
| 19  |  |    |
| 10  | NRCS or FSA practice code, name, and unit  |    |
| 19  | NEIEN BMP name, status, measurement unit, and credit duration  |    |
| 20  | CAST sector, BMP name, measurement unit, and if the BMP is considered official   |    |
| 21  |  |    |
| 22  |  |    |
| 23  | NKCS and FSA practice names and codes include all the NKCS BMPs reported in the Chesapeake Bay Watershed.  |    |
| 24  | The BMDs that are manped in the NEIEN Appendix to CAST BMDs are included. Where BMDs in the NEIEN status column are marked as "release", they are included in the CAST   |    |
| 25  | The own is due mapped in the NELEX Appendix to CAST own is due included, where own is the NELEX status containing are indexed as release , here are indexed and the CAST<br>progress scenarios. NRCS RMCs and a STEEN table of "indexed" and is an indexed as release and the CAST and the Chastness and the NELEX status of "indexed in the CAST and the Chastness and the CAST and the Chastness and the CAST and the Chastness and the CAST and t | _  |
| 26  | be verified The NETRO redit duration reflects the frequency with which BMPs must be inspected for Bay Program verification purposes  |    |
| 27  |  | _  |
| 28  |  |    |
|     |  | 6  |

| 1 | A                   | В   | с                   | D                   | E  | F                             | G             | н   | -         |
|---|---------------------|---|---------------------|---------------------|--|-------------------------------|---------------|---|-----------|
| 1 | NRCS_PracticeCode * | NRCS_PracticeName                                 | NRCS_PracticeUnit * | CAST_BmpShortName * | CAST_BMP ~   | CAST_BMP_Definition           | ParentBmpId * | ParentBmpFullName   |           |
|   |                     |   |                     |                     |  | Any structure designed for    |               |   |           |
|   |                     |   |                     |                     |  | collection, transfer and      |               |   |           |
|   |                     |   |                     |                     |  | storage of manures and        |               |   |           |
|   |                     |   |                     |                     |  | associated wastes             |               |   |           |
|   |                     |   |                     |                     |  | generated from the            |               |   |           |
|   |                     |   |                     |                     |  | confined portion of animal    |               |   |           |
|   |                     |   |                     |                     |  | operations and complies       |               |   |           |
|   |                     |   |                     |                     |  | with NRCS 313 (Waste          |               |   |           |
|   |                     |   |                     |                     |  | Storage Facility) or NRCS 359 |               |   |           |
|   |                     |   |                     |                     |  | (Waste Treatment Lagoon)      |               |   |           |
|   |                     |   |                     |                     |  | practice standards. Enter     |               |   |           |
|   |                     |   |                     |                     |  | units of percent, number of   |               |   |           |
|   |                     |   |                     |                     |  | animals or number of          |               |   |           |
| 2 | 359                 | Waste Treatment Lagoon                            | No                  | awms                | Animal Waste Management System   | animal units.                 | 206           | Animal Waste Managemer  | nt System |
|   |                     |   |                     |                     |  | Any structure designed for    |               |   |           |
|   |                     |   |                     |                     |  | collection, transfer and      |               |   |           |
|   |                     |   |                     |                     |  | storage of manures and        |               |   |           |
|   |                     |   |                     |                     |  | associated wastes             |               |   |           |
|   |                     |   |                     |                     |  | generated from the            |               |   |           |
|   |                     |   |                     |                     |  | confined portion of animal    |               |   |           |
|   |                     |   |                     |                     |  | operations and complies       |               |   |           |
|   |                     |   |                     |                     |  | with NRCS 313 (Waste          |               |   |           |
|   |                     |   |                     |                     |  | Storage Facility) or NRCS 359 |               |   |           |
|   |                     |   |                     |                     |  | (Waste Treatment Lagoon)      |               |   |           |
|   |                     |   |                     |                     |  | practice standards. Enter     |               |   |           |
|   |                     |   |                     |                     |  | units of percent, number of   |               |   |           |
|   |                     |   |                     |                     | and the second | animals or number of          |               |   |           |
| 3 | 359                 | Waste Treatment Lagoon                            | No                  | awms                | Animal Waste Management System   | animal units.                 | 206           | Animal Waste Managemer  | nt System |
|   |                     |   |                     | 1                   |  | Any structure designed for    |               | 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - |           |
|   |                     |   |                     |                     |  | collection, transfer and      |               |   |           |
|   |                     |   |                     |                     |  | storage of manures and        |               |   |           |
|   |                     |   |                     |                     |  | associated wastes             |               |   |           |
|   |                     |   |                     |                     |  | generated from the            |               |   |           |
|   |                     |   |                     |                     |  | confined portion of animal    |               |   |           |
|   |                     |   |                     |                     |  | operations and complies       |               |   |           |
|   | ReadMe              | NRCS_NEIEN_CAST_BMPs FSA_NEIEN_CAST_BMPs Sheet4 + |                     | 20<br>20            | 4  |                               |               |   | Þ         |

| A                                    | B   | с                   | D                   | E  | F  | G             | н                                     | -    |
|--------------------------------------|---|---------------------|---------------------|--|--|---------------|---------------------------------------|------|
| 1 NRCS_PracticeCode   NRCS_Pract     | diceName                                    | NRCS_PracticeUnit * | CAST_BmpShortName * | CAST_BMP   | CAST_BMP_Definition  | ParentBmpId * | ParentBmpFullName                     |      |
| 2↓ Sort Smallest to Largest          |   |                     |                     | a management of the second | Any structure designed for   |               |                                       |      |
| Z   Sort Larnest to Smallest         |   |                     |                     |  | collection, transfer and   |               |                                       |      |
| A Der tel ger tel sine inter         |   |                     |                     |  | storage of manures and   |               |                                       |      |
| Sort by Color                        | 2   |                     |                     |  | associated wastes  |               |                                       |      |
| Sheet View                           |   |                     |                     |  | generated from the   |               |                                       |      |
| Clear Filter From "NRCS_PracticeCode |   |                     |                     |  | confined portion of animal   |               |                                       |      |
| Either by Color                      | x   |                     |                     |  | operations and complies  |               |                                       |      |
| Filter by Color                      |   |                     |                     |  | Storage Eacility) or NBCS 25   |               |                                       |      |
| Number <u>Filters</u>                |   |                     |                     |  | (Waste Treatment Laroon)   | 2             |                                       |      |
| 391                                  | x   |                     |                     |  | oractice standards Enter   |               |                                       |      |
| ✓ (Select All Search Results)        |   |                     |                     |  | units of percent, number of  |               |                                       |      |
| - Add current selection to filter    |   |                     |                     |  | animals or number of   |               |                                       |      |
| - 2 391                              | it Lagoon                                   | No                  | awms                | Animal Waste Management System   | animal units.  | 200           | Animal Waste Management System        |      |
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| -0.0314                              |   |                     |                     |  | collection, transfer and   |               |                                       |      |
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|                                      |   |                     |                     |  | with NRCS 313 (Waste   |               |                                       |      |
|                                      |   |                     |                     |  | Storage Facility) or NRCS 35   | 9             |                                       |      |
|                                      |   |                     |                     |  | (Waste Treatment Lagoon)   |               |                                       |      |
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| 3 359 Waste Trea                     | tment Lagoon                                | No                  | awms                | Animal Waste Management System   | animal units.  | 206           | Animal Waste Management System        | -1   |
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| Lancaster, PA Plan                              |                          | 2023-12-20 05:16:50 PM | Ľ    |     | $\otimes$          |
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#### Shared Scenarios (?)

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| 1985 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:54:55 PM | - |  |  |  |  |  |
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| - No.                        |                      |                       |                            |         |                  | Version: CAS | T-2019 ⑦   |
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| Scenario Description *       |                      |                       | Wastewater Data Set * 💿    |         |                  |              |  |
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| * Required field   |                            |                               | Version: CAST-2019 (?)   |
| Scenario Name * 🕜  | Base Year * (?)            | Base Condition * (?)          |  |
| 2022 Baseline 2024-04-18   | Select Base Year           | ▼ Select Base Condition       |  |
| Scenario Description *   | Wastewater Data Set * 📀    |                               |  |
| Purpose: to establish a baseline   | Select Wastewater Data Set |                               | •  |
| Year: 2022<br>Geography: Nelson, VA  | BMPs Available * 📀         |                               |  |
|  | Select BMPs Available      |                               | •  |
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| Scenario Description *   | Wastewater Data Set * 📀    |                        |                                |
| Purpose: to establish a baseline   | Select Wastewater Data Set |                        | •                              |
| Geography: Nelson, VA  | BMPs Available * ?         |                        |                                |
|  | Select BMPs Available      |                        | •                              |
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| 2022 Baseline 2024-04-18   | 2022  | ·              | Current Zoning   |             | •  |                                       |
| Scenario Description *   | Wastewater D                                      | ata Set * (?)  |                  |             |  |                                       |
| Purpose: to establish a baseline   | Select Waster                                     | water Data Set |                  |             | •  |                                       |
| Year: 2022<br>Geography: Nelson, VA  | Select Waster                                     | water Data Set |                  |             |  |                                       |
| ocography. Hobon, we   | WIP 3 Climate                                     | e Change       |                  |             | A  |                                       |
|  | WIP 3   |                |                  |             |  |                                       |
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| Geographic Scale * (3)   | 2021  |                |                  |             | •  |                                       |
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| USGS BMP Heat Map - 2022 Low Ag BMPs - NO NUTRI | ENT MANAGEMENT | Run Finished    |  | 2024-04-12 12:29:57 PM |   | C           |          | $\otimes$        |                                   |
| USGS BMP Heat Map - 2009 Low Ag BMPs - NO NUTRI | ENT MANAGEMENT | Run Finished    |  | 2024-04-12 12:28:12 PM |   | C           |          | $\otimes$        |                                   |
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| Delaware Wildlands Pocomoke Baseline 2024       |                | Run Finished    |  | 2024-02-28 08:06:38 PM |   | C           |          | $\otimes$        |                                   |
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| Shoreline Management Test                       |                | Run Finished    |  | 2024-02-14 09:15:45 PM |   | C           |          | $\otimes$        |                                   |
| Plan for Lancaster                              |                | Run Finished    |  | 2024-01-09 03:47:52 PM |   | C           |          | $\otimes$        |                                   |
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| Clear Filters Refresh |                 |           |                        |  |  |  |  |  |
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| Scenario Name         | Scenario Status | Author T  | Date Modified          |  |  |  |  |  |
| 1985 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:54:55 PM |  |  |  |  |  |
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| 1985 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:54:55 PM |  |  |  |  |
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| 1994 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:37 PM |  |  |  |  |

| Chesapeake Assessment Sc<br>NEWS SCENARIOS RESULTS COST PROFIL<br>ADD SCENARIO<br>Save Copy Existing Scenario Without BMPs Carco<br>* Required field<br>Scenario Name * (7) | Ti<br>To ensure all b<br>match your bas<br>Copy Existing Sc<br>BMPs b | <ul> <li>p:</li> <li>ase conditions</li> <li>seline, use the</li> <li>enario Without</li> <li>outton</li> </ul> | Search Cast             | Q       C         Q       C         View Documentation       Version: CAST-2019 | euxconsulting<br>Manage F<br>(+ Lo<br>DAST-2019 |
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|   |   | Select Base Year  | ✓ Select Base Condition | V   |   |
| Scenario Description *  |   | Wastewater Data Set * (?)   |                         |   |   |
|   |   | Select Wastewater Data Set  |                         | •   |   |
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| Required Red 2022 Exactine Scanatio Heter Colomonal Scanatio Heter Colo  | Select your baseline<br>scenario from the<br>drop-down-list   | Copy Existing Scenario<br>(Select a scenario)<br>(2022 baseline<br>2022 Baseline - Helen Golimowski<br>2022 Baseline 2024-04-18 - Helen Golimowski | opy Cancel                              | Search                | helen@dev              | ereuxconsultir<br>Manage<br>[+ L<br>CAST-2019 |
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| Д      | ADD SCENARIO Save Copy Existing Scenario Without BMPs                   | Description to reflect<br>that this is a |                                   |   |                    |             | View Documentation   |  |
|        | * Required field<br>Scenario Name * (?)                                 | planning scenario                        | Base Year * ⑦                     |   | Base Condition * 📀 |             | Version: CAST-2019 ( | 3  |
|        | 2022 Baseline 2024-04-18 - COPY Scenario Description *                  |  | 2022<br>Wastewater Data Set * (?) | • | Current Zoning     |             | •                    |  |
|        | Purpose: to establish a baseline<br>Year: 2022<br>Geography: Nelson, VA |  | 2022<br>BMPs Available * (?)      |   |                    |             | •                    |  |
|        |   |  | <br>Cost Profile * ③<br>Virginia  |   |                    |             | •                    |  |

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Check to view geographies located only in the Chesapeake Bay Watershed Area 🗹

#### Geographic Scale \* 💿

County-Area in CBWS only

#### Geographic Area \*

| Search   |   |                                |   |
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| Kent, DE (CBWS Portion Only)   |   | Nelson, VA (CBWS Portion Only) | - |
| Sussex, DE (CBWS rotion Only)  | * |                                |   |
| Washington, DC (CBWS Portion Only)<br>Allegany, MD (CBWS Portion Only) | > |                                |   |
| Anne Arundel, MD (CBWS Portion Only)                                   | • |                                |   |
| Calvert, MD (CBWS Portion Only)  | < |                                |   |
| Caroline, MD (CBWS Portion Only) Carroll MD (CBWS Portion Only)        |   |                                |   |
| Cecil, MD (CBWS Portion Only)  |   |                                |   |
| Charles, MD (CBWS Portion Only)<br>Dorchester MD (CBWS Portion Only)   |   |                                |   |
| Frederick, MD (CBWS Portion Only)                                      |   |                                |   |
| Garrett, MD (CBWS Portion Only)  |   |                                | ŕ |

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#### Copy/Upload BMPs 💿

| Existing Scenario Upload File |                   |      |       |        |
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| ⊖Single ⊖Sector ⊖State        | Copy BMPs History |      |       |        |
|                               | Scenario Name     | Туре | ▼ For | ▼ Date |

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| Scenario Name * 🔞   | Base Year * 💿           |   | Base Condition * 📀    |             |              |  |
| Climate-Smart Plan 2024-04-18   | 2022                    | • | Current Zoning        |             |              | •  |
| Scenario Description *  | Wastewater Data Set * 📀 |   |                       |             |              |  |
| Purpose: to assess climate-smart practice effectiveness                         | 2022                    |   |                       |             |              | •  |
| Year: 2022<br>Geography: Nelson, VA   | BMPs Available * 📀      |   |                       |             |              |  |
|   | Official BMPs           |   |                       |             |              | •  |
|   | Cost Profile * 📀        |   |                       |             |              |  |
|   | Virginia                |   |                       |             |              | •  |

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#### Check to view geographies located only in the Chesapeake Bay Watershed Area 🗹

#### Geographic Scale \* 💿

County-Area in CBWS only

#### Geographic Area \*

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| Kent, DE (CBWS Portion Only)         New Castle, DE (CBWS Portion Only)         Sussex, DE (CBWS Portion Only)         Washington, DC (CBWS Portion Only)         Allegany, IMC (CBWS Portion Only)         Allegany, IMC (CBWS Portion Only)         Baltimore, MD (CBWS Portion Only)         Caroline, MD (CBWS Portion Only)         Charles, MD (CBWS Portion Only) | ><br><<br>+ | Nelson, VA (CBWS Portion Only) |   |
| Frederick, MD (CBWS Portion Only)<br>Garrett, MD (CBWS Portion Only)  |             |                                | , |

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#### Copy/Upload BMPs 💿

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| Chesapeake Asses   | sment Scenario Tool             | antice series and       |       | - manufacture of the | helen@devereuxconsulting.c<br>Manage Pro |
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| NEWS SCENARIOS RESU<br>nationa, MD (Cows Pottion Only)<br>Copy/Upload BMPs ⑦<br>Existing Scenario Upload F | Add the BMPs from your baseline | PORTAL ADMIN CONTACT US |       | Search Cast Q        | CAST-2019 ¥                              |
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| Chesapeake Assessment Scenario                                | Tool                                    | To add BMPs to                 | your                            | rie Tille | helen@dever | ereuxcor<br>Ma |
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| NEWS SCENARIOS RESULTS COST PROFILES LEARN                    | ING ABOUT NEIEN PORTAL ADMIN CONTACT US | plan scenario,<br>the Edit ico | click <sup>earch Cae</sup><br>n | t         | Q (         | CAST-2         |
| Add New Scenario Clear Filters                                |   |                                |                                 |           |             |                |
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| Climate-Smart Plan 2024-04-18                                 | Editing Finished                        | 2024-04-17 07:27:18 PM         | Ľ                               |           | <b>⊘</b> ^  |                |
| 2022 Baseline 2024-04-18                                      | Editing Finished                        | 2024-04-17 07:25:05 PM         | Ľ                               |           | $\otimes$   | 1              |
| USGS BMP Heat Map - 2022 Low Ag BMPs - NO NUTRIENT MANAGEMENT | Run Finished                            | 2024-04-12 12:29:57 PM         | Ľ                               |           | $\otimes$   |                |
| USGS BMP Heat Map - 2009 Low Ag BMPs - NO NUTRIENT MANAGEMENT | Run Finished                            | 2024-04-12 12:28:12 PM         | Ľ                               |           | $\otimes$   |                |
| 2025 Planned  | Run Finished                            | 2024-03-07 06:59:30 PM         | Ľ                               |           | $\otimes$   |                |
| 2022 Baseline   | Run Finished                            | 2024-03-07 06:32:39 PM         | Ľ                               |           | $\otimes$   |                |
| Delaware Wildlands Pocomoke Baseline 2024                     | Run Finished                            | 2024-02-28 08:06:38 PM         | C                               |           | $\otimes$   |                |
| Pocomoke River no BMPs  | Run Finished                            | 2024-02-28 05:03:40 PM         | Ľ                               |           | $\otimes$   |                |
| Shoreline Management Test                                     | Run Finished                            | 2024-02-14 09:15:45 PM         | C                               |           | $\otimes$   |                |
| Plan for Lancaster  | Run Finished                            | 2024-01-09 03:47:52 PM         | Ľ                               |           | <b>○</b> -  |                |

#### Shared Scenarios 💿

| Clear Filters Refresh |                 |           |                        |
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| Scenario Name         | Scenario Status | Author T  | Date Modified          |
| 1985 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:54:55 PM |
| 1986 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:54:58 PM |
| 1987 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:01 PM |
| 1988 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:05 PM |
| 1989 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:11 PM |
| 1990 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:15 PM |
| 1991 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:20 PM |
| 1992 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:24 PM |
| 1993 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:31 PM |
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|           | Scen                                    | ario Metadata Invalid BMPs Land | Policy BMPs Developed BMPs Se                     | eptic BMPs Natural BMPs Agricultu | re BMPs Animal BMPs Manure T | reatment BMPs |                  |                                |                    |  |  |
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|           | BMP Data Submitted 💿                    |                                 |   |                                   |                              |               |                  |                                |                    |  |  |
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|           |   | Agency T                        | BMP T   | Geographic Area                   | Load Source                  | Amount        | Unit             | Total Annualized Cost Per Unit | Actions (?)        |  |  |
|           |   | Non-Federal                     | Grass Buffer-Narrow with Exclusion<br>Fencing     | 020802020402 - Upper South River  | Pasture                      | 5,528.00      | length (feet)    | \$714.89                       | 12 🕩 🛇 📋           |  |  |
|           |   | Non-Federal                     | Grass Buffer-Narrow with Exclusion<br>Fencing     | 020802020402 - Upper South River  | Pasture                      | 1.27          | acres in buffers | \$714.89                       | C ( 🗖 🛇            |  |  |
|           |   | Non-Federal                     | Grass Buffer-Streamside with<br>Exclusion Fencing | 020802020402 - Upper South River  | Pasture                      | 1.37          | acres in buffers | \$284.30                       | C ( 🗖 🛇            |  |  |
|           |   | Non-Federal                     | Grass Buffer-Streamside with<br>Exclusion Fencing | 020802020402 - Upper South River  | Pasture                      | 1,699.00      | length (feet)    | \$284.30                       | C 🕩 🛇              |  |  |
|           |   | Non-Federal                     | Grass Buffer-Streamside with<br>Exclusion Fencing | 020802020402 - Upper South River  | Pasture                      | 7.65          | acres in buffers | \$284.30                       | C 🕩 🛇              |  |  |
|           |   | Non-Federal                     | Grass Buffer-Streamside with<br>Exclusion Fencing | 020802020402 - Upper South River  | Pasture                      | 5,651.00      | length (feet)    | \$284.30                       | C 🕩 🛇              |  |  |
|           |   | Non-Federal                     | Grass Buffer-Streamside with<br>Exclusion Fencing | 020802020402 - Upper South River  | Pasture                      | 0.51          | acres in buffers | \$284.30                       | C (• 🛇             |  |  |
|           |   | Non-Federal                     | Grass Buffer-Streamside with<br>Exclusion Fencing | 020802020402 - Upper South River  | Pasture                      | 633.00        | length (feet)    | \$284.30                       | C ( 🗖 🛇            |  |  |
|           |   | Non-Federal                     | Grass Buffer-Streamside with                      | 020802020402 - Upper South River  | Pasture                      | 2,350.00      | length (feet)    | \$284.30                       | - 🔇 🖪 🖄            |  |  |
|           |   |                                 |   |                                   |                              |               |                  | 1                              | 500 of 787 items 💍 |  |  |

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| Scer | nario Metadata | Invalid BMPs   | Land Policy BMPs              | Developed BMPs        | Septic BMPs  | Natural BMPs     | Agriculture BMPs | Animal BMPs     | Manure Treatment BMPs |   |   |  |                    |
|------|----------------|----------------|-------------------------------|-----------------------|--------------|------------------|------------------|-----------------|-----------------------|---|---|--|--------------------|
| BM   | P Data Su      | bmitted (      | 9                             |                       |              |                  |                  |                 |                       |   |   |  | View Documentation |
| + /  | Add EMP Cle    | ear Filters De | lete Selected                 |                       |              |                  |                  |                 |                       |   |   |  |                    |
|      | Agency         |                | ▼ BMP                         |                       | Add BM       | IP               |                  |                 |                       |   | ×   | Total Annualized Cost Per Unit                     | Actions ③          |
|      |                |                |                               |                       | *Required fi | eld              |                  |                 |                       |   |   |  | C 🕩 🛇 🍵            |
|      | Non-Federal    |                | Grass Buffer-<br>Fencing      | Narrow with Exclusio  | 1            | c                | BWS Only 🕐       |                 |                       |   |   | \$714.89   | 12 🕩 🛇             |
|      | Non-Federal    |                | Grass Buffer-<br>Fencing      | Narrow with Exclusio  | 1            | Geograp          | nic Scale * 🕐    | County-Area in  | CBWS only             | • | ers   | \$714.89   | C 🕩 🛇              |
|      | Non-Federal    |                | Grass Buffer-<br>Exclusion Fe | Streamside with       |              | Geograp          | hic Area * ?     | Nelson, VA (CE  | WS Portion Only)      | • | ərs   | \$284.30   | C 🕩 🛇              |
|      | Non-Federal    |                | Grass Buffer-<br>Exclusion Fe | Streamside with       |              | Second           | BMP * ⑦          | Forest Buffer-U | pland Crops and Hay   | • |   | \$284.30   | C (                |
|      | Non-Federal    |                | Grass Buffer-<br>Exclusion Fe | Streamside with       |              | Loa              | d Source * ⑦     | Select BMP      |                       |   | Forest Buffer - Forest buffers a<br>areas that help filter nutrients, so<br>other pollutants from runoff as w | e linear wooded<br>diments and<br>ell as remove 30 | C (                |
|      | Non-Federal    |                | Grass Buffer-<br>Exclusion Fe | Streamside with       |              |                  | Unit * 💿         | Forest Buffer - | Narrow                |   | nutrients from groundwater. The<br>buffer width is 100 feet, with a 33<br>width required. Enter units of act  | recommended<br>5 feet minimum<br>es or percent. 30 | ₡ ₱ ◊              |
|      | Non-Federal    |                | Grass Buffer-<br>Exclusion Fe | Streamside with       |              |                  | Amount" ()       |                 |                       |   | ers   | \$284.30   | C (                |
|      | Non-Federal    |                | Grass Buffer-<br>Exclusion Fe | Streamside with ncing | 020002020    | u4uz - upper ouu | II RIVEI Fastule |                 | 035.00                |   | Add Cancel  | \$284.30   | ๔ 健 ⊗              |
|      |                |                |                               |                       |              |                  |                  |                 |                       |   |   |  | - 500 of 788 items |

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| Scenario Metadata Invalid BMPs | Land Policy BMPs Developed BMPs                   | Septic BMPs Natural BMPs Agriculture BMP | s Animal BMPs Manure Treatment BMPs |                      |                                |                    |
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| BMP Data Submitted 💿           | )   |  |                                     |                      |                                | View Documentation |
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| Agency                         | T BMP   | Add BMP                                  |                                     | ×                    | Total Annualized Cost Per Unit | Actions ⑦          |
|                                |   | *Required field                          |                                     |                      |                                | C ( 🔍 🔿 🍵          |
| Non-Federal                    | Grass Buffer-Narrow with Exclusion<br>Fencing     | CBWS Only ③                              |                                     |                      | \$714.89                       | C 🗭 🛇              |
| Non-Federal                    | Grass Buffer-Narrow with Exclusion<br>Fencing     | Geographic Scale * ?                     | County-Area in CBWS only            | •                    |                                | 3 🕩 🛇              |
| Non-Federal                    | Grass Buffer-Streamside with                      | Geographic Area * 🕐                      | Nelson, VA (CBWS Portion Only)      | •<br>• • • • • • • • |                                | ۲ III 🛇            |
|                                | Exclusion Fencing                                 | BMP * 🕐                                  | Forest Buffer-Upland Crops and Hay  | • wnen y             | /ou re ready,                  |                    |
| Non-Federal                    | Exclusion Fencing                                 | Secondary BMP * 🕐                        | Forest Buffer                       |                      |                                | 3 C 🔍 🛇            |
| Non-Federal                    | Grass Buffer-Streamside with<br>Exclusion Fencing | Load Source * 🝞                          | Cropland                            | , CI                 |                                | 3 🕩 🛇              |
| Non-Federal                    | Grass Buffer-Streamside with                      | Unit * 🕐                                 | Acres in Buffers                    | •                    | \$284.30                       |                    |
|                                | Exclusion Fencing                                 | Amount * 🕐                               | 100                                 |                      |                                |                    |
| Non-Federal                    | Exclusion Fencing                                 |  |                                     | ars                  | \$284.30                       | C (• 🛇             |
| Non-Federal                    | Grass Buffer-Streamside with<br>Exclusion Fencing | 020002020402 - Opper South River Pasto   | e 033.00                            | Add Cancel           | \$284.30                       | ₡ • ◊              |
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| rs at the top o                   | of 24-04-18                        |                                   |                                |              |                  |                                |                    |           |
| ne BMP list                       | veloped BMPs Se                    | eptic BMPs Natural BMPs Agricultu | ure BMPs Animal BMPs Manure Tr | eatment BMPs |                  |                                | View Documentation |           |
| xdd BMP Clear Filters Delete      |                                    |                                   |                                |              |                  |                                |                    |           |
| Agency T BMP                      | T                                  | Geographic Area                   | Load Source                    | Amount       | Unit             | Total Annualized Cost Per Unit | Actions (?)        |           |
| Non-Federal Forest Bu             | uffer                              | Nelson, VA (CBWS Portion Only)    | Cropland                       | 100.00       | acres in buffers | \$151.30                       |                    |           |
| Non-Federal Fencing               | Inter-Narrow with Exclusion        | 020802020402 - Upper South River  | Pasture                        | 5,528.00     | length (feet)    | \$714.89                       | C 🕩 🛇              |           |
| Non-Federal Grass Bu<br>Fencing   | Iffer-Narrow with Exclusion        | 020802020402 - Upper South River  | Pasture                        | 1.27         | acres in buffers | \$714.89                       | C 🕩 🛇              |           |
| Non-Federal Grass Bu<br>Exclusion | uffer-Streamside with<br>n Fencing | 020802020402 - Upper South River  | Pasture                        | 1.37         | acres in buffers | \$284.30                       | C 🕩 🛇              |           |
| Non-Federal Grass Bu<br>Exclusion | uffer-Streamside with<br>n Fencing | 020802020402 - Upper South River  | Pasture                        | 1,699.00     | length (feet)    | \$284.30                       | 12 🕩 🚫             |           |
| Non-Federal Grass Bu<br>Exclusion | uffer-Streamside with<br>n Fencing | 020802020402 - Upper South River  | Pasture                        | 7.65         | acres in buffers | \$284.30                       | C 🕩 🛇              |           |
| Non-Federal Grass Bu<br>Exclusion | uffer-Streamside with<br>n Fencing | 020802020402 - Upper South River  | Pasture                        | 5,651.00     | length (feet)    | \$284.30                       | 12 🕩 🚫             |           |
| Non-Federal Grass Bu<br>Exclusion | uffer-Streamside with<br>n Fencing | 020802020402 - Upper South River  | Pasture                        | 0.51         | acres in buffers | \$284.30                       | C 🕩 🚫              |           |
| Non-Federal Grass Bu<br>Exclusion | uffer-Streamside with<br>n Fencing | 020802020402 - Upper South River  | Pasture                        | 633.00       | length (feet)    | \$284.30                       | C 🕩 🛇              |           |
|                                   |                                    |                                   |                                |              |                  | 1 - 50                         | 0 of 788 items 🔿   |           |

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## Chesapeake Assessme

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## When you're done adding BMPs, go

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| Scer | nario Metadata Invalid BMPs Land | Policy BMPs Developed BMPs Se                     | ptic BMPs Natural BMPs Agricult  | ure BMPs Animal BMPs Manure Tr | eatment BMPs |                  |                                |                    |
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| вм   | P Data Submitted 💿               |   |                                  |                                |              |                  |                                | View Documentation |
| + /  | Add BMP Clear Filters Delete Sel | ected   |                                  |                                |              |                  |                                |                    |
|      | Agency T                         | BMP T   | Geographic Area                  | Load Source                    | Amount       | Unit             | Total Annualized Cost Per Unit | Actions 💿          |
|      | Non-Federal                      | Forest Buffer                                     | Nelson, VA (CBWS Portion Only)   | Cropland                       | 100.00       | acres in buffers | \$151.30                       | ピ 🕩 🛇 🔒            |
|      | Non-Federal                      | Grass Buffer-Narrow with Exclusion<br>Fencing     | 020802020402 - Upper South River | Pasture                        | 5,528.00     | length (feet)    | \$714.89                       | C 🕩 🛇              |
|      | Non-Federal                      | Grass Buffer-Narrow with Exclusion<br>Fencing     | 020802020402 - Upper South River | Pasture                        | 1.27         | acres in buffers | \$714.89                       | C 🕩 🛇              |
|      | Non-Federal                      | Grass Buffer-Streamside with<br>Exclusion Fencing | 020802020402 - Upper South River | Pasture                        | 1.37         | acres in buffers | \$284.30                       | C 🕩 🛇              |
|      | Non-Federal                      | Grass Buffer-Streamside with<br>Exclusion Fencing | 020802020402 - Upper South River | Pasture                        | 1,699.00     | length (feet)    | \$284.30                       | C 🕩 🛇              |
|      | Non-Federal                      | Grass Buffer-Streamside with<br>Exclusion Fencing | 020802020402 - Upper South River | Pasture                        | 7.65         | acres in buffers | \$284.30                       | C 🕩 🛇              |
|      | Non-Federal                      | Grass Buffer-Streamside with<br>Exclusion Fencing | 020802020402 - Upper South River | Pasture                        | 5,651.00     | length (feet)    | \$284.30                       | C 🕩 🛇              |
|      | Non-Federal                      | Grass Buffer-Streamside with<br>Exclusion Fencing | 020802020402 - Upper South River | Pasture                        | 0.51         | acres in buffers | \$284.30                       | C 🕩 🛇              |
|      | Non-Federal                      | Grass Buffer-Streamside with<br>Exclusion Fencing | 020802020402 - Upper South River | Pasture                        | 633.00       | length (feet)    | \$284.30                       | C ( 🗖 🛇            |
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| My Scenarios 💿  |                  |                        |      |          | View Documentation    |
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| Add New Scenario Clear Filters                                |                  |                        |      |          |                       |
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| Climate-Smart Plan 2024-04-18                                 | Editing Finished | 2024-04-17 07:33:49 PM | Ľ    |          | <b>O</b> <sup>^</sup> |
| 2022 Baseline 2024-04-18                                      | Editing Finished | 2024-04-17 07:25:05 PM | Ľ    |          | $\otimes$             |
| USGS BMP Heat Map - 2022 Low Ag BMPs - NO NUTRIENT MANAGEMENT | Run Finished     | 2024-04-12 12:29:57 PM | Ľ    | $\smile$ | $\otimes$             |
| USGS BMP Heat Map - 2009 Low Ag BMPs - NO NUTRIENT MANAGEMENT | Run Finished     | 2024-04-12 12:28:12 PM | Ľ    |          | 0                     |
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| 2022 Baseline   | Run Finished     | 2024-03-07 06:32:39 PM | Ľ    |          | $\otimes$             |
| Delaware Wildlands Pocomoke Baseline 2024                     | Run Finished     | 2024-02-28 08:06:38 PM | Ľ    |          | 0                     |
| Pocomoke River no BMPs  | Run Finished     | 2024-02-28 05:03:40 PM | Ľ    |          | 0                     |
| Shoreline Management Test                                     | Run Finished     | 2024-02-14 09:15:45 PM | Ľ    |          | 0                     |
| Plan for Lancaster  | Run Finished     | 2024-01-09 03:47:52 PM | Ľ    |          | - ⊘                   |

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#### Shared Scenarios (?)

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| Scenario Name         | Scenario Status | Author T  | Date Modified          |
| 1985 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:54:55 PM |
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| 1987 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:01 PM |
| 1988 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:05 PM |
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| 1990 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:15 PM |
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|---|---|------------------------|-------------|-----|------------------|----|
| SCENARIOS PLANNING TARGETS                                    |   |                        |             |     |                  |    |
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| Add New Scenario Clear GRAPHS                                 |   |                        |             |     |                  |    |
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| Climate-Smart Plan 2024-04-1                                  | Run Finished                            | 2024-04-15 08:15:44 PM | C           |     | $\otimes$        | •  |
| 2022 Baseline 2024-04-18                                      | Run Finished                            | 2024-04-15 07:52:43 PM | C           |     | $\otimes$        |    |
| USGS BMP Heat Map - 2022 Low Ag BMPs - NO NUTRIENT MANAGEMENT | Run Finished                            | 2024-04-12 12:29:57 PM | Ľ           |     | $\otimes$        |    |
| USGS BMP Heat Map - 2009 Low Ag BMPs - NO NUTRIENT MANAGEMENT | Run Finished                            | 2024-04-12 12:28:12 PM | C           |     | $\otimes$        |    |
| 2025 Planned  | Run Finished                            | 2024-03-07 06:59:30 PM | C           |     | $\otimes$        |    |
| 2022 Baseline   | Run Finished                            | 2024-03-07 06:32:39 PM | Ľ           |     | $\otimes$        |    |
| Delaware Wildlands Pocomoke Baseline 2024                     | Run Finished                            | 2024-02-28 08:06:38 PM | Ľ           |     | $\otimes$        |    |
| Pocomoke River no BMPs  | Run Finished                            | 2024-02-28 05:03:40 PM | Ľ           |     | $\otimes$        |    |
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#### Shared Scenarios ③

| Clear Filters Refresh |                 |           |                        |
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| 1985 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:54:55 PM |
| 1986 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:54:58 PM |
| 1987 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:01 PM |
| 1988 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:05 PM |
| 1989 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:11 PM |
| 1990 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:15 PM |
| 1991 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:20 PM |
| 1992 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:24 PM |
| 1993 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:31 PM |
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| MPARE SCENARIOS  |                                |                    |
| Compare Scenarios  |                                |                    |
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| Required field<br>Check to view geographies located only in the Chesapeake Bay Watershed Area  |                                |                    |
| Geographic Scale *   |                                |                    |
| County-Area in CBWs only   |                                |                    |
| Geographic Area *  |                                |                    |
| New Castle, DE (CBWS Portion Only)<br>Anne Arundel, MD (CBWS Portion Only)<br>Caroline, MD (CBWS Portion Only)<br>Queen Annes, MD (CBWS Portion Only)<br>Oneida, NY (CBWS Portion Only)<br>Uuzerne, PA (CBWS Portion Only)<br>Wayne, PA (CBWS Portion Only)<br>Caroline, VA (CBWS Portion Only)<br>New Kent, VA (CBWS Portion Only)<br>New Kent, VA (CBWS Portion Only)<br>Newport News City, VA (CBWS Portion Only)<br>Waynesboro City, VA (CBWS Portion Only)<br>Mineral, WV (CBWS Portion Only) | Nelson, VA (CBWS Portion Only) | ×                  |
| Double-Click Geography Or Use Arrows   |                                |                    |
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| Scenario 1 *   |                                |                    |
| 2022 Baseline 2024-04-18   | •                              |                    |
| Scenario 2 *   |                                |                    |
| Climate-Smart Plan 2024-04-18  | •                              |                    |
| Scenario 3   |                                |                    |
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| mpare Scenarios Costs and Load Sou      | rce Acres Loads Loading Rate Percent Change         |   |  |   |
| tragen Landa (lha/ur)                   |   |   |  | View Documentation                              |
| Load Source                             | 2022 Baseline 2024-04-18<br>(Edge of Stream)        | Climate-Smart Plan 2024-04-18<br>(Edge of Stream) | 2022 Baseline 2024-04-18<br>(Edge of Tide) | Climate-Smart Plan 2024-04-18<br>(Edge of Tide) |
| <ul> <li>Sector: Agriculture</li> </ul> |   |   |  |   |
|   | 326,511.50  | 323,586.71  | 177,722.60                                 | 176,103.0                                       |
| Sector: Developed                       |   |   |  |   |
|   | 157,138.24  | 157,138.24  | 86,164.94                                  | 86,164.9  |
| Sector: Natural                         |   |   |  |   |
|   | 592,198.49  | 591,680.35  | 320,760.74                                 | 320,475.4                                       |
| Sector: Septic                          |   |   |  |   |
|   | 58,264.56   | 58,264.56   | 32,312.30                                  | 32,312.3  |
| Sector: Wastewater                      |   |   |  |   |
|   | 47,361.35   | 47,361.35   | 23,990.70                                  | 23,990.7  |
|   | 1,181,474.14  | 1,178,031.21                                      | 640,951.27                                 | 639,046.4                                       |
| Download Nitrogen Loads                 | ) ③<br>2022 Baseline 2024-04-18<br>(Edge of Stream) | Climate-Smart Plan 2024-04-18<br>(Edge of Stream) | 2022 Baseline 2024-04-18<br>(Edge of Tide) | Climate-Smart Plan 2024-04-18<br>(Edge of Tide) |
| <ul> <li>Sector: Agriculture</li> </ul> |   |   |  |   |
|   | 37,886.73   | 37,604.09   | 19,812.20                                  | 19,661.2  |
|   |   |   |  |   |
| Sector: Developed                       |   |   |  |   |

| Chesapeake Assessment Scenario Tool  | - But- | Manage Profile |
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| HOME NEWS SCENARIOS RESULTS COST PROFILES LEARNING ABOUT NEIEN PORTAL ADMIN CONTACT US | م      | CAST-2019 🔻    |

#### COMPARE SCENARIOS

| gen Loads (Ibs/yr) 💿        |  |   |  | View Documer                                    |
|-----------------------------|--|---|--|---|
| Load Source                 | 2022 Baseline 2024-04-18<br>(Edge of Stream) | Climate-Smart Plan 2024-04-18<br>(Edge of Stream) | 2022 Baseline 2024-04-18<br>(Edge of Tide) | Climate-Smart Plan 2024-04-18<br>(Edge of Tide) |
| tor: Agriculture            |  |   |  |   |
| AgencyType: Non Federal     |  |   |  |   |
| Agency: Non-Federal         |  |   |  |   |
| Ag Open Space               | 7,667.49                                     | 7,629.80  | 4,180.68                                   | 4,  |
| Double Cropped Land         | 0.00   | 0.00  | 0.00                                       |   |
| Full Season Soybeans        | 6,551.43                                     | 6,284.81  | 3,505.95                                   | 3   |
| Grain with Manure           | 1,997.26                                     | 1,925.41  | 1,067.61                                   | 1   |
| Grain without Manure        | 2,283.34                                     | 2,201.74  | 1,220.57                                   | 1   |
| Leguminous Hay              | 1,276.45                                     | 1,270.44  | 695.96                                     |   |
| Non-Permitted Feeding Space | 139.33                                       | 139.33  | 75.97                                      |   |
| Other Agronomic Crops       | 14,129.04                                    | 13,553.84   | 7,561.07                                   | 7   |
| Other Hay                   | 111,827.98                                   | 111,300.91  | 60,973.31                                  | 60  |
| Pasture                     | 140,914.44                                   | 140,232.19  | 76,690.41                                  | 76  |
| Permitted Feeding Space     | 270.93                                       | 270.93  | 150.55                                     |   |
| Riparian Pasture Deposition | 22,154.70                                    | 22,154.70   | 12,260.34                                  | 12  |
| Silage with Manure          | 7.51   | 7.51  | 4.07                                       |   |
| Silage without Manure       | 0.79   | 0.79  | 0.43                                       |   |
| Small Grains and Grains     | 0.17   | 0.17  | 0.09                                       |   |
| Specialty Crop High         | 6,164.39                                     | 5,917.41  | 3,327.64                                   | 3   |
| Specialty Crop Low          | 11,126.25                                    | 10,696.74   | 6,007.94                                   | 5,  |
|                             | 326,511.50                                   | 323,586.71  | 177,722.60                                 | 176   |



# **Project Level Outcomes** How to generate various types of reports at different geographic scales and how to assess ecosystem benefits of practices

| 2    | Chesapeake A                | ssessment Scena                  | ario Tool  |                    | and a state of the |                        | Hereit      | - Ten- | helen@dev          | vereuxconsulting.c<br>Manage Pro<br>(+ Log |
|------|-----------------------------|----------------------------------|------------|--------------------|--|------------------------|-------------|--------|--------------------|--|
| HOME | NEWS SCENARIOS              | RESULTS COST PROFILES            | LEARNING A | ABOUT NEIEN PORTAL | ADMIN CONTACT US   |                        | Search Cast | c      | ٦                  | CAST-2019 🔻                                |
|      | 0.0514.510.0                | COMPARE SCENARIOS                |            |                    |  |                        |             |        |                    |  |
|      | SCENARIOS                   | PLANNING TARGETS                 |            |                    |  |                        |             |        |                    |  |
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|      | Add New Scenario Clea       | GRAPHS                           |            |                    |  |                        |             |        |                    |  |
|      | Scenario Name               | MAPS                             | ▼ Scer     | nario Status       |  | ▼ Date Modified ↓      | Edit        | Run    | Delete             |  |
|      | Climate-Smart Plan 2024-04- | EUTROPHICATION                   | Run        | Finished           |  | 2024-04-15 08:15:44 PM | C           |        | $\otimes$          | A  |
|      | 2022 Baseline 2024-04-18    |                                  | Run        | Finished           |  | 2024-04-15 07:52:43 PM | C           |        | $\otimes$          |  |
|      | USGS BMP Heat Map - 2022    | Low Ag BMPs - NO NUTRIENT MANAGE | MENT Run   | Finished           |  | 2024-04-12 12:29:57 PM | C           |        | 0                  |  |
|      | USGS BMP Heat Map - 2009    | Low Ag BMPs - NO NUTRIENT MANAGE | MENT Run   | Finished           |  | 2024-04-12 12:28:12 PM | C           |        | $\otimes$          |  |
|      | 2025 Planned                |                                  | Run        | Finished           |  | 2024-03-07 06:59:30 PM | C           |        | $\otimes$          |  |
|      | 2022 Baseline               |                                  | Run        | Finished           |  | 2024-03-07 06:32:39 PM | C           |        | $\otimes$          |  |
|      | Delaware Wildlands Pocomol  | ke Baseline 2024                 | Run        | Finished           |  | 2024-02-28 08:06:38 PM | C           |        | $\otimes$          |  |
|      | Pocomoke River no BMPs      |                                  | Run        | Finished           |  | 2024-02-28 05:03:40 PM | C           |        | $\otimes$          |  |
|      | Shoreline Management Test   |                                  | Run        | Finished           |  | 2024-02-14 09:15:45 PM | C           |        | $\otimes$          |  |
|      | Plan for Lancaster          |                                  | Run        | Finished           |  | 2024-01-09 03:47:52 PM | Ľ           |        | 0                  | •  |

#### Shared Scenarios ③

| Clear Filters Refresh |                 |           |                        |
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| Scenario Name         | Scenario Status | Author T  | Date Modified          |
| 1985 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:54:55 PM |
| 1986 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:54:58 PM |
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| 1988 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:05 PM |
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| 1991 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:20 PM |
| 1992 Progress         | Run Finished    | CBP Admin | 2020-02-19 08:55:24 PM |
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**GRAPH SCENARIOS** 

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| County Area in CPIMS only  |                   |                                |   | All Agencies A                |   |
|  |                   |                                |   | Scenario 1*                   |   |
| Geographic Area  |                   |                                |   | 2022 Baseline 2024-04-18      |   |
| Now Castle, DE (CDWS Partian Only)   |                   | Nolcon VA (CRW/S Portion Only) | * | Scenario 2                    |   |
| Anne Arundel, MD (CBWS Portion Only)<br>Carolino, MD (CBWS Portion Only)             | ₩                 |                                |   | Climate-Smart Plan 2024-04-18 |   |
| Queen Annes, MD (CBWS Portion Only)  |                   |                                |   | Scenario 3                    |   |
| Luzerne, PA (CBWS Portion Only)  | *                 |                                |   | Select Scenario               |   |
| Wayne, PA (CBWS Portion Only)<br>Caroline, VA (CBWS Portion Only)                    | <                 |                                |   | Scenario 4                    |   |
| Greene, VA (CBWS Portion Only)<br>New Kent, VA (CBWS Portion Only)                   | 44                |                                |   | Select Scenario               | • |
| Newport News City, VA (CBWS Portion Only)<br>Waynesboro City, VA (CBWS Portion Only) |                   |                                |   |                               |   |
| Mineral, WV (CBWS Portion Only)  |                   |                                |   |                               |   |
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|      | COMPARE SCENARIOS          |                 |             |                |       |              |       |         |                        |  |             |     |                    |             |
|      | My Scenarios REPORTS       |                 |             |                |       |              |       |         |                        |  |             |     | View Documentation | n           |
|      | Add New Scenario Clear     | GRAPHS          |             |                |       |              |       |         |                        |  |             |     |                    |             |
|      | Scenario Name              | MAPS            |             | Y Scenario Sta | atus  |              |       | T       | Date Modified 👃        |  | Edit        | Run | Delete             |             |
|      | 2025 Planned               | EUTROPHICAT     | TION        | Run Finishe    | d     |              |       |         | 2024-03-07 06:59:30 PM |  | Ľ           |     | $\otimes$          | <b>^</b>    |
|      | 2022 Baseline              |                 |             | Run Finishe    | d     |              |       |         | 2024-03-07 06:32:39 PM |  | C           |     | $\otimes$          |             |
|      | Delaware Wildlands Pocomok | e Baseline 2024 |             | Run Finishe    | d     |              |       |         | 2024-02-28 08:06:38 PM |  | Ľ           |     | $\otimes$          |             |
|      | Pocomoke River no BMPs     |                 |             | Run Finishee   | d     |              |       |         | 2024-02-28 05:03:40 PM |  | C           |     | $\otimes$          |             |
|      | Shoreline Management Test  |                 |             | Run Finishe    | d     |              |       |         | 2024-02-14 09:15:45 PM |  | Ľ           |     | $\otimes$          |             |
|      | Plan for Lancaster         |                 |             | Run Finishe    | d     |              |       |         | 2024-01-09 03:47:52 PM |  | Ľ           |     | $\otimes$          |             |
|      | Baseline for Lancaster     |                 |             | Run Finishee   | d     |              |       |         | 2024-01-09 03:41:55 PM |  | Ľ           |     | $\otimes$          |             |
|      | Lancaster, PA Plan         |                 |             | Run Finishe    | d     |              |       |         | 2023-12-20 05:16:50 PM |  | Ľ           |     | $\otimes$          |             |
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|      | Tioga, NY Plan             |                 |             | Run Finishe    | d     |              |       |         | 2023-12-11 02:59:51 PM |  | C           |     | $\otimes$          | •           |

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| Clear Filters Refresh |                 |           |                        |   |
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| Scenario Name         | Scenario Status | Author T  | Date Modified          |   |
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- Atmospheric Deposition Report
- Base Conditions Report
- BMP Input Files
- BMP Submitted vs. Credited Report
- BMP Summary Report
- Loads Per Unit
- Loads Report
- Quick Results Report
- Wastewater Report



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| 1   |            |                  |   |               |                                  |                          |                                |                                     |  |                  |         |                 |         |
| 2<br>3 Agriculture Practices                            | Duration   | Unit             | Anne Arundel, MD (CBWS F<br>2022 Baseline | Portion Only) | Anne Arundel, MD<br>2022 Planned | (CBWS Portion On         | ly) Anne Arun<br>2022 Baseli   | ndel, MD (CBWS Portion Only)        | Anne Arundel, MD (CBWS Porti<br>2022 Planned | on Only)         |         |                 |         |
| 4   |            |                  |   |               |                                  |                          |                                |                                     |  |                  |         |                 |         |
| 5 Nutrient Application Management Core Nitrogen         | annual     | Acres            |   | 11796.00      |                                  | 1531                     | 4.01                           | 61.80%                              |  | 81.40%           |         |                 |         |
| 6 Nutrient Application Management Rate Nitrogen         | annual     | Acres            |   | 4467.61       |                                  | 446                      | 7.61                           | 23.40%                              |  | 23.70%           |         |                 |         |
| Nutrient Application Management Placement Nitrogen      | annual     | Acres            |   | 421.07        |                                  | 42                       | 1.07                           | 2.20%                               |  | 2.20%            |         |                 |         |
| 9 Nutrient Application Management Core Phosphorus       | annual     | Acres            |   | 11796.00      |                                  | 1531                     | 1.95                           | 61.80%                              |  | 81.40%           |         |                 |         |
| 10 Nutrient Application Management Rate Phosphorus      | annual     | Acres            |   | 100.49        |                                  | 10                       | 0.49                           | 0.50%                               |  | 0.50%            |         |                 |         |
| 11 Nutrient Application Management Placement Phosphorus | annual     | Acres            |   | 1302.71       |                                  | 130                      | 2.71                           | 6.80%                               |  | 6.90%            |         |                 |         |
| 12 Nutrient Application Management Timing Phosphorus    | annual     | Acres            |   | 0.00          |                                  |                          | 0.00                           | 0.00%                               |  | 0.00%            |         |                 |         |
| 13  |            |                  |   |               |                                  |                          |                                |                                     |  |                  |         |                 |         |
|   |            |                  |   |               |                                  |                          |                                |                                     |  |                  |         |                 |         |
| 14  |            |                  |   | 1000.07       |                                  | 100                      |                                | 10.000/                             |  | 10.000/          |         |                 |         |
| 15 Conservation Tillage                                 | annual     | Acres            |   | 1360.97       |                                  | 136                      | 0.97                           | 12.30%                              |  | 12.30%           |         |                 |         |
| 16 High Residue Tillage                                 | annual     | Acres            |   | 9295.00       |                                  | 929                      | 5.00                           | 84.00%                              |  | 84.00%           |         |                 |         |
| 17 Low Residue Tillage                                  | annual     | Acres            |   | 10655.97      | ·                                | 1065                     | 0.00<br>5.07                   | 0.00%                               |  | 0.00%            |         |                 |         |
| 19  | amuai      | heres            |   | 10033.31      |                                  | 1005                     | 5.57                           | 30.5078                             |  | 30.3070          |         |                 |         |
| 21 Cover Crop   | annual     | Acres            |   | 4587.50       |                                  | 1043                     | 2.85                           | 41.50%                              |  | 94.30%           |         |                 |         |
| 22 Cover Crop with Fall Nutrients                       | annual     | Acres            |   | 0.00          |                                  |                          | 0.00                           | 0.00%                               |  | 0.00%            |         |                 |         |
| 23 Commodity Cover Crop                                 | annual     | Acres            |   | 898.37        |                                  | 55                       | 2.16                           | 39.20%                              |  | 24.10%           |         |                 |         |
| 24 Commodity + Cover Crop<br>25                         | annual     | Acres            |   | 5485.87       |                                  | 1098                     | 5.02                           | 49.60%                              |  | 99.30%           |         |                 |         |
| 26<br>27 Pasture Alternative Watering                   | cumulative | Acres            |   | 3858.60       |                                  | 385                      | 8.60                           | 90.90%                              |  | 97.40%           |         |                 |         |
| 28 Prescribed Grazing                                   | cumulative | Acres            |   | 1542.81       |                                  | 154                      | 2.81                           | 36.40%                              |  | 38.90%           |         |                 |         |
| 29 Horse Pasture Management                             | cumulative | Acres            |   | 687.90        |                                  | 68                       | 7.90                           | 16.20%                              |  | 17.40%           |         |                 |         |
| 30 Pasture Management Composite                         | cumulative | Acres            |   | 6089.31       |                                  | 608                      | 9.31                           | 100.00%                             |  | 100.00%          |         |                 |         |
| 31  |            |                  |   |               |                                  |                          |                                |                                     |  |                  |         |                 |         |
| 32  |            |                  |   |               |                                  |                          |                                |                                     |  |                  |         |                 |         |
| 33 Forest Buffers                                       | cumulative | Acres in Buffers |   | 29.65         |                                  | 2                        | 9.65                           | 0.10%                               |  | 0.10%            |         |                 |         |
| 34 Narrow Forest Buffers                                | cumulative | Acres in Buffers |   | 0.00          |                                  | -                        | 0.00                           | 0.00%                               |  | 0.00%            |         |                 |         |
| 35 Forest Buffers on Fenced Pasture Corridor            | cumulative | Acres in Buffers |   | 7.85          |                                  |                          | 7.85                           | 0.20%                               |  | 0.20%            |         |                 |         |
| 36 Narrow Forest Buffers on Fenced Pasture Corridor     | cumulative | Acres in Ruffers |   | 0.33          |                                  |                          | 0.33                           | 0.00%                               |  | 0.00%            |         |                 |         |
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| Agriculture Practices   | Duration                | Unit                                 | Anne Arundel, MD (CBWS Portion Only)<br>2022 Baseline | Anne Arundel, MD (CBWS Portion Only)<br>2022 Planned | Anne Arundel, MD (CBWS Portion Only)<br>2022 Baseline | Anne Arundel, MD (CBWS Portion Only)<br>2022 Planned  |             |               |
|   |                         |                                      |   |  |   |   |             |               |
| Nutrient Application Management Core Nitrogen   | annual                  | Acres                                | 11796.00  | 15314.01   | 61.80%  | 81.40%  |             |               |
| Nutrient Application Management Rate Nitrogen   | annual                  | Acres                                | 4467.61   | 4467.61  | 23.40%  | 23.70%  |             |               |
| Nutrient Application Management Placement Nitrogen  | annual                  | Acres                                | 421.07  | 421.07   | 2.20%   | 2.20%   |             |               |
| Nutrient Application Management Core Phosphorus   | annual                  | Acres                                | 117.55  | 15314.01   | 61 80%  | 81 40%  |             |               |
| Nutrient Application Management Rate Phosphorus   | annual                  | Acres                                | 100.45  | 100.49   | 0.50%   | 0.50%   |             |               |
| Nutrient Application Management Placement Phosphorus  | annual                  | Acres                                | 1302.71   | 1302.71  | 6.80%   | 6.90%   |             |               |
| Nutrient Application Management Timing Phosphorus   | annual                  | Acres                                | 0.00  | 0.00   | 0.00%   | 0.00%   |             |               |
|   |                         |                                      |   |  |   |   |             |               |
| Conservation Tillage  | annual                  | Acres                                | 1360.97   | 1360.97  | 12.30%  | 12.30%  |             |               |
| High Residue Tillage  | annual                  | Acres                                | 9295.00   | 9295.00  | 84.00%  | 84.00%  |             |               |
| Low Residue Tillage   | annual                  | Acres                                | 0.00  | 0.00   | 0.00%   | 0.00%   |             |               |
| Conservation + LowResidue + High Residue Tillage  | annual                  | Acres                                | 10655.97  | 7 10655.97   | 96.30%  | 96.30%  |             |               |
| Cover Crop  | annual                  | Acres                                | 4587 50   | 10432.85   | 41 50%  | 94.30%  |             |               |
| Cover Crop with Fall Nutrients  | annual                  | Acres                                | 0.00  | 0.00   | 0.00%   | 0.00%   |             |               |
| Commodity Cover Crop  | annual                  | Acres                                | 898.37  | 7 552.16   | 39.20%  | 24.10%  |             |               |
| Commodity + Cover Crop  | annual                  | Acres                                | 5485.87   | 10985.02   | 49.60%  | 99.30%  |             |               |
| Desture Alternative Wetering  | aumulat <sup>a</sup> ra | A                                    | 2050.00   | 2050.00  | 00.000  | 07.409/   |             |               |
| Pasture Alternative Watering<br>Prescribed Grazing  | cumulative              | Acres                                | 3858.60   | J 3858.60  | 90.90%  | 97.40%  |             |               |
| Horse Pasture Management  | cumulative              | Acres                                | 687.90  | ) 687.90   | 16 20%  | 17 40%  |             |               |
| Pasture Management Composite  | cumulative              | Acres                                | 6089.31   | 6089.31  | 100.00%   | 100.00%   |             |               |
| - •   |                         |                                      |   |  |   |   |             |               |
|   |                         |                                      |   |  |   |   |             |               |
| Forest Buffers  | cumulative              | Acres in Buffers                     | 29.65   | 5 29.65  | 0.10%   | 0.10%   |             |               |
| Narrow Forest Buffers   | cumulative              | Acres in Buffers                     | 0.00  | 0.00   | 0.00%   | 0.00%   |             |               |
| Forest Buffers on Fenced Pasture Corridor   | cumulative              | Acres in Buffers                     | 7.85  | 7.85   | 0.20%   | 0.20%   |             |               |
| Narrow Forest Buffers on Fenced Pasture Corridor  | cumulative              | Acres in Buffers                     | 0.33  | 0 33   | 0.00%   | 0.00%   |             |               |
| < > Read Me ScenarioDetail  | s                       | Sumn                                 | nary BMP Groups SummaryBM                             | 1PPctImpLoadSources +                                | : •   |   |             | ••••          |
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- Atmospheric Deposition Report
- Base Conditions Report
- BMP Input Files
- BMP Submitted vs. Credited Report
- BMP Summary Report
- Loads Per Unit
- Loads Report
- Quick Results Report
- Wastewater Report

#### REPORTS

| Create Reports ③  |   |   |                                      | View Documentation |
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| * Required field  |   |   |                                      |                    |
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| Check to view geographies located only in the Chesapeake Bay Watershed Area 🗹 |   |   |                                      |                    |
| Geographic Scale *  |   |   |                                      |                    |
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| anne  |   |   |                                      |                    |
| Queen Annes, MD (CBWS Portion Only)   | * |   | Anne Arundel, MD (CBWS Portion Only) | *                  |
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| 2022 Daseine ** 2023 Planned **   |   |   |                                      |                    |
| Load Source Aggregations *  |   |   |                                      |                    |
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| A1            | $\sim$           | $: \times \checkmark f_x$ | Geograph                         | hy                              |              |               |           |                            |                    |                |          |         |                |                   |            |         |          |          |            |                  |             |                |          |        |
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| 1 Caaman      | h                | A                         | Bester                           | LeadFourse                      | C            |               | Alless    | U<br>tion Tune             |                    | E              | F        | 0022 B. | G<br>G         | 2022 Diam         | H Amount   | 2022 B  | l I      |          | 2022 DI    | J                | Land EOS    | 2022 Baseline  |          | 2022.1 |
| 1 Geograp     | ny<br>ndel MD    |                           | Sector                           | Load Source                     |              |               | Alloca    | ation i ype                | Agency             | Anonaiaa       | Unit     | 2022 88 | aseline_Amount | 2022 Plan         | ined_Amoun |         | sellne_N | LoadEUS  |            | anned_N          | LoadEUS     | 2022 Baseline_ | PLOadEUS | 2022 1 |
| 2 Anne Aru    | ndel, MD         | CBWS Portion Only         | Agriculture                      | Ag Open Spa                     | ice          |               | Load A    | Allocation                 | Federal<br>New Fed | Agencies       | acres    |         | CE2.44         | 0                 | 925.70     | 7       |          | 1076.00  | 0          |                  | 000.0       |                | 460.620  |        |
| 3 Anne Aru    | ndel, IVID       | CBVVS Portion Unit        | /) Agriculture                   | Ag Open Spa                     | ice          |               | Load A    | Allocation                 | Non-Fed            | ieral Agencies | acres    |         | 553.44         | 0                 | 835.79     | 1       |          | 18/6.23  | 2          |                  | 2652.659    |                | 460.630  |        |
| 4 Anne Aru    | ndei, IVID       | CBV/S Portion Unit        | /) Agriculture                   | Double Cropp                    | ed Land      |               | Load A    | Allocation                 | Federal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 7       |          | 0.00     | 4          |                  | 0.000       |                | 0.000    |        |
| 5 Anne Aru    | ndei, IVID       | CBV/S Portion Unit        | /) Agriculture                   | Double Cropp                    | ed Land      |               | Load A    | Allocation                 | Non-Fed            | ieral Agencies | acres    |         | 1764.14        | /                 | 1764.14    | 1       |          | 316/1.28 | 1          |                  | 29061.467   |                | 1450.032 |        |
| 6 Anne Aru    | ndei, IVID       | CBVVS Portion Unit        | /) Agriculture                   | Full Season S                   | Soybeans     |               | Load A    | Allocation                 | Federal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 7 Anne Aru    | ndel, MD         | CBWS Portion Only         | <ul> <li>Agriculture</li> </ul>  | Full Season S                   | Soybeans     |               | Load A    | Allocation                 | Non-Fed            | feral Agencies | acres    |         | 3853.78        | 9                 | 3853.78    | 9       |          | 60330.68 | 3          |                  | 49831.329   |                | 3168.313 |        |
| 8 Anne Aru    | ndel, MD         | (CBWS Portion Only        | <ul> <li>Agriculture</li> </ul>  | Grain with Ma                   | anure        |               | Load A    | Allocation                 | Federal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 9 Anne Aru    | ndel, MD         | (CBVVS Portion Only       | <ul> <li>Agriculture</li> </ul>  | Grain with Ma                   | anure        |               | Load A    | Allocation                 | Non-Fed            | feral Agencies | acres    |         | 15/1.39        | 1                 | 1571.39    | 1       |          | 53908.45 | 1          |                  | 411/1.9/9   |                | 1351.041 |        |
| 10 Anne Aru   | ndel, MD         | (CBVVS Portion Only       | <ul> <li>Agriculture</li> </ul>  | Grain without                   | Manure       |               | Load A    | Allocation                 | Federal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 11 Anne Aru   | ndel, MD         | (CBWS Portion Only        | <ol> <li>Agriculture</li> </ol>  | Grain without                   | Manure       |               | Load A    | Allocation                 | Non-Fed            | feral Agencies | acres    |         | 1959.41        | 9                 | 1959.41    | 9       |          | 46735.35 | 0          |                  | 36600.351   |                | 1605.228 |        |
| 12 Anne Aru   | ndel, MD         | ) (CBWS Portion Only      | <ul> <li>Agriculture</li> </ul>  | Leguminous I                    | Hay          |               | Load A    | Allocation                 | Federal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 13 Anne Aru   | ndel, MD         | ) (CBWS Portion Only      | <ul> <li>Agriculture</li> </ul>  | Leguminous H                    | Hay          |               | Load A    | Allocation                 | Non-Fee            | leral Agencies | acres    |         | 485.32         | 0                 | 485.32     | 0       |          | 3213.08  | 1          |                  | 3213.081    |                | 195.156  |        |
| 14 Anne Aru   | ndel, MD         | ) (CBWS Portion Only      | <ul><li>Agriculture</li></ul>    | Non-Permitte                    | d Feeding \$ | Space         | Load A    | Allocation                 | Federal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 15 Anne Aru   | ndel, MD         | ) (CBWS Portion Only      | <ul><li>Agriculture</li></ul>    | Non-Permitte                    | d Feeding \$ | Space         | Load A    | Allocation                 | Non-Fee            | leral Agencies | acres    |         | 32.85          | 1                 | 32.85      | 1       |          | 1981.77  | 0          |                  | 1981.770    |                | 241.042  |        |
| 16 Anne Aru   | ndel, MD         | ) (CBWS Portion Only      | <ul> <li>Agriculture</li> </ul>  | Other Agrono                    | mic Crops    |               | Load A    | Allocation                 | Federal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 17 Anne Aru   | ndel, MD         | ) (CBWS Portion Only      | <ul> <li>Agriculture</li> </ul>  | Other Agrono                    | mic Crops    |               | Load A    | Allocation                 | Non-Fee            | leral Agencies | acres    |         | 933.63         | 5                 | 933.63     | 5       |          | 8735.18  | 1          |                  | 7149.277    |                | 866.132  |        |
| 18 Anne Aru   | ndel, MD         | ) (CBWS Portion Only      | <ul><li>Agriculture</li></ul>    | Other Hay                       |              |               | Load A    | Allocation                 | Federal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 19 Anne Aru   | ndel, MD         | ) (CBWS Portion Only      | <ul><li>Agriculture</li></ul>    | Other Hay                       |              |               | Load A    | Allocation                 | Non-Fee            | leral Agencies | acres    |         | 3306.93        | 4                 | 3306.93    | 4       |          | 31481.06 | 2          |                  | 31481.062   |                | 2167.840 |        |
| 20 Anne Aru   | ndel, MD         | ) (CBWS Portion Only      | <ul> <li>Agriculture</li> </ul>  | Pasture                         |              |               | Load A    | Allocation                 | Federal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 21 Anne Aru   | ndel, MD         | ) (CBWS Portion Only      | <ul><li>Agriculture</li></ul>    | Pasture                         |              |               | Load A    | Allocation                 | Non-Fed            | leral Agencies | acres    |         | 4244.04        | 8                 | 3961.70    | 0       |          | 32700.50 | 8          |                  | 27093.155   |                | 3295.902 |        |
| 22 Anne Aru   | ndel, MD         | ) (CBWS Portion Only      | <ul><li>Agriculture</li></ul>    | Permitted Fee                   | eding Spac   | e             | Waste     | Load Allocation            | Federal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 23 Anne Aru   | ndel, MD         | ) (CBWS Portion Only      | <ul><li>Agriculture</li></ul>    | Permitted Fee                   | eding Spac   | e             | Waste     | Load Allocation            | Non-Fed            | leral Agencies | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 24 Anne Aru   | ndel, MD         | ) (CBWS Portion Only      | <ul> <li>Agriculture</li> </ul>  | Riparian Past                   | ure Deposi   | tion          | Load A    | Allocation                 | Federal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 25 Anne Aru   | ndel, MD         | ) (CBWS Portion Only      | <ul> <li>Agriculture</li> </ul>  | Riparian Past                   | ure Deposi   | tion          | Load A    | Allocation                 | Non-Fed            | leral Agencies | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 5667.65  | 9          |                  | 263.031     |                | 1759.142 |        |
| 26 Anne Aru   | ndel, MD         | ) (CBWS Portion Only      | <ul> <li>Agriculture</li> </ul>  | Silage with M                   | anure        |               | Load A    | Allocation                 | Federal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 27 Anne Aru   | ndel, MD         | ) (CBWS Portion Only      | <ul> <li>Agriculture</li> </ul>  | Silage with M                   | anure        |               | Load A    | Allocation                 | Non-Fed            | leral Agencies | acres    |         | 38.46          | 7                 | 38.46      | 7       |          | 918.80   | 3          |                  | 637.400     |                | 49.165   |        |
| 28 Anne Aru   | ndel, MD         | (CBWS Portion Only        | <ul> <li>Agriculture</li> </ul>  | Silage without                  | t Manure     |               | Load A    | Allocation                 | Federal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 29 Anne Aru   | ndel, MD         | (CBWS Portion Only        | <ul> <li>Agriculture</li> </ul>  | Silage without                  | t Manure     |               | Load A    | Allocation                 | Non-Fed            | leral Agencies | acres    |         | 6.78           | 8                 | 6.78       | 8       |          | 167.54   | 9          |                  | 131.158     |                | 8.095    |        |
| 30 Anne Aru   | ndel, MD         | (CBWS Portion Only        | <ul> <li>Agriculture</li> </ul>  | Small Grains                    | and Grains   |               | Load A    | Allocation                 | Federal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 31 Anne Aru   | ndel, MD         | ) (CBWS Portion Only      | Agriculture                      | Small Grains                    | and Grains   |               | Load A    | Allocation                 | Non-Fed            | leral Agencies | acres    |         | 528.33         | 0                 | 528.33     | 0       |          | 8160.80  | 1          |                  | 7415.454    |                | 513.560  |        |
| 32 Anne Aru   | ndel, MD         | (CBWS Portion Only        | <ul> <li>Agriculture</li> </ul>  | Specialty Cro                   | p High       |               | Load A    | Allocation                 | Federal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 33 Anne Aru   | ndel, MD         | CBWS Portion Only         | <ul> <li>Agriculture</li> </ul>  | Specialty Cro                   | p High       |               | Load A    | Allocation                 | Non-Fed            | leral Agencies | acres    |         | 95.58          | 5                 | 95.58      | 5       |          | 3077.33  | 9          |                  | 2212.069    |                | 322.697  |        |
| 34 Anne Aru   | ndel, MD         | CBWS Portion Only         | <ul> <li>Agriculture</li> </ul>  | Specialty Cro                   | p Low        |               | Load A    | Allocation                 | Federal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 35 Anne Aru   | ndel, MD         | (CBWS Portion Only        | /) Agriculture                   | Specialty Cro                   | p Low        |               | Load A    | Allocation                 | Non-Fed            | leral Agencies | acres    |         | 313.36         | 8                 | 313.36     | 8       |          | 2762.96  | 5          |                  | 2097.763    |                | 950.382  |        |
| 36 Anne Aru   | ndel, MD         | (CBWS Portion Only        | /) Developed                     | CSS Building                    | s and Othe   | r             | Waste     | Load Allocation            | Federal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0,000    |        |
| 37 Anne Aru   | ndel, MD         | (CBWS Portion Only        | /) Developed                     | CSS Building                    | s and Othe   | r             | Waste     | Load Allocation            | Non-Fed            | leral Agencies | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 38 Anne Aru   | ndel. MD         | ) (CBWS Portion Only      | /) Developed                     | CSS Construe                    | ction        |               | Waste     | Load Allocation            | Federal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 39 Anne Aru   | ndel. MD         | (CBWS Portion Only        | <ul> <li>/) Developed</li> </ul> | CSS Construe                    | ction        |               | Waste     | Load Allocation            | Non-Fee            | leral Agencies | acres    |         | 0.00           | 0                 | 0.00       | 0       |          | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
| 40 Anne Aru   | ndel. MD         | (CBWS Portion Only        | <ul> <li>Developed</li> </ul>    | CSS Roads                       |              |               | Waste     | Load Allocation            | Eederal            | Agencies       | acres    |         | 0.00           | 0                 | 0.00       | 0       | _        | 0.00     | 0          |                  | 0.000       |                | 0.000    |        |
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| A A  | Sector                 |  |                 | Agoney       | ⊢<br>Unit       | G<br>2022 Basolino Amount | H<br>2022 Planned Amount | 2022 Basolino NL oadEOS | J<br>2022 Plannod NL oadEOS | K<br>2022 Basolino, PL oadEOS  |                       | 2 Basolino, SL oadE( |
| 2 Anne Arundel MD (CBW/S Portion Only)   | Agriculture            | Feeding Space  | All             | All Agencies | acres           | 32 851                    | 32 851                   | 1981 770                | 1981 770                    | 241 042  | 241 042               | 52144                |
| 3 Anne Arundel, MD (CBWS Portion Only)   | Agriculture            | Hay  | ΔII             | All Agencies | acres           | 3792.254                  | 3792.254                 | 34694.143               | 34694.143                   | 2362.996   | 2359.049              | 271253               |
| 4 Anne Arundel, MD (CBWS Portion Only)   | Agriculture            | Other Ag   | All             | All Agencies | acres           | 553.448                   | 835.797                  | 1876.232                | 2852.659                    | 460.630  | 694.037               | 31889                |
| 5 Anne Arundel, MD (CBWS Portion Only)   | Agriculture            | Pasture  | All             | All Agencies | acres           | 4244.048                  | 3961.700                 | 32700.508               | 27093.155                   | 3295.902   | 2979.765              | 308202               |
| 6 Anne Arundel, MD (CBWS Portion Only)   | Agriculture            | Riparian Pasture   | All             | All Agencies | acres           | 0.000                     | 0.000                    | 5667.659                | 263.031                     | 1759.142   | 80.119                | 867081               |
| 7 Anne Arundel, MD (CBWS Portion Only)   | Agriculture            | Row Crops  | All             | All Agencies | acres           | 11064.920                 | 11064.920                | 216474.410              | 176308.246                  | 10284.644  | 9832.227              | 7483159              |
| 8 Anne Arundel, MD (CBWS Portion Only)   | Developed              | Construction   | All             | All Agencies | acres           | 277.100                   | 277.100                  | 6409.623                | 6409.623                    | 925.731  | 925.731               | 328945.              |
| 9 Anne Arundel, MD (CBWS Portion Only)<br>10 Appa Arundel MD (CBWS Portion Only) | Developed              | Impervious Developed   | All             | All Agencies | acres           | 49327.298                 | 49327.298                | /56228.531              | /56228.531                  | 30480.567  | 30480.567             | 45116940.            |
| 11 Anne Arundel, MD (CBWS Portion Only)  | Natural                | Fervious Developed   |                 | All Agencies | acres           | 101850.976                | 101850 976               | 445955.505              | 445555.565                  | 5330 576   | 5330.576              | 1672551              |
| 12 Anne Arundel, MD (CBWS Portion Only)  | Natural                | Non-Tidal Water Deposition   | All             | All Agencies | acres           | 5051 864                  | 5051 864                 | 43435 620               | 43435 620                   | 2919 523   | 2919 523              | 0                    |
| 13 Anne Arundel, MD (CBWS Portion Only)  | Natural                | Open Space   | All             | All Agencies | acres           | 15448.594                 | 15448.594                | 31491.727               | 31491.727                   | 4204,786   | 4204.786              | 8433500.             |
| 14 Anne Arundel, MD (CBWS Portion Only)  | Natural                | Shoreline  | All             | All Agencies | miles           | 468.993                   | 468.993                  | 0.000                   | 0.000                       | 0.000  | 0.000                 | 0.                   |
| 15 Anne Arundel, MD (CBWS Portion Only)  | Natural                | Stream   | All             | All Agencies | miles           | 433.481                   | 433.481                  | 134634.009              | 130532.098                  | 29050.495  | 28410.721             | 145100726.           |
| 16 Anne Arundel, MD (CBWS Portion Only)  | Natural                | Wetland  | All             | All Agencies | acres           | 10548.824                 | 10548.824                | 14167.374               | 14167.374                   | 548.507  | 548.507               | 150580.              |
| 17 Anne Arundel, MD (CBWS Portion Only)  | Septic                 | Septic   | All             | All Agencies | systems         | 42187.324                 | 42187.324                | 452879.840              | 452879.840                  | 0.000  | 0.000                 | 0.                   |
| 18 Anne Arundel, MD (CBWS Portion Only)  | Wastewate              | er Wastewater  | All             | All Agencies | acres           | 0.000                     | 0.000                    | 656486.000              | 656486.000                  | 57067.919  | 57067.919             | 784202.              |
| 19 Anne Arundel, MD (CBVVS Portion Only)   | vvastewate             | vvastewater-CSO  | All             | All Agencies | acres           | 0.000                     | 0.000                    | 0.000                   | 0.000                       | 0.000  | 0.000                 | 0.                   |
| 20   |                        |  |                 |              |                 |                           |                          |                         |                             |  |                       |                      |
| 21   |                        |  |                 |              |                 |                           |                          |                         |                             |  |                       |                      |
| 22   |                        |  |                 |              |                 |                           |                          |                         |                             |  |                       |                      |
| 23   |                        |  |                 |              |                 |                           |                          |                         |                             |  |                       |                      |
| 24   |                        |  |                 |              |                 |                           |                          |                         |                             |  |                       |                      |
| 25   |                        |  |                 |              |                 |                           |                          |                         |                             |  |                       |                      |
| 26   |                        |  |                 |              |                 |                           |                          |                         |                             |  |                       |                      |
| 27   |                        |  |                 |              |                 |                           |                          |                         |                             |  |                       |                      |
| 28   |                        |  |                 |              |                 |                           |                          |                         |                             |  |                       |                      |
| 29   |                        |  |                 |              |                 |                           |                          |                         |                             |  |                       |                      |
| 30   |                        |  |                 |              |                 |                           |                          |                         |                             |  |                       |                      |
| 31   |                        |  |                 |              |                 |                           |                          |                         |                             |  |                       |                      |
| 32   |                        |  |                 |              |                 |                           |                          |                         |                             |  |                       |                      |
| 33   |                        |  |                 |              |                 |                           |                          |                         |                             |  |                       |                      |
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# Resources

# How to get additional information and support from the CAST Team



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Chesapeake Assessment Scenario Tool CAST Newsletter: April 2024

Tips and information to facilitate environmental restoration efforts in the Chesapeake Bay watershed Did You Know?

Did you know about the Local Government Guides to the Chesapeake Bay? The Local Leadership Workgroup developed a Local Government Guide to the Chesapeake Bay, a seven module series created to support decision-making by local officials. Use the Learning Library to acheive beneficial outcomes for your community; review case studies; download presentations, fact sheets and infographics; and find solutions.

# CAST Webinars and Training

#### Upcoming Webinars

This month's CAST webinar will cover climate-smart agricultural practices. Guest speaker, James Martin from the VA Department of Conservation and Recreation, will share the information available on the USDA's Partnerships for Climate-Smart Commodities Project Dashboard. The Dashboard includes background information about climate-smart projects, details about finalized projects, and eligible practices. Then, we will walk through how to create a scenario in CAST using climate-smart eligible practices to estimate their nitrogen, phosphorus, and sediment reductions. Finally, we will set up a discussion about how carbon reduction estimations may be built into CAST, and how to best approach this effort moving forward.

- Topic: Climate-Smart Agricultural Practices
- · Time: April 18, 2024 at noon EDT
- Join Zoom Meeting
- Meeting ID: 843 4972 5553
- One tap mobile +19292056099,,84349725553#

#### Available Training Videos

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### Chesapeake Assessment Scenario Tool

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#### CAST DOCUMENTATION

| Print All 💿           | Expand All | Using This Site Print Section  |
|-----------------------|------------|--|
| Using This Site       | Â          | Below are some basic tips on how to navigate and use the CAST site.  |
| Getting Started       | - 1        | Ribbon   |
| Home                  | - 1        | The user can access any of the CAST pages using the Ribbon at the top of each page. Many of the links represent groupings of features. Placing your mouse over the word opens a dropdown with additional items   |
| Public Reports        | +          | Before logging in, the Ribbon provides limited functionalities including access to a set of public reports available under the link with the same name.  |
| Scenarios             | +          | User Profile   |
| Add Scenarios         | +          | The Manage Profile link is the only page not accessible from the Menu Bar. It is located on the right side of the banner above the Menu Bar.   |
| Edit Scenarios        | +          | Help Icons   |
| Results               |            | Help icons are distributed throughout the application and provide a short description of CAST features. Placing your mouse over the question mark icon will display the message.   |
| Compare Scenarios     | - 1        | Compare Scenarios  |
| Reports               |            | Select the scale and agency for comparing. The scenarios that  |
| Understanding Results |            | Compare Scenarios () appear are thise that include the scale and agencies selected.<br>Compare between 2 to 4 scenarios.   |
| Graphs                |            |  |
| Cost Profiles Page    | +          | View Documentation   |
| Learning              | +          | The View Documentation button links to the section of the User Documentation pertaining to page being displayed.   |
| About                 | +          | Tool Tips  |
| User Information      | +          | Tool Tips are provided throughout the application to provide information about icon functionalities, items contained within the different grids or BMP entries.  |
| Glossary              | -          | I he Scenario Name tool tip in the My Scenarios grid displays the scenario description the user created. It is an effective tool to display the selections used to create a scenario where the Add, Edit, Run and Delete functionalities are available instead of having to edit the scenario to view these details. |





### Chesapeake Assessment Scenario Tool

#### FREE TRAINING VIDEOS

Do you want to create a plan for reducing nitrogen, phosphorus, and sediment? These videos are for you! Learn how to create a scenario and analyze the results using Chesapeake Assessment Scenario Tool (CAST).

| – C | AST 101 – Getting Started        |   | 11 VIDEOS - 275 min  |
|-----|----------------------------------|---|----------------------|
|     | CAST 101                         | 0 | 53 min               |
|     | Scenario Loads                   | 0 | 52 min               |
|     | Adding BMPs to CAST scenarios    | 0 | 58 min               |
|     | CAST Versions and Upgrades       | 0 | 57 min               |
|     | Where do I start                 | 0 | 2 min                |
|     | Adding scenarios                 | 0 | 9 min                |
|     | Invalid BMPs                     | 0 | 4 min                |
|     | BMP Input Files and Invalid BMPs | 0 | 32 min               |
|     | Creating reports                 | 0 | 4 min                |
|     | Downloading reports              | 0 | 1 min                |
|     | Creating graphs                  | 0 | 3 min                |
| + S | cenario Analysis                 |   | 9 VIDEOS - 437 min   |
| + C | ost Data in CAST                 |   | 4 VIDEOS - 41 min    |
| + D | evelop a Plan                    |   | 11 VIDEO S - 426 min |

# Upcoming Webinars None currently scheduled.

In-Person Training

None currently scheduled.

#### Specialized Training

Interested in a training for a special group? Use the Contact Us button on the top menu bar to request additional webinars or in-person trainings in the Chesapeake Bay Watershed. Q



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### Chesapeake Assessment Scenario Tool

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#### Q NEWS PUBLIC REPORTS LEARNING ABOUT CONTACT US Search Cast CAST FAOs Print All (?) Expand All General Print Section General CAST Users Print Section CAST Users Scenario Who is eligible to receive a login and use CAST? Add Scenario Anyone who wants to use CAST may register for a login and use the tool. There are no restrictions on public access, and no charge for access. Invalid BMPs What might happen if I share my CAST login account with another person? Compare Scenarios If you were to share your login, and more than one person was using the account at the same time, then the person could overwrite your inputs. Please consider not sharing your login. Other users of CAST can use the system to share scenarios with you, and vice versa. Reports Understa I forgot my login username and/or password for CAST. What can I do to get it or reset it? Your login is your email. If you no longer have access to that email address, you will need to create a new account. If you forget your password, click on Forgot Password to reset it. ost Profiles How can I update the information in my CAST user profile? and Policy BMPs You can edit your CAST user profile once you create a login and are logged in. Click on Manage Profile, located at top right of the page. This allows you to change your user password, first name, last name, organization, group, and email address. **Developed BMPs** How may I receive updates about changes to CAST? Septic BMPs By setting up a login account on CAST you will receive occasional email updates through the email address you used as your login. If your email address changes, please update it on the Manage Profile page. If you no longer wish to receive updates, you must close your account. We will never solicit you to purchase any goods or services, nor share your login profile with anyone else. You also may check the software Natural BMPs updates page and look for changes in the help pages on this site that indicate new features. Agriculture BMPs Scenario Print Section Animal BMPs How are future scenarios projected? Manure Treatment BMPs The data used to project future scenarios include the items below. The projection methods for these data are determined by the Chesapeake Bay Program Partnerships source sector workgroups. Animal Populations · Animal per Animal Unit and manure produced per animal daily · Biosolids and agricultural spray irrigation Nitrogen and phosphorus amount to meet crop need Crop acres · Crop yield, e.g. bushels per acre · Inorganic fertilizer available in the watershed Land Use

- Nutrient concentration per animal manure type and county
- · Septic systems
- Soil phosphorus

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#### **ABOUT CAST**

Chesapeake Assessment Scenario Tool (CAST) is a web-based nitrogen, phosphorus and sediment load estimator tool that streamlines environmental planning. Users specify a geographical area, and then select best management practices (BMPs) to apply on that area. CAST builds the scenario and provides estimates of nitrogen, phosphorus, and sediment load reductions. The cost of a scenario is also provided so that users may select the most cost-effective practices to reduce pollutant loads.

#### Suggested Citation

Chesapeake Bay Program, 2020. Chesapeake Assessment and Scenario Tool (CAST) Version 2019. Chesapeake Bay Program Office, Last accessed [Month, Year].

#### What is included in the Chesapeake Bay Program's suite of modeling tools?

The Chesapeake Bay Program uses state-of-the-art science and monitoring data to replicate conditions of the Chesapeake Bay watershed. This information is then used by decision-makers at the federal, state and local levels to determine how best to restore and protect local waterways, and ultimately, the Chesapeake Bay. By combining sophisticated modeling data and real-world monitoring data, we gain a comprehensive view of the Chesapeake ecosystem—from the depths of the Bay to the upper reaches of the watershed. The suite of computer modeling tools developed by the Chesapeake Bay Program divides the 64,000-square mile watershed into thousands of smaller segments, and helps us understand the impact of pollution-reducing policies and practices at the regional and local level. The most significant value of the suite of modeling tools is the ability to predict how the Chesapeake Bay will respond to future conditions such as pollutant loads, land use changes and climate change. A fact sheet on the models is available. Information about the changes in moving to the Phase 6 Watershed Model are available.

#### Why use CAST?

CAST enables planners in the watershed to develop a plan for meeting a nitrogen, phosphorus, or sediment load allocation using the most cost-effective strategy. CAST can be used to answer questions about the effect of different BMPs on loads, the impact of land use development over time, and to identify the geographical location where BMPs will reduce the most load. CAST provides estimates of load reductions. CAST allows users to understand which BMPs provide the greatest load reduction benefit, the extent to which these BMPs can be implemented, and the cost of these BMPs. Based on the scenario outputs, users can refine BMP choices in their planning.

CAST facilitates an iterative process to determine if Total Maximum Daily Load (TMDL) allocations are met. Scenarios may be compared to each other, TMDL allocations, or the amount of nitrogen, phosphorus, and sediment from the Watershed Implementation Plan (WIP) or a current annual progress scenario. CAST is used to facilitate Chesapeake Bay TMDL milestone and WIP development.

CAST is the Chesapeake Bay Program's (CBP) Watershed Model. Other available tools have assumptions that may be different from those used in the Watershed Model for developing the 2010 Chesapeake Bay TMDL. Since the Watershed Model is used to assess jurisdictions' progress toward meeting the TMDL allocations, consistency with the Watershed Model is critical.

#### What are CAST's outputs?

CAST estimates of load reductions for load sources include: agriculture, developed, natural, wastewater, and septic loading to the edge of a small stream (EOS) and loads delivered to the tidal portion of the Chesapeake Bay (EOT). CAST stores the geographic area, cost and implementation level associated with each BMP as well as the load for each sector and land use. With these data tables, CAST also serves as a data management system. Thus, users may quantify the impacts of various management actions while improving local management decisions.

#### Who benefits from using CAST?

CAST is used by multiple local jurisdictions and states for the Phase II and III WIPs, two-year Milestones and even local TMDLs. Any user may see the source of the data that was used in developing the TMDL and the state's most recent annual progress scenario, Milestone and WIP. This allows involvement of the counties and other local planners in the Bay TMDL. CAST is easily accessible on-line with no need to install specific databases or software. All who request a login are granted one.

#### Why was CAST developed?

The first version of CAST was launched in 2011 to provide local jurisdictions, such as counties, with a tool to provide input into the TMDL WIP process. The U.S. Environmental Protection Agency (EPA) issued a TMDL in 2010 for the Chesapeake Bay based on allocations established by the states. The jurisdictions that drain to the Chesapeake Bay include New York, Pennsylvania, West Virginia, Maryland, Delaware, District of Columbia, and Virginia. The states agreed that it would be more efficient for states to allocate responsibility within their respective political boundaries, and for EPA to issue one overall TMDL that reflected each state's allocation. Since planning happens at a more local scale, such as county, sown states downscaled the allocation to the county level.

#### How is information entered into CAST?

CAST is designed to be useful to people with a general knowledge of BMPs. Knowledge of models or BMP load reduction calculations is not necessary. CAST is available on-line to users with a login and password, which may be requested from the website





#### **Model Documentation**

#### Suggested Citation

Chesapeake Bay Program, 2020. Chesapeake Assessment and Scenario Tool (CAST) Version 2019. Chesapeake Bay Program Office, Last accessed [Month, Year].

#### CAST-23 version

CAST-23 is planned to be the last model update to the phase 6 suite of models. This follows the decision to update the CAST schedule, which was approved by the Water Quality Goal Implementation Team, Management Board, and Principals' Staff Committee. The decision can be found in the September 26, 2023 PSC meeting minutes. CAST-23 contains all the planned updates for CAST-21 plus:

- Updated BMP history (as of February 2024)
- · 1985-2016 updated AAPFCO fertilizer for the agricultural and urban sector
- · State-supplied fertilizer methodology and data change
- · Urban fertilizer methodology and data change
- Oyster BMPs
- Animal mortality BMPs
- · No expiration for wetland BMPs
- · Resource Improvement Forest Buffer BMPs (9 and 10) added
- · Changes to nutrient application eligibility
- · Correction to regulated/unregulated Virginia developed acreage in CAST

#### Additional CAST-23 related resources are linked below.

- · Response to comments
- Comparison of Loads and Inputs with prior version--Data Visualization Tool

#### CAST-21 version (never released)

BMPs in progress scenarios are pulled from the National Environmental Information Exchange Network (NEIEN), and used to update that year's progress data. This means that new inspections, new cumulative BMPs in any year, and new annual BMPs are used for that year's progress. The prior years' progress scenarios are pulled from the National Environmental Information Exchange Network (NEIEN), and used to update that year's progress data. This means that new inspections, new cumulative BMPs in any year, and new annual BMPs are used for that year's progress. The prior years' progress scenarios are pulled from the National Environmental Information Exchange Network (NEIEN), and used to update that year's progress data. This means that new Inspections, new cumulative BMPs in any year, and new annual BMPs are used for that year's progress. The prior years' progress scenarios are public to include new BMP history.

- Fact Sheet
- Understanding Chesapeake Bay Modeling Tools
- · Comparison of Loads and Inputs Between CAST-19 and CAST-21--Data Visualization Tool
- Technical Documentation of the Change Between CAST-19 and CAST-21
- · Response to Comments

#### CAST-19 version

CAST-17d is updated to CAST-19 with changes to data and BMPs used in the Phase 6 model for the milestone period. This follows the Principals' Staff Committee decision of July 9, 2018 that changes are made only in advance of the two-year milestone period. The decision can be found in the July 9, 2018 PSC meeting minutes. These changes were agreed to by the WQGIT and its workgroups. The changes are limited in scope so that they do not: 1) impact modeled runoff during the 1993-1995 critical period; or 2)

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#### **UPGRADE HISTORY**

#### Update released on February 2, 2024

- Version Phase 6 7.10.0
- The new coagulant enhanced treatment pond BMPs are in CAST-23 and available for use in planning scenarios.

#### Update released on January 19, 2024

- Version Phase 6 7.10.0
- · Animal mortality and ditch BMPs' cost data updated to be consistent with all other BMP cost estimates, which are in 2018 dollar values.

#### Update released on October 26, 2023

- Version Phase 6 7.10.0
- Update to the manure application eligibility and timing files in CAST-23, changing all crop nutrient applications to be both manure and fertilizer eligible if the crop/land use allows it. This will change the results of reports run on the draft version of CAST-23 that was
  made available to members of the WQGIT, WTWG, and other interested parties for review.
- Correction to the unregulated/regulated land use classification in 5 Virginia counties: Fairfax County and all towns and cities contained therein (specifically including Fairfax City and Fails Church City), Loudoun County to specifically include eastern Loudoun
  County and the Town of Leesburg, and Harrisonburg City, by applying an adjustment factor as a CAST-23 post-processing measure. An adjustment factor is now applied as a ratio of CAST-19 unregulated/regulated lands. The ratio has been determined for each
  land-river model segment, load source, for each nonfederal and each federal agency type, and for each vear after 2012.

#### Update released on October 4, 2023

- Version Phase 6 7.9.0
- The Eutrophication Units Calculator is now live on CAST. The Eutrophication Units Calculator is a tool which calculates the nitrogen and phosphorus exchanges needed to meet the planning goals based on a user-selected scenario and geography. Results are
  shown as eutrophication effects on dissolved oxygen in the Chesapeake Bay.

#### Update released on September 26, 2023

- Version Phase 6 7.8.0
- The official 2022 Progress scenario is now available on CAST. This scenario reflects the BMPs that are implemented and functioning in this year (July 1, 2021 June 30, 2022) as reported by the state to the Chesapeake Bay Program for annual progress and verified by the Environmental Protection Agency (EPA).

#### Update released on August 24, 2023

- Version Phase 6 7.8.0
- Access to a draft version of CAST-23 made available to members of the WQGIT, WTWG, and other interested parties for review.
- Updates to CAST-23 will change the loads in all scenarios and years. This includes your own scenarios, scenarios shared with you, and public scenarios. Public scenarios and the shared scenarios owned by CBP Admin are recalculated for you.
- Updates that were made to the aborted version CAST-21 (11/1/2021) are included in the CAST-23 version as well as changes to the inorganic fertilizer data, which is updated through 2020, and the urban fertilizer application method.

#### Update released on August 3, 2023

- · Version Phase 6 7.8.0
- · Updates the text on the homepage to include mention of the ecosystem benefits (co-benefits) information CAST has to offer
- · New BMP Unit-sort to the Add BMPs page
- · Corrects icon display issue on Download Reports page
- · Adds the Transportation BMP to the BMP Summary Report
- · Updates the Estuary Trends URL from TrendsOverTime to EstuaryTrends



# **Steps to Developing a Plan**





# Source Data =

Download data tables including information on load sources and agencies, BMPs, animals, geographic references and delivery factors. The Source Data includes the following data tables:

- Load Source Definitions
- BMP Definitions
- Efficiency BMPs
- Load Source Conversion BMPs
- Load Reduction BMPs
- Animal BMPs
- BMP Units
- BMP Load Source Group
- Load Source Group Components
- BMP Animal Group
- Animal Group Components
- Geographic References
- Geographic Scale and Names
- Agencies
- Delivery Factors





# **BMPs**

Each BMP is developed following a Protocol that was approved by the Chesapeake Bay Program Partnership. The protocol and detailed reports for each BMP are available on the BMPs page. A quick reference guide for BMPs provides general information about some BMPs and how they function within the Chesapeake Bay Program reporting and modeling structure. This Guide provides a single place to learn key information about a selection of BMPs.

The following resources are available on the CAST BMP page:

- Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model
- Expert Panel Reports
  - Pasture Management/Grazing Report
  - Simpson Weammert-Lane 2009 Report with detailed documentation of many BMPs
  - **BMP Reference Guide**
  - Manure BMP Fast Facts
  - Manure Treatment Technologies Fast Facts
  - Credit for Conservation Landscaping



#### NON-TIDAL WATER QUALITY DASHBOARD

Non-Tidal Water Quality Dashb... Phase 6 Dashboard

#### Chesapeake Bay Non-Tidal Phase 6 Data

Select a parameter from the dropdown menu, then select a monitoring station from the map. The U.S. Geologic Survey-Weighted Regressions on Time, Discharge and Season (URTDS) and Planes 6 Watershiel Model loads will be shown on the chart below. More information on the Watershiel Model can be found at <u>http://cast.cleaspeakubay.net.Documentation/ModelDocumentation</u>, Last updated April 16, 2018.



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Non-tidal Stations



# Monitoring

View maps and graphs of monitored water quality data.

Comparisons between the modeled and monitored data can be found on the **non-tidal water quality** dashboard. These visual representations show both the loads estimated from the U.S. Geologic Survey's Weighted Regressions on Time, Discharge and Season (WRTDS) and loads estimated from the timevariable Phase 6 Watershed Model.



Chesapeake Bay Watershed Ag BMP Targeting: Nitrogen



# Mapping Tools

View geographical information and shapefiles. Shapefiles are available for download as GIS layers and KMZ files.

BMP targeting maps have been created using CAST delivery factors and 2022 Progress loads to communicate which land-river segments in the watershed would be most effective for BMP targeting. There are six bivariate targeting maps, one for each nutrient and sector.





### Chesapeake Assessment Scenario Tool

Search Cast...

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### **Cost Profiles**

Default unit cost estimates are provided for each state and the Chesapeake Bay Watershed. The Chesapeake Bay Watershed is an average of all states. Costs are provided as a starting point to use for creating your own cost estimates of various BMP scenarios. Costs are estimated in 2018 dollars. Costs are those incurred by both public and private entities. Technical assistance is not included in costs. Costs are for all BMPs in a scenario, both those currently implemented and those planned.

There are two cost formulas. For Total Annualized Cost, capital and opportunity costs are amortized over the BMP lifespan and added to annual operations and maintenance (O&M) cost. The interest rate for capital and opportunity costs is 5%. Costs represent a single year of cost rather than the cost over the entire lifespan of the practice. Total Annualized Costs are annualized average costs per unit of BMP (e.g.: \$/acre treated/year). These costs are for a single year, and are not accumulated over time. The reason is two-fold. First, once the Bay TMDL deadline of 2025 is met, BMPs will need to remain in place to control loads and new BMPs will need to be implemented to offset new growth. Second, it is difficult to predict when a BMP is going to be implemented. Using this cost formula makes evaluations of costs among scenarios more comparable. The Total Annualized Cost formula is:

- annual costs = (capital \* annualization factor) + O&M costs + (land \* annualization rate)
- annualization factor = i/((1+i)^n 1) + i
- i = annualization rate, which is always 5%.
- n = period of annualization (also called lifespan)

For Total Implementation Cost, the entire capital cost and one year of opportunity cost are summed. Total Implementation Cost does not consider intercycle costs. The formula is capital + land. You may specify this formula in Cost Profiles once logging in. The Total Amount of Cost is provided below.



You can log into CAST and edit the costs by creating your own Cost Profile. CAST provides costs associated with each scenario using the cost profile you select. The data available in the Cost Profiles is summarized to include the capital, operations and maintenance, and opportunity costs, depending on which cost formula you select.

#### **BMP Costs**

BMP costs included in CAST are developed by contractors to the EPA and are in 2018 dollars. The original costs were reviewed with the states who provided input. Additional BMPs were approved by the Chesapeake Bay Program Partnership since the original TMDL costs were determined. The data source of all BMPs are provided in the downloadable files below by sector.

Agricultural BMP Costs
 Developed BMP Costs
 Septic System Costs
 Natural BMP Costs

#### BMP POUNDS REDUCED AND COSTS BY COUNTY



# Costs

Download BMP costs data and cost profiles for each state and Chesapeake Bay Watershed.

The chart provided offers a quick look at the average cost per pound of nitrogen or phosphorus reduced and the average nitrogen or phosphorus pound reduced per BMP unit.



# Thank you!

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# Next steps in our outcomes estimation journey

- □ Join July 10 for the ACPF webinar
- Fill out the 8-question (2-min) online evaluation survey
- □ Schedule a free "coaching" session with us
  - **Email** <u>atappross@farmland.org</u>, RE: Coaching Request
- □ Order a free print copy of the OET Guide
  - Keyword: "AFT outcomes tools"



A Guide to Water Quality, Climate, Social, and Economic Outcomes Estimation Tools guantifying outcomes to accelerate farm conservation practice adoption

Michelle Perez, PhD | Emily J. Cole, PhD

DECEMBER 2020

