Chesapeake Bay Program | Indicator Analysis and Methods Document
Forest Buffers | Updated August 2020

Indicator Title: Riparian Forest Buffers Planted

Relevant Outcome(s): Forest Buffer

Relevant Goal(s): Vital Habitats

Location within Framework (i.e., Influencing Factor, Output or Performance):
Performance

A. Data Set and Source

(1) Describe the data set. What parameters are measured? What parameters are
obtained by calculation? For what purpose(s) are the data used?
- This data set includes miles of forest buffer planted for each jurisdiction in the
Chesapeake Bay watershed. Data are collected for tracking towards the 900
miles per year target in the 2014 Chesapeake Bay Watershed Agreement.
- Acres of forest buffers were measured directly and obtained from annual state
reports to the Chesapeake Assessment and Scenario Tool (CAST). The average
width for each state was reported annually directly to Bay Program staff, but due
to changes in reporting, we used the 2017 average widths for each state to
calculate miles of buffer for 2018 and 2019.

(2) List the source(s) of the data set, the custodian of the source data, and the relevant
contact at the Chesapeake Bay Program.
- Source: Bay State partners: Maryland Forest Service (DNR), Pennsylvania DEP,
Virginia Dept. of Forestry and DCR, West Virginia Division of Forestry, Delaware
Dept. of Environment and Natural Resources, Upper Susquehanna Coalition (NY)
- Custodian: Bay State partners: Maryland Forest Service (DNR), Pennsylvania DEP,
Virginia Dept of Forestry and DCR, West Virginia Division of Forestry, Delaware
Dept. of Environment and Natural Resources, Upper Susquehanna Coalition (NY)
- Chesapeake Bay Program Contact (name, email address, phone number): Katie
Brownson, katherine.brownson@usda.gov, 410-267-5715

(3) Please provide a link to the location of the data set. Are metadata, data-dictionaries
and embedded definitions included? N/A

B. Temporal Considerations

(4)   Data collection date(s): 1996-2019
Note: Prior to 2010, the reporting procedure only included data from the Signatory
states of Maryland, Pennsylvania, and Virginia. From 2010 onward, we began including

data from other jurisdictions. Beginning in 2012, the time period for reporting was changed from September-August of each year to July-June of each year to align with state reporting processes for the Chesapeake Bay model/TMDL. To avoid duplicate counting during the transition reporting year of 2012, buffers planted in July-August 2011 and reported the prior year were removed from the 2012 reporting year.

(5) Planned update frequency (e.g., annual, biannual, etc.):
- Source Data: Annual
- Indicator: Annual

(6) Date (month and year) next data set is expected to be available for reporting:
Tentatively May 2021, dependent on release of the 2020 Progress Run from CAST.

C. Spatial Considerations

(7) What is the ideal level of spatial aggregation (e.g., watershed-wide, river basin, state, county, hydrologic unit code)?
Any Bay tributary basin (e.g., Potomac/Susquehanna)

(8) Is there geographic (GIS) data associated with this data set? If so, indicate its format (e.g., point, line polygon).
Point data for individual buffer projects are used where available from state agencies; where not available, BMP acres at the county scale are used, as reported to the CAST via NEIEN.

(9) Are there geographic areas that are missing data? If so, list the areas. No; N/A

(10) Please submit any appropriate examples of how this information has been mapped or otherwise portrayed geographically in the past.
For 2015, a map of Maryland and Virginia data was produced. Maps from previous years included other states. Contact is Renee Thompson, rthompso@chesapeakebay.net

For 2018 Progress, we created a map showing buffer implementation by county that we posted to our Chesapeake Riparian Forest Buffer network website. This will be updated in the near future with the new 2019 Progress data.

D. Communicating the Data

(11) What is the goal, target, threshold or expected outcome for this indicator? How was it established?
The current goal for riparian forest buffers in the 2014 Chesapeake Bay Agreement is: *Continually increase the capacity of forest buffers to provide water quality and habitat benefits throughout the watershed. Restore 900 miles per year of riparian forest buffer*

and conserve existing buffers until at least 70 percent of riparian areas throughout the watershed are forested.

The target for this indicator was originally set to be 900 miles/year in 2007 as part of the Forest Conservation Directive. The 900 miles/year was agreed to by the states to be a "stretch" goal, but one that was necessary to reach water quality standards. The 900 miles/year goal was reaffirmed in the 2014 Chesapeake Bay Watershed Agreement.

(12) What is the current status in relation to the goal, target, threshold or expected outcome?
The 158 forest buffer miles restored in 2018 reflects 17.6% attainment of the annual goal of restoring 900 miles each year.

The 83 forest buffer miles restored in 2019 reflects 9.2% attainment of the annual goal of restoring 900 miles each year.

(13) Has a new goal, target, threshold or expected outcome been established since the last reporting period? Why?
No, the Bay Program has been working under the same goal (900 miles/year) since 2007. The 2007 Forest Conservation Directive from the Management Board, the 2010 Executive Order Strategy and the 2014 Chesapeake Bay Agreement all reaffirm this goal of 900 miles/year.

However, in 2019, the states did establish ambitious new goals for forest buffers in their Phase III WIPs. In total, the states put 190,500 acres of cumulative forest buffer implementation in their Phase III WIPs to achieve by 2025. To put this in context, as of 2019, states had reported a cumulative total of 38,255 acres of forest buffers. This reflects a gap of 152,245 acres or 12,448 miles (assuming an average 100.9 ft buffer width). Between 2020 and 2025, states would need to add 2,075 miles per year to meet the goals in the WIPs.

(14) Has the methodology of data collection or analysis changed since the last reporting period? How? Why?

In 2018, the Partnership transitioned to using Phase 6 of the Chesapeake Bay Watershed Model known as the Chesapeake Assessment Scenario Tool (CAST). This transition impacted the data record for several indicators, including this one. See the following for more information:
https://www.chesapeakebay.net/news/blog/updated_tools_help_address_pollution_and_plan_for_the_future.

With the transition to CAST and the implementation of verification protocols in the model, many buffer acres started dropping out of the model at the end of their 10-year credit life due to lack of verification. This resulted in the official progress runs showing a

decrease in cumulative buffer implementation year over year. As we know that new buffers were in fact being planted, to capture these acres to track progress towards meeting in outcome in the Agreement, we therefore started using "no expiration" scenarios to calculate the new miles added each year. These scenarios were created for us by the CAST team and did not remove buffers that expired at the end of their credit life.

(15) What is the long-term data trend (since the start of data collection)?
9,190 miles have been planted between 1996 and 2019. 2,298 miles were planted between 2010 (when there was a new reporting baseline for the Executive Order) and 2019.

An early goal for Forest Buffers, 2,010 by 2010, was met 8 years early. 73% of the next goal, 10,000 miles by 2010, was met. Progress has slowed since 2010. Contributing factors include: lower incentives paid to landowners, unpopular and inconsistent buffer programs, competing water quality practices, and lack of effective technical assistance to help with outreach and education of landowners.

(16) What change(s) does the most recent data show compared to the last reporting period? To what do you attribute the change? Is this actual cause or educated speculation?

The Forest Buffers indicator lends itself better to long-term trend analysis, as year-to-year comparisons are generally insubstantial. However, the 2018 and 2019 data changes from the last reporting period are as follows:

For the reporting year 2018, 158 additional miles of riparian forest buffers have been reported as restored in the Chesapeake Bay watershed. The progress reported by individual States in 2018 is as follows:
- Delaware: 0.02 miles (a .02 mile increase from 2017)
- Maryland: 25.70 miles (a 12.89 mile increase from 2017)
- New York: 9.66 miles (a 6.26 mile decrease from 2017)
- Pennsylvania: 103.12 miles (an 85.65 mile increase from 2017)
- Virginia: 7.42 miles (a 1.83 mile increase from 2017)
- West Virginia: 12.16 miles (a 7.83 mile increase from 2017)

For the reporting year 2019, 83 additional miles of riparian forest buffers have been reported as restored in the Chesapeake Bay watershed. The progress reported by individual States in 2019 is as follows:
- Delaware: 0.03 miles (a .01 mile increase from 2018)
- Maryland: 28.52 miles (a 2.81 mile increase from 2018)
- New York: 8.37 miles (a 1.29 mile decrease from 2018)
- Pennsylvania: 40.19 miles (a 62.93 mile decrease from 2018)

- Virginia: 5.74 miles (a 1.67 mile decrease from 2018)
- West Virginia: 0 miles (a 12.16 mile decrease from 2018)

(17) What is the key story told by this indicator?
We are making inadequate progress towards meeting our goals for buffers in the Agreement and the WIPs. According to scientific research, riparian forest buffers are the most effective filters for nutrients and other pollutants carried by storm water runoff. The ultimate goal is water quality improvements in the Chesapeake Bay Watershed because of the increase in riparian forest buffer miles.

Reporting of this information creates awareness of the importance of riparian forest buffers (RFB) for healthy Bay watersheds, but also that much more effort is needed.

E. Adaptive Management

(18) What factors influence progress toward the goal, target, threshold or expected outcome?
These factors are technical or relate to management/leadership and have been identified to be of the highest order of priority.
- Federal/state/local leadership place insufficient emphasis on RFB as a priority practice and allow less beneficial practices to successfully compete for riparian space
- Technical assistance needs to be scaled up and valued by program leaders
- Lack of interagency coordination and staff training at all levels of government
- Lackluster incentives, and incentives that are not strategic and do not leverage resources wisely
- Federal programs lack the flexibility states and landowners need
- Outreach to landowners with riparian areas needs to stress the importance of RFB, new information, and improved incentives for the enrollment, re-enrollment and permanent protection
- Lack of information available to landowners and technical assistance providers
- Complicated cost-share program application and implementation process accompanied by unclear communication
- Lack of targeting riparian forest buffers to where they would do the most good
- Lack of focus on permanent protection of riparian forest buffers; they are often lost when agricultural lands are converted to development and small, linear easements are difficult to manage.

(19) What are the current gaps in existing management efforts?
The Management Strategy for the Forest Buffers Outcome includes a fuller discussion of gaps, which include:
- Landowners need clear messages on the best way to manage riparian areas

- Need more technical assistance—if landowners are informed and incentivized, more will enroll in buffer programs.
- Outreach to landowners needs to improve/increase
- Existing buffer practices need to be verified.
- Riparian forest buffer easement programs are not active in most states.
- Suburban areas need programs to protect and establish buffers.

For a full discussion of gaps and barriers, see Appendix A of the Management Strategy.

(20) What are the current overlaps in existing management efforts? N/A

(21) According to the management strategy written for the outcome associated with this indicator, how will we (a) assess our performance in making progress toward the goal, target, threshold or expected outcome, and (b) ensure the adaptive management of our work?

(a) The biennial Logic & Action Plan will be the main tool for focusing collaboration across federal, state, local, and nongovernmental partners on the riparian forest buffer outcome. Assessment of progress will be aligned with the cycle of state reporting for two-year milestones for the TMDL, because riparian forest buffer data are critical to meeting these milestones.

(b) The partnership will use the following approaches to ensure adaptive management:

- Continue to work with leadership and partners to pilot the Natural Filters Restoration Program.
- Track progress toward the annual 900-mile goal, as well as identifying trends and priority areas.
- Use Chesapeake partners involved in related goals, i.e., conservation, brook trout, wetlands, healthy watersheds and others, as an important source of mutual feedback on what works well and what does not.
- Throughout the year, the partnership's communication tools, including websites, webinars and special announcements, will inform progress toward the RFB goal and highlight needs or opportunities for partnership members to engage.
- Monthly Forestry Workgroup meetings provide a regular venue for evaluating and adjusting particular strategies that support the annual 900-mile goal.
- Annual reporting by the partnership and its members of best practices, success stories and other qualitative and quantitative successes is another means to recognize the impacts of existing programs, reflect on and adapt existing and new strategies, and grow the capacity and stewardship required to increase the amount of riparian forest buffers in the watershed.

F. Analysis and Interpretation
Please provide appropriate references and location(s) of documentation if hard to find.

(22) What method is used to transform raw data into the information presented in this indicator? Please cite methods and/or modeling programs.

The data is taken from the custom "no expiration" scenarios in CAST. As buffer numbers reported in CAST are cumulative, scenarios are created for the focal year and the preceding year to calculate the number of new buffers added for the focal year. These numbers are extracted from the "submitted vs. credited" report in CAST, and numbers are summed from three forest buffer BMPs: Forest Buffer (Agriculture), Forest Buffer (Developed) and Forest Buffer- Streamside with Exclusion Fencing. The Narrow Forest Buffer BMP is not included.

(23) Is the method used to transform raw data into the information presented in this indicator accepted as scientifically sound? Yes. If not, what are its limitations? N/A

(24) How well does the indicator represent the environmental condition being assessed?
BMP data submitted include only acre measurements, so supplemental data from state agencies were historically reported directly to the Forestry Workgroup from several states, including more detailed buffer data (length/width) so that forest buffer miles can be calculated or estimated. We now use averages of this reported width data to calculate miles from the buffer data in CAST.

(25) Are there established reference points, thresholds, ranges or values for this indicator that unambiguously reflect the desired state of the environment? N/A

(26) How far can the data be extrapolated? Have appropriate statistical methods been used to generalize or portray data beyond the time or spatial locations where measurements were made (e.g., statistical survey inference, no generalization is possible)? N/A

G. Quality
Please provide appropriate references and location(s) of documentation if hard to find.

(27) Were the data collected and processed according to a U.S. Environmental Protection Agency-approved Quality Assurance Project Plan? If so, please provide a link to the QAPP and indicate when the plan was last reviewed and approved. **If not, please complete questions 28-31.**
Yes – beginning in 2014, reported data align with the riparian forest buffer BMP data submitted to the Chesapeake Bay model, covered by state QAPPs with EPA. However, these BMP data only include acre measurements, so supplemental data from state agencies are reported directly to the Forestry Workgroup from several states, including more detailed buffer data (length/width) so that forest buffer miles can be calculated or estimated.

(28) *If applicable:* Are the sampling, analytical and data processing procedures accepted as scientifically and technically valid?
Yes.

(29) *If applicable:* What documentation describes the sampling and analytical procedures used?

The data and metadata were historically sent to the Forestry Workgroup by the participating State Coordinators. The data is documented and saved electronically. Currently, all data is submitted by the states into NEIEN and progress is tracked using CAST.

(30) *If applicable:* To what extent are procedures for quality assurance and quality control of the data documented and accessible?

We also review information posted to CAST for progress to the TMDL.

(31) Are descriptions of the study design clear, complete and sufficient to enable the study to be reproduced?

Verified data can be used to determine miles of restored riparian forest buffers.

(32) Were the sampling, analytical and data processing procedures performed consistently throughout the data record? No, see response to Question 14.

(33) If data sets from two or more sources have been merged, are the sampling designs, methods and results comparable? If not, what are the limitations?

Yes (States' data are merged in CAST). Submission criteria have been set and agreed to by State agencies and CBP.

(34) Are levels of uncertainty available for the indicator and/or the underlying data set? If so, do the uncertainty and variability impact the conclusions drawn from the data or the utility of the indicator? No; N/A

(35) For chemical data reporting: How are data below the MDL reported (i.e., reported as 0, censored, or as < MDL)? If parameter substitutions are made (e.g., using orthophosphate instead of total phosphorus), how are data normalized? How does this impact the indicator? N/A

(36) Are there noteworthy limitations or gaps in the data record?

The data are only as good as what was originally submitted by the States.

H. Additional Information (*Optional)*

(37) Please provide any further information you believe is necessary to aid in communication and prevent any potential misrepresentation of this indicator.

This information passes through many hands before being merged into the annual cumulative miles. Human error enters into this type of record. The data are compiled and released with utmost attention to accuracy and validation of locations and extents of restored riparian forest buffers.