

Chesapeake Bay Program | Indicator Analysis and Methods Document
Stream Miles Opened to Fish Passage | Updated 4/3/18

Indicator Title: Stream Miles Opened to Fish Passage

Relevant Outcome(s): Fish Passage

Relevant Goal(s): Vital Habitats

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

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 is a dataset of stream miles in the Chesapeake Bay watershed opened to access by anadromous fish. Data is collected for tracking progress toward the fish passage outcome in the 2014 Chesapeake Bay Watershed Agreement.

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: Chesapeake Bay Program partners
 - Custodian: Fish Passage Coordinators at Maryland DNR, Pennsylvania FBC and Virginia DGIF (who submit data to CBP), and Margot Cumming, CRC
 - Chesapeake Bay Program Contact (name, email address, phone number): Howard Weinberg, hweinberg@chesapeakebay.net, 410-267-5725, and Margot Cumming, cumming.margot@epa.gov, 410-267-9830
3. Please provide a link to the location of the data set. Are metadata, data-dictionaries and embedded definitions included? Stream miles for each year are posted on [ChesapeakeProgress](#) and are available upon request.

B. Temporal Considerations

4. Data collection date(s): 3/20/18
5. Planned update frequency (e.g., annual, biannual, etc.):
 - Source Data: Biannual
 - Indicator: Annual
6. Date (month and year) next data set is expected to be available for reporting: December 2018

C. Spatial Considerations

7. What is the ideal level of spatial aggregation (e.g., watershed-wide, river basin, state, county, hydrologic unit code)? [Bay basin](#).
8. Is there geographic (GIS) data associated with this data set? If so, indicate its format (e.g., point, line polygon). [Line \(stream miles\) and point \(fish blockages and passages\)](#).
9. Are there geographic areas that are missing data? If so, list the areas. [No](#).
10. Please submit any appropriate examples of how this information has been mapped or otherwise portrayed geographically in the past. [Static annual maps to give a visual of watersheds reopened to anadromous fish have been produced in the past, but the interactive map on ChesapeakeProgress now fills this need.](#)

D. Communicating the Data

11. What is the goal, target, threshold or expected outcome for this indicator? How was it established? [The Fish Passage Workgroup has reached their 2025 goal to open an additional 1,000 stream miles, which was established in the 2014 Chesapeake Bay Watershed Agreement.](#)
12. What is the current status in relation to the goal, target, threshold or expected outcome? [About 124% of the goal has been accomplished \(a total of 1236 miles\)](#)
13. Has a new goal, target, threshold or expected outcome been established since the last reporting period? Why? [No](#).
14. Has the methodology of data collection or analysis changed since the last reporting period? How? Why? [No](#).

[In 2014, the method did change. After consulting with fish passage experts, the Fish Passage Workgroup decided to report stream miles opened using the Upstream Functional Network. This involves the Chesapeake Fish Passage Prioritization Tool mapping and counting all miles upstream of the blockage available for anadromous fish \(up to headwaters or next blockage\), rather than the previous methodology for counting miles, which consisted of counting open miles on only the stream order of the blockage and one lower stream order \(ex. blockage is on a 3rd order stream – miles counted for 3rd and 2nd order stream miles opened, but not the 1st order miles\).](#)

15. What is the long-term data trend (since the start of data collection)? Stream miles are continuously being opened for anadromous fish. Large dam removal projects may open an enormous number of miles to be accessible by fish.
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 most recent year had numerous projects in PA, with no reported projects in MD or VA. While mileage increased, it was concentrated in one state compared to other years.
17. What is the key story told by this indicator? Much of the “low hanging fruit” with regards to dam removal has been plucked. Future projects to open more of the watershed to fish passage may be difficult but are necessary for the health of local species. Culverts are being investigated as opportunities to open miles.

E. Adaptive Management

18. What factors influence progress toward the goal, target, threshold or expected outcome? Dams available for removal on both public and private lands.
19. What are the current gaps in existing management efforts? N/A
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? The Fish Passage Workgroup is using the Chesapeake Fish Passage Prioritization tool to both calculate performance and assess potential future projects. The workgroup compares progress obtained to the overall goal when the number of miles is calculated each year.

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. Chesapeake Fish Passage Prioritization tool: http://maps.tnc.org/EROF_ChesapeakeFPP/
23. Is the method used to transform raw data into the information presented in this indicator accepted as scientifically sound? If not, what are its limitations? The tool has been reviewed and accepted by relevant partners.

24. How well does the indicator represent the environmental condition being assessed? The indicator represents stream miles opened. We can expect that fish will populate this habitat, but the efficiency is unknown.
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 29-31. No**
28. *If applicable:* Are the sampling, analytical and data processing procedures accepted as scientifically and technically valid? Yes, within the Bay program. The method to calculate miles opened is described at: http://maps.tnc.org/EROF_ChesapeakeFPP/assets/ChesapeakeFishPassagePrioritization_Report.pdf . Mileage is submitted to the Bay program by state fish passage coordinators and summed to provide annual watershed mileage increases.
29. *If applicable:* What documentation describes the sampling and analytical procedures used? N/A
30. *If applicable:* To what extent are procedures for quality assurance and quality control of the data documented and accessible? Not available
31. Are descriptions of the study design clear, complete and sufficient to enable the study to be reproduced? N/A
32. Were the sampling, analytical and data processing procedures performed consistently throughout the data record? A minor change in analysis/tracking methods occurred in 2005.
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, counting of miles is consistent across states reporting.

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
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? No

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.

Changes to the Indicator: The Chesapeake Bay Watershed Agreement was signed in June 2014. The Agreement includes a new Fish Passage Outcome, "During the period of 2011-2025, restore historical fish migratory routes by opening 1,000 additional stream miles, with restoration success indicated by the presence of blueback herring, alewife, American shad, Hickory shad, Brook Trout and/or American eel." In the past, state fish passage coordinators only counted American shad river miles as opened by fish passage projects towards achieving the previous goal. These miles were calculated by hand using USGS topographic maps where only the order stream plus the next lowest order were used in the calculation. Unfortunately, there are no historical records of these calculations. The updated Fish Passage outcome includes brook trout and American eel as additional target species. When a dam is removed or a fishway is constructed, the entire upstream habitat (not just mainstem miles) is potential habitat for these species. Therefore, the adoption of a new methodology that measures the entire upstream network of functional miles is applicable. The functional network is defined by those sections of river that a fish could theoretically access from any other point within that functional network. Its terminal ends are barriers, headwaters, and/or the river mouth. The Fish Passage Prioritization Tool (developed by TNC in partnership with NOAA) has the ability to measure the functional network mileage when a new project is implemented. The tool is web accessible and all state fish passage coordinators are able to use the tool to ensure annual data reporting is consistent and comparable.

Starting in 2014, the Fish Passage Indicator reports functional mileage opened as measured by the Fish Passage Tool and tracks progress toward the new outcome included in the new Watershed Agreement. This involves the Chesapeake Fish Passage Prioritization Tool mapping and counting all miles upstream of the

blockage available for anadromous fish (up to headwaters or next blockage), rather than the previous methodology for counting miles, which consisted of counting open miles on only the stream order of the blockage and one lower stream order (ex. blockage is on a 3rd order stream – miles counted for 3rd and 2nd order stream miles opened, but not the 1st order miles).