

Outcome: Continually increase habitat to support sustainable migratory fish populations in the Chesapeake Bay watershed’s freshwater rivers and streams. By 2025, restore historical fish migration routes by opening 1,000 additional stream miles to fish passage. Restoration success will be indicated by the consistent presence of alewife, blueback herring, American shad, hickory shad, American eel and brook trout, to be monitored in accordance with available agency resources and collaboratively developed methods.

Long-term Target: Open an additional 1000 miles by 2025. This target has been exceeded through fish passage efforts completed by the work group. Since fish passage is still restricted in many watersheds by dams and road crossings, the workgroup will continue opening stream miles at the rate specified in the Bay Program agreement and bi-yearly work plans (132 miles of habitat every two years).

Two-year Target: Open an additional 132 miles by 2020

| Factor | Current Efforts | Gap | Actions (critical in bold) | Metrics | Expected Response and Application | Learn/Adapt |
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| <i>What is impacting our ability to achieve our outcome?</i> | <i>What current efforts are addressing this factor?</i> | <i>What further efforts or information are needed to fully address this factor?</i> | <i>What actions are essential to achieve our outcome?</i> | <i>Optional: Do we have a measure of progress? How do we know if we have achieved the intended result?</i> | <i>Optional: What effects do we expect to see as a result of this action, when, and what is the anticipated application of these changes?</i> | <i>Optional: What did we learn from taking this action? How will this lesson impact our work?</i> |
| Local Legislative Engagement: Policy maker understanding of the ancillary benefits of dam removal | The workgroup has established relationships with state dam safety programs to coordinate dam removal. | <i>Additional coordination in MD and VA needs to occur so fish passage experts are working closely with dam safety offices to target potential dam removal projects at high risk dams.</i> | <u>1.3</u> | | | |
| Landowner Engagement: Dam owner understanding of the ancillary benefits of dam removal | The workgroup continues conducting outreach to dam owners on the benefits of dam removal through workshops and outreach materials. | <i>The workgroup lacks outreach professionals. The workgroup could use the assistance of the Bay Program in developing high quality outreach materials to mail to dam owners.</i> | <u>1.2</u> | | | |

| Factor | Current Efforts | Gap | Actions (critical in bold) | Metrics | Expected Response and Application | Learn/Adapt |
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| Landowner Engagement: Dam owner willingness to remove dams | The Workgroup continues outreach to dam owners on the benefits of dam removal through brochures and workshops. The Workgroup is also investigating various incentive programs for dam removal including possible mitigation banking. | <i>The workgroup lacks outreach professionals. The workgroup could use the assistance of the Bay Program in developing high quality outreach materials to mail to dam owners.</i> | 1.2 ; 1.3 | | | |
| Use Conflict: Limited financial resources: With the average cost of stream barrier removal in Maryland, Pennsylvania, and Virginia hovering around \$200,000, the Fish Passage Workgroup needs financial resources to continue to remove dams and improve fish passage at road crossings. | The Workgroup has completed the Chesapeake Bay Fish Passage Prioritization Tool which prioritizes dam removal projects. The workgroup currently uses the ranking to guide our dam removal efforts and strategically invest public funds. Limited culvert data has been added to this tool; however, the vast majority of road crossings have not been assessed to determine whether or not it represents a fish barrier. | <i>Road crossings need to be assessed to determine the severity of each potential barrier and associated fish passage benefits. This assessment will determine the most severe barriers and will allow the workgroup to better align limited financial resources with the best projects to meet the fish passage outcome.</i> | 3.1 , 2.5 , 2.6 ; Fisheries data from 2.1, 2.2, 2.3 and 2.4 can also be utilized in assessing fisheries benefits to potential fish passage projects in the same geographic area. | | | |
| Habitat Condition: Populations of targeted fish species-particularly river herring, shad and American eel-have declined nationwide | There are many reasons for declining populations including habitat conditions, water quality, bycatch, climate change including possible changes in migratory patterns and spawning areas, overfishing, and others. The workgroup does not see these factors directly influencing whether the mileage goal outcome is met | <i>Information related to bycatch and possible changes due to climate changes have not been well documented. The workgroup continues to review data and research produced by climate change professionals to assess any potential impacts to fish distribution in various watersheds.</i> | | | | |

| Factor | Current Efforts | Gap | Actions (critical in bold) | Metrics | Expected Response and Application | Learn/Adapt |
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| | but instead as factors influencing the overall recovery of the target species. As such, no work plan action has been identified. | | | | | |
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WORK PLAN ACTIONS

| Action # | Description | Performance Target(s) | Responsible Party (or Parties) | Geographic Location | Expected Timeline |
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| Management Approach 1: During the period 2011-2025, restore historical fish migratory routes by opening 1,000 additional stream miles, with restoration success indicated by the presence of Alewife, Blueback Herring, American Shad, Hickory Shad, American Eel and/or Brook Trout. | | | | | |
| 1.1 | Continue dam removal activities in the Chesapeake Bay | Complete Removal of the Bloede Dam. | MD DNR, NOAA, USFWS, American Rivers | Ilchester, MD | May-19 |
| 1.2 | Continue dam removal activities in the Chesapeake Bay | Various dam removal planning, design and implementation projects - many projects are in a feasibility study phase where there are no immediate milestones during 2018-2019. Continue outreach to dam owners on the benefits of dam removal through brochures and workshops. Fewer and Fewer of remaining dam owners are willing to remove their dam. | Fish Passage Workgroup | Varies | Varies |

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| 1.3 | Coordinate dam removal activities with the state Dam Safety Programs | Establish or continue relationships with state dam safety programs. | Fish Passage Workgroup | Entire Chesapeake Bay Region | Varies |
| Management Approach 2: Document return of fish to opened stream reaches by establishing the presence or absence of target species at a select number of projects within the Chesapeake Bay watershed. | | | | | |
| 2.1 | Monitor NOAA funded dam removal projects for the presence/absence of target fish species (Tier I monitoring) | All NOAA funded dam removals will be monitored. | NOAA, funding recipients | At dam removal sites | Ongoing |
| 2.2 | Conduct Tier II monitoring on select dam removals (Currently, the Patapsco River monitoring is the only river designated as a Tier II site by NOAA). | Conduct Tier II monitoring on the Patapsco River. | NOAA, American Rivers, MD DNR, UMBC, USGS, MGS, USFWS | Patapsco River near Ellicott City, MD | Ongoing through 2023 |
| 2.3 | Conduct target species monitoring of select dam removals in VA (+/- and relative abundance) | Boat electrofishing upstream of Harvell Dam removal on the Appomattox River and Embrey Dam removal on the Rappahannock River. | VDGIF | Appomattox River in Petersburg, VA And Rappahannock River near Fredericksburg, VA | Ongoing and continued availability of funding for fish passage technician crew. |
| 2.4 | Conduct target species counts at technical fishways in VA | Continue Annual American Shad count at Boshers Vertical Slot Fishway. Establishing electronic herring run count at Walkers Dam Denil fishway. | VDGIF | Boshers Dam in Henrico County on James River near Richmond, VA. Walkers Dam in New Kent Count on Chickahominy River near Lanexa, VA. | Ongoing and continued availability of funding for fish passage technician crew. |

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| 2.5 | Conduct target species monitoring (+/- and relative abundance) at road culverts in VA | Continue annual backpack electrofishing at Claiborne Run nature-like fishway (herring). | VDGIF | Rappahannock tributary: Claiborne Run in Stafford County, VA | Two more of five consecutive years |
| 2.6 | Continue to develop environmental DNA (eDNA) tool to detect shad. Continue sampling for river herring and apply river herring eDNA analysis to determine priority fish passage projects and develop habitat use models | Develop and test tools for shad. Use river herring tools already developed (completed task in previous fish passage work plan). | SERC, UMCES | Frozen samples collected in Patapsco River; if funded, expand to entire Chesapeake Bay | Ongoing |
| Management Approach 3: Use the Chesapeake Bay Fish Passage Tool that was completed by the workgroup to implement high priority dam removal and fish passage projects. | | | | | |
| 3.1 | Continue using the Chesapeake Bay Fish Passage Tool to implement high priority dam removal and fish passage projects. Complete Tool updates to include culvert assessment information | Conduct culvert and bridge assessments in areas with anadromous species and brook trout to determine extent of fish blockages due to road and rail infrastructure. Add information to the Chesapeake Fish Passage Tool. | USFWS, NOAA, Maryland, Virginia and Pennsylvania, American Rivers, TNC | Entire Chesapeake Bay region | Ongoing |