Chesapeake Bay Program
A Watershed Partnership

www.chesapeakebay.net

Backgrounder

410 Severn Avenue, Suite 109 • Annapolis, Maryland 21403 • 410-267-5700 • toll free 800-YOUR-BAY

Restoring Migratory Fish Passage in the Chesapeake Bay Watershed

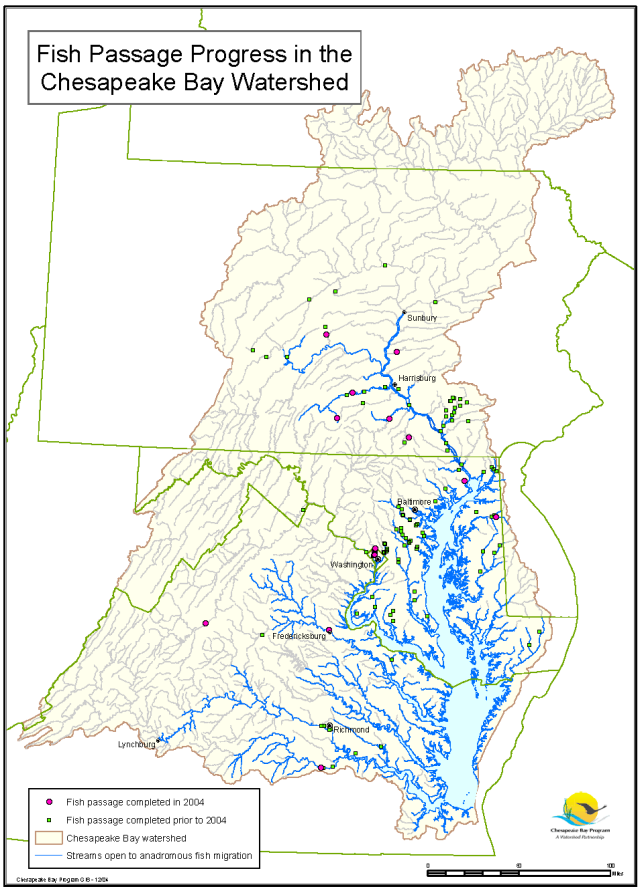
The great rivers of the Chesapeake Bay watershed – the Potomac, Susquehanna, Rappahannock, York and James – supply nearly 90 percent of the Bay's fresh water and are fed by innumerable minor rivers, creeks and streams as they flow toward the mouth of the Chesapeake Bay.

In these tributaries, the Bay's anadromous fish species, including shad and herring, swim upriver to fresh water streams to spawn after spending most of their lives in the ocean. Likewise, the catadromous American eel makes a reverse migration, leaving its fresh water rivers to spawn in the salty Sargasso Sea.

Over the past two centuries numerous mill dams, hydroelectric dams and small blockages were constructed, which prevented fish throughout the Bay watershed from reaching their natal rivers. Migratory fish populations consequently suffered severe declines.

In recent years many of the largest blockages have been breached or removed; however, many small dams and blockages remain.

The decline in migratory fish stocks throughout the Chesapeake Bay is the result of several factors: historical overharvest, habitat loss due to blockages and degraded water quality. Moratoria and harvest restrictions have been implemented throughout the Bay to address these issues. Habitat restoration, by constructing fishways and removing blockages, has been a key focus of migratory fish restoration programs throughout the watershed.



Chesapeake Bay Program partners have completed 160 fish passage projects reopening 1,570 river miles to migratory fish in the Chesapeake Bay watershed since 1989.

How Blockages Affect Fish Populations

Fish blockages prevent anadromous fish from reaching historic spawning habitats and contribute to the low abundance of adult migratory fish, which leads to a low rate of natural reproduction. Dams must continue to be dismantled and fish passages constructed to give fish access to their spawning grounds.

Dams and fish blockages also affect the physical integrity of aquatic systems by fragmenting the length of rivers, changing their hydrologic characteristics and altering sediment regimes by trapping most of the sediment that enters river systems. These cause landscape changes downstream, shrinking channels and deactivating floodplains. Dams also alter water quality, which in turn affects aquatic ecosystems.

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Dam removal demonstrably augments the abundance and diversity of aquatic insects and fish. However, the most significant biological effect of removing dams is the increased accessibility of upstream habitat and spawning areas for migratory and resident fish.

Another important restoration technique that benefits stream habitat is to plant forested riparian zones. Riparian buffers filter nutrients and sediment, capture rainfall and regulate streamflow, moderate stream and air temperature, stabilize stream banks and create and maintain habitat. Research demonstrates that forest buffers improve water quality and habitat conditions for fish species.

When removing a dam is not feasible, fishways are a necessary alternative. Fishways are manmade structures designed to enable migratory fish to pass through stream blockages. There are five main types of fishway structures used in the Chesapeake Bay watershed: Denil, steepass, vertical slot, pool and weir, and fish lifts.

Fish Passage Restoration Projects in the Bay Watershed

Since fish passage restoration projects were first initiated in 1989, a total of 160 projects have been completed. In 1991, the fish lift at Conowingo Dam opened, inaugurating the first of many significant fish passage and dam removal projects. In 1997, fish elevators opened at both Safe Harbor and Holtwood dams on the Susquehanna River, creating the largest-capacity fish lift operations in the nation. In 2002, Maryland completed one project at Forge Branch notch, which opened an additional 12 miles to migratory fish, bringing the total number of miles opened in Maryland to 358. In 2002 West Virginia opened the first eelway in the watershed at the Millville hydroelectric station on the Shenandoah River, opening up 45 miles to migratory American eels. More than 1,000 shad migrated upstream in 2002 through the fishway at Bosher's Dam in Virginia, continuing the upward trend in migration from prior years. In 2003, Youngs Dam on Lititz Creek in Pennsylvania also was removed. Many other projects have since been completed in all three states, including Andover Branch and Adkins Race in Maryland; Embrey Dam in Fredericksburg, Virginia; and more than five other projects in Pennsylvania.

To augment restoration efforts, fish have been stocked in many Bay tributaries and restoration efforts are beginning to exhibit some positive results. Hatchery-raised adults are returning to spawn in increasing numbers. The increased number of adult fish has resulted in an increased number of juvenile fish. In the past 10 years, more than 340 million shad have been stocked in tributaries in Maryland, Pennsylvania and Virginia.

Migratory Fish Restoration Goals

The Chesapeake Executive Council signed Directive 93-4, Fish Passage Goals, in 1989, which states that all jurisdictions in the Bay watershed will "…provide for fish passage at dams and remove stream blockages whenever necessary to restore natural passage for migratory fish." Goals established in 1993 directed Bay Program signatories to open 731 stream miles by 1998 and 1,357 miles by 2003. By the end of 2004, Bay Program partners met the fish passage goal by reopening 1,570 river miles.

The New Fish Passage Goal

The Chesapeake Bay Program has set a new 10-year goal, which calls for 100 fish passage and dam removal projects to be completed and 1,000 miles of tributary habitat to be opened to migratory and resident fish. The goal also requires passage at all new dams or other blockages that interfere with the free passage of migratory fish within the Bay watershed to the fullest extent possible. Each new project will document fish use and passage, and the projects will be integrated wherever possible into locally supported watershed management or restoration plans. The new goal:

- gives priority to projects that open large stretches of highest quality habitats;
- favors dam removal over structural fish passages, where practical;
- favors projects that enhance passage of migratory fish over resident fish or those in which shad and herring stocking programs occur; and
- addresses the removal of impediments in streams formerly impaired by acid-mine drainage, where water quality improvements will support a diverse assemblage of fish and other aquatic resources.

The Bay Program has determined that 50 percent of new fish passage projects in the watershed will be accomplished using an integrated, holistic approach that targets specific tributaries for restoration based on their particular environmental challenges. The Bay Program's Fish Passage Task group will work closely with watershed planning and fisheries management teams to prioritize areas and develop a more multidisciplinary approach to restoring the tributary. The new goal includes a monitoring component requiring more data collection on the effectiveness of fishways. While many of the largest projects to open spawning habitats are completed, a critical need still exists to open additional river habitats and document passage in Pennsylvania, Maryland and Virginia.

For more information on completed and future projects visit http://www.chesapeakebay.net/fishpass.htm.