

The Brandywine Watershed is one of the largest in the Delaware Basin and lies close to the Delaware Estuary. Long before the arrival of European settlers, spring migratory runs of 20-30 inch silver shad numbered in the tens of thousands here. American shad were once so numerous that during their migration the rivers were described as “black and boiling” with them.

A vital food source for Native Americans, early European settlers, and numerous wildlife species, American shad, like salmon, return to spawn in the stream of their hatching. Their huge numbers and excellent flavor were once renowned throughout the East Coast.

An Early Industrial Legacy

The Brandywine once contained more than 125 dams which provided water power for a great variety of milling operations. In the early 1800s, the du Pont family began manufacturing gunpowder in Wilmington and the Lukens family began forging steel in Coatesville along this small but powerful river. The Brandywine River became an industrial millstream, and the mill dams inadvertently blocked passage for spawning fish. Thus, today only a few remnant shad

swim up to the first dam in the Brandywine. We’ve lost an enormous natural, cultural, and economic legacy.



A fisherman displays a beautiful Brandywine shad caught at the base of the first dam in Wilmington, Delaware.

Let's Restore this Fascinating Fish

A major initiative to restore the shad to the Brandywine River is underway. Led by the Brandywine Conservancy with the **Brandywine Shad Restoration Partnership** of federal, state, regional, and local stakeholders, the unique and dramatic phenomenon of migrating and spawning shad is being restored.



'The Founding Fish'

Shad have been nicknamed the “Founding Fish” because of the key role their abundance played in early American life.

Settlements were named after the fish, and the shadbush (*Amelanchier spp.*) is so named because it blooms when shad runs occur in the spring. Shad was eaten fresh and preserved through drying, smoking, pickling or salting. Its Latin name (*Alosa sapidissima*) means “most delicious or savory herring.” Fishing or trading for shad was so widespread in colonial America that it was said that “no family was without its share.”

Painters Thomas Eakins and Howard Pyle depicted shad fishermen at work on the Delaware River. Pictured above: Thomas Eakins, 1881, *Shad Fishing at Gloucester on the Delaware*

American Shad, a Keystone Species

Restoring shad after an absence of three centuries represents a kind of rebirth of the Brandywine River. A healthy shad population will support many wildlife species (eggs, fry and adults all provide food), increasing the biological vitality of the watershed. River otter, fox, mink, heron, kingfisher, bald eagle and osprey populations will likely increase with the augmented high-protein food supply.

In addition to American shad, other migratory fish will also benefit from improvement to the river’s flow. Restoring these species could create a new type of recreational fishery and engender a fresh excitement in the river.



Shad are hard-fighting sport fish growing up to 30" and eight pounds.

What the Conservancy is Doing

- Facilitating the entire restoration project in close collaboration with project partners and dam owners.
- Developing plans for fish passages at selected dams.
- Preparing and publishing feasibility studies for restoring American shad to the Brandywine watershed for both the Delaware and Pennsylvania portions. Each study identifies the blockages in the Brandywine and provides potential options for fish passage. The studies also identify possible funding and environmental permitting issues. Both publications are available on the website www.brandywineconservancy.org.
- Taking the lead to remove two dams on the Pennsylvania side of the Brandywine.
- Preparing and distributing presentations and other educational materials about shad restoration and conducting field tours (available upon request).
- Working with schools to educate students and release “fry” into the Brandywine through the **Shad in Schools** program (see picture below).



Students use classroom tank set-ups to hatch fish and learn about shad ecology and history, left. After hatching eggs in their classrooms, students release shad into the river, below. The fry will imprint on the Brandywine and will try to return in four to six years to spawn.



Get Involved

- Organize a slide presentation or project tour led by the Conservancy.
- Become a Brandywine Shad educator; give slide presentations or lead tours yourself.
- Join the Brandywine Shad Restoration list-serve for regular progress reports and opportunities to get involved.
- Visit the Brandywine Conservancy’s website.

Brandywine Conservancy

Environmental Management Center
P.O. Box 141, Chadds Ford, Pennsylvania 19317
Phone: 610-388-8386 Fax: 610-388-1575
Email: emc@brandywine.org
Website: www.brandywineconservancy.org
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Bringing Back the Shad



Restoring the unique and dramatic phenomenon of migratory shad to the Brandywine



Brandywine Conservancy
Environmental Management Center

Is it Feasible to Restore American Shad to the Brandywine?

Yes it is! Each spring shad try to swim up the river but are blocked by dams—about a dozen that obstruct shad runs on the main stem of the Brandywine and still more on branches and tributaries. For shad to be restored as a common fish, more shad will need to be stocked and each dam will require a unique fish passage. Dam removal is the most effective way to restore fish runs and is the highest restoration priority. However, it is not possible to remove every dam, especially those with historical significance or other significant benefit to retaining them. Other fish passage options include:

- fish ladders
- rock ramps
- dam by-pass channels
- dam notching



Removing a dam restores a portion of free-flowing river and natural habitat, allowing all migratory fish to pass upstream. It can improve water quality and reduce flooding caused by a dam.

Some fish passageways combine a rock ramp with a by-pass channel built around a dam. The rocks create pools and small falls, or riffles, that resemble natural habitat features.



Dams no longer used commercially are often not maintained and eventually breach under the river's relentless, pounding flow.



Notching involves the partial removal of a dam, lowering the height of the barrier that the fish must pass. This can increase the success of fish passage and reduce fish passage costs in an unobtrusive way. Notching can also be made temporary by the use of special boards that can be installed or removed seasonally.

The Brandywine Shad Restoration Partnership
“The Brandywine River is one of our City’s most beloved resources. By working together, we can re-establish our native migratory fish populations and thereby provide a healthier, revitalized Brandywine River.”

— James M. Baker, Mayor of the City of Wilmington

“The Brandywine River has been an important part of the history of the DuPont Company. The river’s strength provided the power needed to operate the mills that manufactured DuPont’s first product, black powder explosives. Today, we are working with the Brandywine Conservancy in full support of the Shad Restoration Project.”

— Dr. Thomas M. Connelly, Jr., Executive Vice President and Chief Innovation Officer, DuPont Company

The Partnership

- American Rivers
- Brandywine Conservancy
- Brandywine Valley Association
- City of Wilmington
- Delaware Department of Natural Resources and Environmental Control
- DuPont
- First State RC&D Council
- Hagley Museum and Library
- National Fish and Wildlife Foundation
- National Oceanic and Atmospheric Administration
- National Resources Conservation Service
- Partnership for the Delaware Estuary
- Pennsylvania Fish and Boat Commission
- Stroud Water Research Center
- Trout Unlimited, Delaware Chapter
- University of Delaware, Water Resources Agency
- U.S. Fish and Wildlife Service
- West Chester University, Environmental Council



Shad runs once numbered in the tens of millions of fish annually and occurred in all accessible East Coast streams from southern Canada to Florida.

An Amazing Journey

After four to six years in the Atlantic Ocean, shad return to spawn in the stream of their hatching and give birth to a new generation. In March or April, shad congregate in bays and estuaries, adjusting from salt to fresh water. They next travel upstream, some of them hundreds of miles, before spawning. A female can produce over 100,000 eggs (called “roe,” considered a delicacy) which hatch in 3-5 days. The young “fry” feed on plankton throughout the summer. When fall rains arrive, these young descend the stream, eventually moving into the open ocean to begin the cycle anew.

