

Restoration of American Shad in the Potomac River

Delivered to 2014 Shad Schools In Schools participants.

March 8, 2013

Aquatic Resources Education Center, DC.

by Jim Cummins (301-274-8106)

The Interstate Commission on the Potomac River Basin

Watersheds Cross Political Boundaries. That's Why We're Here.

-Interstate Commission on the Potomac River Basin



Photo: J. Palmer

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American Shad Restoration Project

THE POTOMAC RIVER SHAD RESTORATION PROJECT

[Potomac River American Shad Status Report, as Presented to the Teachers](#)

[An Historical Compilation About American Shad and the Potomac River](#)

[African American Watermen Heritage on the Potomac River](#)

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[ICPRB's American Shad Restoration Project Fact Sheet](#)

A COMPILATION OF HISTORICAL PERSPECTIVES ON THE NATURAL HISTORY AND ABUNDANCE OF AMERICAN SHAD AND OTHER HERRING IN THE POTOMAC RIVER.

By Jim Cummins, The Interstate Commission on the Potomac River Basin
(Always Draft, Updated: 03/2012)



Gill-net collections of spawning shad in the tidal Potomac with the help of volunteers and Virginia watermen
Photo Credit: David Hovesturst

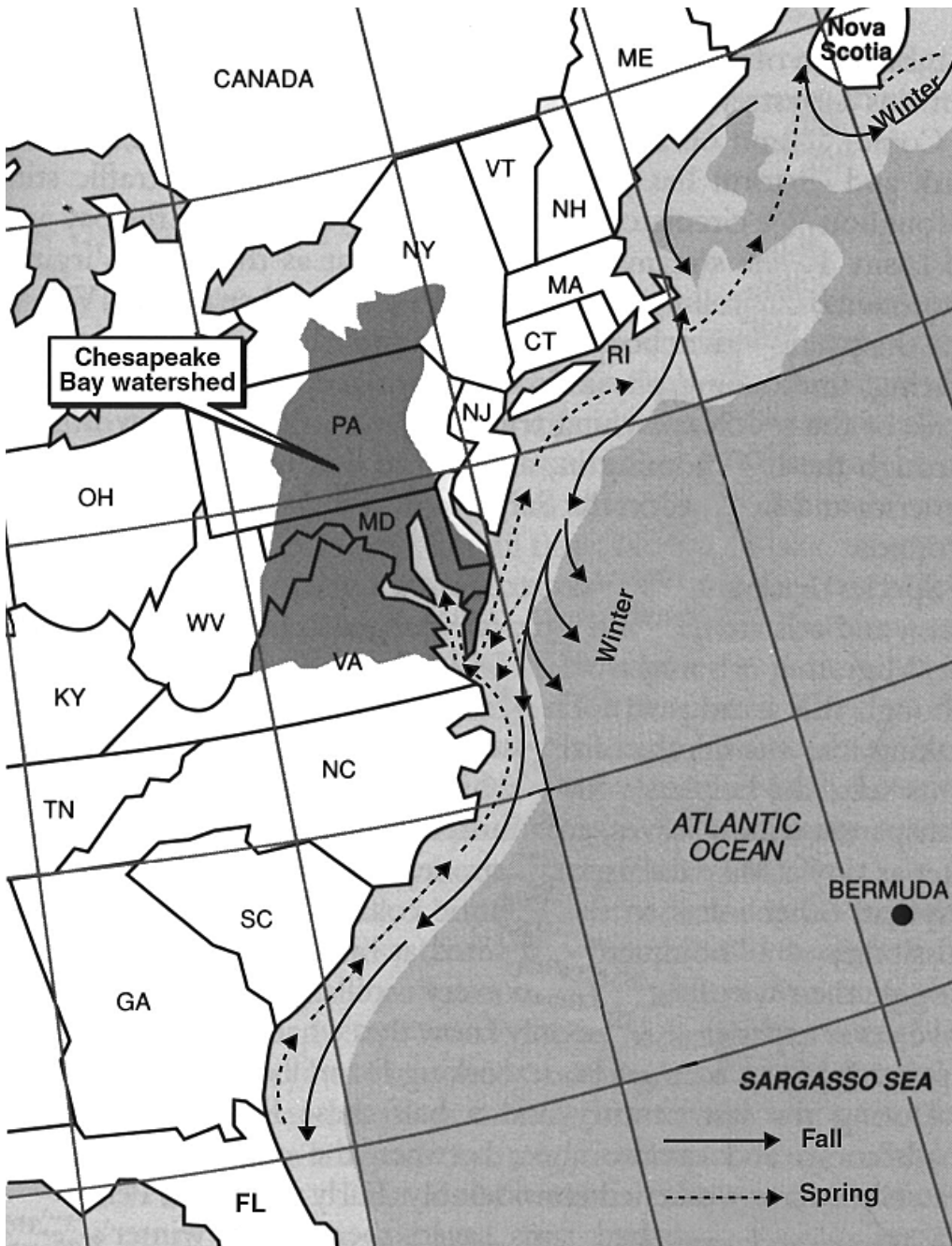


US Fish & Wildlife Service stocking shad fry at Mather George
ICPRB Photo Credit: Jim Cummins



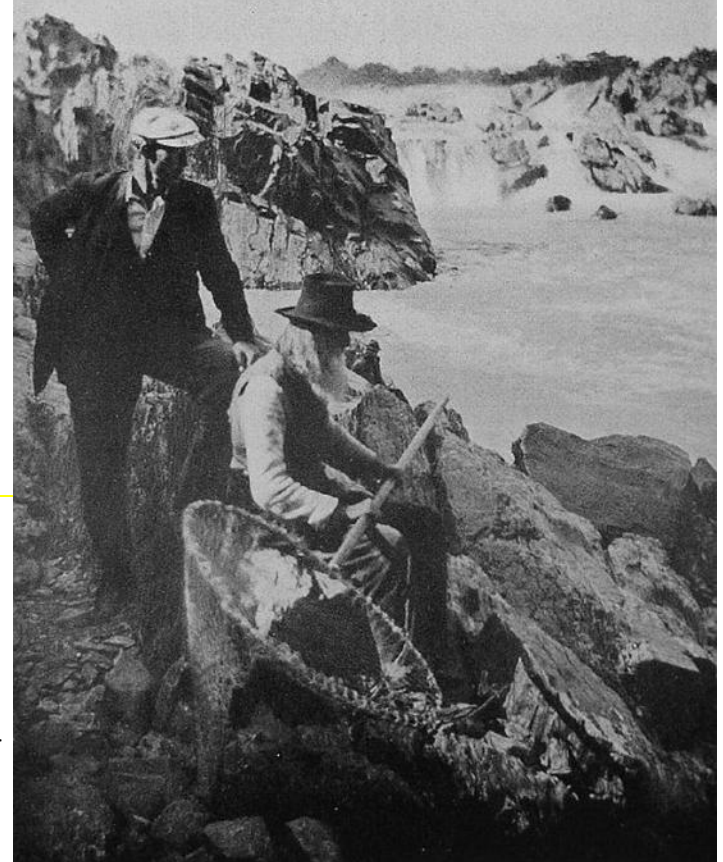
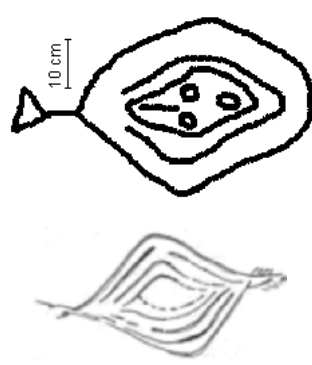
Field stripping and fertilization of shad eggs for delivery to the USFWS's Harrison Lake Hatchery.
Photo Credit: David Hovesturst

Also available at the ICPRB website "potomacriver.org"
see "Projects" then "American Shad Restoration"



The American shad
 The world's largest herring.
 The beautiful fish makes a 12,000 mile journey.
 Summers in Canada, Winters near Florida,
 Overall a pretty good strategy.





A little history and background on shad fishing in the Potomac.

Images, clockwise from above left:

Petroglyph of shad at Great Falls, artist rendering top, Spanish cave art below **Hupa Indians**, Trinity River, CA, bow-netting at weir and on rocks (by E.S. Curtis) - techniques like these were used on the Potomac.

Shad dippers at "Shad Rock," 1912.

Lithograph of **fishing at Great Falls**, 1801 (Library of Congress).

Throughout their journey, shad are important to the ecosystem - food for a lot predators.

In rivers they are especially important, as a “clock-spring species,” powering the system.





Shad were important to new Americans. George Washington had a shad fishery at Mount Vernon. In 1778, shad saved the starving Continental Army at Valley Forge (“Valley Forge Fish Story”).

Traditional Shad Fisheries on the Potomac River, circa 1890s



Shad Fishery
Commencing to boat seine.
Stony Point
Potomac River



Black History:

Black watermen are abundant in the photographs or art of historic shad fisheries of the Potomac and other mid-Atlantic rivers.



A similar story for the Delaware - Thomas Eakins' from Shad Fishing Gloucester DE, 1881



**If you are interested in more information on black watermen, please see
“American Shad and Black Watermen:
A Heritage Nearly Forgotten**

Originally delivered at the Accokeek Foundation's African American Heritage Day, Sept 25, 2010.

It is available at the ICPRB website “potomacriver.org” see “Projects” then “American Shad”

The American shad was once remarkably, even outstandingly, abundant in the Potomac River.

From Spencer F. Baird, left, first Director of the US Fish Commission*, in their report for 1886:

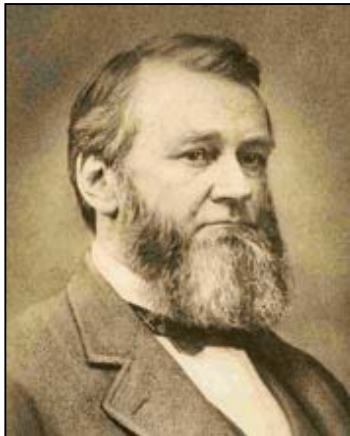
“No better illustration of the numbers in which anadromous fish enter the rivers can be given.... than a presentation of the case as it relates to the Potomac River in the short distance between its mouth and the Great Falls of the Potomac, only twelve miles above Washington.”

An estimated 22,500,000 shad (110,000,000 lbs) were harvested from the Potomac River in 1832.

“Approximately 995,000 barrels of salt were used to cure them.”

That many barrels would make a pyramid with a base the size of a football field from goalpost to goalpost and a height of 298’.

One barrel of salt used to make 5 barrels of shad/herring, so Δ is 5X as large)



*Appointed in 1871, Baird was also appointed Secretary of the Smithsonian in 1878

Preparing shad and other herrings were substantial industries.

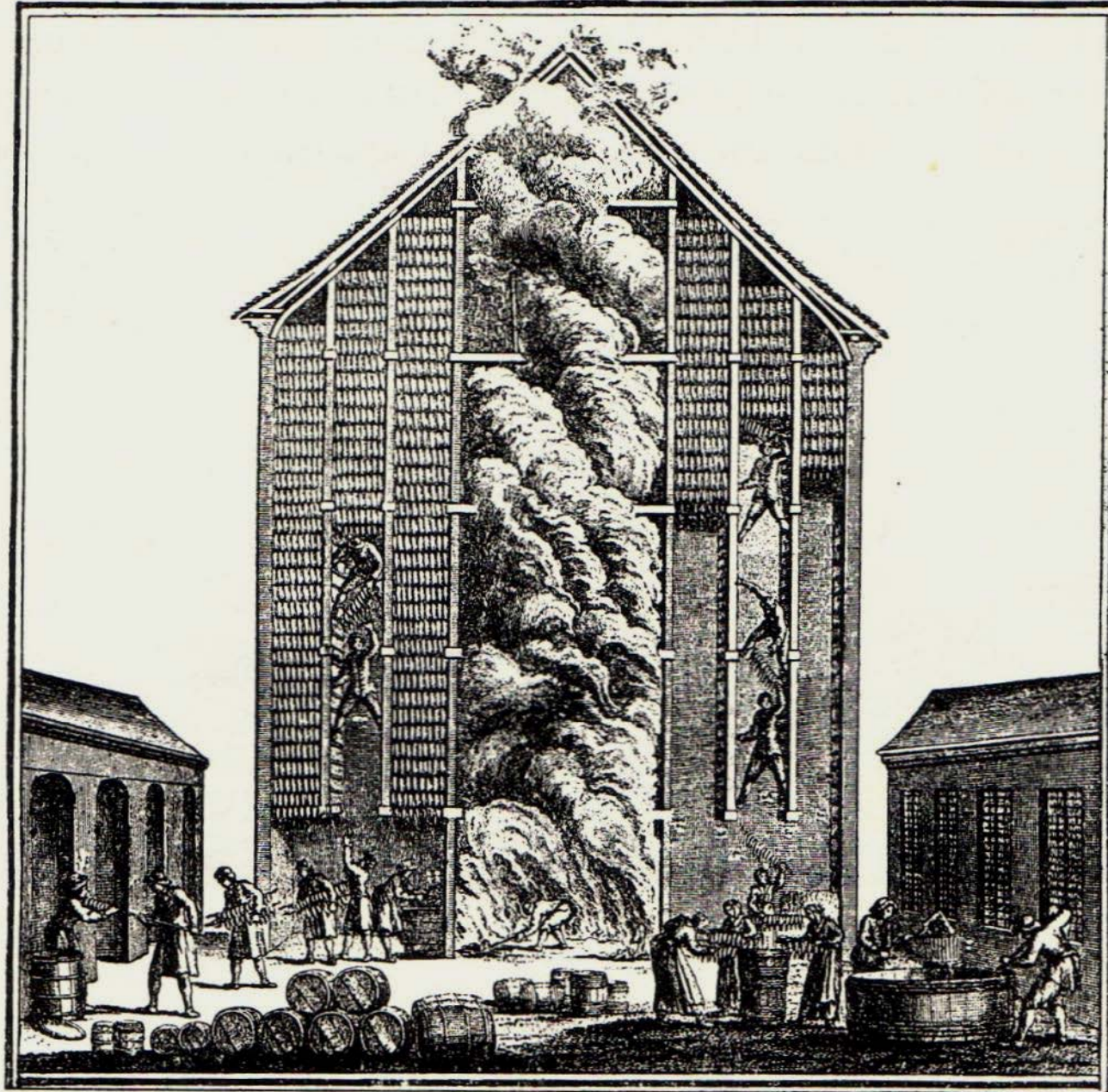
They were smoked, then salted in barrels.

How many fish in the smoker? Approximately 1500 fish could be in the visible layer alone. There is no way to tell the length of the building. If it was 30' long, with 1 layer/foot, it could hold 45,000 shad.

That's a smoker!

Image is from Singer, Charles, 1958. A History of Technology, 1750-1850.

Volume IV, p. 49.



Shad planking is a cooking technique where shad are slowly baked on wooden blanks before a bonfire.

Shad plankings were big events along the Potomac as early as 120 years ago.

Right: Marshall Hall, MD 1893 (Lib. Of Congress)

Below Top: Annual Shad Plank, DC Bar 1916. Bottom: Marshall Hall, MD 1924 .



SCIENTIFIC AMERICAN

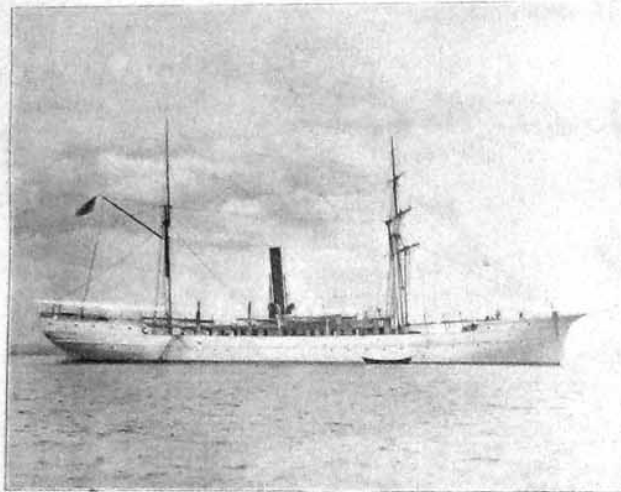
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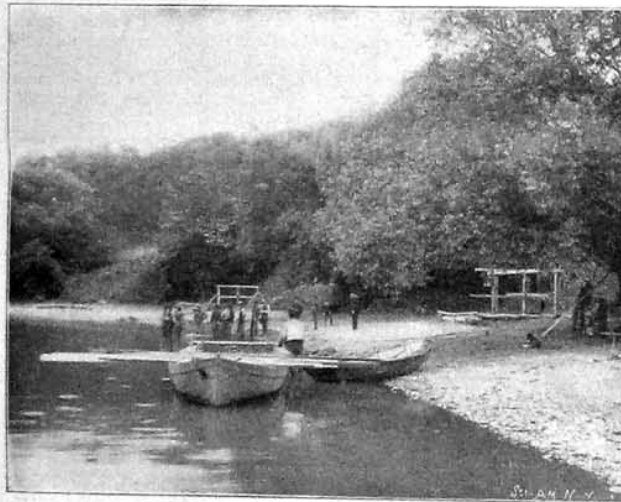
There is little new
under the sun.



The Fish Commission Ship "Albatross."



Loading Cans of Shad Fry on Launch.



Landing Shad Seine, Potomac River.



Hauling Shad Seines on the Potomac River.

**“Largest seine
in the world”**

**At Stoney Point,
Potomac River,
c 1890s.**

**The seine net was
6 miles long!
(32,000 feet)**

**They caught 5,000
shad in one haul.**

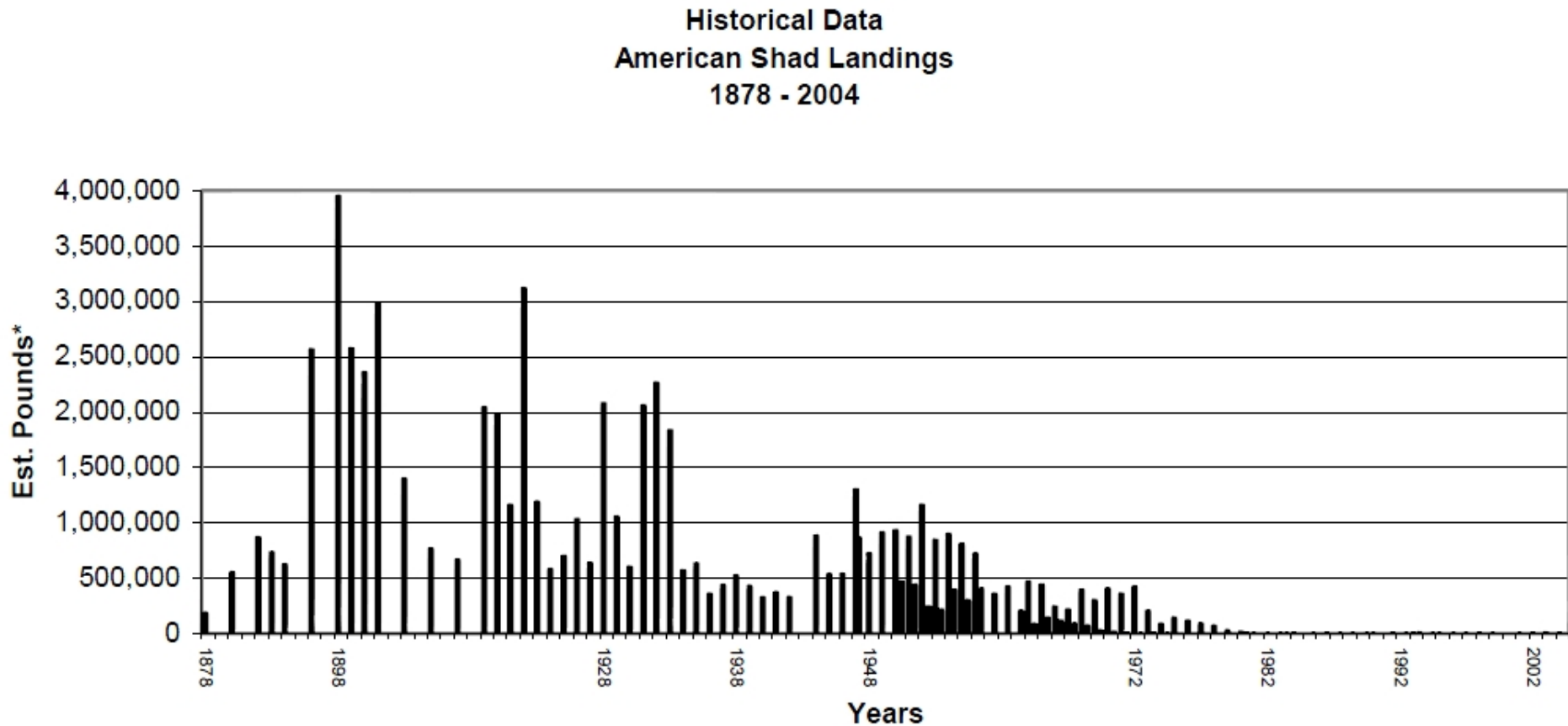
**Not surprisingly, shad
started to disappear.**



Largest seine in the world. This seine, operated for shad and alewives at Stony Point, Virginia, on the Potomac River, was the longest net of the kind. The net proper was 9,600 feet in length, and the hauling ropes at the ends were 22,400 feet long, giving 32,000 feet as the total sweep of the seine, only one end of which shows in the illustration. The seine was hauled by steam power and the labor of 80 men, and was drawn twice daily, at ebb tide, throughout the season. As many as 3,600 shad were taken at one haul, and 126,000 in one season, and 350,000 alewives were caught at one time. Recently the season's yield of shad fell to 3,000, and the fishery was consequently discontinued in 1905 after having been carried on for a century. This seine was a source of eggs for the Bureau's shad hatchery on this river. (See p. 1399.)

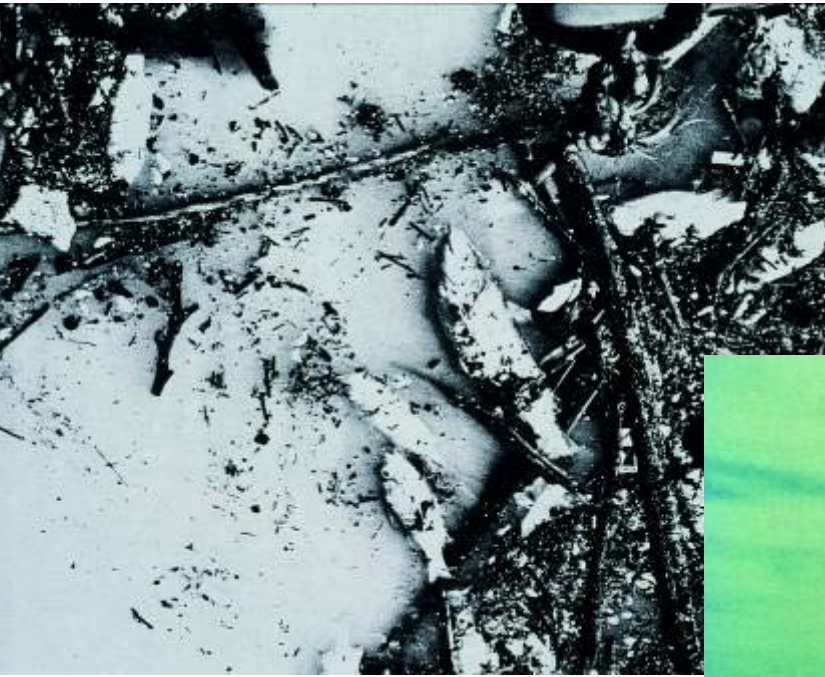
Shad Landings in the Potomac River

Figure 2. The 1878- 1956 Potomac landings are from *Chesapeake Fisheries*. The 1964-2004 landings are from PRFC data. (PRFC)



However, the decline in shad was not due solely to over-fishing. Like other east-coast rivers, there are three main reasons for their decline in the Potomac, each had significant impacts:

- 1) Over-fishing (as shown and discussed),
- 2) Pollution, and
- 3) Loss of Spawning Habitat
(primarily due to dams).



Pollution: The Potomac River was once synonymous with water pollution. Huge fish kills which occurred during the 1960s, especially at spring spawning runs, led President Johnson to declare the Potomac River “a national disgrace.”



↑ Dock at Mount Vernon, 1972.

Our nation’s founders would have been shocked about the state of the beloved Potomac.

←Virginia

Dams: there are two at Little Falls

Maryland → (Private lands)

They blocked fish migrations until a fishway was constructed near the Virginia shore in 2000.



Little Falls Fishway Completed:
January 6, 2000

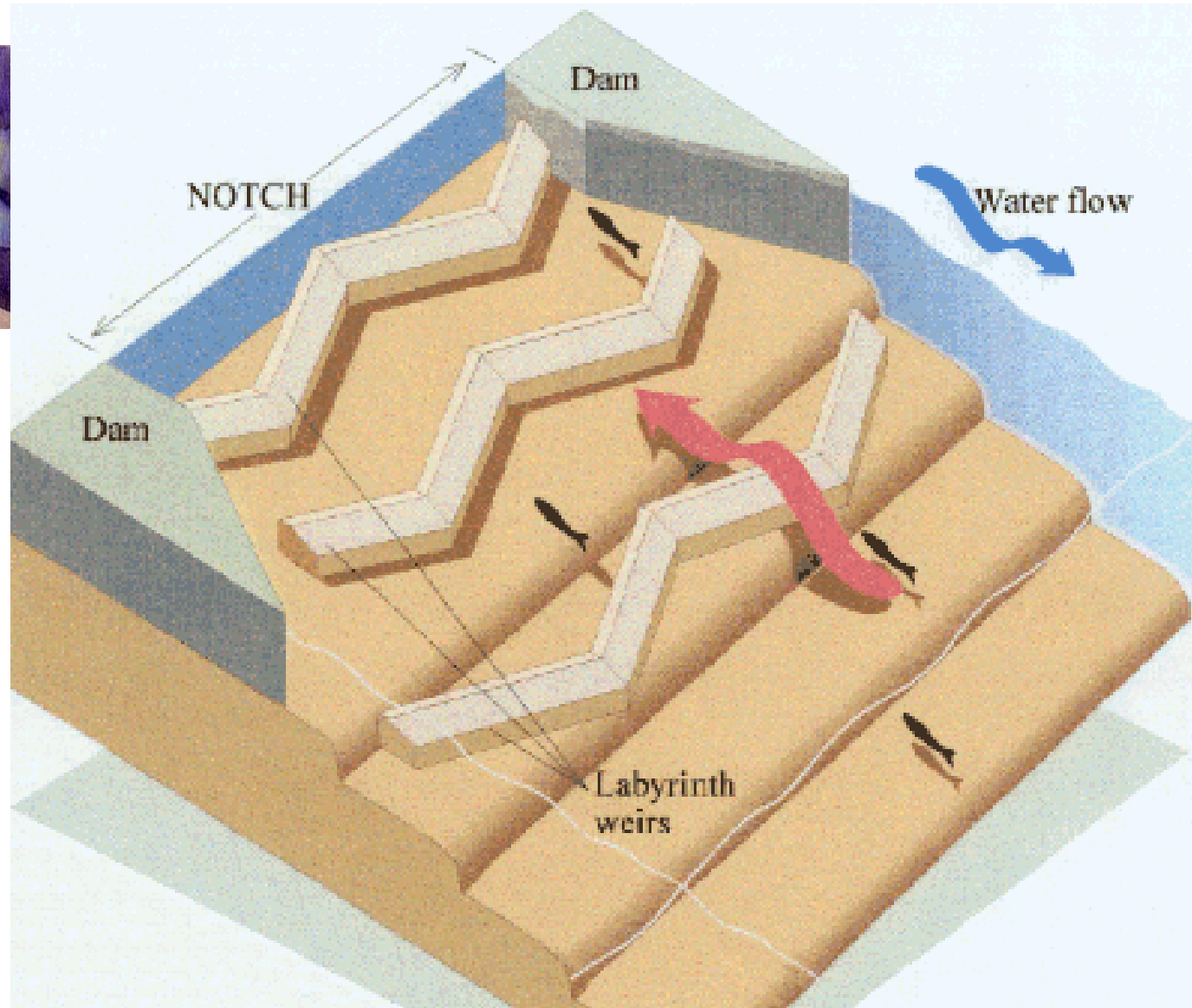
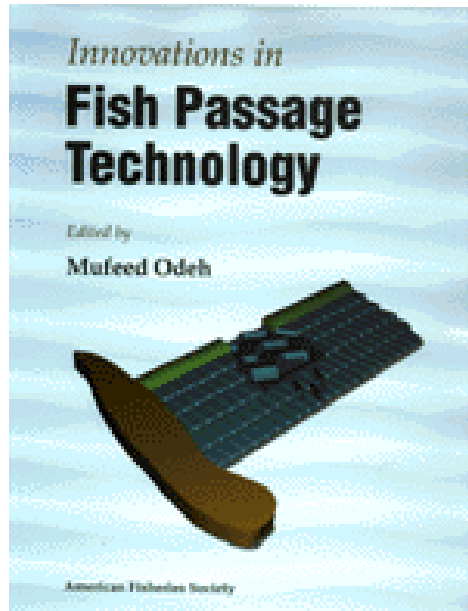
Remains of coffer dam

Three labyrinth weirs
to reduce water velocity

Expected fish movement



The fishway notch uses a new design with three labyrinth weirs.



Providing fish passage alone is not enough.

A program to stock American shad fry upstream of Little Falls was initiated in 1995 with the purposes of imprinting them to the historic waters and to help rebuild the shad population.

However, with the population so low, where do you go and how would you capture spawning adults for brood stock?

It is best to use experience, but the fishery closed in 1982.

Where could we find experience?

Right: Drift Gill-netting for American Shad in the Potomac River, near the mouth of Dogue Creek, off of Fort Belvoir and Mount Vernon, VA



Hundreds of volunteers have helped - on many damp and chilly nights.



Eggs and milt are field stripped and the fertilized eggs are hardened for approximately one hour before transport .



The fertilized eggs are transported to the USFWS's Harrison Lake National Fish Hatchery. Dave Petersen* loads a new batch into a hatching jar. The eggs hatch in about 4-5 days and then swim into the larger blue holding tank.

*Dave was instrumental in developing a scaled-down egg chamber used by the schools.



After hatching and OTC marking, the fry were stocked back in the Potomac River at Mather Gorge near Great Falls, the natural upstream boundary to shad migration, which is approximately 10 river miles upstream from Little Falls.

Over 17 million fry were stocked from 1995 to the conclusion of restoration stocking in 2002.

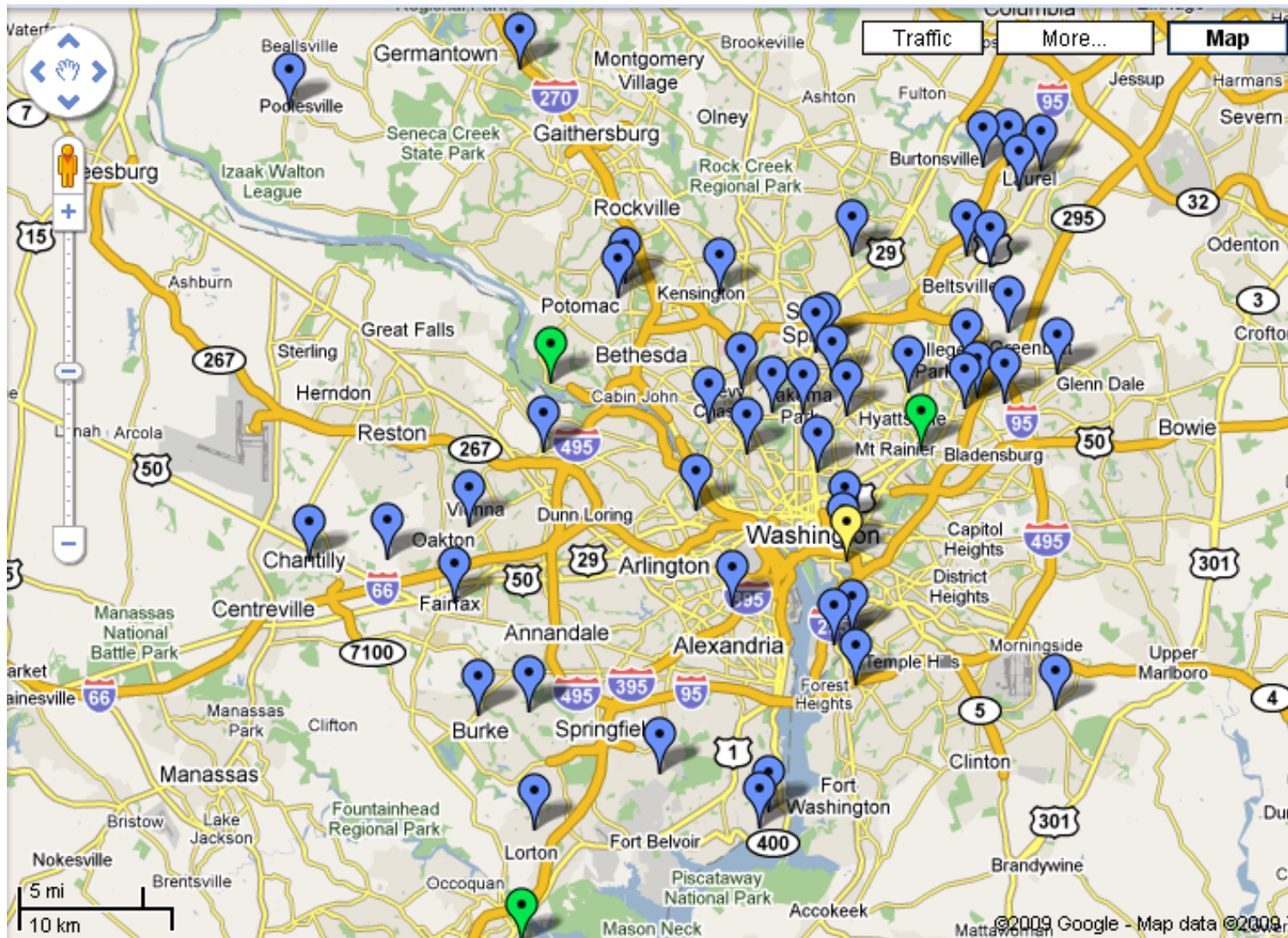


A by-product? Since 1996, tens of thousands of Washington area students have released almost 700,000 shad fry hatched in their classrooms.



Over 50 schools from around the metropolitan Washington area are involved, with more than 80 classroom shad-hatching setups, as some schools have multiple classrooms (like all 5th graders, involved).

(Note to Living Classrooms = can I get an updated map?)



Many students have joined us on the river.







**GOODBYE
WESTBROOK SHAD**

**So what has happened to the
Potomac's shad population?**



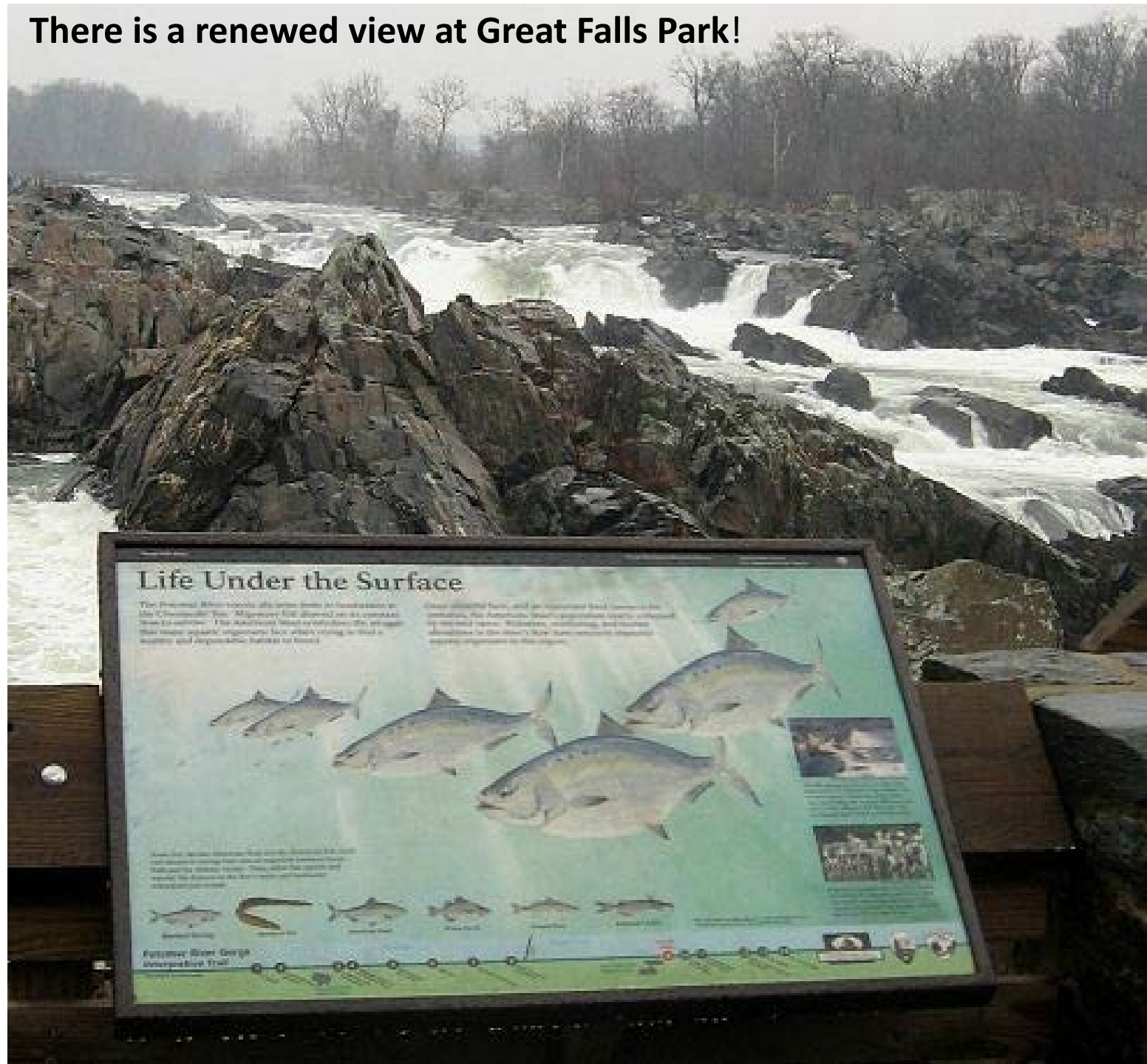
The fishway at Little Falls is working.

Mike Odom, USFWS, with one of the first shad captured at Great Falls after the fishway was opened in 2000. Mike is standing on "Shad Rock."

Year----# shad
2000 ---- 3
2001 ---- 12
2002 ----43



There is a renewed view at Great Falls Park!



Life Under the Surface

The Pennsylvanian River is home to a variety of fish species. The river's fast-moving water and rocky banks create a unique habitat for many different types of fish. The river's diverse ecosystem supports a wide range of aquatic life, from small invertebrates to large predators.

Some of the most important fish species in the river are salmon and trout. These fish are anadromous, meaning they spend part of their lives in the ocean and part in the river. They are important to the river's ecosystem and are also a popular sport for anglers.



OUTDOORS

ANGUS PHILLIPS

Shad News for Local Anglers

Of all the fish that swim in the sea, few are as easy to catch as shad. That's because you don't have to go to sea to catch them. Each spring they come barreling back to the rivers where they were born to scatter eggs by the millions. Dangle a small lure or fly in front of them, and they'll smash at it, then leap and dance at the end of your line.

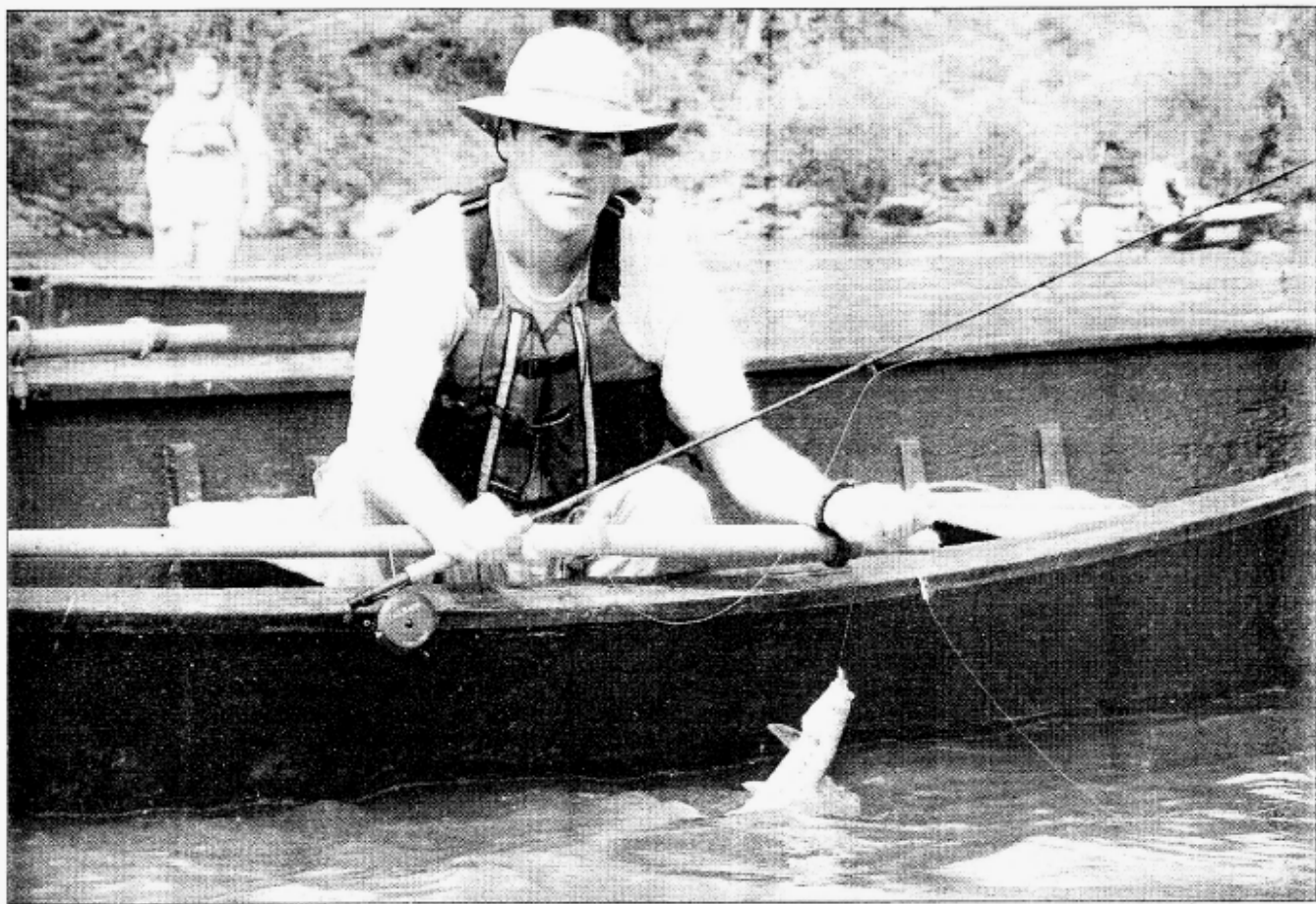
When is best? Right now. Where? Right here.

"They're thicker than fleas," said Mike Bailey, still slightly breathless after landing a six-pound American shad Thursday on the Potomac off Fletcher's Boathouse in the District.

"It ought to be right at the peak here by the end of the month," said Max Skelly of Havre de Grace, Md., just back from a midweek foray on Octoraro Creek off the Susquehanna River, where he caught 20 hickory shad in 40 minutes before reluctantly going to work. "They were all big fish, too," he said. "The Susquehanna is loaded right now."

"Fishermen were shoulder-to-shoulder at all the good holes on the Rappahannock when I crossed the Route 1 Bridge at Falmouth this morning," said Lt. Phil Parrish, a Virginia game warden who works the waters around Fredericksburg. (All eyes are on the Rappahannock this year after the dam above Fredericksburg was demolished in February, opening miles of new spawning waters to shad and other species).

Even George "Shad Pappy" Magaro, president of the Delaware River Shad Fisherman's Association, said he's landed 26 American shad in three trips around



BY ANGUS PHILLIPS FOR THE WASHINGTON POST

Washingtonian Kevin Barnes shows off a shad he snagged on the Potomac below Chain Bridge. Many shad are now coming up the Potomac to spawn.

Cummins captured American shad in the Potomac from 1995 to 2002, milked their roe and milt, grew fry in tanks and

fishing with enthusiasm. In my two trips to the Potomac this spring I've seen almost as many anglers waving the long wand as fishing

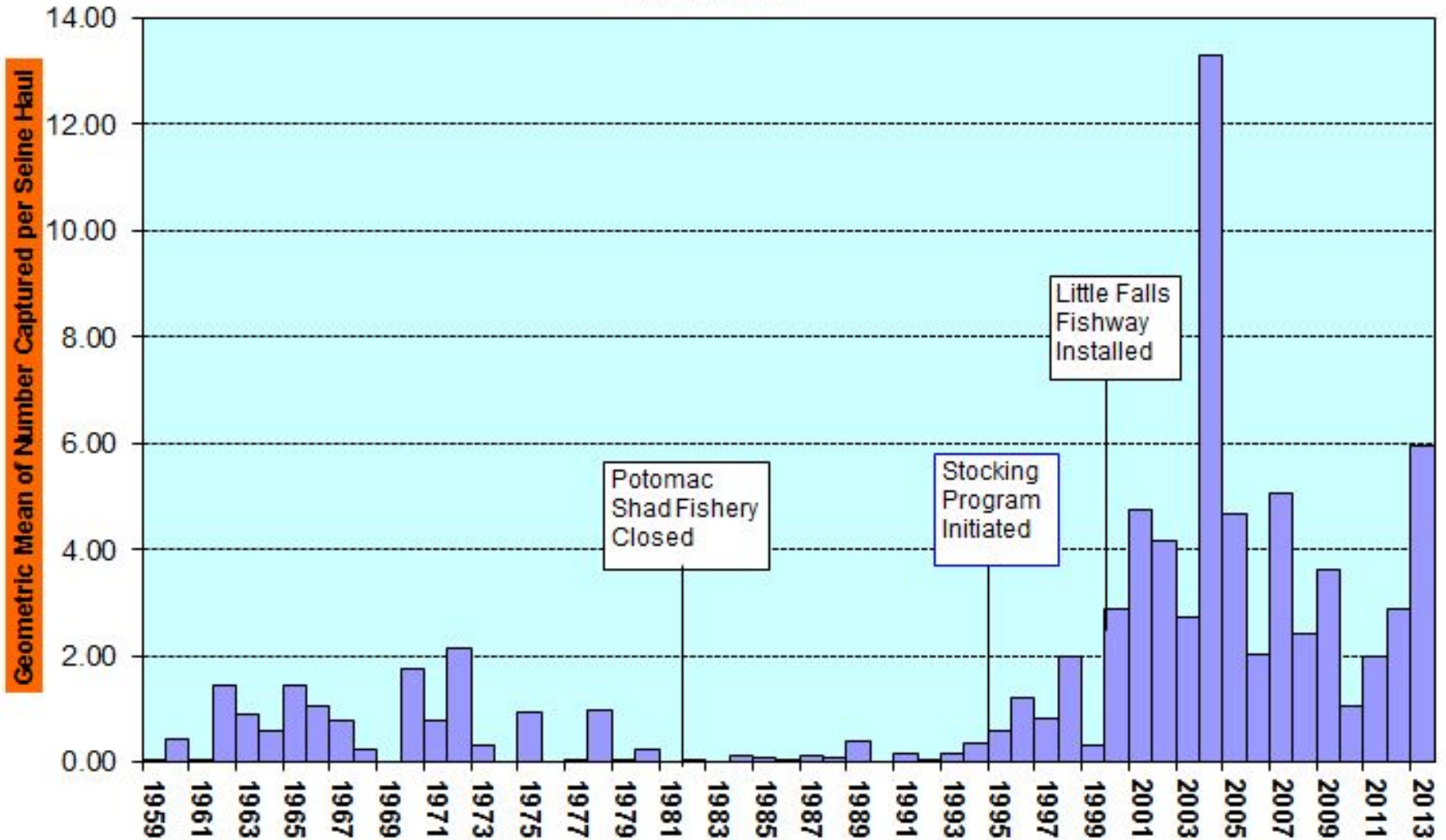
the boat. Since shad are filter feeders from the herring family, the ones hooked in the gills are unlikely to survive, Cummins said.

Juvenile abundances have increased dramatically, exceeding pre-moratorium's levels for 11 out of the last 14 years.

Juvenile American Shad Captured in the Potomac River by the Maryland Shore Haul Seine Survey - 1959-2013

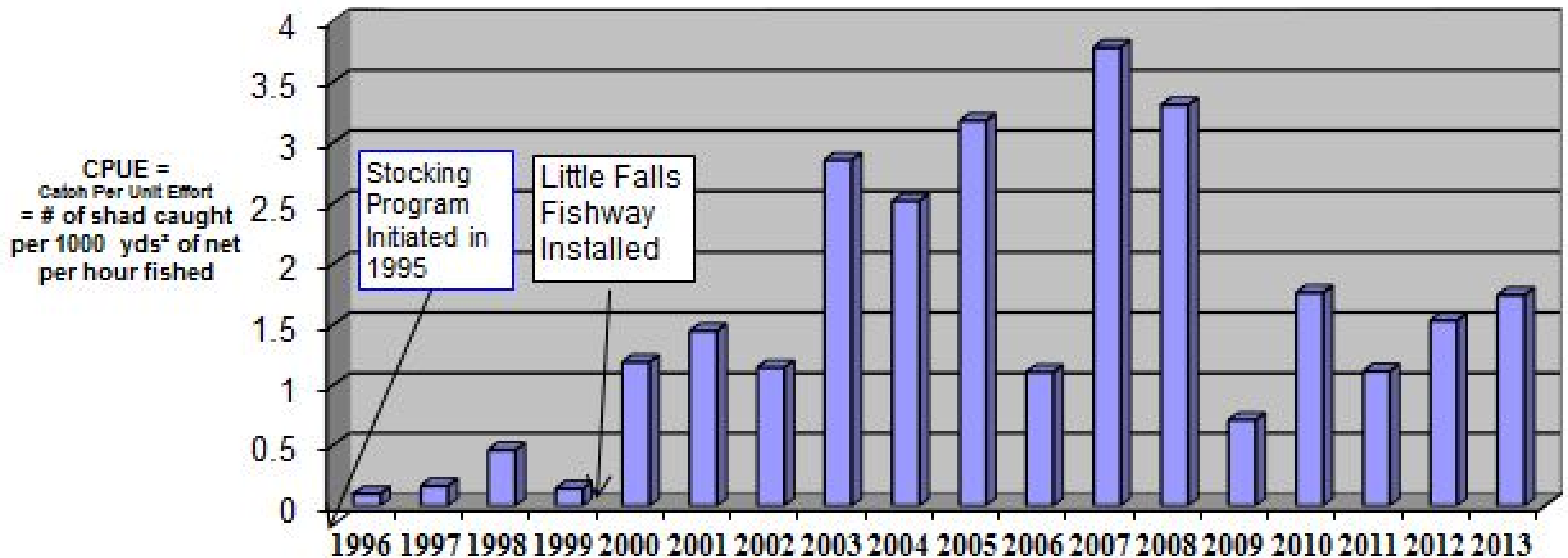
Data From MD DNR, Durell, E.Q., and Weedon, C. 20132.

Chart by ICPRB

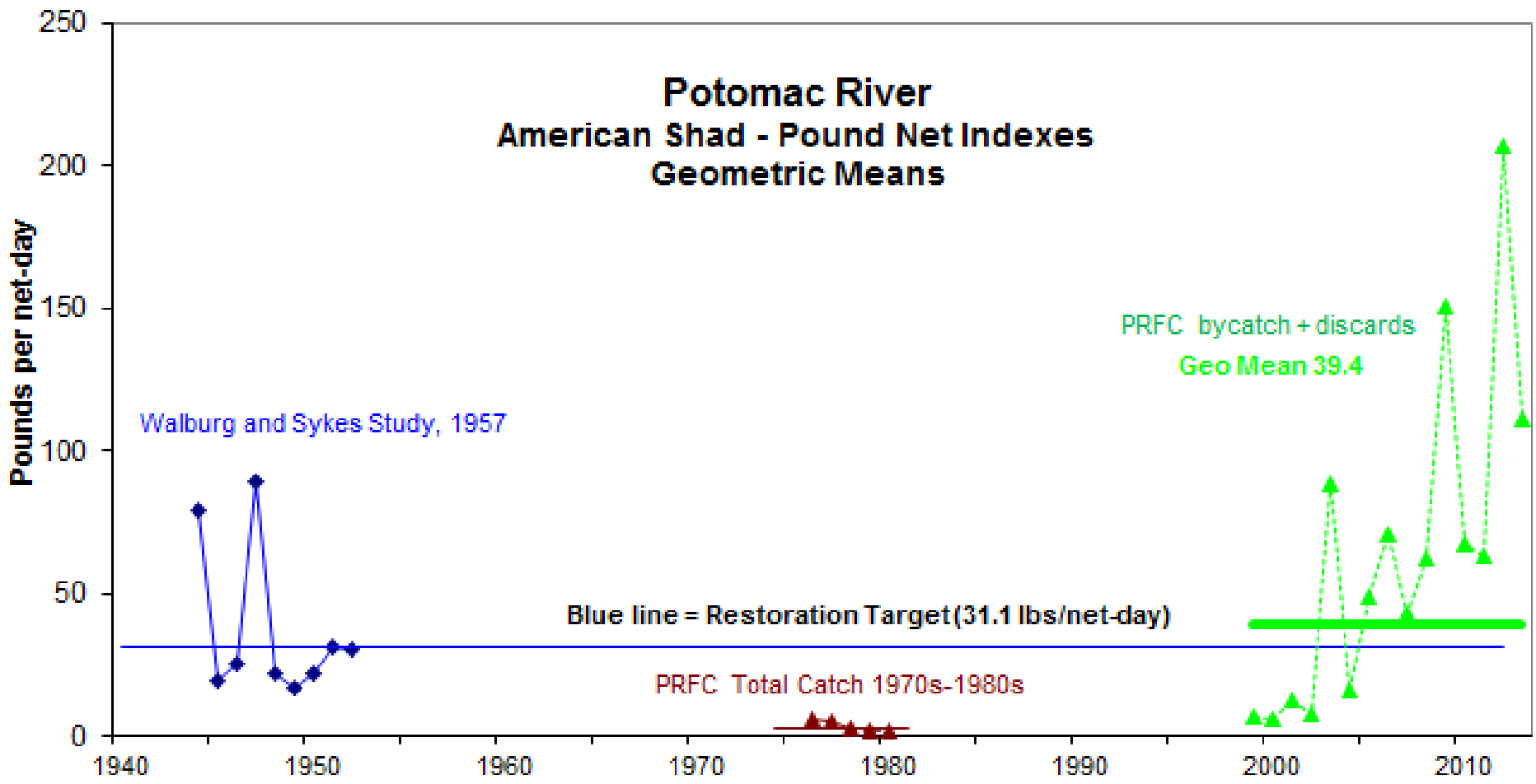


Returning adult numbers have increased significantly.

MD DNR Potomac River American Shad CPUE
during MD Striped Bass spawning stock survey (1996-2013)
(DataSource = Eric Durell, MD DNR, Chart = ICPRB)

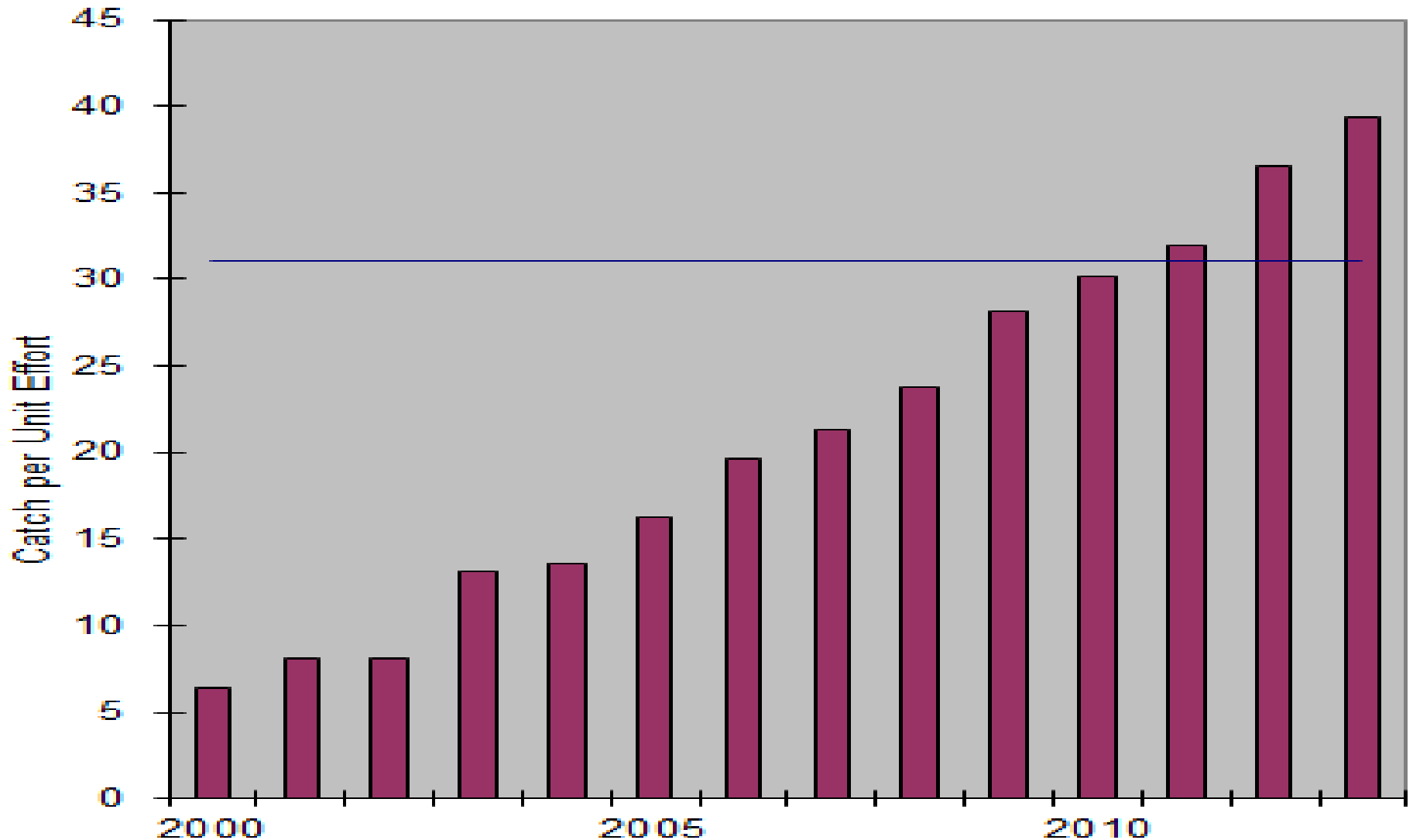


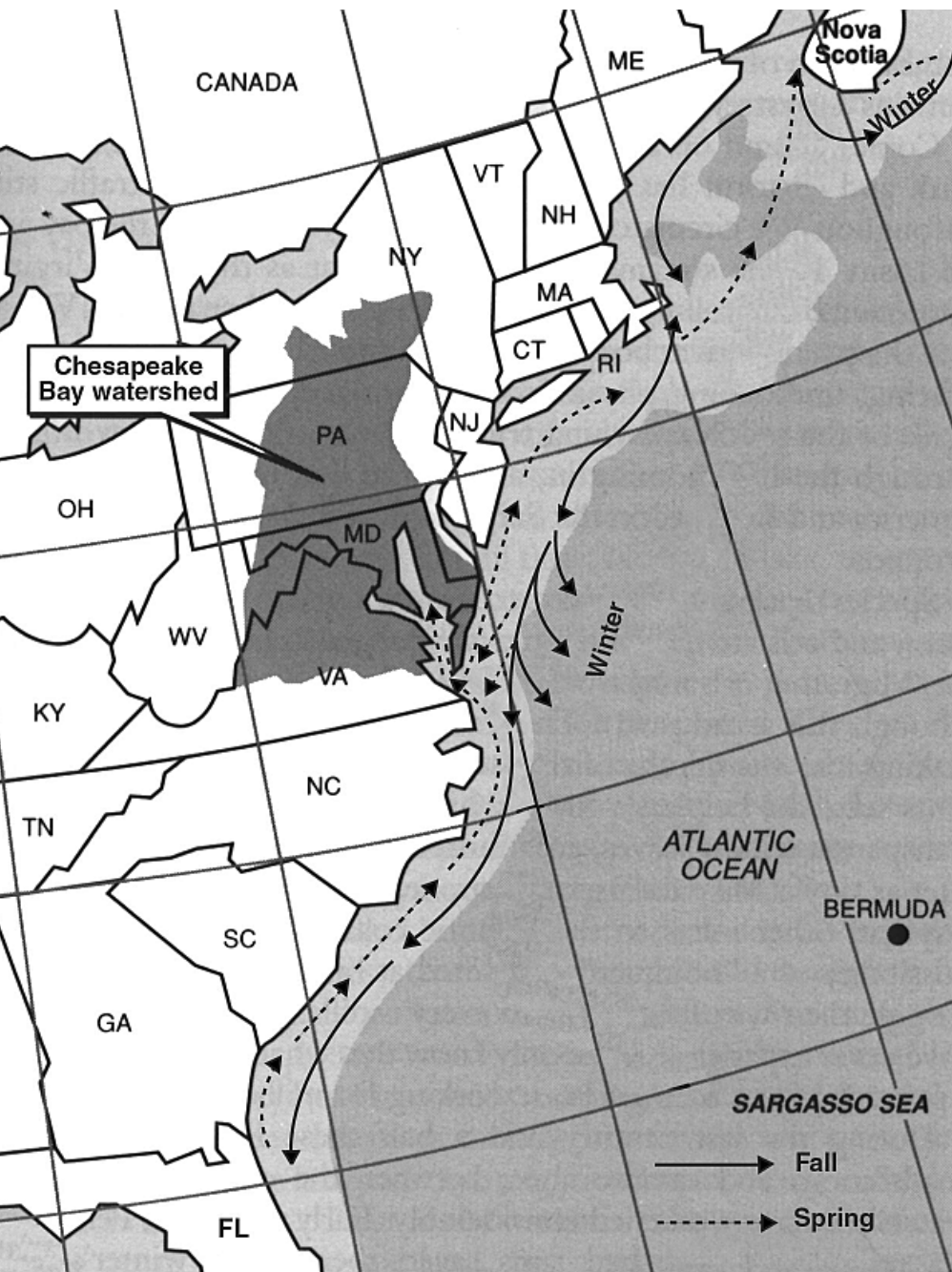
Commercial pound-net fisheries are used to gauge the recovery. In 2007, the Atlantic States Marine Fisheries Commission set the recovery threshold to be a geometric mean of 31.1 lbs/net-day for American shad captured as by-catch (i.e., from non-targeted gear) in the Potomac River. In 2011, that threshold was exceeded. In 2012, the Potomac American shad population was officially declared recovered and sustainable. (from the Potomac River Fisheries Commission (PRFC))



Index of Commercial Catch of American Shad in the Potomac River. The blue line is the Atlantic States Marine Fisheries Commissions' Sustainable American Shad Fishery Threshold (= 31.1/Lbs/net-day). Currently the 14 yr geometric mean of By-Catch Per Unit Effort = 39.4, or 127% of the goal.

Note: The geometric mean for the previous 10 years is 84.1, or 270% of the goal.



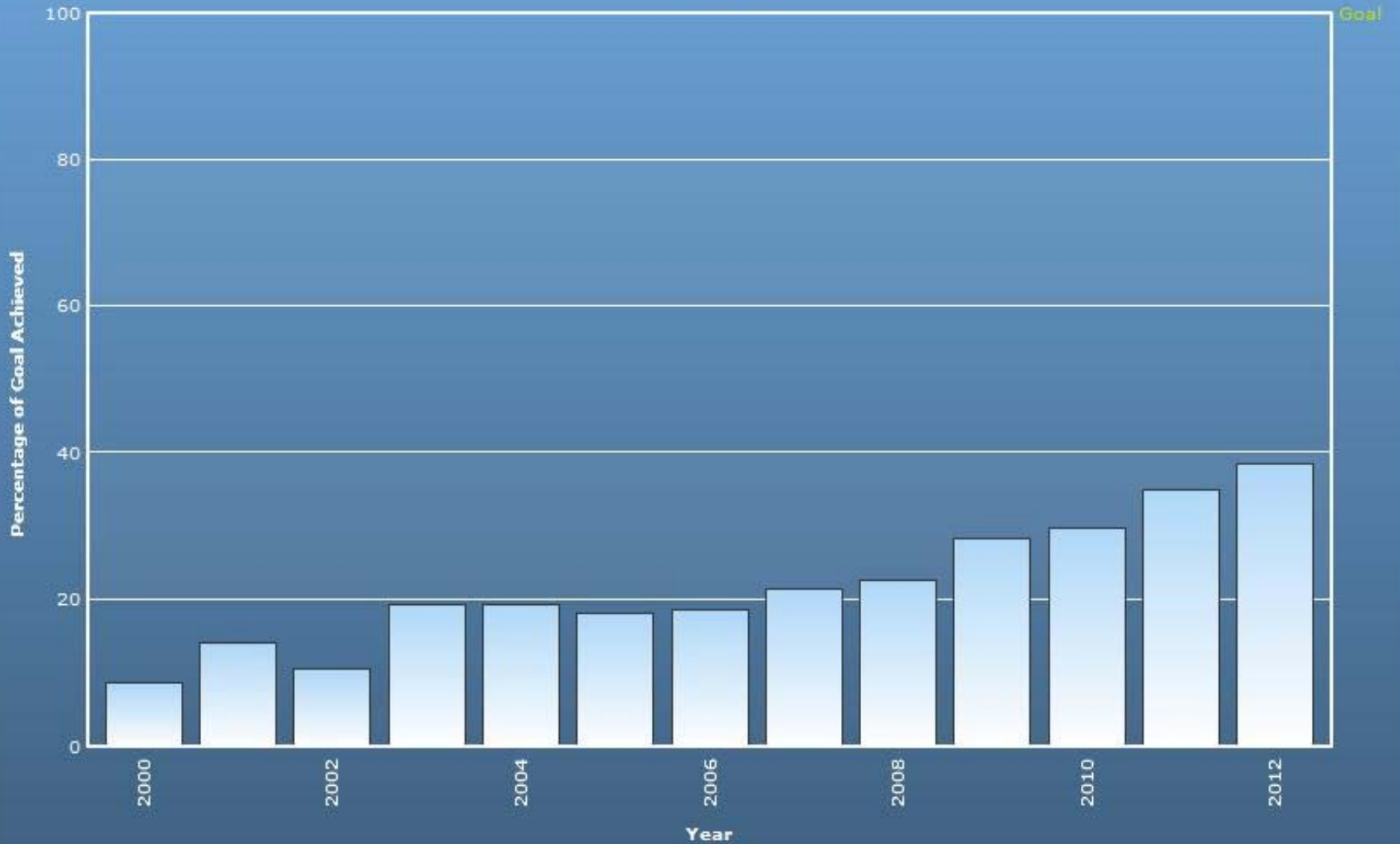


An end to the story?
No – The journey is long, we
need to keep up our efforts
until American shad are
abundant coast wide

Chesapeake Bay Program's Bay-Wide American Shad Restoration Goal

American Shad Abundance

Goal: 100%

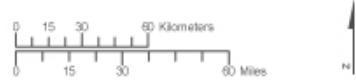
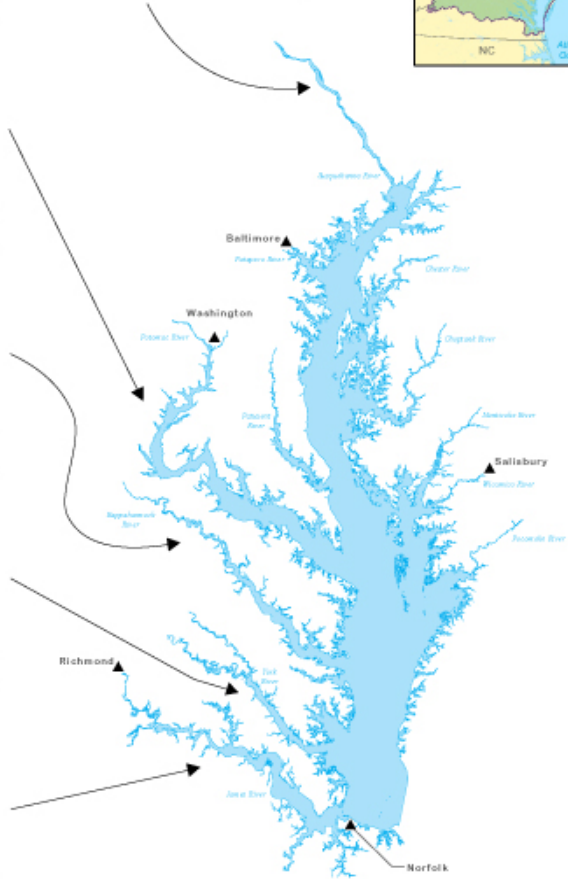
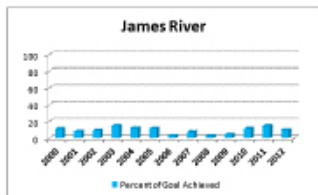
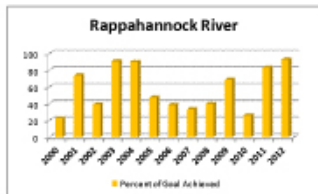
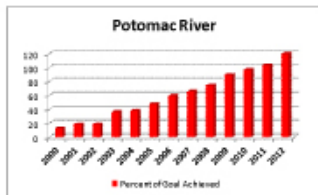
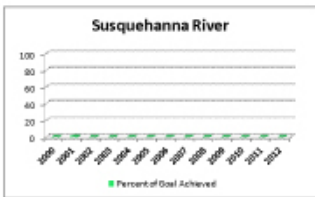


Shad Abundance (2012)

Ecosystem Health Assessment



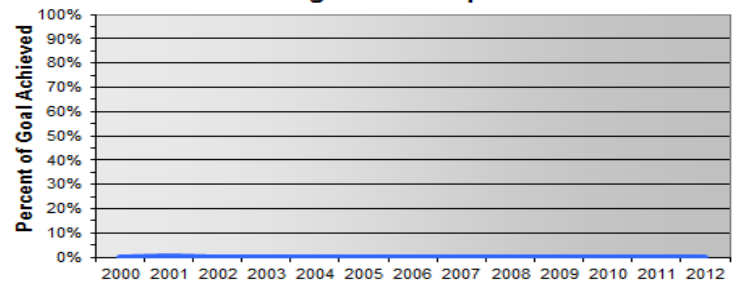
Chesapeake Bay and Tributaries



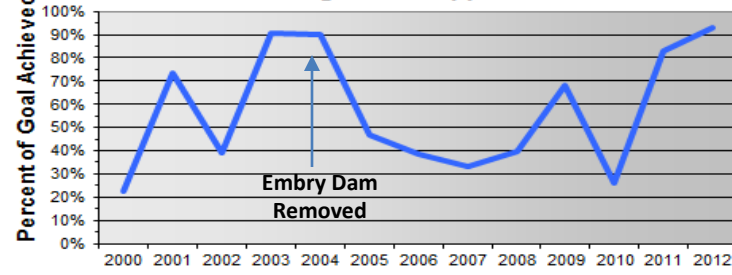
Data Sources: Chesapeake Bay Program
For more information, visit www.chesapeakebay.net
Disclaimer: www.chesapeakebay.net/terms_of_use.htm

Note: Y axis not the same for all graphs.

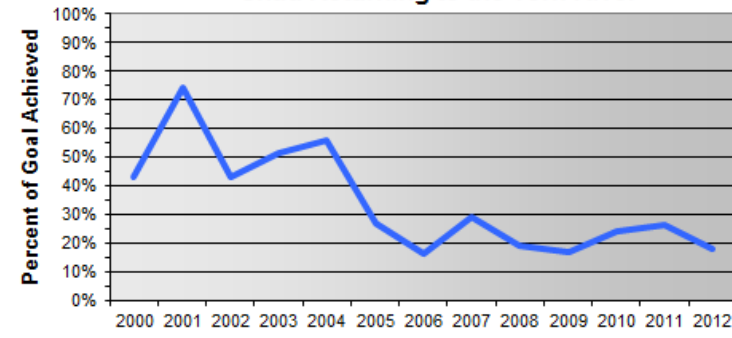
Shad Returning to the Susquehanna River



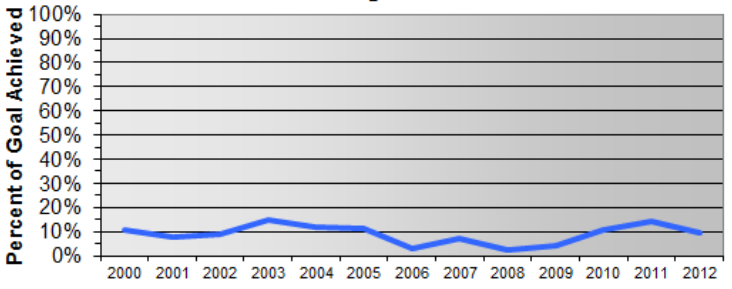
Shad Returning to the Rappahannock River



Shad Returning to the York River



Shad Returning to the James River



Even though the Potomac River's shad population is doing pretty well, we need to be careful. Currently the Potomac is the egg source for the Susquehanna and Delaware Rivers, all of Maryland's shad restoration rivers, and the Rappahannock River. Each of these requires a sacrifice from the Potomac's shad population because the shad used for egg collections do not recover from the handling required. Therefore we have been performing replacement stockings in the Potomac River ever since restoration stocking was concluded in 2002. Roughly 10% of the Potomac-origin fry raised for each of these other rivers are returned to the Potomac to help replace the adults which were sacrificed. This replacement stocking is how students have been helping. The student's efforts are not just helping the Potomac shad population, they are helping to ensure we can continue all of these other restoration stocking programs.



Draft Schedule of Predicted Potomac River Shad Collections for 2014¹

This page of projected early schedule includes 30 dates, but we are limited to only (about) 16 collections. The 21 dates with **yellow bolding** are the best predicted dates for good tides, the 3 blue-boldings are the Sundays when we plan to make collections for the school eggs. The other dates are maybes or back-ups which depend on when we start and if we have a lot of cancellations of the prime dates.

Remember: We meet at the watermen's home about 2 hours before the tidal time.
 When we have a Low Tide, we need to drop nets about ½ hour ahead of the tide.
 When we have a High Tide, we need to drop nets about 1 hour ahead of the tide.
 We need to be on the river site at least 10 minutes earlier than these adjustments.

Date	Time of Evening Tide	Stage	Notes
4/9 Wed	4:45	H	This is early in the season, we will have to see
4/10 Thu	5:50	H	Much depends on water temps
4/11 Fri	6:40	H	Go when LFalls mid-depth temps are 13C
4/12 Sat	7:30	H	The recommended start date or
4/13 Sun	8:10	H	this date, as is more typical AND..
4/14 Mon	8:45	H	<u>Full - Fish Moon! - total eclipse 2:20 a.m.</u>
4/17 Thu	4:45	L	
4/18 Fri	5:30	L	Should be great
4/19 Sat	6:20	L	This whole stretch
4/20 Sun	7:10	L	Egg Day
4/21 Mon	8:05	L	
4/22 Tue	9:05	L	Earth Day
4/24 Thu	4:50	H	
4/25 Fri	5:55	H	
4/26 Sat	6:50	H	Expect good and plenty eggs
4/27 Sun	7:45	H	Primary event for MD, VA school eggs! Need 6+liters
4/28 Mon	8:30	H	No moon => very good shadding
5/1 Thu	4:45	L	
5/2 Fri	5:30	L	Morning Casting Call at Fletchers
5/3 Sat	6:10	L	
5/4 Sun	6:50	L	Back-up #1, Primary for DC schools, DE/PA/NJ/NY
5/5 Mon	7:30	L	
5/6 Tues	8:15	L	Good evening for a swim?
5/8 Thu	4:10	H	
5/9 Fri	5:05	H	Its still good.
5/10 Sat	5:55	H	These are late in the season, but...
5/11 Sun	6:45	H	Mother's Day, distant maybe for school collections
5/12 Mon	7:30	H	Any bucks in the river?
5/13 Tues	8:20	H	
5/14 Wed	9:10	H	Full - Flower Moon!

If you are interested in volunteering to help collect shad, I typically have room for 1-5 students/teacher/parents each trip.

Check out the schedule, it will be at the end of this presentation on the ICPRB website.

Call me (301-274-8106)

to arrange an evening.

Have several dates in mind to help ensure a spot.

Thanks.