

## A PARALLEL CRISIS: THE SUSQUEHANNA AND DELAWARE RIVERS

By Ben Hoskins

What ever happened to the migration of ocean fish and eels up and down the Susquehanna and Delaware Rivers? How much damage have our rivers endured in past generations? What are the causes? And what can we do about it?

Find out. The Susquehanna River Symposium is being held October 18<sup>th</sup> and 19<sup>th</sup> at Bucknell University with the theme “Dams on the Susquehanna,” as presented by the Susquehanna Heartand Coalition for Environmental Research comprised of over a dozen universities in the area. You are welcome to attend.

### History and Tourism on the Susquehanna and Delaware Rivers

The Susquehanna River watershed covers 275,109 square miles, so if you start paddling at Cooperstown, NY, you will take days to reach Harrisburg, and you’re only part way to the Chesapeake Bay. Its twin river watershed in eastern Pennsylvania, the Delaware River, covers only half of that area.

Migratory fish spawning up and down the two rivers in early spring and summer include American and hickory shad, short nose and Atlantic sturgeon, striped bass, alewives, blueback and river herring, and eels. Interesting that while fish migrate upriver from the ocean to spawn, eels migrate downriver to the ocean to spawn in the Sargasso Sea between the US and Europe.

From pre-colonization until the early 1900s, catches provided a major source of food and income. For years around 1900 the average commercial migratory catch on the Susquehanna was 12-25 million pounds of fish but river pollution, particularly from major city industrial waste and sewage, coal mining waste, then dams, greatly reduced the number of ocean fish migrating north to spawn.

Even as late as the 1930’s fishermen on the Susquehanna remember communities ringing church bells and honking horns announcing the large spring shad run as it passed them swimming north.

A number of communities along the Delaware including Easton, PA and Lambertville, NJ (averaging 35,000 recreational visitors) enjoy annual week-long shad festivals. PA Fish and Boat Commission states in their studies on Migratory Fish that, “recreational shad fishing along the Susquehanna will result in some \$30 million annually in economic benefit”.

### Dams on the Susquehanna River

Migratory fish in the ocean and all along the East Coast rivers has declined 98% since historic highs. The Susquehanna watershed claimed the highest number of migratory fish on the East Coast, but in 1928 the hundred foot high Conowingo Dam was built like a concrete colossus across the river blocking ALL migration 165 miles further north as no fish passage was required or built.

Until the 1930s and after the Delaware River became the most commercially productive river on the East Coast with annual shad runs before the 1900s numbering in the tens of millions of fish. The Delaware surpassed the Susquehanna because there are no dams across the main stem of the Delaware, with the first dams on the Lehigh River at Easton, and those are being demolished according to the Delaware River Basin Shad Restoration Plan of 2012.

Raising a family in Easton, PA, I would rally friends to canoe down the Delaware, and I remember camping by the river and seeing hundreds of male shad fins make small circles in the water as they fertilized the eggs of the females below. A magical sight.

There are five dams across the main stem of the Susquehanna and none across the Delaware River. The Conowingo Dam built by Philadelphia Electric Co. in Maryland in 1928, and then bought by PPL, provides electric power to Philadelphia. Finally, the State mandated a fish passage and PPL built a fish elevator in 1991 with a capacity to pass 750,000 American shad annually and the dam has the capacity for a second hopper.

Three other electric power dams are around Harrisburg: Holtwood (1910), Safe Harbor (1931), York Haven (1904), and the Sunbury Fibridam (2001). All dams except the Fabridam have fish lifts and the last has a vertical slot fish ladder. The Fabridam fish passage design was approved by the State in 1991, and is very effective in allowing all migratory fish and other species to pass both ways, but despite funding being available construction is blocked until a wetland on the west bank is replaced.

### Migratory Fish Passage Blocked

Success of these migratory fish passages is very poor. Results from 2011-2013 upstream shad migration past the four dams show abysmal results: Conowingo 55,447 shad passed, Holtwood 6,759, Safe Harbor 5,024 and York Haven 426. If I were a shad and had .007% chance of making it through the four dams, I wouldn't be optimistic. Overall variations depend on commercial ocean harvesting, river water levels, and fish passage efficiencies and blockages.

The Conowingo Dam had a successful program from 1985 to 1996 where they caught 200,000 migratory fish annually in their elevator, dumped them in tanker trucks then transported them above the next three dams to flourish and fertilize their eggs further upriver. Since 1996 PPL claimed the dams upstream had improved their fish passages and stopped their fish transport, but data certainly doesn't reflect that.

The production of wild juvenile shad upriver is considerable, but their numbers are poor due to predation, turbine mortality, poor water quality, poor lift efficiencies and commercial fishery bycatch.

## Permits on Dam Renewal Now Reviewed

The Susquehanna River Basin Commission and PA Fish and Boat Commission are scientifically examining the low numbers of migratory and spawning ocean fish passing through the five dams on the Susquehanna, as licenses for all dams are soon under review.

The Conowingo Dam license expires in 2014, and their application for renewal was submitted for review in 2009. Once approved, they're operational under new regulations until 2060, so NOW is the appropriate time to make changes to help migratory fish upriver and down. Public comment is appreciated.

Biologists want to include performance standards in the the new Conowingo licensing renewal, and insist that all four dams must be much more efficient in passing fish. PA Fish and Boat in a 2012 report on Fish Passage Results gives the following estimates: Conowingo, a 750,000 shad capacity with expansion capabilities to 1.5 million fish; Holtwood, 2.7 million fish capacity; Safe Harbor, 2.5 million shad capacity; and nothing said about York Haven or the Fabridam.

## Other Threats to Ocean Fish Migration and Spawning

In addition to dams impeding the flow of migratory fish, a complicated pattern of causes has been emerging for past decades. Marine Fisheries state that the stock of fish is at 8% of historic levels. The devastating use of 500 foot wide nets a half-mile long for commercial ocean fishing is now banned as of 2012, and commercial takes of shad on the East Coast is reduced by two thirds.

Current threats to the basin's aquatic resources and habitat include storm water runoff, mine drainage discharges, habitat encroachment, invasive species and changes to land use. During the 20<sup>th</sup> Century, both rivers suffer reduced oxygen levels due to sewage discharge at major cities like Philadelphia, Camden and Harrisburg that were too low for shad to survive, and this problem, although reduced, continues.

Farms at tributaries are producing too much nitrogen and phosphorus from manure as well as high levels of sediment now clogging up behind the Susquehanna dams. Industries continue to dump chemicals and other pollutants into the tributaries and rivers. A "no fracking zone" has been declared for the Delaware Basin, and Governor Corbett has been urged not to dump fracking water in rivers.

Despite all the current problems of excessive coastal ocean fishing and river pollution, the problem of dams on both rivers is still the greatest impediment to fish migrating from the ocean to the Susquehanna and Delaware rivers and tributaries and spawning, thus renewing our commitment to restoration.