

SOME ESTUARY ESSENTIALS



THE HUDSON RIVER WATERSHED

A watershed is the area of land from which water drains into a stream, river, lake, or other water body. The Hudson's watershed covers nearly 13,400 square miles, an area equal in size to Massachusetts and Connecticut combined. The Mohawk River is the largest of the Hudson's tributaries — the streams that drain from the watershed into the Hudson.

THE HUDSON RIVER ESTUARY

An estuary is a body of water, partly enclosed by land, in which fresh water running off the land meets salty ocean water. Depending on the volume of runoff from the watershed, the leading edge of diluted seawater, called the salt front, is usually located between the New York/New Jersey state line and Newburgh. As generally described, the Hudson River estuary extends into fresh water beyond Newburgh to Troy, since Atlantic Ocean tides roll up the river to Troy.



Steve Stammer/DEC

The dam between Green Island and Troy, 153 miles north of the Battery at Manhattan's southern tip, marks the up-river limit of tidal influence on the Hudson. Sunfish, including this pumpkinseed, are common in the fresh water here.



Steve Stammer/DEC

When there is little freshwater runoff from the Hudson's watershed, the salt front may push upriver through Newburgh Bay and past the Beacon-Newburgh Bridge. In droughts, it may reach Poughkeepsie.



Clare Dunn and Lana Lau

Steve Stammer/DEC



Chris Bowser/DEC

Nearer the Atlantic Ocean, the Hudson is almost always salty. Saltwater fish such as the lined seahorse can be found along Manhattan's shores.

“THE TIMES THEY ARE A’ CHANGIN’”

According to the State of the Hudson 2009, “The river shaped our past; we now shape its future.” While that statement remains true, the situation is more complicated. We do have the power, in the short term and on a local and regional scale, to alter the state of the Hudson for better or worse. However, the scope of human activity over many years and the entire globe has set into motion environmental change over which we have little immediate control. Like the sorcerer’s apprentice in the Disney film *Fantasia*, we now find ourselves being buffeted by forces that we cannot command.

Take climate change and invasive species, for example. Even under the most optimistic scenarios for lowering emissions of greenhouse gases, the realities of physics and chemistry ensure that atmospheric concentrations of these gases will remain problematic and promote global warming for decades to come. Likewise, once an invasive species spreads beyond its initial beachhead, there are few practical methods for containing its impacts.

We must reduce emissions and restrict the introduction of non-native species, but at the same time, Hudson Valley communities — natural and human — will have to adapt to ongoing environmental change. In doing so, we must use what powers we do have to alter conditions in ways that improve the state of the Hudson and community resilience in the face of change.

With all the research done on the estuary, one might assume that we thoroughly understand the Hudson ecosystem — all its components and the processes and relationships that knit them together, plus clear metrics for measuring change. Our knowledge is growing, but much remains unknown. Will tidal marshes — a critical estuarine habitat — drown under rising sea levels, or will sediment accumulate to elevate marshes at a pace that matches the rate of sea-level rise? We don’t know. Recent years have seen efforts to establish baselines — robust and accurate assessments of conditions at given points in time that become yardsticks for measuring change as years pass.

Where long-term data exist, annual variability can make interpretation challenging. Fisheries biologists saw a collapse in the abundance of young American shad in 2002, and the decline continued to 2013. In 2014, their numbers showed an encouraging increase, though they remained very low by historical standards. Was this a single good year? The start of a trend? Over the next decade we should be able to tell. But faced with such variability, the challenge is to come up with a timely, informed response that will benefit the species and take into account people’s interests in the fish.

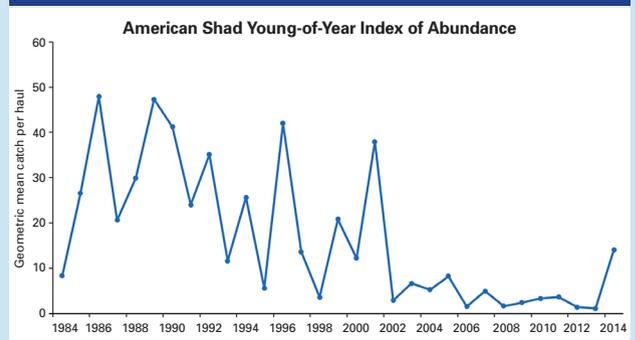
In addition to examining trends, this report looks at how Hudson Valley residents, scientists, institutions, agencies, community leaders, and others are working together to respond to challenges. Only by means of such shared commitment and partnerships will the next State of the Hudson be able to report progress.

BASELINE: Accurately determining the elevation of the river bottom in the Tivoli North Bay marsh will aid in observing how tidal marshes respond to rising sea levels.



Steve Stanne/DEC

TREND: The Hudson’s American shad stock has been in decline.



Data from Hudson River Fisheries Unit/DEC

The population peaks of the 1980s are much lower than historic highs. Production of young shad crashed in 2002 and dropped further through 2013. Only time will tell if 2014’s uptick signals a new trend.



A young American shad.

Steve Stanne/DEC