A Preliminary Analysis of Commercial Fishery Records in the Patuxent River Estuary with Emphasis on the Jug Bay area, Chesapeake Bay National Estuarine Reserve

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Introduction
The Maryland Department of Natural Resources (MDNR) has kept records of commercial fish catch in the Chesapeake Bay since 1929. These records are used for stock assessment and to monitor fishery compliance with state regulations.

In an effort to better characterize commercial fish harvesting within Jug Bay, a component of the Maryland National Estuarine Research Reserve, DNR records for the upper, lower, and entire Patuxent River from 1929-2004 were analyzed to examine temporal trends of total fish catch changes in main targeted species, species relative importance, and harvest, and comparisons between the upper and lower sections of the Patuxent River. This is a first and important step to understand the role and potential impact of commercial fishing on the fish population dynamics of the Patuxent River.

Analysis of Fishing Records
Fishermen have been required by DNR to report information about their catch for each fishing trip, including:

- Fishing location
- Species of fish being caught
- Gear type used
- Fish harvest (measured in pounds)
- Amount of time fishing

Simple descriptive analyses (total sums, means, relative proportions) were used to process the fish catch data for the Patuxent River estuary from 1929 to 2004, and to characterize:

- Trends of total fish harvested for the upper, lower, and entire Patuxent.
- Changes in the composition of species harvested for the upper, lower, and entire Patuxent.

Data limitations:
The nature of commercial fish catch data and the way the data are collected creates limitations on the interpretation and extrapolations that can be drawn from this information. Commercial fishing data by itself cannot be used to estimate fish population trends, but it provides an estimate of human fish removal, a component of the overall population mortality.

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Trends in Patuxent River Commercial Fish Landings

Species Composition of Harvested Fish 1929-2004

- Croaker
- Herring
- Catfish
- White Perch
- Striped Bass

From 1972 until 2004, fishermen specified whether they harvested fish from the upper or the lower part of the Patuxent River, separated by the Benedict Bridge (see map). In comparing the two sections of the river, we found:

- Total fish harvest between the upper and lower Patuxent did not vary dramatically between 1972 and 2004. However from 1999 to 2004, the upper Patuxent was much more heavily fished than the lower section of the river.
- Catfish species (mostly channel catfish) were the main targeted species in the upper Patuxent, but not in the lower section.
- White perch and herring are important commercial species in both sections of the river, but contribute to the lower Patuxent fishery in a greater percentage.

The percentage of striped bass harvest was similar between the two sections of the Patuxent.

Discussion

The Jug Bay component of the Chesapeake Bay National Estuarine Research Reserve has historically been an important spawning area for a variety of anadromous and estuarine fish species, including striped bass and yellow perch. It has also been an historically important site for commercial fishing. In addition to commercial fishing, several ecological factors impact these fish species (the loss of submerged aquatic vegetation, chronic levels of dissolved oxygen, and high concentrations of suspended solids, which currently degrade spawning grounds). It is not known whether commercial fishing alone has a significant effect on these fish populations and the overall Patuxent River freshwater tidal ecosystem in general.

MDNR commercial fishing records reflect a market-driven and regulated fishery, and therefore do not reflect the population status of any targeted species. Examining them may, however, help us begin to understand the extent of the mortality pressure exerted by commercial fishing on the fish populations of the Patuxent River.