

# Delaware Estuary

## Bucks, Delaware, and Philadelphia Counties

### 2021 Striped Bass Survey

The Pennsylvania Fish and Boat Commission (PFBC) assessed the Striped Bass spawning stock in the Delaware Estuary between May 3 and May 24, 2021. Annually, PFBC staff conducts adult Striped Bass sampling at 21 index sites between the mouth of Rancocas Creek, NJ (river mile 109) downriver to the mouth of Raccoon Creek, NJ (river mile 80). Each of the 21 sites were sampled twice using boat electrofishing (42 total samples). Additional collection efforts (beyond the 21 historical sites) were conducted at Trenton Falls near the head-of-tide to capture larger Striped Bass ( $\geq 16$  in.) for tagging purposes.



*Area 6 Fisheries Biologist Tyler Grabowski holding one of the many adult Striped Bass collected in 2021.*

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A total of 336 fish were captured at the 42 index sites in 2021. Males accounted for 78% of the total catch and ranged from 8 to 38 in., while females accounted for 13% of the total catch and ranged from 25 to 45 in. The remaining 9% of the total catch was comprised of fish of unknown sex. Sex could not be determined for these fish because they were small, sexually immature juveniles or larger fish that were not “running ripe” (actively flowing milt) or did not exhibit distinguishing features (large, bulbous stomachs in pre-spawn females) at the time of capture. Fish of unknown sex ranged from 8 to 25 in. The total catch rate (19.7 fish/hr), catch  $\geq 12$  in (17.1 fish/hr), and catch  $\geq 28$  in (2.2 fish/hr) of Striped Bass during the 2021 survey were all higher than long-term averages (Figure 2).

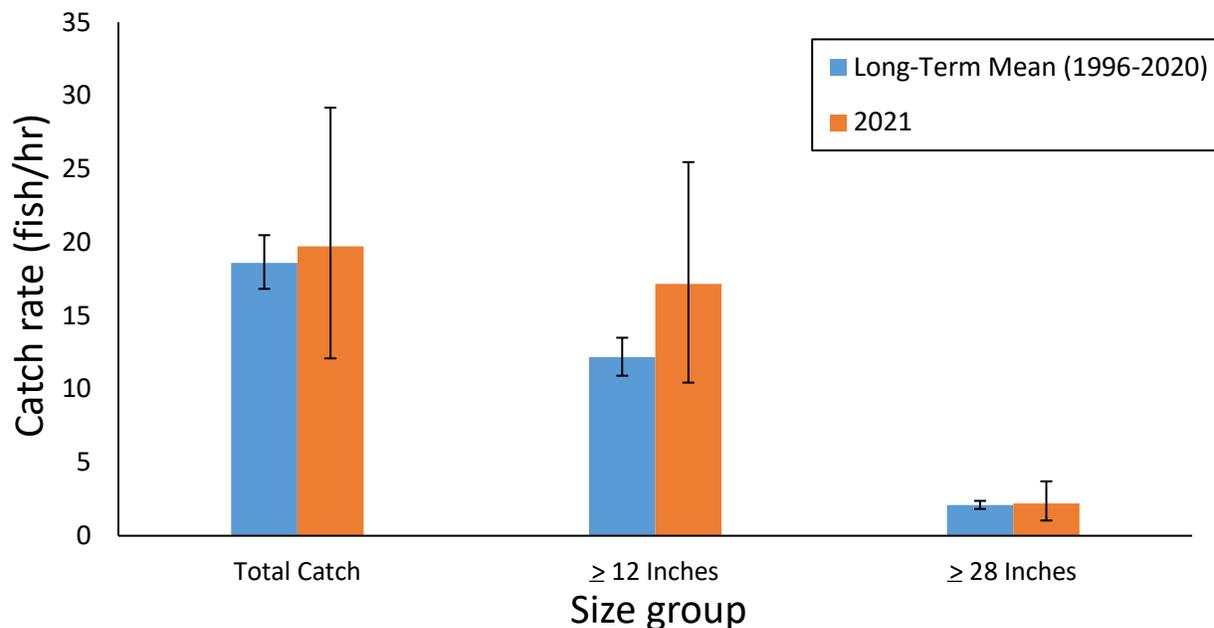


Figure 2. Electrofishing catch rates for Striped Bass captured from the Delaware Estuary between May 3 and 24, 2021 compared to corresponding long-term averages (1996 to 2020). Vertical black bars depict the 95% confidence intervals.

The total catch rate of Striped Bass from the 2021 survey represents the eleventh highest catch rate on record since monitoring began in 1996. Further, the catch rate of Striped Bass  $\geq 28$  in was the tenth highest catch rate recorded over the time series. The catch rates of these larger fish, until 2021, had been declining for several years (Figure 3), which resulted in action being taken by the [Atlantic States Marine Fisheries Commission \(ASMFC\) in the fall of 2019](#) in an effort to reduce fishing mortality of the coastwide Striped Bass stock. Striped Bass of larger sizes ( $\geq 28$  inches) are generally mature females (Figure 4). Therefore, limiting harvest of these fish is important to ensure these fish can spawn and contribute to the overall Striped Bass population.

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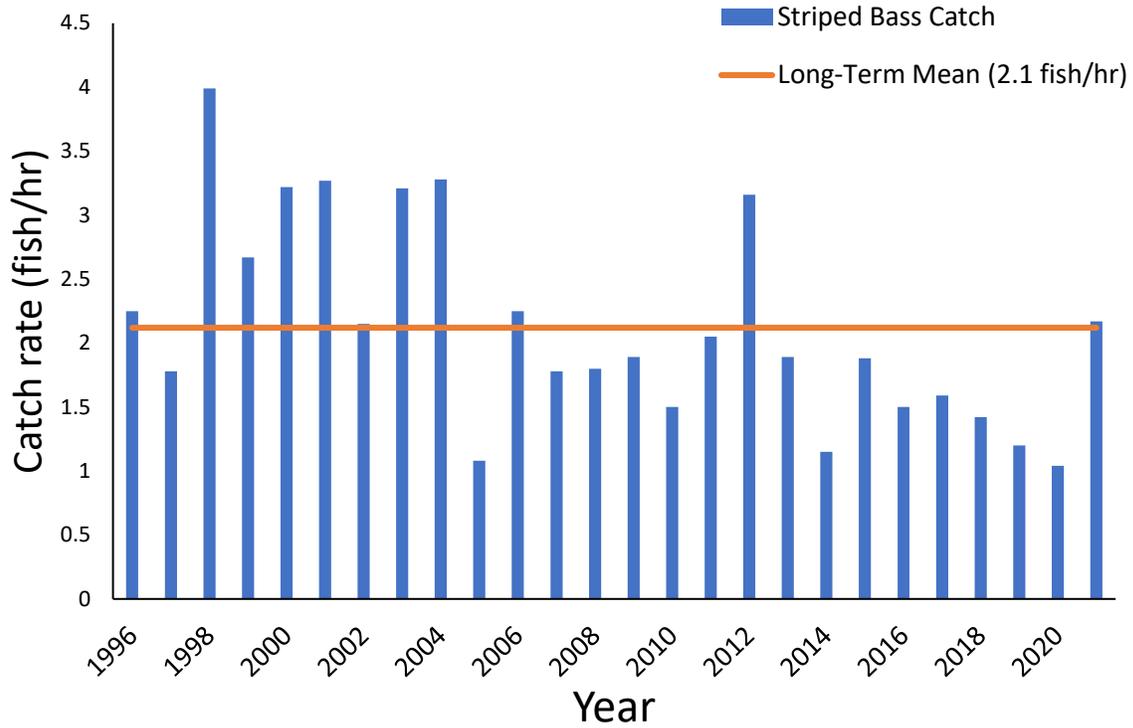


Figure 3. Catch rate of Striped Bass greater than 28 inches collected during the Striped Bass spawning stock survey (1996-2021).

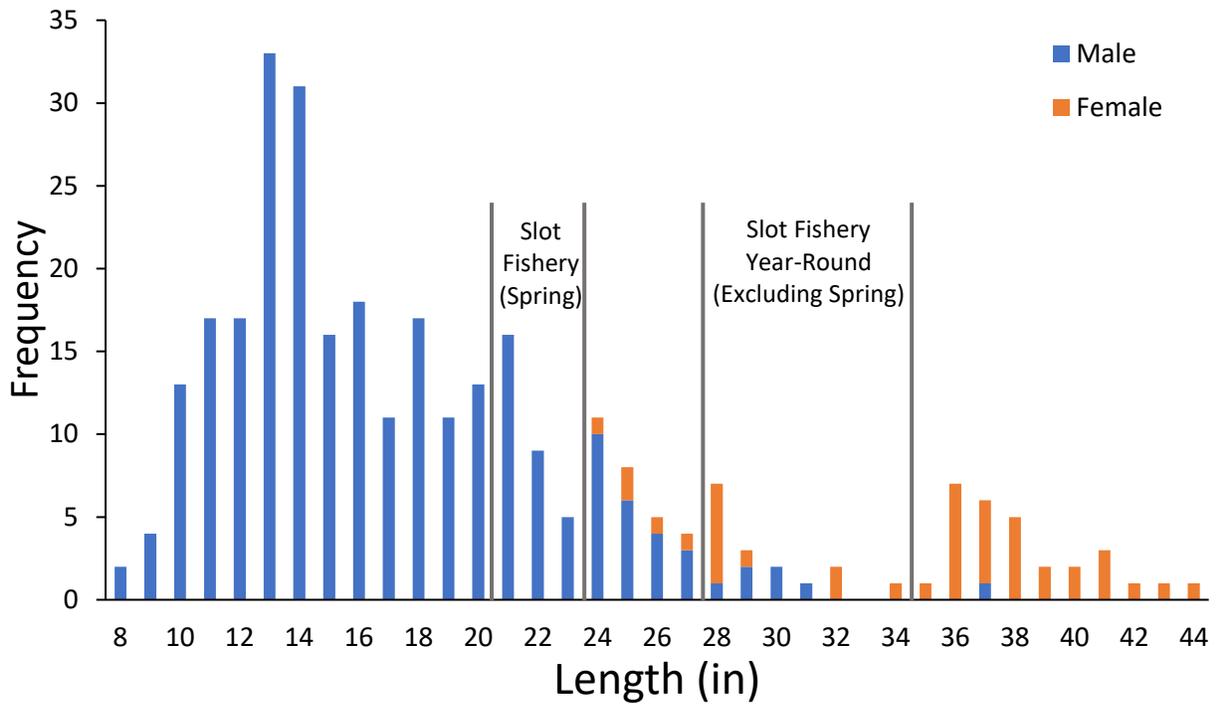


Figure 4. Length-frequency distribution of Striped Bass collected during the 2021 spawning stock survey. Bars within slots represent fish available for harvest during their respective seasons.

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Striped Bass reproductive events that result in large year classes contribute substantially to the overall population. Therefore, it is important to track the progression of these year class to the adult population. Biologists evaluate year class contribution by collecting scales from individuals and assign an age estimate to that fish. Due to differences in growth between male and female Striped Bass, ages are not assigned to fish of unknown sex. Half (50%) of the Striped Bass aged in 2021 represented fish from the 2017 and 2018 year classes. Figure 5 shows a scale collected from an age-3 (2018 year class) Striped Bass. We remain hopeful, that the recent large year classes and the above average number of fish  $\geq 28$  in documented here, combined with the proactive steps taken by the ASMFC Striped Bass Board to reduce fishing mortality, will result in a higher spawning stock biomass and improved reproduction.

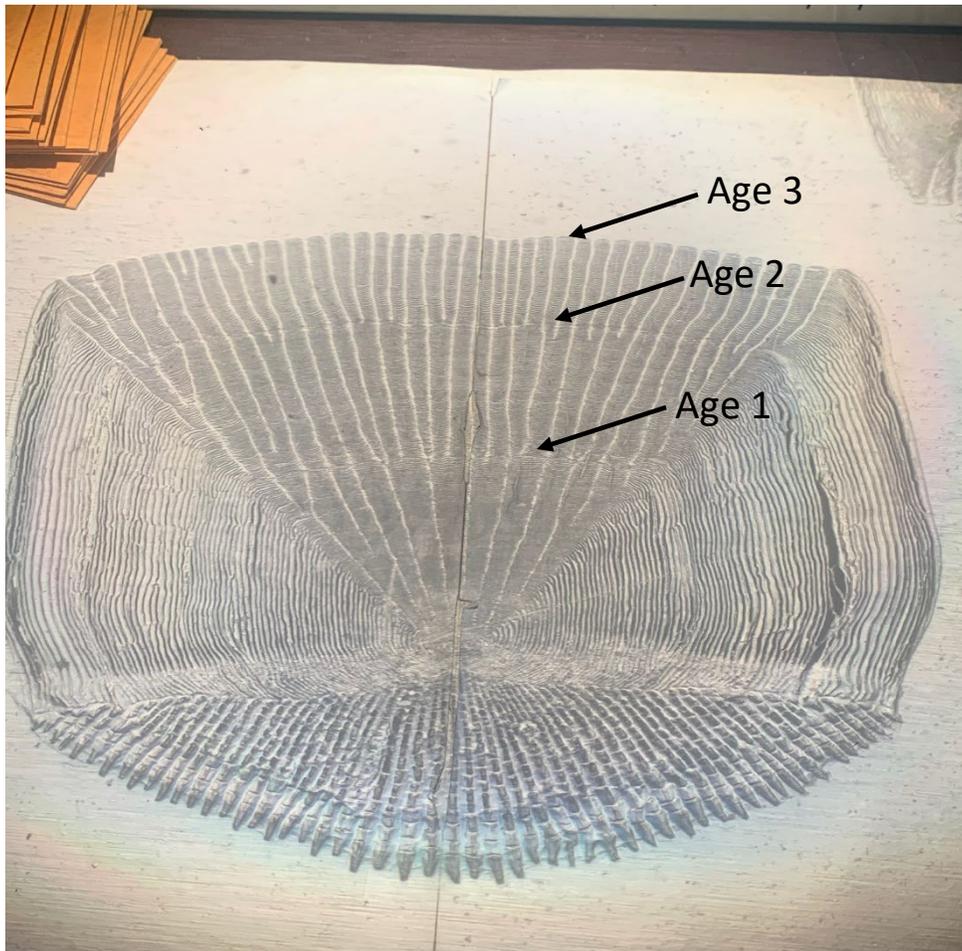


Figure 5. A scale sample from an age-3 male Striped Bass collected in 2021. More information about how biologists age fish can be found at this [link](#).

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In 2021, a total of 269 Striped Bass  $\geq 16$  in were tagged with a pink-colored U.S. Fish and Wildlife Service (USFWS) reward tags (see photo below), as part of a multi-state, coastwide tagging program. Information gathered from tagging programs relies on angler reporting and allows fisheries biologists to monitor coastal movement patterns, determine where fish are harvested, estimate annual fishing mortality, and angler release rates.



***Note the three-inch, pink, spaghetti-like tag near the tip of the left pectoral fin.  
Please report reward tags to the U.S. Fish and Wildlife Service by  
calling 1-800-448-8322.***

Between 1995 and 2021, the PFBC tagged a total of 5,938 Striped Bass in the Delaware Estuary. As of December 2021, 15% of the 5,938 tagged fish were reported as caught. Recreational and commercial fishermen accounted for 89% and 7% of these captures, respectively, and 4% were credited to other collectors, such as scientific researchers. Of the reported tags, 52% were caught and released, 47% were harvested, and 1% were found dead, dying, or were captured while performing scientific research. Recreational and commercial fishermen harvested 46% and 78% of the tagged Striped Bass that they caught, respectively. The ratio of female to male Striped Bass in the harvest was 1.5:1, indicating more harvest pressure on the female segment of the population. However, this ratio was likely influenced by the large number of tagged males that were too small to be legally harvested. Fish tagged by the PFBC have been caught from Maine to North Carolina. A large portion of these tagged fish were caught by anglers along the Atlantic coast of New Jersey, in the Chesapeake Bay, and the Delaware Bay (or from tributaries to the bay; Figure 6).

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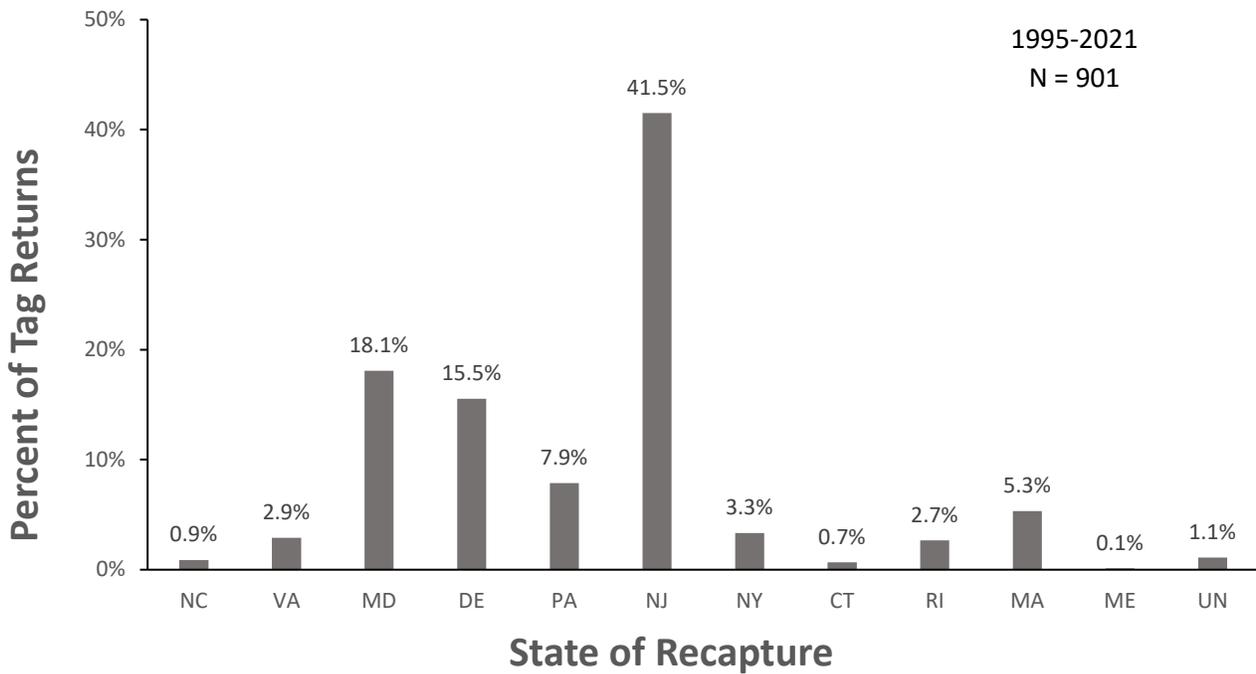


Figure 6. Percent of tag returns by state of recapture for Striped Bass tagged by the Pennsylvania Fish and Boat Commission in the Delaware Estuary between 1995 and 2021. UN = unknown recapture location.

Based on PFBC tagging data, it appears that some Striped Bass exhibit strong site fidelity (return to the same areas of the Delaware River) each year. For example, in 2021 nine fish were captured in PA or NJ waters of the Delaware River (reports for these fish included a detailed site description), of which 4 were caught at the exact location that they were tagged in a previous year (one fish was tagged in 2021). The longest interval between tagging and being reported by an angler was 3 years. Additionally, for the first time in 26 years of tagging, a fish was tagged during the PFBC annual survey and was subsequently caught by anglers twice within a month of the tagging event. Based on detailed angler reports, this fish was caught at the same location that it was tagged. Anglers are encouraged to provide specific location information when reporting tagged fish (ex. Betsy Ross Bridge versus just simply saying Philadelphia). This detailed information allows PFBC biologists to further understand site fidelity and identify potentially important spawning areas.

In 2020, new size limits and circle hook regulations were implemented in effort to reduce fishing mortality of Striped Bass in the Delaware River. The size and creel limits for the 2022 Striped Bass season are provided in Table 1 below. Figure 7 provides a comparison of fishing hooks and highlights the

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required non-offset circle hook design. Non-offset circle hooks are required when fishing with bait in the Delaware Estuary, regardless of species being targeted. Anglers are also advised that New Jersey regulations apply if they cross the PA/NJ boundary line, which is delineated as the approximate middle of the channel. Also, in addition to possessing a valid Pennsylvania fishing license, anglers targeting Striped Bass in the Delaware River and Estuary below Trenton Falls are required to register for the PFBC’s free on-line Saltwater Angler Registry through the [huntfish.pa.gov](http://huntfish.pa.gov) webpage. Likewise, if fishing across the state line in New Jersey, Pennsylvania anglers must also register in the free [New Jersey Saltwater Recreational Registry Program](#).

Table 1. Regulations for the Striped Bass fishery in the Delaware River and Estuary, including tributaries from the mouths of the tributaries upstream to the limit of tidal influence. Note the upper slot numbers of 24 and 35 inches are not inclusive, meaning it is illegal to harvest fish  $\geq 24$  or  $\geq 35$  inches for each respective slot length limit.

<b>Location</b>	<b>Length Limit</b>	<b>Bag Limits</b>	<b>Other</b>	<b>Open Season</b>
<b>Pennsylvania</b> Delaware Estuary <i>PA/DE state line upriver to Calhoun St. Bridge at Morrisville, PA (56 river-miles)</i>	21” to less than 24”	2	In-line (non-offset) circle hooks <b>required</b> when fishing with bait	4/1 - 5/31
	28” to less than 35”	1	In-line (non-offset) circle hooks <b>required</b> when fishing with bait	1/1 - 3/31, 6/1 - 12/31
<b>Pennsylvania</b> Delaware River (non-tidal) <i>Calhoun St. Bridge upriver (196 river-miles)</i>	28” to less than 35”	1	In-line (non-offset) circle hooks recommended when fishing with bait	1/1-12/31

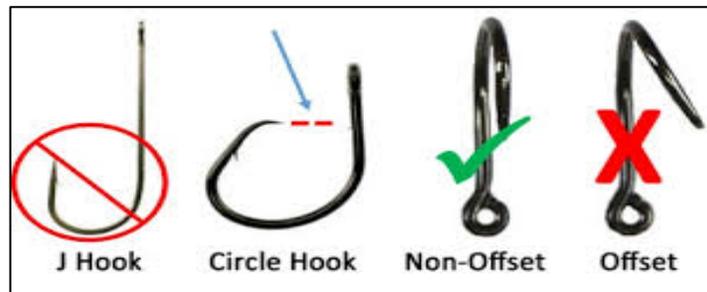


Figure 7. A comparison of hook types showing the approved in-line (non-offset) hook type required when fishing with bait in the Delaware Estuary.

\*Image courtesy of the Virginia Marine Resources Commission

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Anglers interested in consuming Striped Bass caught in the Delaware River should consult the [fish consumption advisory information](#) provided in the [Pennsylvania Fishing Summary Booklet](#). There is currently a one meal per month advisory for Striped Bass 28 inches to less than 35 inches in length. Slot-sized Striped Bass (21 to less than 24 inches in length) are now covered by the general statewide advisory for recreationally caught sportfish, which is one meal per week.

**Tyler Grabowski – Area 6 Fisheries Biologist**

**Mike Porta – Area 6 Fisheries Manager**