

Delaware River

Wayne, Pike, Monroe, Northampton, and Bucks Counties

2022 Adult Smallmouth Bass Assessment

Fisheries biologists from Fisheries Management Areas 5 and 6 annually assess the adult Smallmouth Bass population in the non-tidal Delaware River with nighttime boat electrofishing. Area 5 staff conducted surveys at two sites (Damascus and Lackawaxen) in the upper Delaware River (Damascus to Matamoras) and at three sites (Dingman's Ferry, Delaware Water Gap, and Sandts Eddy) in the middle Delaware River (Matamoras to Easton); whereas Area 6 staff surveyed three sites (Upper Black Eddy, Point Pleasant, and Yardley) in the lower Delaware River (Easton to Morrisville). Surveys typically occur in the fall between the middle of September and end of October when river flows are easily navigable and water temperatures are falling. This report details the results from sampling that occurred during September 18-29, 2022 and catch rate data are compared across the long-term dataset (2005-Present) for each river reach.



A healthy 15 in Smallmouth Bass collected from the Delaware River.

The results of the 2022 Delaware River adult Smallmouth Bass assessment that examined abundance and size structure are positive. A total of 607 Smallmouth Bass were collected across the 8 sites and fish measured 2 to 17 in (Table 1). The total catch rate of Smallmouth Bass for combined sites was 130.5

fish/h, which was well above the long-term median value of 63.2 fish/h (Figure 1). This represents the highest catch rate recorded during the time series. The combined catch rate of fish ≥ 12 (10.2 fish/h) exceeded the long-term median of 6.4 fish/h (Figure 2), ranking 4th in the time series. The combined catch of fish ≥ 15 in (1.1 fish/h) was the only metric in 2022 to fall below the long-term median (1.3 fish/h; Figure 3).

Table 1. Length frequency distributions of Smallmouth Bass (by site) collected from the Delaware River during September 18-29, 2022. Note that effort was rounded to two significant digits.

River Mile	Lower River			Middle River			Upper River	
	138	156	168	189	212	239	278	298
Length (inches)	Yardley	Point Pleasant	Upper Black Eddy	Sandts Eddy	Delaware Water Gap	Dingman's Ferry	Lackawaxen	Damascus
2	-	-	-	-	-	-	2	4
	-	-	2	1	4	3	24	51
4	1	3	4	13	13	18	10	6
5	4	2	9	1	6	4	6	9
6	2	1	2	-	7	6	6	11
7	1	3	6	3	11	4	10	8
8	1	10	6	8	3	13	24	10
9	1	6	1	2	16	9	30	7
10	2	8	9	8	12	2	23	2
11	6	8	12	16	8	-	7	1
12	1	5	4	4	6	-	6	2
13	-	1	2	4	-	-	6	1
14	-	1	-	1	-	1	2	-
15	-	1	2	2	-	-	-	-
16	-	-	1	-	1	-	-	-
17	-	-	-	-	-	-	1	-
Total	19	49	60	63	87	60	157	112
Effort (h)	0.97	1.20	1.80	0.66	0.57	0.44	0.56	0.61

Site specific catch rates and their respective long-term median values are presented below in Table 2. For all size classes, seven (7) of eight (8) sites produced catch rates above their long-term median, with only the Yardley site (19.5 fish/h) falling below the long-term median (21.2 fish/h). For size classes > 12

in, both Yardley (1.0 fish/h) and Dingman’s Ferry (2.3 fish/h) were below their long-term median catch rate values (3.2 fish/h and 8.9 fish/h for Yardley and Dingman’s Ferry, respectively). Catch rates of fish ≥ 15 in exceeded the long-term median at half of the sites (Upper Black Eddy, Sandts Eddy, Delaware Water Gap, and Lackawaxen), while Yardley, Point Pleasant, Dingman’s Ferry, and Damascus were below.

Table 2. Catch rates of Smallmouth Bass (by site and size grouping) collected from the Delaware River during September 18-29, 2022, and their respective long-term median values.

River Mile	Site	Catch Rate (fish/h)					
		2022 Total CPUE	Long-term Median Total CPUE	2022 ≥ 12 in CPUE	Long-term Median ≥ 12 in CPUE	2022 ≥ 15 in CPUE	Long-term Median ≥ 15 in CPUE
138	Yardley	19.5	21.2	1.0	3.2	0	0.7
156	Point Pleasant	40.5	40.0	6.6	3.9	0.8	1.0
168	Upper Black Eddy	33.3	24.6	5.0	3.9	1.7	0.9
189	Sandts Eddy	95.5	79.5	16.7	7.1	3.0	2.0
212	Delaware Water Gap	153.8	85.3	12.4	4.5	1.8	0.6
239	Dingman’s Ferry	136.9	72.4	2.3	8.9	0	3.6
278	Lackawaxen	280.7	150.0	26.8	8.4	1.8	1.1
298	Damascus	182.9	84.9	4.9	4.5	0	0

In 2021, Delaware River flows were stable during most of the year, however flows were consistently high during part of our sampling season (mid-September – late October). These high flows prohibited completion of surveys at 5 of the 8 sites in 2021. Thus, estimation of Delaware River CPUE for the 2021 season would be unrepresentative of the Smallmouth Bass population, due to necessary sampling omissions. To afford a level of comparison, any year when surveys were not conducted, or all 8 sites that could not be completed in 2021, were not included in the calculation of long-term median values (these years are indicated on Figures 1-3).

The dynamic nature of rivers, as described above, greatly affects reproduction and eventual recruitment of Smallmouth Bass in these systems. Results from the 2022 survey indicate that the low, stable river flows experienced during spring and summer 2021 allowed formation of an abundant or strong year class (Table 1). Preliminary results from the 2022 survey also indicate the potential of another strong year class produced in 2022. However, recruitment of the 2022 year class will be evaluated in 2023

when age-1 fish become susceptible to the boat electrofishing gear. The production of a strong year class, and possibly consecutive year classes, bodes well for future angling opportunities in the Delaware River. Current angling opportunities for large fish (≥ 15 in) appears to be less promising. Fish of this size are typically reaching the end of their lifespan in the Delaware River and may have aged out of the population, which may explain the below median catch of fish in this size class. However, a fair number (above the long-term median) of legal-sized fish (≥ 12 in) were encountered during the 2022 survey, and these fish should provide high quality angling opportunities in coming years. As results indicate, the middle river section provides anglers with the best fishing opportunities. Angling opportunities exist in the lower and upper river sections, but more preferred habitat for larger fish occurs within the middle river stretch. Additionally, just as river flows influence recruitment, it also impacts sampling efficiency and catchability. Under various river flows, different habitats within long-term sites may yield different electrofishing capture efficiencies, thus influencing catch rates. However, biologists attempt to minimize capture efficiency differences through choice of sampling days and number of sample sites selected (sample size) to produce the most representative result.

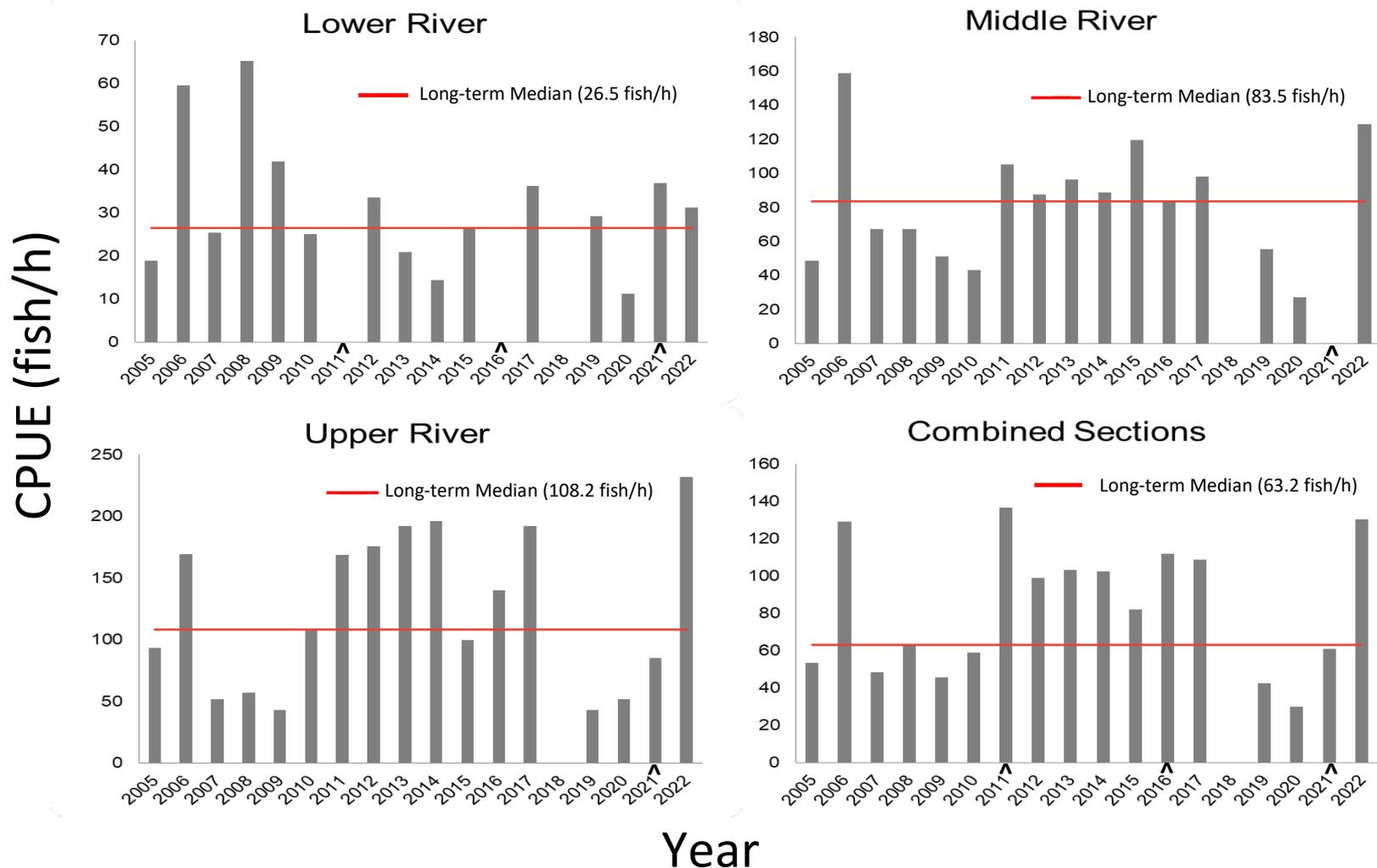


Figure 1. Catch per unit effort (CPUE, by hour) of all Smallmouth Bass captured during nighttime electrofishing surveys conducted from 2005 – 2022 in the lower (Yardley, Point Pleasant, Upper Black Eddy), middle (Sandts Eddy, Delaware Water Gap, Dingman’s Ferry), and upper (Lackawaxen and Damascus) Delaware River, and for all river sections combined. Blank values represent years when surveys were not conducted. Years with an asterisk (*) represent surveys when no fish were captured. Years with a caret (^) indicate when the full survey was not completed. Scale on the vertical axis of the graphs is different for visual purposes.

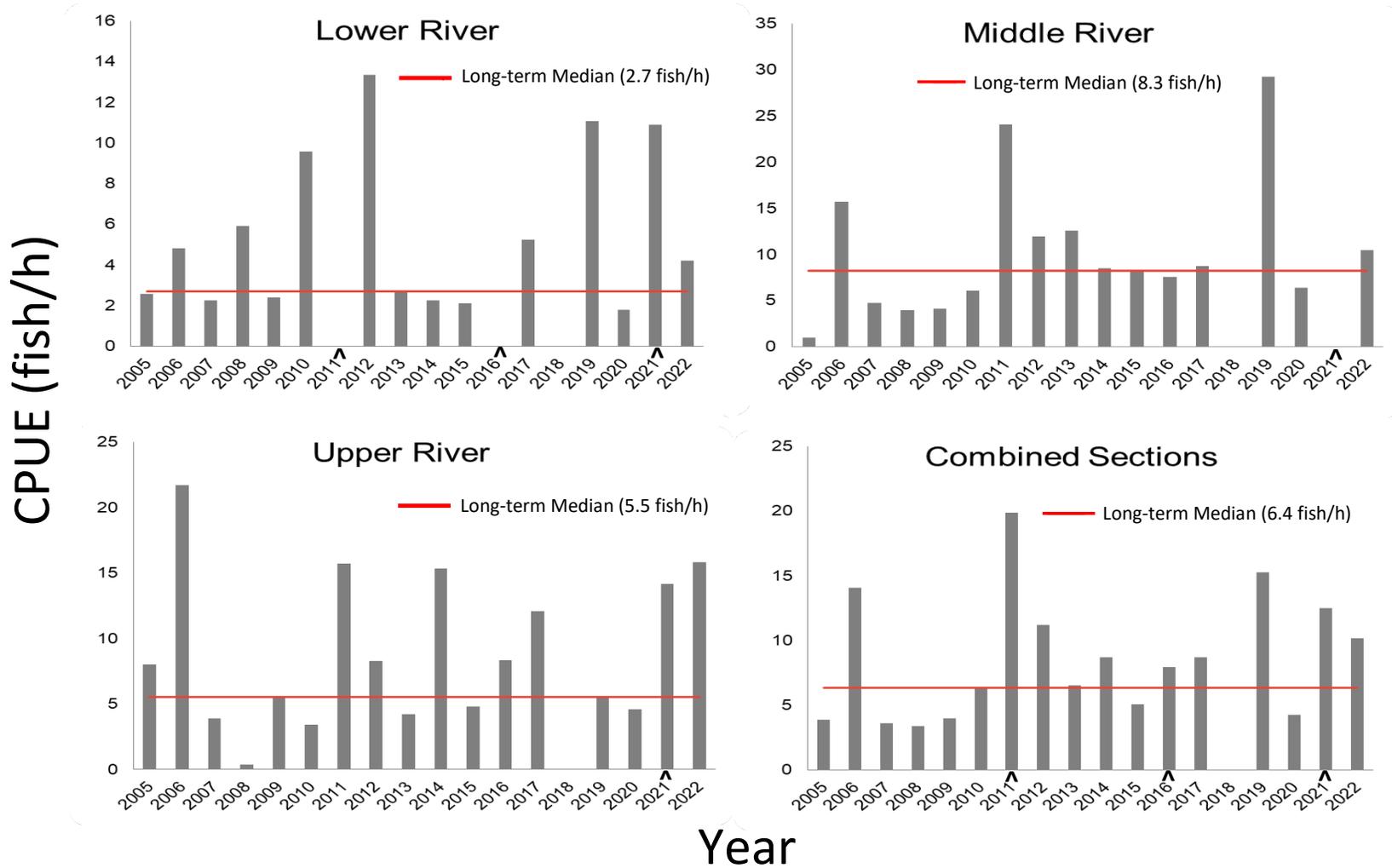


Figure 2. Catch per unit effort (CPUE, by hour) of Smallmouth Bass ≥ 12 in captured during nighttime electrofishing surveys conducted from 2005 – 2022 in the lower (Yardley, Point Pleasant, Upper Black Eddy), middle (Sandts Eddy, Delaware Water Gap, Dingman’s Ferry), and upper (Lackawaxen and Damascus) Delaware River, and for all river sections combined. Blank values represent years when surveys were not conducted. Years with an asterisk (*) represent surveys when no fish were captured. Years with a caret (^) indicate when the full survey was not completed. Scale on the vertical axis of the graphs is different for visual purposes.

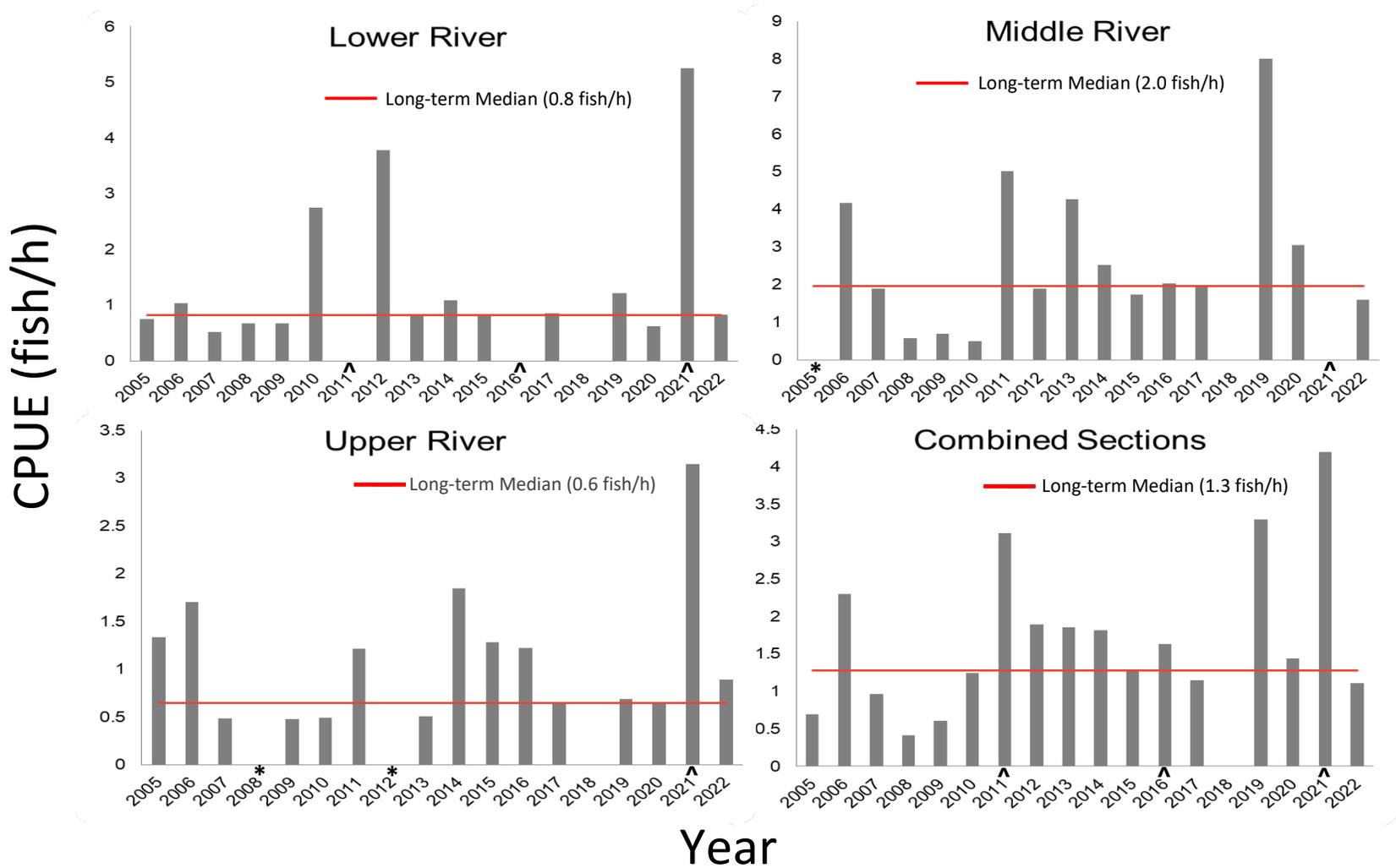


Figure 3. Catch per unit effort (CPUE, by hour) of Smallmouth Bass ≥ 15 in captured during nighttime electrofishing surveys conducted from 2005 – 2022 in the lower (Yardley, Point Pleasant, Upper Black Eddy), middle (Sandts Eddy, Delaware Water Gap, Dingman’s Ferry), and upper (Lackawaxen and Damascus) Delaware River, and for all river sections combined. Blank values represent years when surveys were not conducted. Years with an asterisk (*) represent surveys when no fish were captured. Years with a caret (^) indicate when the full survey was not completed. Scale on the vertical axis of the graphs is different for visual purposes.

Overall, the Delaware River Smallmouth Bass population appears to be stable (several size classes above median values) and comprised mostly of smaller fish. This scenario should provide anglers with consistent opportunities as these fish grow to preferred sizes. Delaware River Regulations differ from Commonwealth Inland Regulations for most species so anglers should consult the [2023 Summary Book](#) (Page 13) for Delaware River specific fishing regulations. Anglers are allowed to possess 5 black bass (combination of Largemouth and Smallmouth Bass) between January 1 and April 7 and June 10 through December 31. Between April 8 and June 9, the catch and immediate release of all black bass is required. Anglers and boaters should also be aware that during fall and winter (November 1 through April 30) there is [a mandatory life jacket requirement](#) for all boats less than 16 ft in length and all kayaks and canoes.

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