



2014 Rappahannock River Report

Initial Assessment of the Supplemental Largemouth Bass Stocking

The largemouth bass population within the tidal portion of the Rappahannock River below Port Royal used to be a cherished fishery to the local anglers that live in and around the northern neck. Recent changes in the dynamics of the fishery, unstable submerged aquatic vegetation growth and overall limitations on desired bass habitat have created the decline in the bass fishery. The Concerned Bass Anglers of Virginia (CBAV) – Rappahannock River Chapter were granted permission to stock F-1 largemouth bass fingerlings into the river by the Virginia Department of Game and Inland Fisheries after a series of meetings between DGIF Fisheries Biologists and CBAV members. The recent success of the three years worth of F-1 largemouth bass stockings into the tidal Chickahominy River spurred the CBAV Rappahannock River Chapter into believing that the same results might be possible on the tidal Rappahannock River. Numerous fund raising activities were conducted by CBAV members to collect a substantial amount of money to buy bass fingerlings from the American Sportfish Hatchery in Montgomery, Alabama.

The tidal Rappahannock River was stocked with roughly 62,000 F-1 LMB on May 20, 2013. CBAV members were able to disperse these bass into 18 selected sites by way of aerated hatchery bags that held a desired weight of bass fingerlings. A DGIF fisheries biologist was present at the Wilmont Landing boat ramp to observe the stocking. Assistance was given in the weighing of the bass before each bag was sent out to the desired stocking location. The stocking sites ranged from Snowden Creek on the western edge to Otterburn Marsh on the eastern range. A large percentage of the bass were stocked within the Marsh Point to Horsehead Point section of the river.

The Virginia Department of Game and Inland Fisheries has been conducting business with American Sportfish Hatchery for several years. DGIF requested that all F-1 LMB fingerlings be marked by hatchery staff with OTC (Oxytetracycline) for use in determining the percentage of contribution to the 2013 year class as well as tracking the growth rate potential of the supplemental stocking. DGIF staff was able to grow out a subsample of the LMB fingerlings to

determine if the fish were properly marked with the OTC dye. DGIF staff at the DGIF Age and Growth Lab detected the presence of the OTC mark on the extracted otoliths of the grow-out bass fingerlings. The majority of the stocked bass were around 1.75 to 2 inches in total length at the time of stocking.

The 2013 electrofishing survey of the tidal Rappahannock River covered the section of the river from just below Port Royal to Catpoint Creek. The 18 standardized sites provided 18,000 seconds (5 hours) of electrofishing effort. The fall 2012 survey consisted of the sampling of 20 sites for a total effort of 19,200 seconds (5.33 hours) of pedal time. The two sites within Totuskey Creek that were sampled in 2012 were dropped from the 2013 survey. The 2013 survey consisted of the sampling of 29 sites for the expanded effort of 30,800 seconds (8.56 hours). The survey consisted of an expanded effort to cover additional sites that have not been historically sampled in the past. Eleven additional survey runs were conducted for an effort of 12,800 seconds (3.56 hrs). The goal of this increased effort was to determine if the general areas stocked with supplemental largemouth bass fingerlings on May 20, 2013 would actually still hold fish four months later. Certain areas showed some promise while other areas revealed less than ideal results.

The 11 non-standardized sites provided the collection of 136 largemouth bass for CPUE of 38.25 bass/hr. Of the total of 136 bass, 118 of them fell into the YOY (Young of Year) category based upon using the total length of 250 mm as the cut-off size determination. The YOY CPUE was 33.2 bass/hr. A total of 18 adult-sized bass were collected from these sites. The adult bass CPUE was 5.06 bass/hr. The 18 standardized sites yielded a total of 96 largemouth bass for a CPUE of 19.2 bass/hr. These sites showed the presence of 61 YOY largemouth bass for a YOY CPUE of 12.2/hr. The 35 adult-sized bass yielded a CPUE of 7 bass/hr. Table 6 provides additional detail on which sites were covered during the survey. Six of the survey sites conducted in Cat Point Creek (2), Occupacia Creek (2) and Pee Dee Creek (2) were withheld from the analysis displayed in Table 6 due to the fact that these areas were well outside of the stocked section of the river. These six sites yielded no YOY largemouth bass. Only one adult bass from the upper site on Cat Point Creek was collected over the course of these six survey runs. The removal of this effort (6,000 seconds) from the total effort for standardized sites allows for the CPUE of YOY LMB to climb from 12.2/hr to 18.3/hr.

The surveys within the non-standardized sites provided insight into which stocked areas supplemental bass were able to survive in substantial abundance. The two sample sites of Troy Creek and the marsh edge and side creek across from Wilmont Landing were surveyed on September 11th. These areas had a substantial amount of hydrilla present during the time of sampling. The collection of 72 bass from these sites provided an impressive CPUE of 108 bass/hr and a high proportion (31%) of the total 232 largemouth bass collected during the

entire survey. These two sites yielded a total of 62 YOY (young of year) bass which was 34.6% of the total 179 YOY collected. The 2013 overall CPUE (catch per unit of effort) for largemouth bass was 27.1 bass/hr. The CPUE from the 2012 survey was 14.6 bass/hr. The 2013 CPUE for YOY bass was 20.9 bass/hr. The 2012 CPUE for YOY bass was 5.4 bass/hr. The increased sampling effort in areas where bass were stocked allowed for this favorable increase in CPUE.

Table 1. Catch rates of largemouth bass from the various days that the Rappahannock River was sampled during the fall of 2013.

Day	9-Sep	11-Sep	13-Sep	16-Sep	17-Sep	18-Sep	19-Sep	23-Sep	1-Oct	Totals
# sites	3	2	2	3	3	4	3	3	6	29
Effort	3,600	2,400	1,800	3,000	3,000	4,000	3,000	3,000	7,000	30,800
# LMB	6	72	24	7	34	1	23	15	50	232
CPUE LMB	6	108	48	8.4	40.8	1.2	27.6	18	25.7	27.1
# YOY LMB	2	62	23	6	19	0	13	11	43	179
CPUE YOY	2	93	46	7.2	22.8	0	15.6	13.2	22.1	20.9

A total of 176 YOY bass were used for otolith analysis. Of these 176 fish, the DGIF Age and Growth Lab successfully read 172 of the otoliths for OTC mark verification. A total of 144 bass came back as positive for having OTC marked otoliths. This provided an 83.72% contribution of stocked bass to the 2013 year class. The remaining 28 bass did not have an OTC mark and have been classified as natural stock from the successful spawning behavior of the limited brood stock that is present in the river. The natural stock component of the year class based on the sample set collected was 16.28% contribution. Tables 2-4 goes into greater detail as to the specific % of OTC marked fish that were collected and detected from each site.

Some sample sites yielded a limited number of bass that were all from the supplemental stocking. A prime example would be the three YOY bass that were tested from Otterburn Marsh that came back as positive for having an OTC mark. The additional survey run that was conducted within the western branch of Lyons Creek provided 100% OTC mark verification of the 13 bass collected. The survival rate of stocked bass was clearly evident in areas such as Lyons Creek. The 21 YOY LMB from Lyons Creek provided a total of 20 OTC+ LMB for a 95.2% contribution to the 2013 year class. The marsh edge and side creek across from Wilmont Landing provided another high percentage contribution (91.49%) of stocked bass from the largest sample set of 47 YOY bass.

Tables 2-4. Individual site analysis of the largemouth bass collected during the electrofishing surveys of the Rappahannock River during the fall of 2013

Site Location	Blind Point	Marsh/creek near Wilmont	Troy Creek	Baylors Creek	Marsh Point	Green Bay Flat	Wilmont Flats
CBAV stocked	Yes	Yes	Yes	Yes	Yes	No	Yes
# LMB	5	53	19	7	10	11	10
# YOY	1	47	15	6 (5 read)	6 (5 read)	4	6 (5 read)
# OTC detected	1	43	13	3	5	4	4
% OTC marked	100	91.49%	86.67%	60%	100%	100%	80%

Site Location	Otterburn Marsh	Leedstown Flat	Mouth of Snowden Cr.	Green Bay Creek	Piss Creek	Buoy #69 Flat	Drakes Marsh (S)
CBAV stocked	Yes	No	Yes	Yes	Yes	No	Yes
# LMB	4	2	2	13	22	2	5
# YOY	4 (3 read)	2	2	9	21 (20 read)	2	5 (4 read)
# OTC detected	3	2	2	8	17	0	3
% OTC marked	100%	100%	100%	88.89%	85%	0%	75%

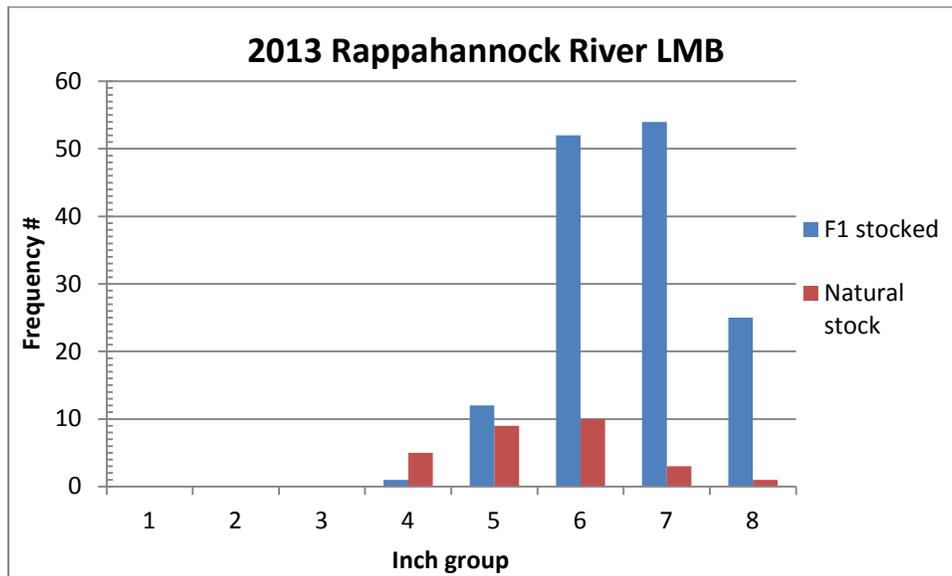
Site Location	Drakes Marsh (N)	Gingoteague Mouth to west	Gingoteague Creek	Lyons Cr. East arm	Lyons Cr. West arm	Jetts Cr. Low	Jetts Cr. Upper
CBAV stocked	Yes	No	No	Yes	Yes	Yes	Yes
# LMB	5	6	15	11	13	3	13
# YOY	3	4	7 (6 read)	8	13	2	12
# OTC detected	3	1	0	7	13	2	10
% OTC marked	100%	25%	0%	87.50%	100%	100%	83.33%

The otoliths collected from the standardized sample sites at the Buoy 69 Flat, Gingoteague Mouth to the west and Gingoteague Creek provided a total of 12 readable pairs of otoliths in which 11 were from natural recruitment. One of the bass collected from the north shore of the river up from the mouth of Gingoteague Creek was a stocked fish that migrated west from either the stocking at Jetts Creek or Snowden Creek. If these 12 fish were not

counted in the overall total of tested YOY, the % contribution of stocked bass would have rose to 89.37% (143 marked out of 160 tested).

The size distribution of the 144 OTC marked bass ranged from 114 mm – 228 mm (4.49” – 8.97”). The mean TL of these stocked bass was 180.53 mm (7.11”). The size distribution of the 28 natural recruited bass ranged from 102 mm – 222 mm (4.02” – 8.74”). The mean TL of these naturally produced bass was 151.79 mm (5.98”).

Figure 1. Length frequency comparison of the otolith read YOY largemouth bass collected from the Rappahannock River during the fall of 2013 (N = 144 F-1 stocked, N = 28 natural stock)



Results and Summary

The 2013 electrofishing surveys of the Rappahannock River yielded an increased CPUE of largemouth bass (27.1 LMB/hr) when compared to the 2012 survey (CPUE: 14.6 bass/hr). This increase was a direct reflection of the stocked bass that were still present within the areas that were targeted during the May 20th stocking. The catch rate of YOY LMB showed a favorable increase from 5.4/hr in 2012 to 20.9/hr in 2013. It appears that the higher concentrations of largemouth bass were found within defined tributaries that had lower concentrations of blue catfish and white perch present. The presence of a substantial amount of SAV (submerged aquatic vegetation), primarily in the form of hydrilla, provided great nursery habitat for young bass in tributaries such as Troy Creek, Piss Creek and the no name, side creek across from Wilmont Landing. The open, shallow water flats of Otterburn Marsh and Drakes Marsh provided limited numbers of stocked bass. The slow growth of SAV due to the cold snap in April

might be one of the determining factors that these areas did not support a higher survival rate of stocked bass. The fact that abundant white perch, yellow perch and blue catfish are present in these areas most likely added to the demise of a large percentage of stocked bass. The collection of seven largemouth bass within Baylors Creek was rather disappointing. The abundance of blue catfish stacked along the pad line most likely took care of their share of stocked bass. The survey run within Baylors Creek collected a total of 253 blue catfish (CPUE: 910.8 fish/hr) along with 92 white perch (CPUE: 331.2 fish/hr). The survey yielded the collection of 8,615 total fish. Each survey run was a complete community collection except for the three non-standardized runs conducted on October 1st which specifically targeted largemouth bass, black crappie, spot and striped bass. These three runs, with the effort of 4,000 seconds, were removed from the total effort used to calculate the CPUE of fish species listed on Table 8. The 232 largemouth bass provided only 2.69% of the total catch. This percentage pales in comparison to the 2,127 white perch (24.69%) and the 1,203 blue catfish (13.96%).

The overall contribution percentage of 83.72% of stocked bass to the 2013 year class should provide a substantial boost to the largemouth bass fishery for years to come. The abundance of forage fish (eastern silvery minnows, spottail shiners, threadfin shad) in most areas sampled will provide a great forage base for the bass. Four of the 18 stocked areas were not sampled during the electrofishing survey. These areas were Portobago Creek, Snowden Creek and the two small creeks on the southern edge of Green Bay. Portobago Creek and Snowden Creek were inaccessible during the low tide stages on the days sampled.

The density of hydrilla growth was closely observed during the survey. The protected water within Troy Creek provided the greatest hydrilla growth of any of the 29 sites sampled. The upper reach of Jetts Creek had flats covered with hydrilla growth. The upper flat within Piss Creek had a decent amount of hydrilla growth as well. All three of these sites showed a decent catch rate of juvenile largemouth bass from the 2013 stocking.

The results of the otolith analysis and the high percentage of contribution from the stocked fingerlings showed that the supplemental stocking can provide some improvements to a limited largemouth bass fishery. Whether or not some additional fish will be stocked in the future will be based upon further discussions and future decisions. Any additional bass stockings will be conducted in areas that have revealed successful survival of bass from the 2013 stocking. A few of these areas would be Troy Creek, Lyons Creek, Piss Creek, the upper reaches of Jetts Creek, as well as the marsh edge and tributary across from Wilmont Landing. The full impact of the 2013 supplemental bass stocking may take some time for anglers to see a noticeable change in the abundance of adult-sized bass they catch. DGIF fisheries staff will continue to monitor the largemouth bass fishery within the tidal Rappahannock River with the majority of data collected from fall electrofishing surveys.

Table 5. Analysis of specific sites that provided Young of Year (YOY) largemouth bass for OTC mark verification during the 2013 electrofishing surveys of the Rappahannock River

Site	Date	# YOY	# OTC +	# OTC -	Mean TL	Mean TL
					OTC+ (mm)	OTC- (mm)
Blind Point	9/9/2013	1	1		189	
Troy Creek	9/11/2013	15	13	2	155.54	102
Marsh Flat and side creek	9/11/2013	47	43	4	167.56	161.25
Piss Creek	9/13/2013	20	17	3	171.18	148
Mouth of Snowden Creek	9/13/2013	2	2	0	201.5	
Baylors Creek	9/16/2013	5	3	2	184.33	119.5
Green Bay Creek	9/17/2013	9	8	1	178.13	142
Marsh Point East	9/17/2013	5	5	0	186.6	
Green Bay Flat	9/17/2013	4	4	0	177.25	
Buoy 69 Flat	9/19/2013	2	0	2		169
Gingoteague Mouth North	9/19/2013	4	1	3	183	140.67
Gingoteague Creek	9/19/2013	6	0	6		170.83
Wilmont Flats	9/23/2013	5	4	1	190.75	147
Otterburn Marsh North	9/23/2013	3	3	0	198	
Leedstown Flat	9/23/2013	2	2	0	218	
Lyons Creek East Arm	10/1/2013	8	7	1	190.43	162
Lyons Creek West Arm	10/1/2013	13	13	0	207.69	
Drakes Marsh South	10/1/2013	4	3	1	212	222
Drakes Marsh North	10/1/2013	3	3	0	212	
Jetts Creek Low	10/1/2013	2	2	0	181.5	
Jetts Creek High	10/1/2013	12	10	2	200.2	130
	Totals	172	144	28		
	% contribution		83.72	16.28		

Table 6 and 7: CPUE values of the YOY largemouth bass collected from the Rappahannock River during the 2013 fall electrofishing surveys of the 11 non-standardized sites and the 12 standardized sites within the general region where the supplemental bass stocking occurred

Non-standardized sites	# YOY	CPUE YOY/hr	% of YOY OTC +
Marsh Flat and side tributary	47	141	91.49
Piss Creek	21	63	85
Troy Creek	15	45	86.67
Lyons Creek (western branch)	13	29.3	100
Jetts Creek (upper third)	12	36	83.33
Otterburn Marsh (northern half)	3	10.8	100
Drakes Marsh (upper channel)	3	9	100
Mouth Edge of Snowden Creek	2	6	100
Blind Point	1	3	100
Otterburn Marsh (southern half)	1	3	Not tested
Drakes Marsh side tributary	0	0	n/a
Total YOY collected	118	33.2	

Standardized sites	# YOY	CPUE YOY/hr	% of YOY OTC +
Green Bay Creek	9	32.4	88.89
Lyons Creek (eastern branch)	8	28.8	87.5
Gingoteague Creek	7	25.2	0
Marsh Point (eastern bank)	6	21.6	100
Wilmont Flats	6	21.6	80
Baylors Creek	6	21.6	60
Drakes Marsh (southern edge)	5	18	75
Green Bay Flats (south bank)	4	14.4	100
Gingoteague Creek Mouth	4	14.4	25
Jetts Creek (lower third)	2	7.2	100
Leedstown Flats	2	7.2	100
Buoy 69 flat	2	7.2	0
Total YOY collected	61	18.3	

Table 8. CPUE values for all fish species collected during the fall electrofishing survey of the 2013 Rappahannock River

Fish Species	N	CPUE #/hr	Fish Species	N	CPUE #/hr
White perch	2,127	285.7	Longnose gar	18	2.4
Blue catfish	1,203	161.6	Atlantic menhaden	16	2.1
Bluegill	1,104	148.3	Inland silverside	15	2
Gizzard shad	824	110.7	Common carp	15	2
Pumpkinseed sunfish	716	96.2	Alewife	14	1.9
Eastern silvery minnow	605	81.3	White catfish	12	1.6
Yellow perch	576	77.4	Tessellated darter	9	1.2
Spottail shiner	280	37.6	Blueback herring	9	1.2
Largemouth bass	232	27.1	Redear sunfish	8	1.1
Bowfin	128	17.2	Satinfin shiner	6	0.8
Brown bullhead	126	16.9	Redbreast sunfish	5	0.7
Threadfin shad	96	12.9	Northern snakehead	5	0.7
Golden shiner	81	10.9	Shorthead redhorse	4	0.5
Channel catfish	67	9	Bay anchovy	3	0.4
Banded killifish	58	7.8	Red drum	2	0.3
Black Crappie	48	5.6	Bluegill x Pumpkinseed	2	0.3
Hogchoker	42	5.6	Hickory shad	2	0.3
Silver perch	42	5.6	American shad	1	0.1
American eel	41	5.5	Mummichog	1	0.1
Striped bass	26	3	Margined madtom	1	0.1
Creek chubsucker	22	2.9	Smallmouth bass	1	0.1
Spot	22	2.6			

Figure 2. Length frequency distribution of the largemouth bass collected from the 2013 electrofishing survey of the Rappahannock River (N: 232, CPUE: 27.1 bass/hr)

