January 2021 - December 2021

Delaware Bass Tournament News

Over 100 water hyacinth and water lettuce plants were removed from Blairs Pond in September. These plants are available at local garden centers, but they do not belong in Delaware's public water bodies. Dumping invasive plants into public waters is illegal and can have detrimental affects on native vegetation, water quality, and the fish community.

This newsletter is a recap of our 2021 activities related to black bass research and management. I'm optimistic that 2022 will see a return to 'normal' at some point. I am also looking forward to filling the fancy new tackle box my niece got me for Christmas, perhaps with lures I've seen advertised in fishing magazines that come in an array of colors and have interesting names like Hail Mary, Rage Bug, Warpig, and Baby D Bomb. If my dad were still alive he'd have a chuckle. We used to catch fish in Ohio's Olentangy River and in the lakes around Columbus just using nightcrawlers from the front yard and dough balls made with white Wonder bread. It was a blast catching sunnies and catfish. I didn't realize at the time how few black bass we actually caught with our basic set up. Now, I'll fill my new tacklebox with top water frogs, jigs, spinnerbaits, and rubber worms. But it won't hurt to sneak in a dough ball or two for old times sake. I hope you have great fun and success during your 2022 Largemouth Bass tournaments. As always, get in touch if you have any questions for us.

Sincerely, Edna

Can Largemouth Bass Be Educated?

An angler recently asked if Largemouth Bass learn to avoid anglers in frequently fished water bodies and if this reduces "catchability." Research into this question, as with many things in science, is complicated. A study conducted by researchers in six small (1 to 5-acre) ponds in northeast Mississippi found that learned behavior (i.e. lure or hook avoidance) accounted for declining catch rates of bass over a sixth month period, May to October. They hypothesized that it wasn't just lures, but also the presence of anglers, boats and the sound of trolling motors that bass associated with being caught. These angler avoidance behaviors did not appear to extend to naïve individuals (bass that had never been caught). The learned behaviors were not permanent though and catch rates increased after a two- to six-month fishing closure, suggesting that bass 'forget' at some point. Other studies found that the ability to learn avoidance behaviors is an inheritable trait in Largemouth Bass; essentially, bass from heavily fished populations may learn angler avoidance behaviors faster than bass from unfished populations. These research findings are no surprise to avid bass anglers. That is why the professionals keep their fishing strategies "close to the vest" and use different types of lures/baits for bass depending on the season, water clarity, habitat and light conditions. Angler satisfaction is closely linked to catch rates. This research highlights how angling data is useful to fisheries managers, but more information is needed to determine if the findings are comparable in larger water bodies.

Fish Contaminant Testing

Most anglers are aware of the general benefits of fish protein and also of the potential health risks associated with consuming locally caught fish. Fish can absorb contaminants from the water, the sediments, and from the food they eat. Although Delaware's waterways are less contaminated than they were in the past, some chemicals introduced decades ago have properties that allow them to persist in the environment. To guide citizens in the amount of fish that can be safely consumed, DNREC's Watershed Assessment scientists along with Division of Fish and Wildlife fisheries biologists, collect fish from water bodies throughout the state each year so their tissues can be tested for industrial and agricultural related contaminants. Largemouth Bass are often the target species in freshwater areas because of their popularity with anglers, although other sunfish species, catfish and white perch are also commonly collected. Hydrologist John G. Cargill IV leads DNREC's testing efforts, using the results from fish tissue to conduct a human health risk assessment. This assessment is used to determine the number of meals (8-oz serving for adults, 3-oz. serving for children) that can be eaten per year while keeping human health risk low. For more information, visit DNREC's fish consumption advisory page or refer to Delaware's annual fishing guide, with 2022 available soon online and at DNREC offices and licensing agents.

John, an avid bass angler, leads Delaware's fish tissue contaminant testing program.

2021 Pond/Lake Fish Community Surveys

The DNREC Division of Fish and Wildlife evaluated fish communities via electrofishing in 13 of the state's public fishing ponds in May of 2021. Statistics on the Largemouth Bass populations are provided below. Abundance was estimated as Catch per Unit of Effort (CPUE). The proportion of bass ≥12", ≥15" and ≥18" reflects the length structure of the population. The target ranges are for a moderately dense bass population. Relative Weight (Wr**)** is a measure of body condition or 'robustness'. Bass with Wr values >90 are considered in good condition.

Pond/Lake	CPUE Bass/Hour	% of Bass ≥ 12" (target 40-70)	% of Bass ≥ 15" (target 10-40)	% of Bass ≥18" (target > 5)	Bass Average Wr (target ≥ 90)
Abbotts Pond	36	83	50	0	103
Bass abundance improved from the 2015 survey, but algae density was much lower in 2021 making the survey more effective. Gaps in length distribution indicate sporadic spawning and recruitment (growth to catchable size). Size structure is skewed towards larger bass, but they are not abundant. Largest Bass caught during the survey = 3.2 lbs.					
Becks Pond	129	73	32	7	100
Bass abundance improved from 2016 survey. Bass 15" to 18" most abundant size group. Largest bass caught during the survey = 5.5 lbs. Bass fry observed. Diversity of panfish high. Pond has an established Northern Snakehead population.					
Blairs Pond	52	81	31	0	93
Bass abundance more than doubled from 2015 survey. Size structure skewed towards larger bass but they are not abundant. Anglers periodically report catching >20" bass. Largest bass caught during the survey = 2.4 lbs.					
Craigs Pond	57	87	25	12	95
Bass abundance similar to 2016 survey. Thick mats of filamentous algae impeded survey catch. Gaps in length distribution indicate sporadic spawning and recruitment. Largest bass caught during the survey = 3.1 lbs. Low diversity of species.					
Derby Pond	86	44	2	2	96
Bass abundance doubled from 2016 survey, but the population is skewed towards small bass. Bass 8" to 12" most numerous size group. Largest bass caught during the survey = 4.9 lbs.					
Haven Lake	37	68	32	5	90
Bass abundance was low but was comparable to the 2016 survey. Size structure balanced and indicative of a moderately dense bass population. Anglers periodically report catching >20" bass. Largest bass caught during the survey = 3.2 lbs. Panfish diversity was high. Common carp are abundant.					
Horsey Pond	144	55	18	9	100
Bass abundance increased 101% from 2016 survey. Population is skewed towards bass <15". Length distribution indicates stable spawning and recruitment. Largest bass caught during the survey = 4.7 lbs. Bluegill and Black Crappie abundant.					
Lums Pond	71	86	55	4	99
Bass abundance increased 63% from the 2015 survey. The population is skewed towards larger bass, with the highest catch rate among bass >15". Stocking of Striped Bass Hybrids was suspended after the fall of 2014 when relative weights of Largemouth Bass were low. Golden shiners were stocked soon after and largemouth relative weights improved. A Flathead Catfish was reported from a fishing tournament in 2020. This species is considered highly invasive.					
Millsboro Pond	33	78	50	17	100
Bass abundance similar to 2016 survey. Relatively low CPUE due to inaccessibility of shallow areas. Population is skewed towards bass >15". Largest bass caught during the survey = 5.9 lbs. Panfish diversity high.					

2021 Pond/Lake Fish Community Surveys Continued...

Pond/Lake	CPUE Bass/ Hour	% of Bass ≥12" (target 40-70)	% of Bass ≥ 15" (target 10-40)	% of Bass ≥ 18" (target > 5)	Bass Average Wr (target ≥ 90)
Raccoon Pond	49	78	33	0	117
Bass abundance increased from the 2015 survey, still a relatively low density population. Gaps in length distribution indicate sporadic spawning and recruitment. Largest bass caught during the survey = 2.8 lbs. Anglers report 18" catches.					
Records Pond	60	63	30	11	115
Bass abundance doubled from the 2015 survey. PSD, RSD within target ranges. CPUE consistent between 8" to 15" bass. Largest bass caught during the survey = 4.5lbs. Snakehead (25") caught during survey. Redear, Black Crappie abundant.					
Tubmill Pond	57	90	10	0	94
Bass abundance similar to the 2015 survey. Bass 12" to 18" most abundant size group. Gaps in size distribution indicate sporadic spawning and recruitment. Largest bass caught during the survey = 1.8 lbs. Bluegill and Pumpkinseed abundant.					
Wagamons Pond	54	59	32	0	93
Bass abundance increased from 2015 survey, but still historically low for this pond. Bass 12" to 15" most abundant size group. Gaps in length distribution indicate sporadic spawning and recruitment. Largest bass caught during the survey = 2.6 lbs. Anglers frequently report bass >20".					

2021 Marshyhope Creek Largemouth Bass Survey

A non-tidal portion of Marshyhope Creek was electrofished in the fall of 2021 to evaluate the Largemouth Bass population. The electrofishing boat was launched at the gravel ramp by the Route 404 bridge, northwest of Bridgeville, Del. The survey was conducted several thousand feet up and downstream of this bridge, on both sides of the creek.

Abundance
Population size was evaluated by comparing catch rates (number of bass caught per electrofishing hour) to results from previous surveys and to other comparable streams. The 2021 catch rate of 93.9 bass/hour was lower than the 231 bass/hour derived from the 2009 survey; however it was much higher than the catch rates of Largemouth Bass in other comparable Chesapeake Bay tributaries such as the Choptank, Patuxent, Sassafras and Wicomico.

Size Structure
The Marshyhope bass were comprised of a variety of size groups indicating consistent spawning and growth. Bass caught during the survey ranged in length from 2.5" to 20.1" in length. The population is slightly skewed towards bass ≥12", with bass 12"-15" the most numerous size group. Bass ≥12" comprised 77% of the survey catch, while bass ≥15", ≥18" and ≥20" comprised 37%, 9% and 2% of the survey catch respectively.

Condition or 'Robustness'
"Condition," known by biologists as Relative Weight (Wr), is measured by evaluating the length to weight relationship of individual bass. Bass with Wr >90 are considered in good condition. The overall Wr of the Marshyhope bass population was 100, which indicates very good condition and the ability to obtain adequate prey resources. Bass in all size categories had Wr above 90, which indicates that the population is not overcrowded and has an array of sizes of prey available. The heaviest bass caught during the survey weighed 4.4 lbs.

Fisheries technicians Jake Matthews (left) and Mike Steiger hold a Northern Snakehead caught in Marshyhope Creek during the 2021 Largemouth Bass survey.

Invasive Species
Numerous Northern Snakehead were observed during the survey, including the >25" individual in the photo on the right. The variety of sizes and number of individuals that were observed during the survey confirm that the snakehead population is well established in this part of the river system.

2021 Broadkill River Largemouth Bass Population Survey

The Broadkill River Largemouth Bass population was evaluated in the fall of 2021 during two days of electrofishing. The survey was conducted in the freshwater portion of the river system, starting at the pedestrian bridge near the Milton Town Library and ending downstream near the first set of overhead powerlines. Information from anglers and acoustic tracking data prove that bass are distributed well downstream of the powerlines, however, the salinity was too high (>0.3ppt) to effectively operate the electrofishing unit downstream of the lines.

This is one of several preferred size bass caught during the 2021 survey. Broadkill River bass were abundant and in good condition.

Abundance
A population estimate of Largemouth Bass >6" in length was conducted using mark-recapture methods, where bass caught during the first day of sampling were marked with a hole punch in their caudal fin. Approximately one week later, the survey was repeated to recapture marked fish. Analysis of the data resulted in a population estimate of 2,551 bass. Population size was also evaluated by comparing catch rates (number of bass caught per electrofishing hour) from year to year. The 2021 catch rate of 100 bass/hour was higher than the previous nine survey years.

Size Structure
The Broadkill River bass population was comprised of a variety of size groups indicating consistent spawning and growth to catchable size (≥8"). The size range was 3" to 21". Bass ≥12" comprised 54% of the survey catch, while Bass ≥15" were at 19%, Bass ≥18" at 4% and Bass≥20 at 1%. All of these figures were within target values for a moderately dense population.

Condition or 'Robustness'
Condition, known by biologists as Relative Weight (Wr), is measured by evaluating the length to weight relationship of individual fish. Bass with Wr >90 are considered in good condition and receiving adequate food resources. The Broadkill River bass population's overall Wr was 102, and all size categories of bass had Wrs > 90 which further indicates a balanced population that is receiving adequate amounts of forage. The heaviest bass caught weighed more than 6 lbs.

2021 Nanticoke River Largemouth Bass Population Survey

The Nanticoke River Largemouth Bass population was evaluated in the fall of 2021 during two weeks of electrofishing. The survey included the Nanticoke Branch, Deep Creek, Broad Creek and the main river to the Delaware-Maryland state line.

Abundance
A population estimate of bass >6" in length was conducted using mark-recapture methods (described above for the Broadkill survey). Data analysis revealed a population estimate of 4,400 bass. Population size was also evaluated by comparing catch rates (number of bass caught per electrofishing hour) from year to year. The 2021 catch rate of 30 bass/hour was higher than surveys in 2016 and 2018 (the survey is conducted biennially). However, the catch rate was below the long-term historical catch rate of 55 bass/hour.

Size Structure
Bass caught during the survey ranged in length from 3.5" to 19.7". The population is slightly skewed towards bass ≥12", with bass 12"-15" the most numerous size group. Bass ≥12" comprised 77% of the survey catch, while bass ≥15" comprised 21% of the catch, and bass ≥18" comprised 2% of the catch. The proportion of bass ≥18" was below target values for a moderately dense bass population.

A variety of length groups indicates a balanced population with consistent reproduction and growth

Condition or 'Robustness'
The Nanticoke River bass population is in good condition overall with a Wr of 101, which indicates the ability to obtain adequate amounts of prey. Bass in all size categories had Wrs above 90, which indicates a population that is not overcrowded and has an array of prey sizes available. The heaviest bass caught weighed 4.7 lbs

Tournament Activity
The Nanticoke River system has been the most popular water body in Delaware for Largemouth Bass tournaments since the tournament reporting program began in 1989. Statistics for 2021 are incomplete due to the number of post tournament reports that were not submitted. To date, 14 tournament reports were received for 2021 (see table below); this is a 48% decrease in reporting from known tournaments held in 2020.

No. of Anglers	No. of Angler Hours	No. Legal Size Bass (≥12")	No. Legal Size Bass/Angler Hour	Lbs. of Legal Size Bass/Angler Hour	Average No. of Bass/Tournament	Total Average Weight/Tournament
327	2,705	720	0.27	0.45	51.4	87.76

2021 Warmwater Fish Stocking

The Division of Fish and Wildlife stocked fish from a local supplier to improve fish populations in several public fishing ponds. For stocking in tidal waters, bass fingerlings were obtained from a certified supplier in Arkansas.

NON-TIDAL WATER:

Bluegill (2 to 6 inches total length) were stocked in the following ponds to supplement decreased abundance:

Blairs Pond was stocked with 200 Bluegill
Derby Pond was stocked with 150 Bluegill
Craigs Pond was stocked with 100 Bluegill

Largemouth Bass (average size >4 inches total length) were stocked into the following ponds to supplement populations:

Concord Pond was stocked with 150 Largemouth Bass
Lums Pond was stocked with 200 Largemouth Bass

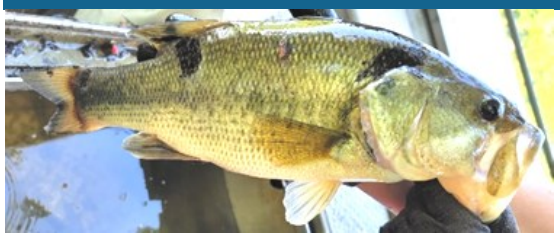
Golden Shiners will be stocked in early spring 2022 in the following water bodies to provide supplemental forage for Largemouth Bass: Abbotts Pond, Blairs Pond, Concord Pond, Lums Pond, and Wagamons Pond.

TIDAL WATER:

Largemouth Bass (4-inch average length) were stocked into the Nanticoke River system (n=6,500) and Broadkill River (n=2,000) to supplement natural reproduction.

DNREC Division of Fish and Wildlife Shad Biologist Johnny Moore (right) and seasonal biologist Khaliq Still, assisted the tidal bass program by transferring several thousand Largemouth Bass fingerlings into the Division's overnight holding tank. The bass were stocked the next day into the Nanticoke and Broadkill River systems.

A Note about Blotchy Bass



For more information on Blotchy Bass Syndrome visit the USGS web page.

Largemouth Bass with black areas of skin discoloration or 'black blotches' have been caught for many years in Delaware's non-tidal and tidal water bodies by anglers and Division of Fish and Wildlife biologists. A possible cause for the blotches, also called *hyperpigmented melanistic skin lesions* (HPML), were not known until recently.

Research led by the U.S. Geological Survey found that HPMLs of Smallmouth Bass collected from the Susquehanna and Potomac rivers systems may be associated with a virus in the *Adomaviridae* family. Further research is needed to determine if the skin cells that produce the black coloration are responding to the presence of the virus or if the virus is directly causing the blotches.

Blotchy Bass Syndrome has been reported from sixteen states. The severity of the blotches can range from just one spot to near full body and fin coverage. There is no cure, but it does not appear to be lethal. Apparently the blotches can disappear over time as observed in Largemouth Bass that were held for a few months at Delaware State University. Although most of the research about the virus has been with Largemouth and Smallmouth Bass, the blotches have also been noted in Chinook Salmon, Arctic Char, Brown Bullhead, Bluegill and several marine fish species.

Submit tournament reports to de.gov./lmbtourney

Contact Information:

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302-739-9913

Fish and Wildlife
Natural Resources Police
New Castle County 302-836-4682
Kent County 302-739-6139
Sussex County 302-855-1901

Report Violations
302-739-4580
800-523-3336

Operation Game Theft
800-292-3030

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