UNIVERSITY OF MARYLAND EXTENSION

extension.umd.edu FS—1142 August 2020

Chesapeake Bay Blue Catfish: Invasive, but Delicious and Nutritious!

Blue Catfish is an invasive fish species in the Chesapeake Bay but increasing commercial harvest and consumption is one way to reduce their numbers. This fact sheet aims to enhance public awareness of this invasive species as a new commercial fishery resource.

Blue Catfish (*Ictalurus furcatus*) is the Largest Species of Catfish in North America

Blue Catfish has a slate blue body with smooth skin, a silver-white belly and four pairs of black, whisker-like barbels around its mouth. Its smooth skin lacks scales. Adults usually grow to be less than two feet long but can be up to five feet and weigh more than 100 pounds.

The Blue Catfish are native to the Mississippi, Missouri, and Ohio river drainages but were introduced in the James, York, and Rappahannock rivers to establish recreational fisheries Blue Catfish to spread throughout the inland waters and its tributaries of Chesapeake Bay.

Non-native Blue Catfish

Why Are They Invasive?

The Blue Catfish has become an invasive species in the Chesapeake Bay because they are voraciously opportunistic predators that daily consume between 8-9% of their body weight (CBP, 2017). Blue catfish represent up to three-quarters of the biomass in the James, Rappahannock and York rivers on Virginia's western shore of the Chesapeake Bay (Schloesser et al. 2011). Initially introduced within fresh-water habitats, their range has extended into tidal, brackish estuarine habitats, which overlap many valuable commercial and recreational native species, including native white catfish.

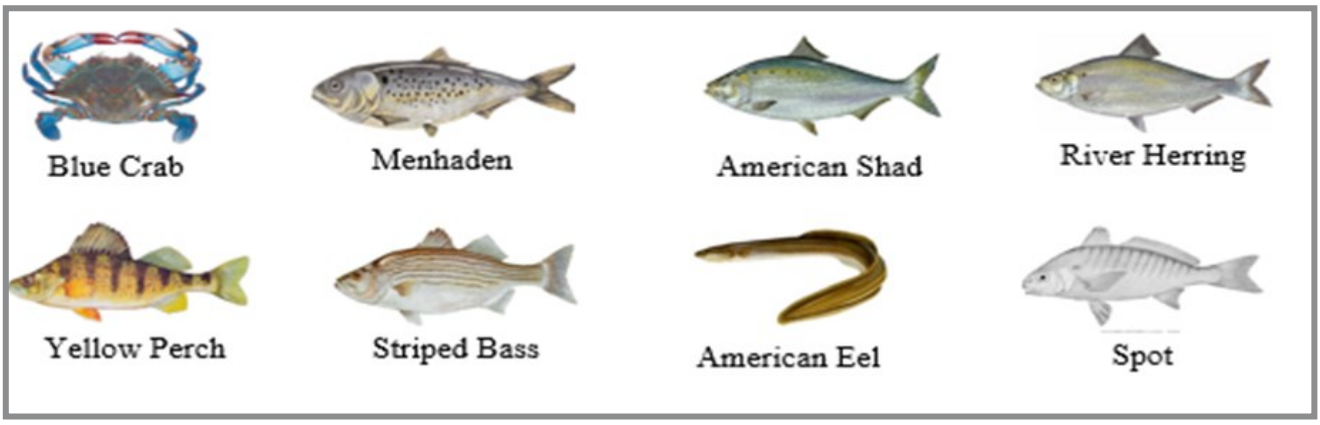
As a new predator in the ecosystem, Blue Catfish have been flourishing, invading the spawning waters of American Shad and other fish and shellfish native to the Bay's tributaries, eating their eggs and endangering their survival.

Blue Catfish also eat crab, fish, crayfish, clams, mussels, frogs, and other readily available aquatic food sources, which play an important role in our ecosystem and economy. The following are some of the important native species in Chesapeake Bay that Blue Catfish eat.

Growing Numbers of Blue Catfish Raised Concerns about Potential Negative Impacts on Native Species in Chesapeake Bay Ecosystems

Even though they prefer fresh water, Blue Catfish can tolerate brackish waters of the Chesapeake Bay river estuaries with salinities up to 15 ppt (parts per thousand). Since they are not picky about where they live, they have expanded their range to most of the major rivers of the Chesapeake Bay.

There are no current published Bay-wide estimates of Blue Catfish, though it has been reported there may be more than 100 million in the Bay (Tkacik and Dance 2019). Estimates of 1.6 million Blue Catfish within a 12 kilometers (km) stretch of the James River are reported (Fabrizio et al 2018). Concerns about their potential negative effects on native species have arisen due to the abundance of Blue Catfish and their ability to consume a broad prey base (Schloesser, et al., 2011).



What Is Being Done to Mitigate the Invasion?

Fishermen are catching more Blue Catfish and selling them to seafood grocery stores, as well as to restaurants. Commercial watermen in Maryland and Virginia harvested more than 5 million pounds of Blue Catfish in 2017 (Jerry Jackson / Baltimore Sun).

Maryland announced a Blue Catfish purchasing initiative program in September 2019. The purpose of this program is to create sales of Blue Catfish to state institutions providing food services and help reduce the Blue Catfish's negative impact on the Potomac River and Chesapeake Bay ecosystems by creating a reliable market for the nonnative species.

Virginia has created a new commercial fishery to target Blue Catfish using Low Frequency Electrofishing Technology (a generator supplied pulsed low frequency DC current that temporarily stuns the fish and causes them to surface to enable harvesting). This will result in greater numbers of catfish harvested from the system and available for processing market and consumers.

Chefs in Maryland and Virginia have led the way in popularizing Chesapeake Bay Blue Catfish and increasing consumer demand to help control the fish's numbers. Chef's symposiums held annually at the Virginia Institute of Marine Science offer Blue Catfish fishery, sustainability, and culinary products education to chefs and culinary students.

The University of Maryland Extension Seafood Technology Specialist and Family and Consumer Science Educators have worked together to deliver education and demonstration programs to enhance public awareness on food safety and nutrition of invasive Blue Catfish and promote safe consumption.

University of Maryland Dining Services serves Chesapeake Bay Blue Catfish on campus and includes it in menus and promotions. An estimated 7,265 pounds of blue catfish were served on campus during the fall 2019 semester.

Delicious Chesapeake Bay Blue Catfish

Photo by NOAA Fisheries

Greens on blues, a Latin-inspired Dish with Chesapeake Bay Blue Catfish

Photo by MDNR

Chesapeake Bay Blue Catfish Fillets

Photo by VIMS

How Can You Help?

Increasing commercial harvest and consumption of Chesapeake Bay Blue Catfish is one way to reduce numbers of this invasive fish in our Bay.

Watermen are encouraged to commercially harvest Chesapeake Bay Blue Catfish. Consumers should ask for Chesapeake Bay Blue Catfish at their local grocery store or restaurant.

Chesapeake Bay Blue Catfish is mild and flaky, with a taste similar to striped bass. In fact, it may be tastier than any catfish you've ever had. Why are they so delicious? Adult Chesapeake Bay Blue Catfish are not bottom feeders and thus don't acquire a muddy taste. They actively feed on aquatic prey, including other fish (Menhaden, American Shad, White Perch, and River Herring) and shellfish (crabs, clams, and mussels). This is good for developing the flavor but bad for the ecosystem of our Bay. Therefore, eating Blue Catfish might just be the tastiest ways to help save the Bay.

What Forms of Blue Catfish Product Can You Buy?

The main product is whole fillet. Fillet portions (3 oz, 4oz, 8oz), whole-fish, gutted or un-gutted are available upon request from buyers.

Like Most Fish Species, Blue Catfish Fillet is High in Protein and Low in Fat and Cholesterol

According to a recent study (Fisher, 2020), Chesapeake Bay Blue Catfish fillets contain 19g of high-quality protein per serving (4 oz) with only 1.5g of fat. The fillets have more healthy fats (unsaturated 75%) than unhealthy ones (saturated 25%).

Most importantly, Blue Catfish fillets provide an abundance of healthy Omega-3 fatty acids (270 mg per serving), especially eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) which are not found in land-based plants and animals products. The fillets also contain vitamin D and potassium but provide negligible amounts of *trans fat.*

There are many health benefits of Omega-3 fats in fish. They lower the risk of obesity. As part of a healthy diet, eating fish and other seafood offer heart health benefits and lower the risk of obesity. For the general population, consumption of about 8 ounces per week of a variety of seafood, which help provide a minimum recommended consumption of 250 mg per day of EPA and DHA, is associated with reduced cardiac deaths among individuals with and without preexisting cardiovascular disease (WHO, 2008; USDHH and USDA, 2015).

Omega-3 fats enhance infant brain development and health outcomes. Maternal consumption, during pregnancy and breastfeeding, of at least 8 ounces (two servings) per week of seafood that contains DHA is associated with better infant health outcomes.

For more information, visit the National Institute of Health (NIH)'s website: https://ods.od.nih.gov/factsheets/Omega3FattyAcids-HealthProfessional/

Even though another omega-3 alpha-linolenic acid (ALA) present in plant oils, such as flaxseed, soybean, and canola oils, can be converted into EPA and then to DHA, the conversion is very limited (≤15%). Therefore, consuming EPA and DHA directly from seafood is the only practical way to increase levels of these fatty acids in the body.

Nutrition Facts

varied servings per container

Serving size **4 oz (112g)**

Amount per serving

Calories **90**

	% Daily Value*
Total Fat 1.5g	**2%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 0.5g	
Monounsaturated Fat 0g	
Cholesterol 60mg	**20%**
Sodium 55mg	**2%**
Total Carbohydrate 0g	**0%**
Dietary Fiber 0g	**0%**
Total Sugars 0g	
Includes 0g Added Sugars	**0%**
Protein 19g	
Vitamin D 1.7mcg	8%
Calcium 10mg	0%
Iron 0mg	0%
Potassium 460mg	10%

*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Are Commercially Harvested Chesapeake Bay Blue Catfish Safe to Eat?

Like any kind of food, fish (including Chesapeake Bay Blue Catfish), may have potential risks associated with microbial and chemical contaminants. Chesapeake Bay Blue Catfish products prepared for distribution in commerce for use as human food are routinely inspected by the USDA Food Safety and Inspection Service (FSIS) under the Federal Meat Inspection Act (USDA, 2018).

Cooking is the best way to control microbial contaminants (bacteria, virus and parasite). Therefore, Blue Catfish should be thoroughly cooked and not eaten raw. For chemical contaminants such as polychlorinated biphenyls (PCBs) and methyl mercury, source control is the only way to reduce the associated risks since these chemical contaminants are heat stable and may not be destroyed through heating, refrigerating or freezing. Older and larger fish can accumulate higher levels of PCBs and methyl-mercury chemical contaminants.

Abundant and commonly caught sizes of Chesapeake Bay Blue Catfish are 15-36 inches long and their fillets are safe to eat. Luellen et al (2018) analyzed mercury and PCBs levels for a total of 116 individual Chesapeake Bay Blue Catfish samples (31 from the James River and 44 from the Rappahannock River in VA, and 41 from the Potomac River in MD). The results show that the levels of mercury (<0.47 ppm) and PCBs (0.001 to 0.856 ppm) in fish up to 41 inches are much lower than the *FDA and EPA Safety Levels in Regulations and Guidance* for methyl mercury (1.0 ppm) and PCBs (2.0 ppm) in commercial seafood (FDA, 2020). The guidelines are published in FDA's *Fish and Fishery Products Hazards and Controls Guidance,* Appendix 5 (Fourth Edition-March 2020).

More recently, Fisher (2020) conducted another study to investigate the methyl mercury and PCBs levels of Chesapeake Bay Blue Catfish (15 to 36 inches long) caught in the James' River in Virginia. The methyl mercury levels in fish fillets ranged from 0.033 ppm to 0.188 ppm and PCBs from 0.012 ppm to 0.071 ppm. These results confirm that the methyl mercury and PCBs levels of Chesapeake Bay Blue Catfish (15-36 inches long) are much lower than the *FDA and EPA Safety Levels in Regulations and Guidance* for commercial seafood (FDA, 2020).

Acknowledgement: The authors would like to thank Joe Love and Mary Groves (MDNR), Charles Poukish, Amy Laliberte and Kathy Brohawn (MDE), Weida Stoecker and Stone Slade (MDA), Mike Hutt (VMPB), and Laurie Arnold (UME) for their help including comments, suggestions and edits.

References

Chesapeake Bay Program (CBP, 2017). *Invasive Catfish in the Chesapeake Bay*. 2017. Available at: https://www.chesapeakebay.net/documents/workshop_catfish_report_final_pdf.pdf

Fabrizio, M.C., Tuckey, T.D., Latour, R.J. et al. Tidal Habitats Support Large Numbers of Invasive Blue Catfish in a Chesapeake Bay Subestuary. *Estuaries and Coasts* 41, 827–840 (2018). https://doi.org/10.1007/s12237-017-0307-1

Fisher, R.A. 2020. *Virginia Wild-Caught Blue Catfish: Nutrition and Contaminant Analysis.* VIMS Marine Resource Report No. 2020-8 and VSG-20-03.

Food and Drug Administration (FDA, 2020). *The FDA and EPA Safety Levels in Regulations and Guidance in FDA's Fish and Fishery Products Hazards and Controls Guidance, Appendix 5* (Fourth Edition-March 2020). Available at: https://www.fda.gov/media/80400/download

Luellen, D.R., LaGuardia, M.J., Tuckey, T.D. et al. Assessment of legacy and emerging contaminants in an introduced catfish and implications for the fishery. *Environ Sci Pollut Res* 25, 28355–28366 (2018). https://doi.org/10.1007/s11356-018-2801-9

Maryland Department of Natural Resources. *Chesapeake Bay Invasive Catfish.* Available at: https://dnr.maryland.gov/fisheries/Documents/Invasive_Catfish_%20Fact_Sheet.pdf

National Institute of Health (NIH, 2019). *Omega-3 Fatty Acids. Fact Sheet for Health Professionals.* Available at: https://ods.od.nih.gov/factsheets/Omega3FattyAcids-HealthProfessional/

Schloesser, R.W., Fabrizio, M. C., Latour, R. J. et al. (2011). *Ecological Role of Blue Catfish in Chesapeake Bay Communities and Implications for Management and Implications for Management.* Available at: https://scholarworks.wm.edu/cgi/viewcontent.cgi?article=1009&context=vimsbooks

Tkacik C. and Dance S. (2019): As blue catfish multiply in Chesapeake Bay, watermen pursue new catch — and restaurants offer new delicacy. *The Baltimore Sun.* 06/07/2019. Available at: https://www.baltimoresun.com/news/environment/bs-md-blue-catfish-20190603-story.html

U.S. Department of Health and Human Services and U.S. Department of Agriculture (USDHH and USDA, 2015). *2015–2020 Dietary Guidelines for Americans.* 8th Edition. December 2015. Available at http://health.gov/dietaryguidelines/2015/guidelines/.

U.S. Department of Agriculture (USDA, 2018). *Siluriformes*. Available at: https://www.fsis.usda.gov/wps/portal/fsis/topics/inspection/siluriformes

World Health Organization (WHO, 2008). Interim Summary of Conclusions and Dietary Recommendations on Total Fat & Fatty Acids. From the *Joint FAO/WHO Expert Consultation on Fats and Fatty Acids in Human Nutrition*, 10-14. 2008, Geneva. Available at: https://www.who.int/nutrition/topics/FFA_summary_rec_conclusion.pdf?ua=1

Chengchu Liu (University of Maryland-AGNR-UME Sea Grant Extension)

cathyliu@umd.edu

Robert Fisher (Virginia Institute of Marine Science, Virginia Sea Grant)

rfisher@vims.edu

This publication, *Chesapeake Bay Blue Catfish: Invasive, but Delicious and Nutritious* (FS-1142), is a series of publications of the University of Maryland Extension and the Department of Environment and Natural Resources.

The information presented has met UME peer review standards, including internal and external technical review. For help accessing this or any UME publication contact: itaccessibility@umd.edu

For more information on this and other topics, visit the University of Maryland Extension website at extension.umd.edu