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The Nutrition Value of the Chesapeake Bay Blue Catfish

Authored by Yiming Feng, Assistant Professor and Extension Specialist, Virginia Seafood Agricultural Research and Extension Center, Virginia Tech; Haibo Huang, Associate Professor, Food Science and Technology, Virginia Tech; Sean O'Keefe, Professor, Food Science and Technology, Virginia Tech; Jonathan van Senten, Associate Director, Virginia Seafood Agricultural Research and Extension Center, and Associate Professor and Extension Specialist, Agricultural and Applied Economics, Virginia Tech; Taozhu Sun, Extension Specialist, Virginia Seafood Agricultural Research and Extension Center, Virginia Tech; and Michael Schwarz, Director, Virginia Seafood Agricultural Research and Extension Center, Virginia Tech

The Chesapeake Bay blue catfish (*Ictalurus furcatus*), originally native to the Mississippi, Missouri, and Ohio river basins, was introduced to Virginia waters for recreational fishing in the 1970s (Hilling et al. 2023) salinity-tolerant species that exhibits broad diet breadth and preys on species of both conservation concern and fisheries management interest. To better understand the ecological consequences of the establishment of Blue Catfish fisheries, estimates of predatory impacts are needed. Methods: Using a Monte Carlo simulation, we integrated abundance estimates, diet information, and consumption-to-biomass ratios to estimate population-level Blue Catfish predation for a large Chesapeake Bay tributary along the mid-Atlantic coast of the United States, the James River. Result: Population-level annual predation estimates by Blue Catfish exceeded 100 metric tons for several species or taxa of interest, including an estimated 400.7 metric tons (95% CI = 272.6–613.2. Now an invasive species in the Chesapeake Bay watershed, it thrives in tributaries such as the Potomac, James, and York rivers. These large, slate-blue fish with smooth, scaleless skin and whisker-like barbels can grow up to 5 feet and exceed 100 pounds. As opportunistic predators, they feed on fish, crabs, mussels, and more, impacting native species like blue crabs and striped bass (Schloesser et al. 2011).

In response to this ecological challenge, initiatives that encourage the consumption of Chesapeake Bay blue catfish have emerged, with goals that include enhancing public health, conserving the Virginia watershed ecosystem, and boosting the commonwealth's economy. As a result, Virginia harvested 3.6 million pounds in 2022, worth $2.1 million (NOAA 2024). Figure 1 shows blue catfish fillets for sale in a seafood market in Hampton, Virginia.

This publication examines the nutritional profile of blue catfish, as recently determined by the Virginia Seafood Agricultural Research and Extension Center, highlighting its value as a healthy and sustainable seafood option.

Figure 1. A photo of blue catfish fillets for sale in a Hampton, Virginia seafood market along with monkfish, cod, and trout. (Photo by Keri Rouse.)

Nutritional Profiles Determined

The nutritional profiles of Chesapeake Bay blue catfish fillets (all fish tested were caught in winter 2024), measured on a wet weight basis, are as follows per 100 grams:

- **Protein**: 16.63 g ± 1.99 g.
- **Fat**: 5.95 g ± 1.08 g.
- **Moisture**: 74.32 g ± 0.72 g.
- **Ash**: 1.00 g ± 0.13 g.

These values indicate that blue catfish fillets are rich in protein and omega-3 fatty acids (table 1) and have a high moisture content, typical of fresh fish. Insignificant size-dependent variation was observed across the typical harvest size range (<2 pounds, 2-4 pounds, and 4-6 pounds), indicating consistent nutritional quality across commercially viable specimens.

Table 1. Omega-3 fatty acid breakdown.

Omega-3 fatty acid	mg/100g
ALA (18:3n3)	96.7 ± 19.8
Stearidonic (18:4n3)	13.9 ± 9.0
Homo-a-linolenic (20:3n3)	16.5 ± 4.9
3n-arachidonic (20:4n3)	0.0 ± 0.0
EPA (20:5n3)	165.7 ± 15.0
DPA (22:5n3)	126.4 ± 10.2
DHA (22:6n3)	432.8 ± 34.8
Total omega-3	**852.0 ± 49.7**

The omega-3 fatty acid content of blue catfish was analyzed as a percentage of total fat (5.95 g/100 g), with individual components quantified in table 1. While the total omega-3 content is 852 mg/100 g, blue catfish contains 598.5 mg/100 g of a beneficial combination of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). These long-chain omega-3s are well known for supporting cardiovascular health, cognitive function, and eye development. EPA plays a key role in reducing inflammation and maintaining heart health, while DHA is a critical structural component of the brain and retina, making it especially important during prenatal and early childhood development.

Data collected by the Virginia Seafood AREC in 2025 indicate that blue catfish contain 852 mg of omega-3 fatty acids per 100 g, surpassing many other fish species with the exception of salmon and mackerel (table 2).

Table 2. Comparison of omega-3 fatty acid content in different fish species.

Fish	Total omega-3 FA (mg/100 g)
Atlantic salmon	2,252[1]
Mackerel	1,677[2]
Chesapeake Bay blue catfish	**852[3]**
Squid	584[1]
Rainbow trout	415[1]
Prawn (shrimp)	375[1]
Red snapper (bight redfish)	357[1]
Deep sea cod (ribaldo)	340[1]
Tilapia	329[4]
Southern bluefin tuna	230[1]

Sources:

[1] Soltan, S. S. A. M., and R. A. Gibson. 2008. "Levels of Omega 3 Fatty Acids in Australian Seafood." *Asia Pacific Journal of Clinical Nutrition* 17 (3): 385-90. https://apjcn.nhri.org.tw/server/APJCN/17/3/385.pdf.

[2] Rincón-Cervera, M. Á., V. González-Barriga, J. Romero, R. Rojas, and S. López-Arana. 2020. "Quantification and Distribution of Omega-3 Fatty Acids in South Pacific Fish and Shellfish Species." *Foods* 9 (2): 233. https://doi.org/10.3390/foods9020233.

[3] Data collected by the authors at the Virginia Seafood AREC, 2025.

[4] Young, K. 2009. "Omega-6 (n-6) and Omega-3 (n-3) Fatty Acids in Tilapia and Human Health: A Review." *International Journal of Food Sciences and Nutrition* 60 (Supp. 5): 203-11. https://doi.org/10.1080/09637480903140503.

Benefits of Consuming Blue Catfish

- **Health benefits:** High omega-3 fatty acids (total omega-3 = 852 mg/100 g; EPA + DHA = 598 mg/100 g) in blue catfish fillets exceed the 300-500 mg daily recommendation for heart health established by major health organizations, including the American Heart Association and the World Health Organization (Kris-Etherton et al. 2002) although the ideal intakes presently are unclear. Evidence from prospective secondary prevention studies suggests that EPA+DHA supplementation ranging from 0.5 to 1.8 g/d (either as fatty fish or supplements. Blue catfish's 16.63 g of protein per 100 g fillet support muscle maintenance.

- **Ecological advantage**: Harvesting this invasive species helps restore the Chesapeake Bay's ecosystem balance by reducing predation pressure on native species, though quantitative ecosystem restoration targets require further research to establish optimal harvest levels.
- **Market potential**: Blue catfish's nutritional value supports its promotion as a premium, sustainable seafood option that contributes to the growth of the Virginia economy.

Conclusion

Chesapeake Bay blue catfish provide a nutrient-rich option with high omega-3 fatty acids, substantial protein, and moderate fat content, outperforming lean fish like tilapia, channel catfish, and cod, but lagging behind oily species like salmon and mackerel in omega-3 content. Promoting its consumption supports both public health and ecological conservation.

For more information, contact Virginia Cooperative Extension by visiting www.ext.vt.edu or https://arec.vaes.vt.edu/arec/virginia-seafood.html.

References

Hilling, C. D., J. D. Schmitt, Y. Jiao, and D. J. Orth. 2023. "Predatory Impacts of Invasive Blue Catfish in an Atlantic Coast Estuary." *Marine and Coastal Fisheries*, 15 (5): e210261. https://doi.org/10.1002/mcf2.10261.

Kris-Etherton, P. M., W. S. Harris, and L. J. Appel. 2002. "Fish Consumption, Fish Oil, Omega-3 Fatty Acids, and Cardiovascular Disease." *Circulation*, 106 (21): 2747–57. https://doi.org/10.1161/01.CIR.0000038493.65177.94.

Lapinski, T. 2023. "Blue Cat vs Channel Cat: The Difference Between America's Most Common Catfish." The Fishingwire.com website. https://thefishingwire.com/blue-cat-vs-channel-cat-the-difference-between-americas-most-common-catfish/.

NOAA (National Oceanic and Atmospheric Administration). 2024. "Fisheries One Stop Shop." NOAA website. https://www.fisheries.noaa.gov/foss/f?p=215:200::::::

Schloesser, R. W., M. C. Fabrizio, R. J. Latour et al. 2011. "Ecological Role of Blue Catfish in Chesapeake Bay Communities and Implications for Management." In *The Conservation, Ecology, and Management of Catfish: The Second International Symposium*, edited by P. H. Michaletz and V. H. Travnichek. American Fisheries Society Symposium 77. American Fisheries Society. https://fisheries.org/doi/9781934874257-ch31/

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