

Enhance Public Awareness on Food Safety and Nutrition of Invasive Fish Species and Promote Safe Consumption

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Introduction

Blue catfish (*Ictalurus furcatus*) and the northern snakehead (*Channa argus*) are emerging invasive fish species in the Chesapeake Bay. Their rapid expansion throughout the region has raised concern about their potential negative impacts on Chesapeake Bay ecosystems. Despite their negative environmental impact, these species are an excellent source of protein and healthy fat (ω -3 fatty acids). Therefore, one way to control their growing numbers, reduce their negative impacts, and promote consumer health is to promote safe consumption of these species. In response, Maryland Department of General Services (DGS)—in partnership with the departments of Agriculture and Natural Resources—has instated the Blue Catfish Purchasing Initiative, which creates a reliable market for these invasive species.

However, misinformation and negative publicity of blue catfish associated with seafood health benefits and contaminants (methyl mercury and polychlorinated biphenyls (PCBs)) have created confusion amongst consumers and health professional personnel. These mixed messages may be a source of confusion to the consumer and to the health professional.

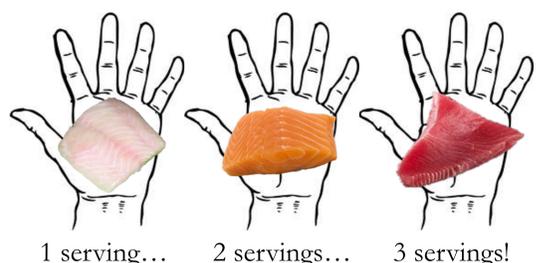
Response/Inputs/Outputs

In response, we have collaborated with state agencies and local vendors on organizing and offering educational events to enhance public awareness on food safety and nutrition of blue catfish to promote safe consumption.

Consumer Education 101: Health Benefits and Safety of Seafood

Health Benefits: Fish are low in calories, an excellent source of protein, and contain important healthy fats. Two of these “polyunsaturated ω -3 fatty acids”¹ are eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). EPA and DHA are important for growth, development, and heart health.^{1,2}

The 2015-2020 Dietary Guidelines for Americans recommends consuming **at least eight ounces** of seafood a week (less for younger children).² It is especially critical for women who are pregnant or breast feeding to consume 8-12 ounces to provide unique ω -3 fatty acids (EPA and DHA), vitamins, and minerals to her growing baby. You can measure eight ounces (or 2-3 servings) using the palm of your hand. According to the USDA National Nutrient Database,³ blue catfish are low in calories, high in protein, and provide a significant amount of healthy fats per 3.5 ounce serving, making it a healthy choice to consider. No nutrition information is found for northern snakehead.



Nutrition Facts	
Serving Size	(100 grams, 3.5 oz)
Amount per serving	
Calories	97
Total Fat	2.65 gm
Saturated	0.88 gm
Polyunsaturated	0.88 gm
Monounsaturated	0.88 gm
Protein	16.81 gm

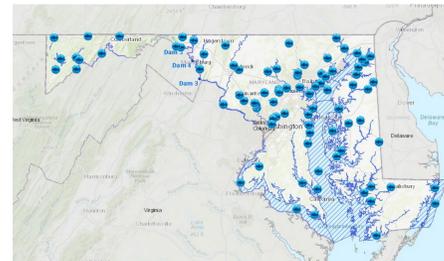
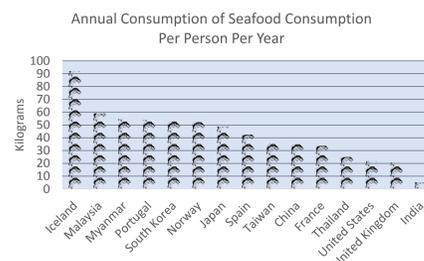
Seafood Safety: Like all foods, fish may have potential risks associated with microbial and chemical contaminants (e.g. methyl mercury) if products are not harvested from approved bodies of water or if they are mishandled.

Methyl mercury is a heavy metal and can harm your brain and nervous system. However, selenium, a naturally occurring mineral in fish, has a high affinity for mercury. Therefore, it works as an antioxidant and protects against mercury damage. The US FDA and EPA’s seafood chart has identified catfish as a “best choice” due to low mercury levels and recommend 2-3 servings/week.¹

Response/Inputs/Outputs (continued)

Another major safety concern of blue catfish is polychlorinated biphenyls (PCBs) contamination. Both federal and state level governments have issued consumption advisories for both commercial and recreational fishing. More specific advisories are recommended for individual species depending on the size of the fish and where it was caught in the body of water. Blue catfish more than 30 inches should be avoided in the Potomac and Patuxent Rivers. For blue catfish in the Nanticoke and Choptank River, there are no specific consumption advisories.⁴

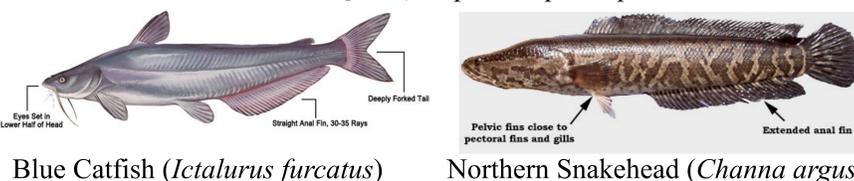
American’s Health Problem: The National Health and Nutrition Examination Survey indicates Americans’ average seafood intake is below what is recommended for all age-sex groups.² On a global perspective, the United States consumes less seafood annually than other countries (see chart below).⁵



Two species of fish—blue catfish and northern snakehead—are invasive to the Chesapeake Bay. Both species’ large size, physical attributes, predatory feeding style, and resilience contribute to their overpopulation. Without action, these species pose potential danger of changing the biomass of the waters they inhabit. Safe consumption may help reduce their numbers and improve Americans’ health in the process.⁶

Consumer Education 102: Safely Identify, Handle, Cook, and Consume

In support of this statewide initiative, University of Maryland Extension partnered with state agencies and local vendors to organize and offer an educational event titled “Gotta Hook ‘Em to Cook ‘Em” to enhance public awareness of these species and promote safe handling and consumption practices. Piloted at a local county fair, 37 patrons participated.



Educational Workshop (Taught by Joseph Love, Maryland DNR)



Blue Catfish Cooking Demonstration (Taught by Gwyn Novak, a Local Chef)

Response/Inputs/Outputs (continued)

During the education and demonstration workshop, Erin Carney (Healthy Living Educator) informed participants about healthy fats using the American Heart Association’s “Four Ways to Get Good Fats” infographic (right photo below). She chose the recipe (left and middle photos) to show how to pair nutrient dense foods (i.e. whole grain tortilla chips, homemade pico de gallo) with caloric dense foods (i.e. fried fish) to practice eating in moderation. She demonstrated how homegrown produce could be used in recipes to encourage eating more vegetables and preventing chronic disease.



Pico De Gallo

Ingredients:
 2 whole roma tomatoes, diced
 1 large red onion, diced
 1/2 cup cilantro, minced
 1/2 large jalapeno, minced (remove seeds for a milder taste)
 2 Tbsp. freshly squeezed lime juice
 2 cloves garlic, minced or pressed
 salt to taste

Directions:
 Dice, mince, squeeze, or press ingredients as directed. Place all the ingredients (except salt) into a large bowl. Mix and season with salt to taste. Cover and place in the refrigerator until ready to serve.

Adapted from Jennifer’s recipe, <https://www.thefairyprint.com/recipe-pico-de-gallo-recipe/>



Fried Fish

Ingredients:
 1 lb. fish fillet
 1 cup all purpose flour
 2 Tbsp. seasoning (ex: Old Bay, Cajun, dried herbs, garlic/onion powders, lemon pepper, etc.)
 2 large eggs, lightly beaten
 5 cups panko bread crumbs
 Oil for frying (suggest using healthier oils with higher smoke points: canola, peanut, corn, or soybean)

Directions:
 Place flour, eggs, and panko bread crumbs in three separate shallow dishes. Mix seasoning in with flour. Dry off fish fillets using paper towels. Cut into desired sized pieces or leave whole for fried fillet. In a bucket, use fish in flour (shake off excess), dip into egg, and cover with panko bread crumbs, pressing slightly to adhere. Fill the bottom of a large skillet with oil (depth about 1/2 inch). Heat over medium-high heat. Arrange fish in the pan in a single layer without overcrowding. Fry until golden brown and cooked through (~ 1 minute/side). Transfer to a paper towel-lined plate to drain off excess oil. Serve as fish steaks with Pico de Gallo, or a salad, or other creative ways to eat balanced and in moderation!

Adapted from Maria Stewart’s recipe, <https://www.seagrants.org/2018/04/panko-breaded-fish-sticks/>



Future Plans

Our future plan is to continue and expand upon the collaborative efforts of state and local organizations. We will offer more educational and interactive events to promote safe consumption of invasive fish species. In addition, we will also seek funding to conduct research and fill the gap of nutrition and safety data. There are several factors (e.g. location, season, size and age of the fish) that contribute to variations in nutritional and chemical compositions. There are limited data for blue catfish and a lack of information for northern snakehead species inhabiting local tributaries of the Chesapeake Bay. It is critical to collect these data and make them available to the public for safe consumption and local buy-in to occur. Coastal communities must take collective action to help prevent rising population size and detriment to the ecosystems these species invade.

Acknowledgement



References

1. U.S. Food and Drug Administration and U.S. Environmental Protection Agency (2017). *Eating Fish: What Pregnant Women and Parents Should Know* [Online pdf]. Retrieved from <https://www.fda.gov/downloads/Food/FoodborneIllnessContaminants/Metals/UCM537120.pdf>
2. U.S. Department of Health and Human Services and U.S. Department of Agriculture (2015). *2015-2020 Dietary Guidelines for Americans* [8th edition]. Retrieved: <https://health.gov/dietaryguidelines/2015/guidelines/>
3. U.S. Department of Agriculture (2019). *USDA Food Composition Databases* [Online database]. Retrieved: <https://ndb.nal.usda.gov/ndb/foods/show/45267210?man=&lfacet=&count=&max=25&qlookup=BLUE+CATFISH+FLILETS%2C+UPC%3A+099482460952&offset=&sort=default&format=Full&reportfmt=other&prtfrm=&ndbno=&nutrient1=&nutrient2=&nutrient3=&subset=&toCount=&measureby=&Q493615=3.54&Qv=1&Q493615=3.53&Qv=1>
4. NOAA Chesapeake Bay Office (2016). Retrieved from <https://chesapeakebay.noaa.gov/fish-facts/invasive-catfish>
5. Ritchie, H. & Roser, M. (2019). *Meat and seafood production & consumption* [Online resource]. Retrieved from <https://ourworldindata.org/meat-and-seafood-production-consumption> (Original work published 2017).
6. Maryland Department of the Environment. *Fish Consumption Advisories* [Interactive map]. Retrieved from <https://mdewin64.mde.state.md.us/WA/FCA/index.html>
7. American Heart Association (2018). *4 Ways to Get Good Fats* [Online infographic]. Retrieved from <https://www.heart.org/en/healthy-living/healthy-eating/eat-smart/fats/4-ways-to-get-good-fats-infographic>