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Sea Grant North Carolina BLUEPRINTS

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Purchasing Seafood

Answering Questions of Mercury in North Carolina-Caught Species

Results from N.C. Fishery Resource Grant Projects

For seafood consumers, deciding which of the many products available to purchase can be confusing. Providing selection criteria is difficult because seafood consumption guidelines can vary based on the individual. Adding to the confusion, recommendations are available from the U.S. Food and Drug Administration (FDA), the U.S. Environmental Protection Agency (EPA), and nongovernmental groups. The FDA and EPA provide information on contaminants in seafood, most notably mercury content. Nongovernmental organizations, which often provide recommendations in the form of seafood cards or digital applications, also include factors associated with the status of the fish stock and how the fish is harvested.

Mercury and Methylmercury

Mercury is a heavy metal that occurs naturally in the environment but is released into the air through natural causes and industrial pollution. It can enter various water bodies where it is converted by bacteria to methylmercury, a form that is toxic to humans, and readily available to aquatic organisms. Methylmercury can accumulate in fish tissues that are eventually consumed by humans.

In fact, the primary source of human exposure to mercury is through seafood (Grandjean et al., 1995). That is why mercury is a major consideration in seafood consumption recommendations. In particular, the nervous systems of fetuses and young children are very sensitive to mercury exposure. As a result, mercury consumption recommendations vary with the intended audience.

Federal Guidelines

EPA provides recommendations on seafood consumption based on methylmercury content. The action level established by EPA is 0.3 parts per million (also reported as 0.3 milligrams per kilogram), a level by which species are considered to have high methylmercury. However, the actual consumption recommendations vary based on the individual and the average number of seafood meals consumed per week. A seafood meal is defined as 6 ounces of a given species.

EPA considers two groups of consumers in their recommendations. The general public are males 15 years and older, and women older than 44 years. Higher-risk individuals are women of childbearing age and children less than 15 years of age. *Table 1* shows the maximum number of meals for each group at various methylmercury levels. While figures are provided for those in the higher risk group, it is generally recommended that pregnant or nursing mothers, and young children limit or avoid consuming fish with mercury levels greater than 0.3 ppm.

Table 1. Maximum seafood consumption limits for consumer group and methylmercury level, based on data from U.S. EPA document EPA 828-B-00-008.

Group	Methylmercury level (ppm)	Maximum number of meals per week	Maximum amount of seafood per week (oz)
Higher risk [1]	0.1 0.2 0.3 0.5 1.0 2.0	3.0 1.5 1.0 0.5 0.3 0.2	18 9 6 3 2 1
General public [2]	0.1 0.2 0.3 0.5 1.0 2.0	9.4 4.7 3.1 1.9 0.9 0.5	56 28 19 11 5 3

1. Women of childbearing age and children less than 15 years of age.
2. Males 15 years and older, and women older than 44 years.

Insufficient Data and New Research

The data on methylmercury content in seafood that is used for consumption advisories in North Carolina is obtained from both in- and out-of-state sources, and often does not accurately reflect what is caught locally. In addition, dated samples further complicate establishing effective guidelines.

In 2010, the N.C. Fishery Resource Grant Program, administered by North Carolina Sea Grant, funded two separate methylmercury studies. Derek Aday, Sally Petre and Dana Sackett from North Carolina State University, and fisherman Dale Britt conducted project 10-ST-02. Duke University researchers Dan Rittschof, Amy Freitag and Nari Sohn, and

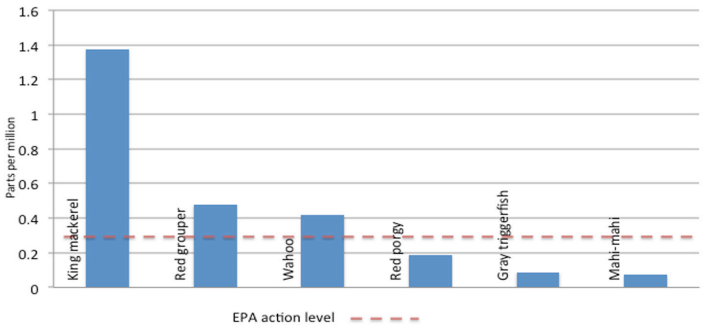
fisherman Mark Hooper collaborated on study 10-EP-07. These projects were designed to determine the methylmercury content in commonly caught species in the state, and were based solely on locally harvested samples.

Offshore Species

Project 10-ST-02 focused on offshore species, including mahi-mahi, king mackerel, wahoo, red porgy, red grouper and gray triggerfish. Fish either were caught by a charter vessel in Morehead City, N.C., or purchased from a local fish market where the source of the fish was known. Tissues from 30 of each species were sampled over three months, except for king mackerel, for which 27 fish were sampled. Tissues were analyzed for mercury using EPA method 7473. Since methylmercury comprises greater than 95 percent of all mercury in fish tissues (Bloom, 1992), total mercury is reported.

Figure 1 shows the average total mercury content of the six species evaluated. Red porgy, gray triggerfish and mahi-mahi were below the EPA action level of 0.3 ppm, while king mackerel, red grouper and wahoo exceeded EPA limits.

Figure 1. Average mercury levels in offshore species harvested in North Carolina.



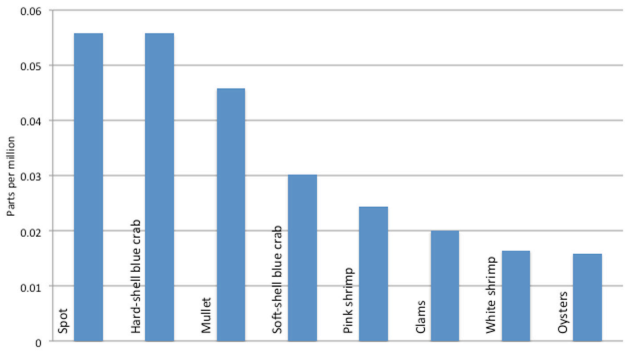
Inshore Species

Project 10-EP-07 focused on several inshore species — oysters, white and pink shrimp, clams, hard and soft-shell blue crabs, mullet, and spot. A total of 600 samples were analyzed using the same methods as those used in project 10-ST-02. *Figure 2* displays the average total mercury of the eight species tested. All inshore species evaluated were well below the EPA action level of 0.3 ppm, which is not shown on the graph.

Selecting Seafood

Decisions on which seafood to purchase are personal, and ideally, made by individuals equipped with the best information. Having data on locally caught species benefits the consumer by providing a more accurate representation of the seafood being purchased, so long as its origin is known.

Figure 2. Average mercury levels in inshore species harvested in North Carolina.



The information provided in this document shows that most of the species harvested in the two studies were within the guidelines established by EPA. In cases where those levels are exceeded, individuals should determine their own risks, based on their health status and age, the species being consumed, and the number of meals that include the species.

References

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