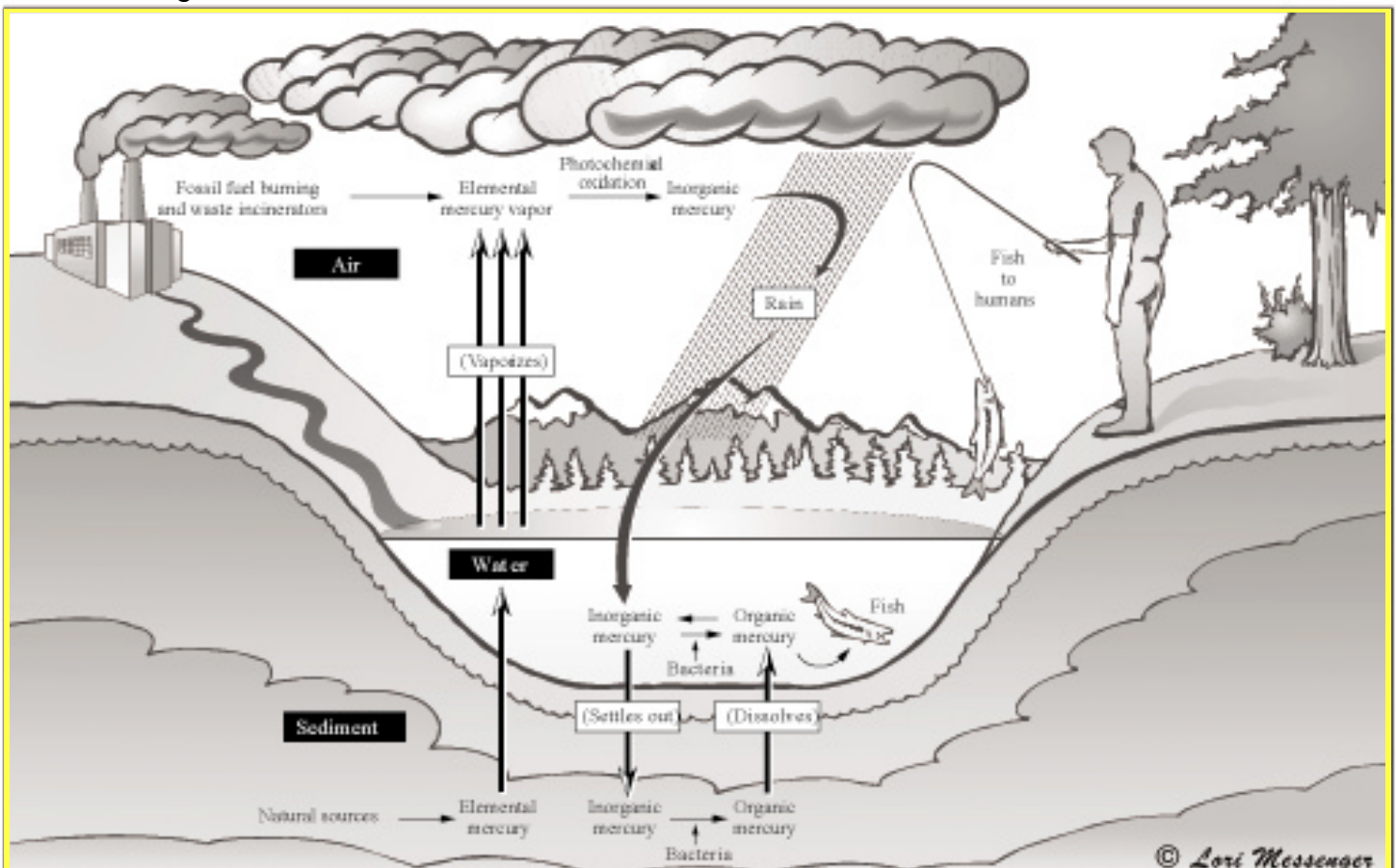


Fishing for Mercury: What You Should Know About Mercury Contamination in Fish

Fish and shellfish are an essential part of a healthy diet since they are high in protein, essential nutrients, contain omega-3 fatty acids and are low in saturated fat. Eating a variety of fish and shellfish is recommended especially for children and pregnant women to ensure heart health and correct growth and development. Children and women should also be the most aware that all fish contains concentrations of mercury and some have concentrations that may be harmful to unborn babies and children's proper development. Knowing which fish have high concentrations of mercury and which are safer alternatives will help reduce the risk of any negative health effects.

Sources of Mercury

Mercury is naturally occurring in the environment, but humans also add mercury to the environment. The main human-induced sources are from coal-fired power plants and the use of mercury in manufacturing.



Why is Mercury Harmful to Humans?

There are multiple forms of mercury in the environment and all forms have potential adverse health effects. Methylmercury is the most harmful form to humans. Mercury falls from the atmosphere into bodies of water, settles, accumulates in sediment and is converted to methylmercury by bacteria. The amounts of inorganic and chemical mercury are key factors in determining how much methylmercury the bacteria produce.

Brain tissue is the most mercury-sensitive tissue in the body. Methylmercury taken into the body enters the bloodstream and passes the blood–brain barrier and enters the brain. While mercury has more specific targets in adult brains, developing babies and children show more general neurological effects. The earlier the exposure the more general the effects are. Methylmercury affects brain and nervous system development in babies and children. It adversely affects language, memory, attention, walking and talking and visual development, as well as fine motor skills and general behavior. For women who may become pregnant, natural mercury removal from the blood stream, such as through deposits in hair, may take years.

What is Sustainable Seafood?




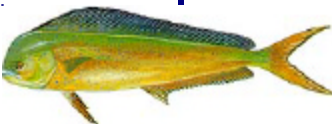


Seafood that it is captured in a way that does not risk the future of the fishery. When a species is “overfished,” it leads to a number of problems for the fish and the fisher. First, there are fewer fish, making them harder to capture and, with fewer parents, there will be fewer offspring. Second, the fish tend to get smaller. They mature at a smaller size and at a younger age. Smaller fish produce fewer offspring.

A fishery that exhibits these characteristics becomes less profitable, which eventually has a far-reaching economic impact: fishers, boat manufacturers, hotels and restaurants can all suffer. (Source: South Carolina Aquarium)

Why are Fish the Major Source of Mercury for Humans?

All fish have some methylmercury in their bodies, but most have concentrations considered safe by the U.S. Environmental Protection Agency. Small organisms take up methylmercury as they feed. As larger organisms eat the smaller prey, methylmercury bioaccumulates. This means more methylmercury is retained in the body’s tissues than expended as energy. This is a problem mostly in larger predatory fresh and saltwater fish. Certain commercial saltwater fish that are long-lived large predatory fish eat large amounts of small fish containing mercury. As the fish grow they continually deposit mercury in their muscle tissue. Often people eat fish high on the predatory food chain, which increases the risk of exposing them to high concentrations of mercury. Methylmercury can also accumulate in shellfish, since they are filter feeders, but most local shellfish in North Carolina are safe according to the N.C. Department of Health and Human Services. Most people are not affected by mercury in fish. However, childbearing women and children do need to be cautious of the amount and type of fish they consume.

Mercury Content and Sustainability of Select North Carolina Fish Species

Species	Habitat	General Feeding Habits	Mercury Content	Is It Sustainable?
<p>Swordfish</p> 	Off-shore	Swordfish prefer squid, but they eat mackerel, menhaden, bluefish, silver hake, butterfish and herring.	HIGH - Swordfish grow quickly to a very large size. They feed heavily and incorporate much of their intake into body mass, including the mercury in their prey, increasing the amount of mercury in their muscle tissue. Since swordfish feed on high mercury fish such as mackerel this greatly increases their mercury content.	No , swordfish are considered overfished in the Atlantic and around the globe. Pacific populations are recovering, but both populations are still cause for high levels of bycatch of marine birds and turtles.
<p>King Mackerel</p> 	Near-shore and Off-shore	Mackerel mainly eat fish, such as jack mackerels, grunts, snappers and halfbeak, but also eat squid, crustaceans and mollusks.	HIGH - King mackerel is the largest fish in its genus and can live for up to 26 years. They are high on the food chain and the fish they eat have already bioaccumulated mercury.	Gulf of Mexico species are not sustainable. They are currently recovering from overfishing and high bycatch of juveniles in shrimp trawls. Atlantic king mackerel are considered a "best choice."
<p>Tilefish</p> 	Off-shore	Benthic organisms are their main prey and include crabs, conger eels, Atlantic hagfish, other fish, bivalve mollusks, polychaetes, holothurians, sea anemones. They also eat near-bottom or pelagic prey such as salps, squid, hyperiid amphipods, small spiny dogfish, Atlantic mackerel, Atlantic herring and silver hake.	HIGH - Tilefish live more than 45 years and grow rapidly in the first 2 years. During their rapid growth and throughout their lifespan their primary feeding area is the benthic community. This is where mercury is converted to methylmercury. Therefore many of their prey, who are primary or secondary consumers, take in mercury while feeding.	No , tilefish are a long-lived and slow-growing species. They do not migrate and are easy to catch. They are currently overfished and current management measures have not stopped stock declines. There is also no population data for many stocks.
<p>Dolphin (or Mahi-Mahi)</p> 	Off-shore	Dolphin are at the top of the food chain eating flying fish to crabs, shrimp, squid, mackerel and other small fish.	LOW - Dolphin have a short lifespan of three or four years, which means, even though they are high on the food chain, they have much less time to accumulate mercury.	Troll-caught dolphin is environmentally friendly. They grow and mature very quickly helping them to resist fishing pressure. There are some concerns with the bycatch associated with catching these fish on longlines.
<p>Flounder</p> 	Near-shore	Flounder eat small fishes, squid, seaworms, shrimp and other crustaceans.	LOW - Flounder can live up to 20 years, but since they have a relatively small body mass, compared to many pelagic fish, they do not accumulate mercury as quickly.	Pole and hand caught Summer/Fluke flounder are sustainable. Flounder caught with bottom trawls can damage habitat.
<p>Spot</p> 	Near-shore	Spot eat many benthic invertebrates.	LOW - Spot can live up to five years, but most do not exceed three and they have a low body mass so they do not accumulate large amounts of mercury.	Yes , spot are an abundant, locally caught seafood species.

Source of fish pictures in table: Duane Raver, from the book *Fisherman's Guide / Fishes of the Southeastern U.S.*

Do Fish Handle Methylmercury Differently from Humans?

Some fish can store mercury in vesicles, or enclosed compartments, in muscle fibers. Therefore they are not as greatly affected because their blood concentrations of methylmercury are not as high. Some behavioral effects have been seen in fish, but they are limited and not as severe as in humans. Humans can store mercury in lipids and internal organs without ill effects because of their low sensitivity to mercury. But due to the human brain's high sensitivity to mercury, very low concentrations in the blood will damage brain tissue before other organs.

Health Recommendations from the EPA and FDA

1. Do not eat shark, swordfish, king mackerel or tilefish because they contain high concentrations of mercury.
 - The N.C. Department of Health and Human Services also recommends not eating spanish mackerel caught off the coast of North Carolina.
2. Eat up to 12 ounces (two average meals) a week of a variety of fish and shellfish that are lower in mercury.
 - Five of the most commonly eaten fish that are low in mercury are shrimp, canned light tuna, salmon, pollock and catfish.
 - Another commonly eaten fish, albacore ("white") tuna has more mercury than canned light tuna. So, when choosing your two meals of fish and shellfish, you may eat up to six ounces (one average meal) of albacore tuna per week.
3. Check local advisories about the safety of fish caught by family and friends in your local lakes, rivers and coastal areas. If no advice is available, eat up to six ounces (one average meal) per week of fish you catch from local waters, but don't consume any other fish during that week. Follow these same recommendations when feeding fish and shellfish to your young child, but serve smaller portions.

For More Information...

...On Mercury:

- Fish Advisories, U.S. Environmental Protection Agency: www.epa.gov/waterscience/fish
- Fish Consumption Advisory, N.C. Department of Health and Human Services: www.epi.state.nc.us/epi/fish
- Mercury, U.S. Environmental Protection Agency: www.epa.gov/mercury
- Seafood Information and Resources, U.S. Food and Drug Administration: www.cfsan.fda.gov/seafood1.html

...On Sustainable Seafood:

- N.C. Division of Marine Fisheries: www.ncfisheries.net
- Seafood Watch, Monterey Bay Aquarium: www.mbayaq.org/cr/seafoodwatch.asp
- Sustainable Seafood, South Carolina Aquarium: www.scaquarium.org/content.cfm?FAM=86&CLAN=5

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