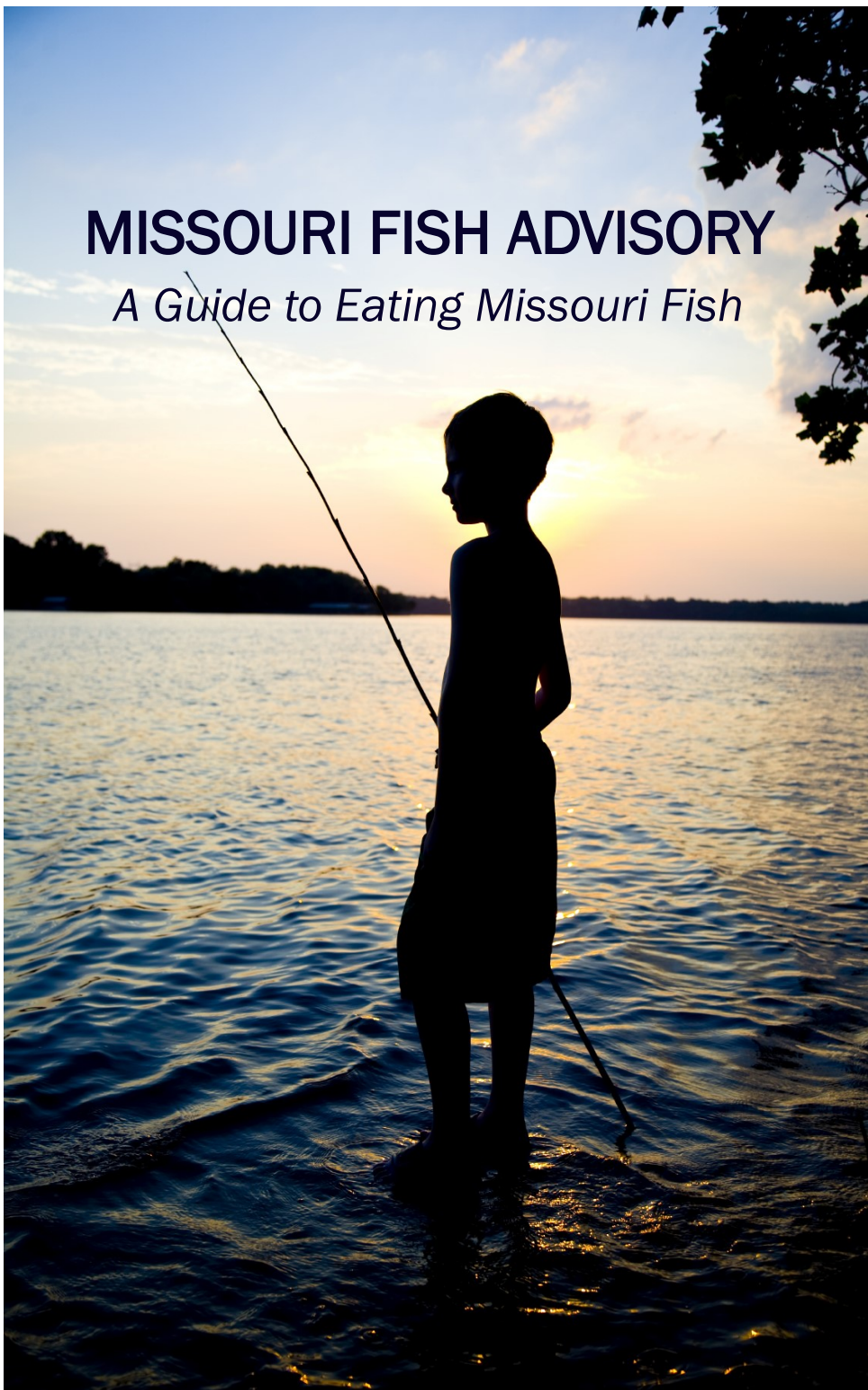


MISSOURI FISH ADVISORY

A Guide to Eating Missouri Fish



WHAT'S INCLUDED?

- An Explanation of the Guide
 - Terms & Definitions
 - Fish Advisories & Maps
 - Trimming & Cooking Tips
 - How-To Fillet
 - Healthy Recipes

THE GUIDE

This guide informs individuals of the benefits of eating fish and which fish to eat in limited quantities or not to eat due to environmental contaminants. Fish is a good source of high-quality protein, “heart healthy” fatty acids, and essential nutrients that contribute to a healthy diet if eaten regularly. Fish is low in cholesterol. Some types of fish have omega-3 fatty acids that are essential in the development of the central nervous system and may be beneficial in reducing heart disease. **DHSS evaluates contaminant levels in fish annually; however, DHSS does not update this advisory on a regular schedule. DHSS updates this advisory on an as-needed basis when evidence warranting additions or removals of advisories comes to our attention.**

Annually, the Missouri Department of Health and Senior Services (DHSS) evaluates fish contaminant levels to make sure fish are safe to eat. All fish contain a small amount of chemical contaminants. **In most instances and for most people, the health benefits of eating fish outweigh the potential risks from contaminants.** However, there are occasions when limited or no consumption of certain fish is appropriate.

This guide is not intended to discourage you from eating fish; rather, it should help you make informed decisions about eating fish from Missouri’s water bodies.



GENERAL INFORMATION

GENERAL RULES TO FOLLOW:

Keep eating fish. Eat the smaller, legal-size fish and release the lunkers so they can fight another day. Smaller or younger fish tend to have lower levels of contaminants than older fish of the same species because younger fish consume smaller prey and have not lived as long to accumulate as many contaminants.

Fish in Missouri that typically have very low levels of mercury are trout, crappie (except those from Clearwater Lake), sunfish (except green sunfish), and suckers.

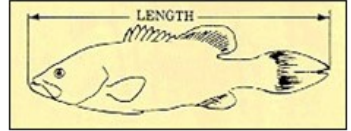


POSTED SIGNS:
If a fishing location has warning signs posted, follow them.

TERMS AND DEFINITIONS

SENSITIVE POPULATIONS: Because growth and development occur rapidly in young children, some chemicals may affect them differently than adults. Due to the potential risk mercury poses to the developing nervous system of fetuses and young children, special consideration is given to pregnant women, women of childbearing age, nursing mothers, and children younger than 13. These groups will be referred to as sensitive populations throughout this advisory.

FISH LENGTH: Fish are measured from the snout to the tip of the tail, as shown in the drawing.



MEAL SIZE: This advisory defines a meal as 8 ounces of uncooked fish for a 150-pound person and 3 ounces for a 40-pound child.



FISH PREPARATION: The chemical levels in some fish can be reduced by filleting the fish and carefully trimming away the fat when the fish is cleaned.

Some chemicals, like lead, concentrate in bones, while other chemicals, such as chlordane and PCBs, concentrate in fatty tissue. When fish is prepared by filleting and trimming away the fat, contaminants are minimized.

The meal advice in this advisory is based on these preparation techniques. Individuals may be exposed to higher chemical levels if they fail to follow these techniques. Filleting will not reduce the levels of some chemicals, such as mercury.

TABLE OF CURRENT MISSOURI FISH ADVISORIES FOR SENSITIVE POPULATIONS

| Advisory Population | Map Location | Species ² | Length (>) greater than | Serving Advice ¹ no more than: | Contaminant |
|---|---|---|-------------------------|---|-------------|
| <p>Sensitive Populations:</p> <p>Pregnant women, women of childbearing age, nursing mothers, and children younger than age 13.</p> | All United States water bodies | All fish | All sizes | 1/week | Mercury |
| | All Missouri water bodies | Large-mouth Bass, Spotted Bass, Small-mouth Bass, and Walleye | > 12" | 1/month | Mercury |
| | | Flathead, Channel, and Blue Catfish | > 30" | | |
| | <p>H</p> <p>Clearwater Lake in Reynolds County</p> | White Bass | > 15" | 1/month | Mercury |
| Crappie | | > 9" | | | |

DHSS bases the advisory on extensive, annual fish-tissue studies by Missouri Department of Conservation (MDC) and Missouri Department of Natural Resources (DNR) at various Missouri lakes, ponds, rivers, and streams. DHSS uses the most recent science to develop reasonable, conservative consumption guidelines for Missouri.

TABLE OF CURRNET MISSOURI FISH ADVISORIES
FOR ALL CONSUMERS

| Map Location | Species ² | Length (>) greater than | Serving Advice ¹ no more than: | Contaminant |
|---|--------------------------------------|-------------------------|---|--------------------------|
| A Mississippi & Missouri Rivers | Shovelnose Sturgeon (excluding eggs) | All sizes | 1/ month | PCBs, Chlordane, Mercury |
| | Sturgeon eggs | — | Do Not Eat | |
| | Flathead, Channel, & Blue Catfish | > 17" | 1/week | |
| | Buffalo ³ | All sizes | 1/ month | |
| | Common Carp | > 21" | 1/week | |
| B Blue River from Minor Park to the Missouri River in Jackson County including Indian Creek up to Holmes Road | Common Carp & Catfish | All sizes | 1/ month | PCBs, Chlordane |
| C Lake Buteo at Knob Noster State Park in Johnson County | Largemouth & Smallmouth Bass | All sizes | Do Not Eat | Mercury |
| | All other fish | All sizes | 1/ month | |
| D Simpson Park Lake at Simpson Park in St. Louis County | Buffalo ³ | > 16" | 1/ month | Chlordane, Mercury, PCBs |

Footnotes:

1 - This advisory defines a meal as 8 ounces of uncooked fish for a 150-pound person and 3 ounces for a 40-pound child.

**TABLE OF CURRENT MISSOURI FISH ADVISORIES
FOR ALL CONSUMERS (CONTINUED)**

| Map Location | Species ² | Length (>) greater than | Serving Advice ¹ no more than: | Contaminant |
|---|---|-------------------------|---|-------------|
| E Big River in St. Francois & Jefferson Counties | Sunfish ⁴ , Carp, Redhorse Suckers, & other types of suckers | All sizes | Do Not Eat | Lead |
| F Flat River in St. Francois County from Highway “B”, to where it enters the Big River | Sunfish ⁴ , Carp, Redhorse Suckers, & other types of suckers | All sizes | Do Not Eat | Lead |
| G Big Creek near the town of Glover in Iron County | Sunfish ⁴ | All sizes | Do Not Eat | Lead |
| I Montrose Lake In Henry County | Flathead Catfish | > 24” | 1/week | PCBs |
| J Lake Springfield In Greene County | Catfish and Carp | All sizes | 1/ month | PCBs |
| K Adair, Sweetwater, and Logan Creek from Adair Creek to Susie Creek in Reynolds County | Suckers and other bottom feeding species | All sizes | Do Not Eat | Lead |


Footnotes:

2 - For species identification see Missouri Department of Conservation’s (MDC) website: <https://huntfish.mdc.mo.gov/fishing/regulations>.

3 - Buffalo describes several species including bigmouth buffalo, smallmouth buffalo, and black buffalo

4 - Only five sunfish species are included in the Big River, Flat River, and Big Creek advisories: longear sunfish, green sunfish, bluegill, warmouth, and rock bass.

TABLE OF CURRENT MISSOURI FISH ADVISORIES
FOR ALL CONSUMERS (CONTINUED)

| Map Location | Species ² | Length (>) greater than | Serving Advice ¹ no more than: | Contaminant |
|---|--|-------------------------|---|-------------|
|  St. Francis River, Little St. Francis River, and Fredericktown City Lake in Madison County | Sucker, carp, and other bottom-feeding species | All sizes | See foot-note 5 below | Lead |

Footnotes:

5- The skeletons, particularly vertebrae and ribs, of fish in these waterbodies contain elevated levels of lead. Remove vertebrae and ribs for all preparations, including pickling, grinding, and canning. Fillets of these fish, even with the small “Y” bones intact, are safe to eat. For fillets, statewide mercury advisories apply for sensitive populations. See “Trimming and Cooking Your Fish to Reduce Fat and Chemical Contaminants” on page 13 for more information.

Map Key for Local Missouri Fish Advisories (Map on page 9)

| Map Location | Details |
|--------------|--|
| A | <u>Mississippi and Missouri Rivers: PCBs, Chlordane, and Mercury</u> Shovelnose Sturgeon - 1/Month Sturgeon Eggs - Do Not Eat Flathead, Channel, and Blue Catfish > 17" - 1/Week Common Carp > 21" - 1/Week Buffalo ¹ - 1/month |
| B | <u>Blue River (from Minor Park to the Missouri River in Jackson County including Indian Creek up to Holmes Rd.): PCBs and Chlordane</u> Common Carp and Catfish of all sizes - 1/Month |
| C | <u>Lake Buteo: Chlordane and Mercury</u> Largemouth and Smallmouth Bass - Do Not Eat - Mercury All other Fish of all sizes - 1/Month - Mercury |
| D | <u>Simpson Park Lake: Chlordane, Mercury, and PCBs</u> Buffalo ¹ > 16" - 1/Month |
| E | <u>Big River: Lead</u> Sunfish ² , Carp, and Suckers - Do Not Eat |
| F | <u>Flat River: Lead</u> Sunfish ² , Carp, and Suckers - Do Not Eat |
| G | <u>Big Creek: Lead</u> Sunfish* - Do Not Eat |
| H | <u>Clearwater Lake: Mercury</u> White Bass > 15" - 1/Month (for Sensitive Populations) Crappie > 9" - 1/Month (for Sensitive Populations) |
| I | <u>Montrose Lake: PCBs</u> Flathead Catfish > 24" - 1/Week |
| J | <u>Lake Springfield: PCBs</u> Catfish and Carp of all sizes - 1/Month |
| K | <u>Adair Creek, Sweetwater Creek, and Logan Creek from Adair Creek to Susie Creek in Reynolds County: Lead</u> |

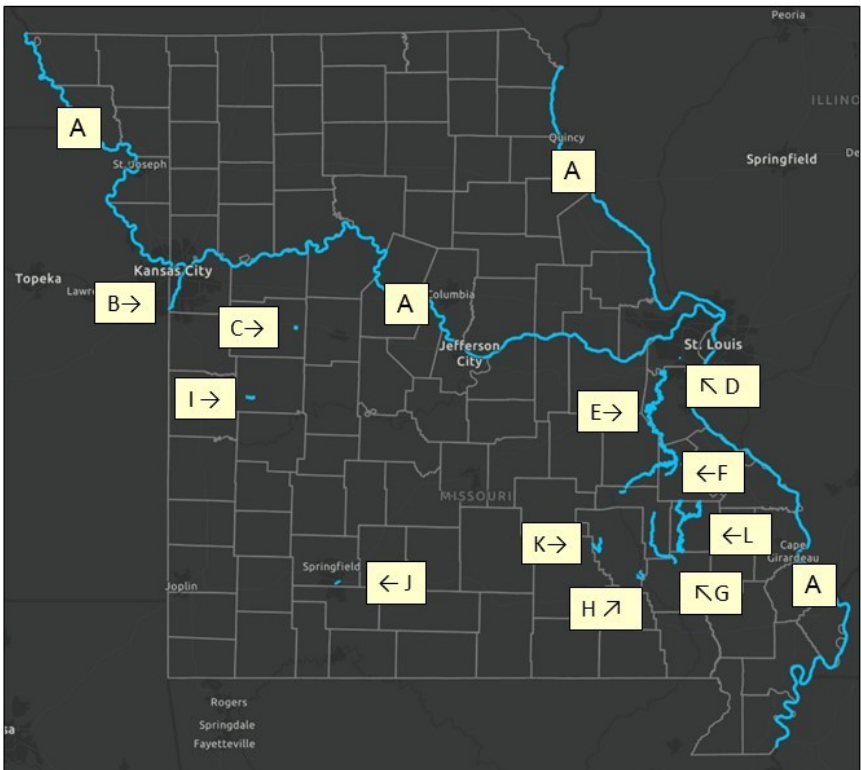
1 - Buffalo describes several species including bigmouth buffalo, smallmouth buffalo, and black buffalo.

2 - Only 5 species in the sunfish family are included in the Big River, Flat River, and Big Creek advisories: Long-ear sunfish, green sunfish, bluegill, warmouth, and rock bass.

Map Key for Local Missouri Fish Advisories

| Map Location | Details |
|--------------|---|
| L | <p>St. Francis River, Little St. Francis River, and Fredericktown City Lake in Madison County: Lead</p> <p>Suckers, carp, and other bottom-feeding species of all sizes - See page 7</p> |

Current Missouri Fish Advisory Locations



Statewide Advisory: All Missouri waterbodies, including those not shown - *Mercury*

Largemouth Bass, Smallmouth Bass, Spotted Bass, and Walleye >12":
1/month for Sensitive Populations

Flathead, Channel, and Blue Catfish >30":
1/month for Sensitive Populations

All other fish:
1/week for Sensitive Populations

Details about the lettered locations on the map are on the next two pages.



HEALTH BENEFITS OF EATING FISH

Recent medical research indicates that both the young and old can have significant health benefits from eating fish. A well-balanced diet that includes a variety of fish and shellfish can contribute to heart health and children's proper growth and development. The American Heart Association recommends that individuals include fish in their diets due to evidence of a link between eating fish and a lowered risk of coronary heart disease death.

Fish is an important part of a healthy diet.

- Fish contain high-quality protein and other nutrients our bodies require.
- Fish are low in saturated fat and cholesterol.
- Fatty fish, such as salmon, herring, and, to a lesser extent, tuna and trout, have high levels of omega-3 fatty acids which may:
 - ◆ lower cholesterol when substituted for saturated fatty acids such as those in meat;
 - ◆ improve learning ability in children;
 - ◆ decrease triglycerides;
 - ◆ lower blood pressure;
 - ◆ reduce blood clotting; and
 - ◆ enhance immune function.



Healthier fish recipes can be found at: <https://www.heart.org/en/healthy-living/healthy-eating> , select Healthy Living, Eat Smart, View Recipes.

HOW DO THE RECOMMENDATIONS MADE IN THE FISH ADVISORY COMPARE TO THOSE MADE BY THE AMERICAN HEART ASSOCIATION AND OTHERS?

The American Heart Association recommends eating at least two servings (3.5-ounces each) of fish a week.

This recommendation may seem different than the one fish meal per week recommendation in this advisory. However, the two recommendations are comparable. For instance, eating at least two, 3.5-ounce servings of baked or grilled fish each week is roughly equivalent to eating one, 8-ounce fish meal per week.

The American Heart Association recommends that individuals include fish in their diets.



WEB RESOURCES

- Visit our website at www.health.mo.gov/fishadvisory for more information on fish advisories, or call us at 573-751-6102 or (toll-free) 866-628-9891.
- To help you identify fish species, see the Missouri Department of Conservation's (MDC) website at: <https://huntfish.mdc.mo.gov/fishing/regulations>.

TRIMMING AND COOKING YOUR FISH TO REDUCE FAT AND CHEMICAL CONTAMINANTS



- Fillet your fish. Filleting is strongly recommended because removing bones, fatty tissues, and all internal organs will greatly reduce the levels of most contaminants in fish.
- Trim away fatty portions of the fish such as the dorsal, lateral, and belly area.
- Remove the skin from fish.
- Do not eat fish eggs. They are very high in fat and may contain contaminants that are associated with fatty tissue.
- Bake, grill, or broil fish on a rack and let the fat drip away. Do not use the juices. Avoid pan-frying in butter or animal

fat, or making soups or chowders. These methods retain fat-laden juices.

- Do not reuse the oil if you deep-fry fish. Some contaminants will become concentrated in reused oil.
- Filleting, trimming fat, or special cooking methods will not reduce the mercury levels in fish, since mercury occurs throughout the fillet.
- Lead accumulates in fish bone at much higher concentrations than in other parts of fish. Because the larger fish bones such as the vertebrae and ribs are not typically consumed by individuals, the amount of lead in the bone is usually not taken into account while drawing recommendations for the Missouri Fish Consumption Advisory. However, quantities of these larger bones might remain in some preparations such as canning, pickling, and grinding. Suckers, carp, and other fish may have high bone-lead levels if they are caught in counties where lead mining has historically occurred, like Jasper, Madison, Jefferson, St. Francois, Washington, and Iron. For fish caught in these areas, DHSS recommends removing as much of the larger bones as possible before preparing fish. Refer to the rest of this document for any site-specific advisories on fillets.

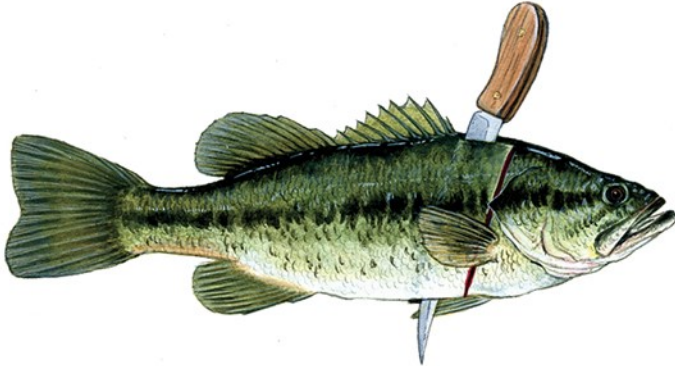
FILLETING YOUR CATCH

Filleting a bass, crappie, or other sunfish is easy. It just takes a little practice.

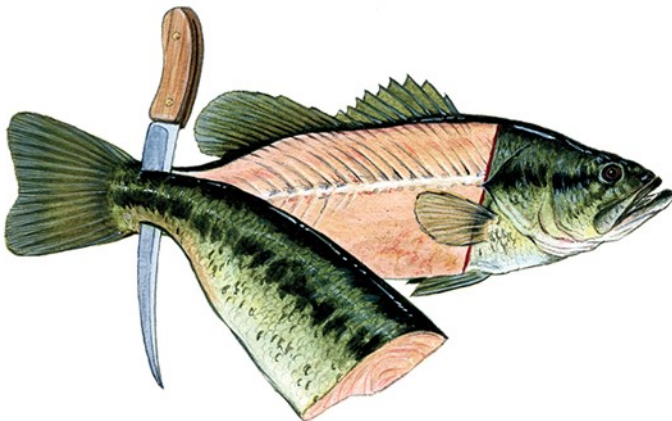
Gather these supplies:

- Long, sharp knife
- Bowl of water
- First-aid kit (just in case)

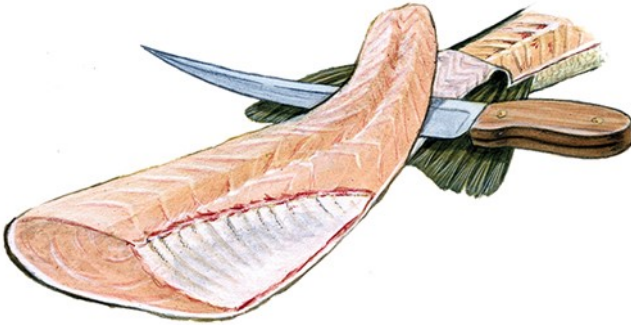
1. Wash the fish to remove as much slime as possible, then lay the fish on its side. Make a vertical cut just behind the gills. Cut gently until you feel the backbone. You don't want to cut through the bone, but you want to get as close to it as possible.



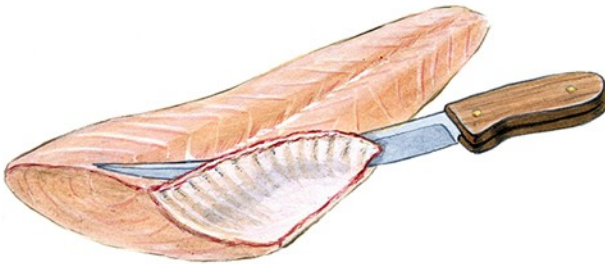
2. Hold the fish's head with your free hand. Slide the knife blade with a sawing motion along the backbone toward the tail. Stop slicing when you get half an inch from the tail fin.



3. Flip the freshly cut fillet over, then slice it off the flap of skin to which it's attached.



4. If there are patches of shiny gray connective tissue, slice them off. Drop the fillet in a bowl of water, flip the fish over, and repeat. In no time, you'll be having fish for dinner!



Warning:
You'll be working with a sharp
knife and a slippery fish,
so be careful!

These filleting tips are from the June/July 2012 issue of Xplor magazine, available online at:

<http://xplor.mdc.mo.gov/xplor/stuff-do/all-activities/fillet-fish>.

Advisory: Lead in Fishing Tackle

Lead can be harmful to individuals, especially children, when ingested or inhaled. Many of us do not have to look further than our tackle boxes to find lead. Items like sinkers, weights, shots, jig heads, and weighted hooks are often made of lead. Improper use and handling of these items may result in lead entering your body. Protect yourself and your family by following these simple steps:

1. Replace the lead items in your tackle box with non-lead alternatives such as tin, bismuth, tungsten, and ceramic. Look for these alternatives at locations where fishing tackle is sold.
2. If non-lead fishing tackle is not a viable option, you can still minimize your exposure by:
 - Never putting lead weights in your mouth! AND
 - Washing your hands before eating, drinking, or putting them in or near your mouth.

Following these simple steps will help protect you and your family from the dangers of lead.

Special Advisory: **MELTING LEAD IS VERY DANGEROUS!** Melting lead to cast sinkers should not be done at home. Lead fumes and lead dust can be released during this process and contaminate your home, garage, yard, and clothes.



COMMERCIALLY PURCHASED FISH

U.S. Environmental Protection Agency (EPA) and Food and Drug Administration (FDA)

EPA and FDA issued updated advice on fish consumption in October 2021. In this advice, the two agencies have concluded that the following types of people should eat more fish that is lower in mercury in order to gain important developmental and health benefits:

- Pregnant and breastfeeding women
- Those who might become pregnant
- Children aged 11 years and younger

This advice was prompted in part by an analysis, conducted by the FDA, of seafood consumption data from over 1,000 pregnant women in the U.S. This study found that 21 percent of the women ate no fish in the previous month, and those who ate fish ate far less than what is recommended in the 2010 Dietary Guidelines for Americans.

The 2021 advice recommends that pregnant women eat at least 8 ounces and up to 12 ounces (2-3 servings) per week of a variety of fish that are lower in mercury to support fetal growth and development. The advice also recommends children aged 11 and younger eat 2 servings (1 – 4 ounces, depending on age) of a variety of fish that are lower in mercury to support spinal cord development.

The updated advice cautions pregnant or breastfeeding women to avoid four types of fish that are associated with high mercury levels: tilefish from the Gulf of Mexico, shark, swordfish, marlin, orange roughy, bigeye tuna, and king mackerel.

In addition, the updated draft advice recommends limiting consumption of white (albacore) tuna to 4 ounces a week.

Fish consumption choices lower in mercury include some of the most commonly eaten fish, such as: shrimp, pollock, salmon, canned light tuna, tilapia, catfish, and cod.

More information is available online at:

<https://www.epa.gov/fish-tech/epa-fda-advisory-mercury-fish-and-shellfish>.

Trout with Skillet-Roasted Peppers

Ingredients:

- 1 tablespoon olive oil, divided use
- 2 medium poblano peppers, ribs and seeds discarded, thinly sliced
- 5 ounces grape tomatoes or cherry tomatoes, halved (about 1 cup)
- 1 medium garlic clove, minced
- 1 to 2 teaspoons balsamic vinegar
- 1/2 teaspoon salt, divided use
- 1/4 teaspoon pepper
- Paprika to taste
- 4 trout fillets or any other thin mild fish fillets (about 4 ounces each), rinsed and patted dry
- 1 medium lime, cut into 8 wedges

Cooking Instructions:

Heat a large nonstick skillet over medium-high heat. Add 1 teaspoon oil, swirling to coat the bottom. Cook the peppers for 4 to 6 minutes, or until beginning to richly brown on the edges, stirring frequently.

Gently stir in the tomatoes. Cook for 2 minutes, or until soft, stirring gently and frequently. Remove from the heat. Gently stir in the garlic, vinegar, and 1/4 teaspoon salt. Transfer to a small bowl. Cover to keep warm.

In the same skillet, heat the remaining 2

teaspoons oil over medium-high heat, swirling to coat the bottom. Sprinkle the pepper, paprika, and remaining 1/4 teaspoon salt over both sides of the fish. Cook for 3 minutes on each side, or until the fish flakes easily when tested with a fork. Transfer to a platter.



To serve, squeeze 4 lime wedges over the fish. Spoon the poblano mixture on top. Serve with the remaining lime wedges to squeeze over the poblano mixture if desired.

Oven Baked Fish & Chips



Ingredients:

- Canola or olive oil cooking spray
- 1 1/2 pounds russet potatoes, scrubbed and cut into 1/4-inch-thick wedges
- 4 teaspoons canola oil
- 1 1/2 teaspoons Cajun or Creole seasoning, divided
- 2 cups cornflakes
- 1/4 cup all-purpose flour
- 1/4 teaspoon salt
- 2 large egg whites, beaten
- 1 pound fresh fish fillets, cut into 4 portions

Cooking Instructions:

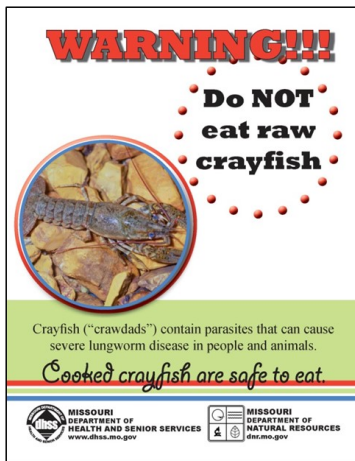
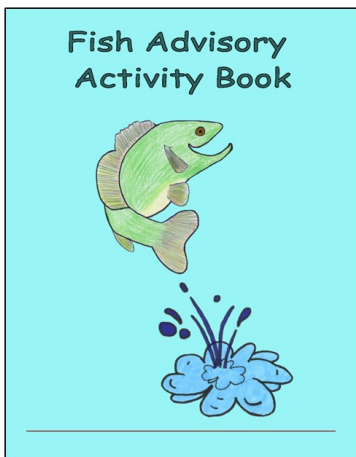
Position racks in upper and lower third of oven; preheat to 425°F. Coat a large baking sheet with cooking spray. Set a wire rack on another large baking sheet; coat with cooking spray.

Place potatoes in a colander. Thoroughly rinse with cold water, then pat dry completely with paper towels. Toss the potatoes, oil and 3/4 teaspoon Cajun (or Creole) seasoning in a large bowl. Spread on the baking sheet without the rack. Bake on the lower oven rack, turning every 10 minutes, until tender and golden, 30 to 35 minutes.

Meanwhile, coarsely grind cornflakes in a food processor or blender or crush in a sealable plastic bag. Transfer to a shallow dish. Place flour, the remaining 3/4 teaspoon Cajun (or Creole) seasoning and salt in another shallow dish and egg whites in a third shallow dish. Dredge fish in the flour mixture, dip it in egg white and then coat all sides with the ground cornflakes. Place on the prepared wire rack. Coat both sides of the breaded fish with cooking spray. Bake the fish on the upper oven rack until opaque in the center and the breading is golden brown and crisp, about 20 minutes.

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Visit the DHSS Fish Advisory website for additional information,
educational materials and kid activities at:
www.health.mo.gov/fishadvisory



Missouri's Environmental Public Health Tracking (EPHT) Network
portal is available at:

<http://ephtn.dhss.mo.gov>



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