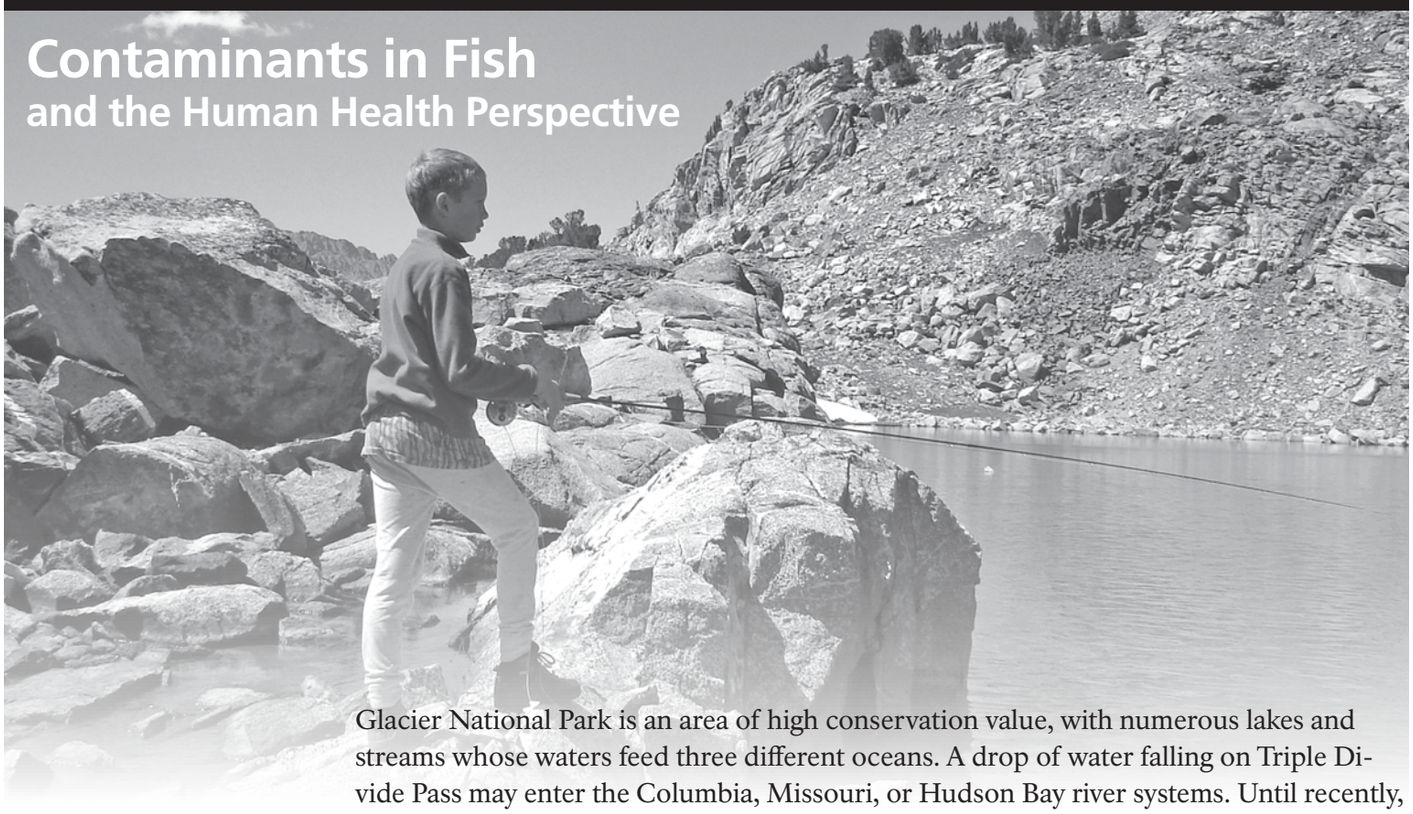
Glacier

National Park Service
U.S. Department of the Interior

Glacier National Park

Contaminants in Fish
and the Human Health Perspective



Angler fishing high mountain lake
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Glacier National Park is an area of high conservation value, with numerous lakes and streams whose waters feed three different oceans. A drop of water falling on Triple Divide Pass may enter the Columbia, Missouri, or Hudson Bay river systems. Until recently, the waters of the park were thought to be pristine, with little impact from contaminants. However, the more we learn about transport of airborne pollution and contaminants, as well as food-chain effects, the more we become aware of issues that impact even those areas we thought were relatively secure from contamination, like Glacier.

Western Airborne Contaminants Assessment Project

The National Park Service (NPS), Parks Canada, and the Environmental Protection Agency (EPA) have recently evaluated mercury levels in fish tissues in a number of Glacier's waters. Fish have been tested from Lake McDonald, as well as Bowman, Harrison, St. Mary, Upper Two Medicine, Oldman, and Snyder Lakes, as well as in Waterton Lakes, Waterton Lakes National Park in Canada. Upper Waterton Lake is a transboundary water spanning the international border between Glacier and Waterton Lakes National Park in Canada. Mercury levels of concern, resulting in fish consumption advisories, were detected in these waters.

In addition to the recent mercury testing, the six-year, interagency Western Airborne Contaminants Assessment Project (WACAP), evaluated cutthroat trout from Snyder and Oldman Lakes in Glacier for the presence of semi-volatile organic compounds (e.g., current and historic-use pesticides, combustion and industrial by-products), as well as metals such as mercury. WACAP was initiated by NPS in 2002 to determine the risk to ecosystems and food webs from airborne contaminants, and to determine probable sources of contaminants. Glacier was one of eight "core" national parks studied, where researchers analyzed air, water, snow, sediment, lichen, conifer needles, and fish. More limited sampling focusing on vegetation was conducted at twelve secondary parks. The study results, which looked at parks from northern Alaska to southern Texas, were released in February 2008.

WACAP results showed mercury levels did not exceed human consumption thresholds for cutthroat trout in Oldman or Snyder lakes. However, in Oldman and Snyder lakes, dieldrin (a pesticide banned in 1987) and DDT (a pesticide banned in 1972) were detected in these fish. One fish (out of 10) from Oldman Lake exceeded the dieldrin human consumption cancer risk threshold for recreational fish consumption. Other pesticides were also measured in fish at both lakes, at concentrations well below EPA human health thresholds. The combined effects of these contaminants in Oldman Lake correspond to a 1 in 100,000 increase in lifetime cancer risk over a lifetime of fish consumption, at or above 2.3 meals/month (8 ounce fillet, cooked = 1 meal). One would have to consume greater than 30 meals/month of cutthroat trout fillets over a lifetime from Snyder Lake to reach the same cancer risk. Therefore, it is recommended that individuals consume less than these amounts from these waters to minimize any risk. Due to the complexity of the findings, we urge you to look at the study summaries and health advisory explanations available on the NPS website at: http://www.nature.nps.gov/air, which also has links to other informative sites about WACAP.

Due to the expense of this type of evaluation, we cannot sample additional lakes in Glacier for the broad suite of contaminants evaluated in the WACAP study, but it is expected that these contaminants may be in other park waters. Subsequent to the WACAP study, Glacier National Park, in collaboration with the Glacier National Park Fund and the University of Montana, sampled additional lakes in the park for mercury concentrations in fish tissue. The results prompted additional guidance for anglers who wish to consume fish caught in the park.

What contaminants, and where do they come from?

Mercury is a naturally occurring element found in rocks, soil, water, and air. However, human activities have greatly increased the amount of mercury cycling in the environment through processes such as burning coal for electricity, mining, and burning household and industrial waste. When mercury is deposited in water, bacteria convert inorganic mercury into methylmercury, the toxic form that accumulates in fish and other aquatic organisms. Fish consumption is the most important pathway for human and wildlife exposure to methylmercury. Methylmercury impairs neurological development in fetuses, infants, and children. Larger, longer-lived fish, such as lake trout, which eat other fish, accumulate more methylmercury than smaller, younger fish which eat less contaminated prey. Fish at the top of the food-chain will generally contain the most mercury in any given system. The presence of current and historic use pesticides likely results from the disturbance of agricultural areas with previously contaminated soils, and subsequent atmospheric transport and deposition to Glacier's waters by wind and precipitation patterns. Many pesticides can also accumulate in fish.

Are the fish safe to eat?

The health risks of eating highly contaminated fish are likely low, but each person should make his or her own decision about eating fish that were caught in Glacier. Glacier has a fish consumption advisory for Upper Two Medicine and Waterton Lakes (see table below). Individuals at high-risk, such as young children, nursing mothers, pregnant women, and women who may become pregnant should be more conservative in their fish-eating habits.

Health benefits of fish

Due to body size, weight, and other factors, risks and benefits from eating fish vary from person to person. When properly prepared, fish provide an excellent source of protein that is low in saturated fat and sugar, and is also a good source of Vitamin E and omega-3 fatty acids. Some researchers suggest that eating a half-pound of properly prepared fish each week is helpful in preventing heart disease.

General guidelines to reduce your health risk

In general, eat fish that are likely to be less contaminated. Keep smaller, younger fish for eating. Younger fish have had less time to accumulate contaminants than older, larger fish. Contaminants such as mercury and PCB's build up in large predatory fish. Clean and cook your fish properly. Certain contaminants, such as PCB's, accumulate in fatty areas of the fish. Trim off the skin and other fatty portions of the fish such as the back, side, and belly fat. Bake or broil your fish on a rack to allow any remaining fat to drip away. Fish are part of a healthy diet, and by following these guidelines, you can pursue the dietary benefits of fish while reducing the amount of unwanted contaminants in your diet.

Fish consumption guidelines (for mercury contamination)

Meals/month defined as an 8 oz serving for a man and a 6 oz serving for women and children

			Total fish length in inches						
Water	**Species**	**Person**	**6-10**	**10-14**	**14-18**	**18-22**	**22-26**	**26-30**	**30+**
Cosley Lake	Lake Trout	M	U	–	U	–	12	–	2
		WC	U	–	11	–	5	–	1
Hidden Lake	Yellowstone Cutthroat	M	U	U	U	–	–	–	–
		WC	U	U	U	–	–	–	–
Lake McDonald	Lake Whitefish	M	–	–	U	U	–	–	–
		WC	–	–	8	8	–	–	–
Sherburne Lake	Lake Whitefish	M	–	U	U	–	–	–	–
		WC	–	7	7	–	–	–	–
	Northern Pike	M	–	–	–	–	–	–	3
		WC	–	–	–	–	–	–	1
Logging Lake	Mountain Whitefish	M	U	U	–	–	–	–	–
		WC	U	12	–	–	–	–	–
St. Mary Lake	Lake Trout	M	–	–	9	9	9	9	–
		WC	–	–	3	3	3	3	–
	Lake Whitefish	M	–	–	U	U	–	–	–
		WC	–	–	8	8	–	–	–
	Burbot	M	–	–	11	11	6	6	–
		WC	–	–	4	4	2	2	–
Upper Two Medicine Lake	Lake Trout	M	–	–	U	–	–	–	–
		WC	–	–	8	–	–	–	–
Waterton Lakes	Lake Trout	M	–	U	12	8	4	–	4
		WC	–	7	4	3	1	–	1
	Lake Whitefish	M	U	U	U	U	U		U
		WC	U	U	9	7	7		8
Lakes west of the Continental Divide	Lake Trout	M	–	–	U	9	6	6	5
		WC	–	–	6	3	2	2	2

M = Men and Women not of reproductive age
WC = Women of reproductive age and Children
U = Unlimited meals per month
– = No data

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