

Fisheries Extension Enhancement

CONTAMINANTS AND PATHOGENS

Theme Scope: Raising consumer awareness of the proper ways to handle, store and prepare seafood to minimize risk is a critical component of this theme. This theme both includes and goes beyond the scope of the national seafood science theme to include the health of fishery-dependent wildlife and the health of the fisheries themselves in the face of risks due to contaminants and pathogens.

Regional Issues Addressed by this Theme

Many chemical contaminants are present in Great Lakes surface waters at very low concentrations. Some of these chemicals can bio-accumulate in aquatic organisms via their diet and become concentrated at levels that are much higher than in the water itself. This is especially true for substances that do not break down readily in the environment, like persistent chemicals such as PCBs and metals like mercury. The concentration of some chemicals in the tissues of top predators, such as lake trout and large salmon, can



be millions of times greater than the concentration in the water. Forty-two Areas of Concern (AOCs) have been internationally recognized on the Great Lakes largely due to concerns about contaminants.

It is important that people are aware of contaminants in fish and the actions that can be taken to reduce exposure – particularly for those people who are at greatest risk from overexposure to contaminants found in fish. These include people who eat a lot of Great Lakes fish, who regularly eat large predator fish, who eat fish from highly contaminated waters, or eat a large amount of fish over a short period of time. In addition, the developing fetus and young children are at greater risk than adults. Subsistence fisheries in the Great Lakes region include both tribal and inter-city immigrant communities. Fish consumption advisories differ between the individual Lakes, as well as between different States and Provinces bordering each Lake, creating a patchwork of information that can be difficult for the consumer to interpret. Balancing health benefits of fish consumption against these risks is also an important consideration.

Health of the Great Lakes fisheries themselves, as well as that of fisheries-dependent wildlife, is also under threat from both contaminants and a variety of pathogens. Toxic microcystin-laden algal blooms are on the rise in the region as are pathogens such as botulism and diseases such as BKD.



Current Great Lakes Sea Grant Network Activities:

Hazard Analysis Critical Control Point (HACCP)

In the mid-1960's Pillsbury developed an innovative approach to ensuring safe meals for astronauts that has grown to become a standard for food safety here on Earth. HACCP programs emphasize processes rather than products. They identify the points in a process that are critical to the safety of the food and stress using scientifically-based methods to control the hazards. An effective HACCP plan is a self-inspection system that promotes communication between regulators and industry. Since HACCP principles are defined by how a company operates, they can be customized to suit a variety of industries. In 1997, the Food and Drug Administration (FDA) established HACCP regulations for the seafood industry. The National Sea Grant Program agreed to assist businesses to develop HACCP plans in their efforts to comply with the FDA's mandate. All programs of the Great Lakes Sea Grant Network regularly provide HACCP training to local industry. Besides this traditional approach to seafood safety, network agents have put a new twist on HACCP by applying it to practices in fish hatcheries and wild baitfish businesses that might spread aquatic nuisance species.

Innovation in Delivering Consumption Advisory Messages: Freddy the Fish

One example of an innovative project to address the need for better information on

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fish consumption advisories is Pennsylvania Sea Grant's partnership in editing and funding the printing of "Freddy the Fish", a brochure created by Villa Maria Academy Earth Force students that lists the Lake Erie and Presque Isle Bay fish consumption advisory and explains how to properly prepare fish in order to minimize intake of PCBs. With the help of Erie's International Institute and Printing Technologies, "Freddy the Fish" has been translated into Bosnian, Vietnamese, Spanish, Arabic, and Russian to target subsistence anglers in the region.

Standardizing Approaches to Assessing Fish Health: Fish Tumor Conference

National and international environmental regulatory agencies have determined that more standardized approaches are necessary to measure and compare the occurrence of fish tumors and deformities in Great Lakes' AOCs. Pennsylvania Sea Grant took the lead role, working with the U.S. EPA to host a conference on fish tumors and deformities as they relate to beneficial-use impairments in Great Lakes' AOCs. National and regional experts on fish tumors and Remedial Action Plan coordinators from around the Great Lakes attended the conference to develop standardized monitoring criteria for this beneficial-use impairment.

Integration with National Goals

The Contaminants and Pathogens Theme supports National Sea Grant goals in the areas of Fisheries, Seafood Science and Technology, and Biotechnology.

Fisheries extension enhancements within this theme will support national efforts to:

- Improve the safety and quality of existing and new seafood and seafood-derived products.

Encourage and support a wide range of freshwater and marine biotechnology research for:

- improving risk characterization of toxicants to aquatic animal life, and
- enhancing aquaculture and seafood safety.

Priorities for Regional Action

Help consumers understand the health risks of consuming seafood by:

- Developing user-friendly fish consumption advisories
- Assisting in the delivery of advisories to anglers and at-risk members of the public
- Educating anglers, charter captains, and managers on the accumulation and effects of toxins

Improve seafood safety by:

- Developing techniques and risk management principles to maintain or increase seafood quality during the period from catch to consumption.
- Coordinating efforts by the seafood industry and federal, state and local regulatory authorities to enhance the safety of seafood products

Reduce the risk to human health by:

- Developing a better understanding of the fate and effect of toxic chemicals and biological contaminants
- Relating toxic substances/materials to trophic levels in the food chain that may be at risk

Reduce the risk to fish health by:

- Identifying factors influencing disease prevalence and how to identify them, assess their impacts and manage them to reduce pathologies
- Developing more accurate approaches for assessing and predicting the risks to feral fish populations exposed to persistent bioaccumulative chemical contaminants



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Additional Information

**Great Lakes Fisheries Leadership Institute Curriculum Module:
Contaminant Issues Relevant to Great Lakes Fisheries**
www.glerl.noaa.gov/seagrant/GLFLI/PublicNotebook/Curriculum/Modules.html