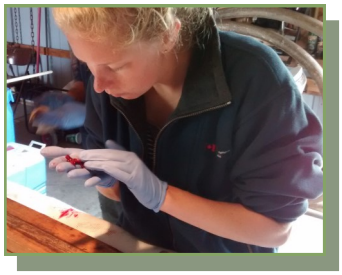
Who did the study ?

Environment and Climate Change Canada in collaboration with Walpole Island conducted the study on Brown Bullheads collected from channels and bays of the Walpole delta.

Fish Tumour Study

Fishermen of the study



Visual examination of livers

Study Facts:

"Older" fish have higher likelihood of developing cancerous tumours so fish 3 years and older were used in the study.

Fishermen from the WIFN community caught all of the fish provided for the study.

The field lab was set up at the WIFN Rod and Gun Club.

What was the study about?

The study was conducted to determine the frequency of cancerous liver tumours in brown bullheads, a sediment dwelling fish, within the bays and channels of the Walpole Island delta.

Why study brown bullheads?

Brown Bullhead fish are ideal for assessing biological impacts of local contamination because…

- they tend to stay in a specific areas and do not migrate long distances;
- are bottom-feeding and dwelling fish therefore they are exposed to contaminants in sediment; and
- A large database of approximately 1300 brown bullhead livers from various locations around the Great Lakes Basin allows for spatial comparison.

When was the study conducted?

The brown bullheads were collected in 2013 and 2014. Sixty fish, 25 cm in length or longer, were captured.

How was the Walpole Island First Nation community involved in the planning and conduct of the study?

In **2011**, Walpole Island First Nation indicated that brown bullheads were present in the bays and channels of the Walpole Island delta.

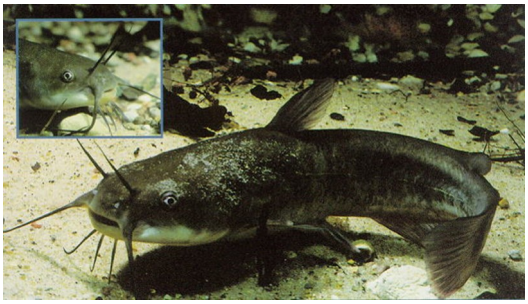
In **2012**, Environment and Climate Change Canada and the Walpole Heritage Centre arranged for a community information session to seek support to conduct a study on the prevalence of liver tumours in brown bullheads, the indictor species for the lower Great Lakes. Permission to collaborate on a study was granted and planning started.

In **2013 and 2014**, local fishermen trapped 60 brown bullheads. Livers were extracted and dorsal muscles were collected for contaminant analysis.

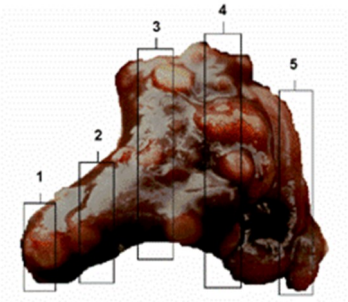
In **2016** the scientific analysis of the livers was completed.

Results of the Brown Bullhead Liver Tumour Study

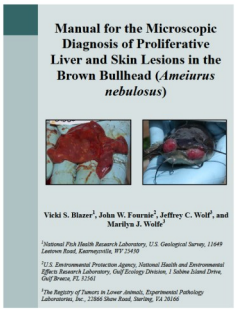
- 60 brown bullhead livers were collected and analyzed for cancerous liver tumours.



Brown Bullhead



Brown Bullhead liver sectioned for analysis



Protocol for liver analysis

What are the background levels in the lower Great Lakes?

- Based on 1300 samples of fish collected around the lower Great Lakes, a 2% tumour rate (2 of 100 fish would have cancerous liver tumours) became the accepted background tumour rate.

How many cancerous tumours were found in the brown bullheads collected from the WIFN delta?

- Zero cancerous liver tumours were found in the brown bullheads (0 of 60 livers analyzed).

Summary

The history of Sarnia's "chemical valley" extends back to the 1900's. Industrial and urban development led to significant degradation of the St. Clair River. Contaminants released can settle in the sediment and accumulate in areas where sedimentation occurs, such as the WIFN delta. Brown bullheads collected by WIFN anglers from bays and channels in the WIFN delta waters did not have cancerous liver tumours.

Sediment studies conducted within the WIFN delta revealed low contaminant levels and PAH concentrations, which are associated with the development of liver tumours in brown bullhead, are well below (by 100 + times!) than concentrations associated with biological effects.

A study on the Shorthead Redhorse Sucker conducted between 2002 to 2006 also revealed zero liver tumours in the 126 livers analyzed.

Based on the two studies, zero (0%) cancerous liver tumours were found in the two fish species collected