

Angler Perspective on Fish Tumors in the St. Lawrence River Massena/Akwesasne Area of Concern (AOC)

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OBJECTIVE

- Use standardized field and lab methodologies to assess incident rates of liver lesions and external anomalies in fish
- Ascertain public perception of fish tumors in both indigenous and non-indigenous communities of impact

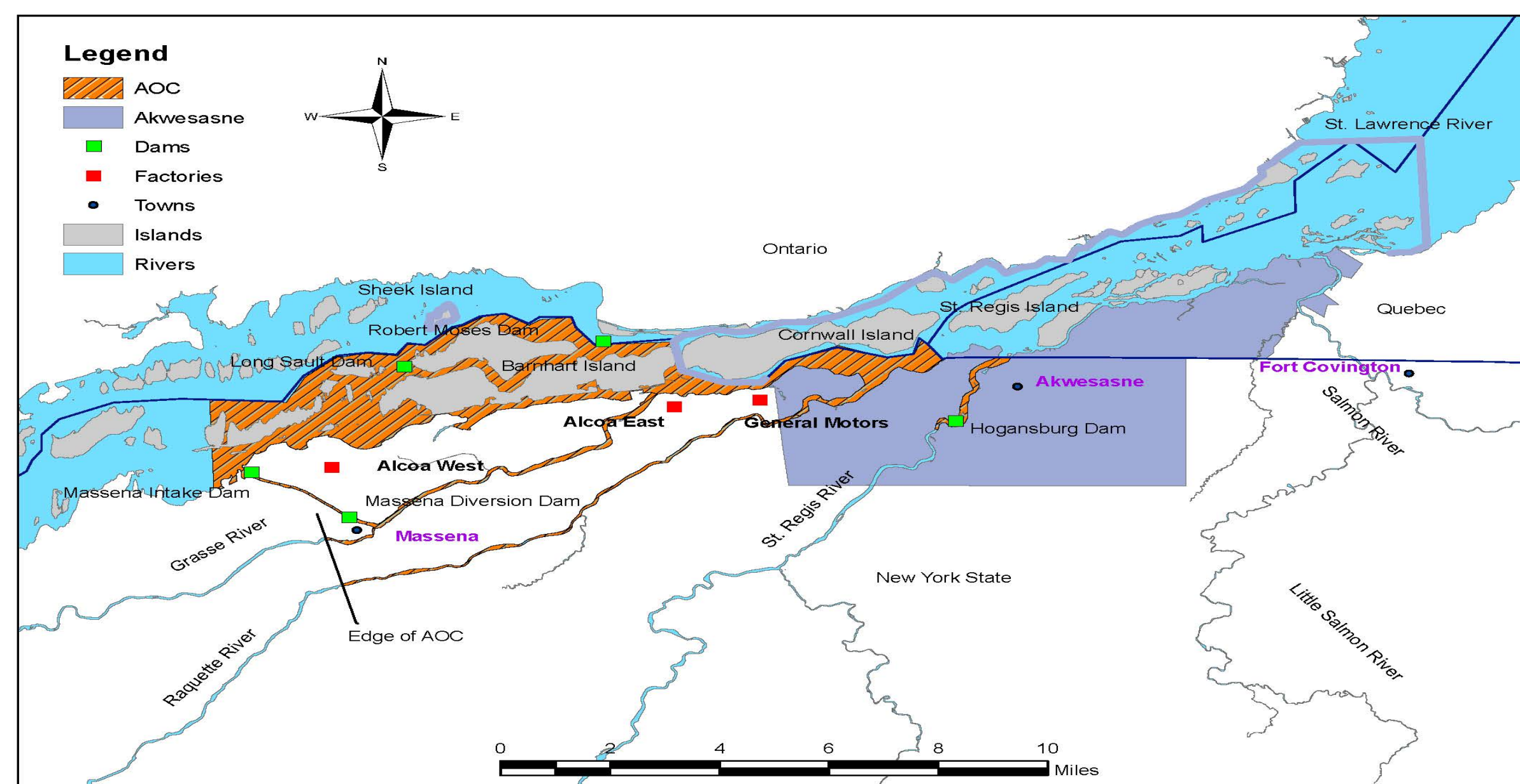
INTRODUCTION

Brown bullhead (*Ameiurus nebulosus*) are commonly affected with epidermal neoplasms of the mouth and skin. Observed external anomalies often cause angler concern. Neoplasms are defined as an abnormal tissue that grows by cellular proliferation to form a distinct mass of tissue that may be benign or malignant. Liver neoplastic and pre-neoplastic lesions have been used to indicate contaminant impacts. Three industrial facilities in Massena, NY were known to have historically released discharges that contained persistent organochlorine chemicals (POCs) such as polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), dibenzo-p-dioxins, dibenzofurans, dichlorodiphenyldichloroethylene (DDE), mirex, as well as nutrients and heavy metals into the Massena/Akwesasne Area of Concern (AOC). PAH contaminants are often associated with fish tumors.

To remove the Fish Tumor Beneficial Use Impairment (BUI) in the AOC the following must be demonstrated:

- incidence rates of fish tumors or other deformities do not exceed rates at unimpacted reference sites;
- survey data confirm the absence of neoplastic or pre-neoplastic liver tumors in bullhead or suckers compared to reference sites;
- liver tumors do not exceed 5%; and
- public acceptance.

STUDY SITE



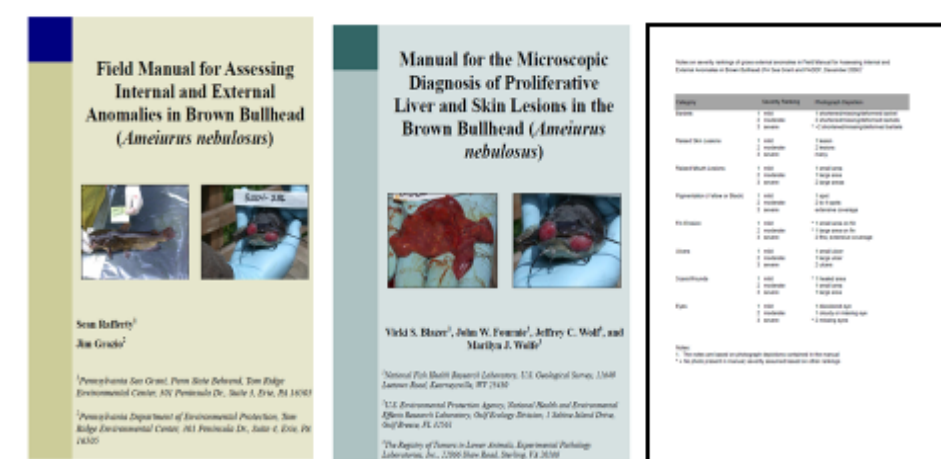
St. Lawrence River Area of Concern (AOC) at Massena/Akwesasne

By The St. Regis Mohawk Tribe Environment Division

SLR – St. Lawrence River, GRA – Grasse River, RAQ – Raquette River, StR – St. Regis River.
“Inside” = Inside the Area of Concern and “Outside” = Outside (upstream) Area of Concern.
R – Reference Site.

METHODS

Standardized Field and Lab Methodologies
Used in 2012, 2013, and 2014



St. Lawrence River Area of Concern (AOC) at
Massena/Akwesasne
Fish Tumor Research Unit Department (SRMT) Survey

The purpose of this survey is to determine the prevalence and potential of fish tumors in the St. Lawrence River Area of Concern (AOC) at Massena/Akwesasne. The survey will focus on the following sites:

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RESULTS - HISTOLOGY

2012 LIVER RESULTS				AOC vs. Ref.	AOC vs. Ref
SITE	N=Fish	Liver Pre-Neoplastic	Liver: neoplastic	Liver Pre-Neoplastic	Liver Neoplastic
SLR-AOC	24	20 (83%)	6 (25%)	Inside	Inside
SLR-R	30	20 (67%)	4 (13.3%)	72%	14.8%
GRA-AOC	30	19 (63%)	2 (6.7%)	Outside	Outside
GRA-R	8	1 (12.5%)	0 (0%)	55.8%	9.3%
RAQ-AOC	0				
RAQ- R	5	3 (60%)	0		

2013 LIVER RESULTS				AOC vs. Ref.	AOC vs. Ref
SITE	N=Fish	Liver Pre-Neoplastic	Liver: neoplastic	Liver Pre-Neoplastic	Liver Neoplastic
SLR-AOC	26	1 (3.8%)	0	Inside	Inside
SLR-R	32	1 (3.1%)	0	3.8%	0.0%
GRA-AOC	30	1 (3.3%)	0	Outside	Outside
GRA-R	31	0 (0%)	0	2.6%	0.0%
RAQ- AOC	23	1 (4.3%)	0		
RAQ-R	15	1 (6.7%)	0		

2014 LIVER RESULTS				AOC vs. Ref.	AOC vs. Ref
SITE	N=Fish	Liver Pre-Neoplastic	Liver:neoplastic	Liver Pre-Neoplastic	Liver Neoplastic
SLR-AOC	57	0(0%)	0	Inside	Inside
SLR-R	35	0(0%)	0	0.0%	0.0%
GRA –AOC	35	0 (0%)	0	Outside	Outside
GRA-R	14	1(7.1%)	0	3.5%	0.0%
RAQ-AOC	32	0(0%)	0		
RAQ-R	8	1(12.5%)	0		
StR-AOC	35	0(0%)	0		
StR-R	0				

*Only three fish with raised external lesion for histology in 2012-2014.
(see photos below for results and explanation).



Granulomas: raised smooth nodules on the skin containing numerous small nematodes (parasitic roundworm)



Papilloma: Small benign tumors known as warts (dermal sarcoma). Unknown cause.

RESULTS –ANGLER SURVEYS

ANGLER SURVEY		# of Surveys Completed	Gift Incentive
Year	Survey Method		
2011	Community Event	8	YES
	"Wellness Day"		
2012	Bait and Tackle Shops & Marinas (N=6) & Fishing Tournaments (N=3)	48	YES
2014	Community Event	90	YES
	Rod and Gun Club		
	Annual Sportsman's Expo		



CONCLUSIONS

- 470 fish (i.e. bullhead, white sucker, catfish, and redborse sucker) submitted for liver histology between 2012-2014 in Massena/Akwesasne AOC.
- Liver histology results indicated no significant difference between Inside AOC and Outside AOC Reference for all 3 years.
- 2012 results caused anglers concern, and anglers believe industrial contamination still a problem in the AOC.
- Best survey results obtained from engaging the anglers at fishing tournaments and sportsman's expo.
- 2012-2014 Angler surveys indicate:
 - fishermen associate external anomalies with contamination
 - some residents still fearful to consume fish
 - not all fishermen have observed anomalies in the AOC
 - concern expressed by both indigenous and non-indigenous anglers



Photo Credit: Kyrie Ransom



**Acknowledgment and Appreciation to
Marinas, Bait and Tackle Shops, and
Fishing Tournaments that made this effort
possible! Thank you!!**

Akwesasne

- Adams Marina
- Thomas Marina
- Tacklebox Marina
- Sitting Bull Marina
- Louie King Fishing Tournament
- Noah Thompson Fishing Derby

Massena

- Northern Harness and Tackle
- Massena Bait and Tackle
- St. Lawrence River Walleye Association – Walleye Challenge
- Massena Rod and Gun Club- 2014 Sportsman's Expo

For more info, contact:
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