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**ST. MARYS RIVER
REMEDIAL ACTION PLAN
TAINTED FISH SURVEY**



Ontario

Ministry of
Natural
Resources

ST. MARYS RIVER REMEDIAL ACTION PLAN
TAINTED FISH SURVEY

by

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EXECUTIVE SUMMARY

The St. Marys River has been identified as an Area of Concern by the International Joint Commission because of problems associated with phosphorus, bacteria, heavy metals, trace organics, contaminated sediments, fish consumption advisories, and impacted biota. A binational Remedial Action Plan (RAP) Team was formed in 1987, and although it did not consider fish tainting, i.e. offensive odor or taste to the flesh, to be a problem, there have been some reports over time, so the issue was to be examined at least on a preliminary basis to determine the nature and extent of any problem that may exist.

A preliminary survey consisted of contacting key staff in certain public and private organizations and interviewing sports fishermen who regularly fish the St. Marys River. Five people from the Ontario Ministry of Natural Resources (OMNR), two from the Ministry of the Environment (OMOE) and one from the Michigan Department of Natural Resources (MDNR), the three public agencies most likely to receive complaints of this nature, were queried as to how many reports of tainted fish from the St. Marys River were received. There was one report from the OMNR and three reports from the MDNR during a five year period. In addition, two anglers from 20 contacted recalled that a friend told them about a walleye that they had caught in the lower river that tasted "off". None of the 20 anglers contacted had recalled any tainted fish that they had caught themselves although several mentioned the occasional occurrence of tumors and deformities. Other organizations queried reported no tainting.

From the 34 people contacted directly, the number of years of experience was obtained from, or applicable to, 30 of them. Collectively, they represent more than 385 years of experience. With a total of six direct and indirect reports of tainted fish, the incidence rate was 0.016 incidents per year, or one incident for every 61 years of experience.

The conclusion from the preliminary survey was that tainting of fish from the St. Marys River was not common. In the few isolated cases that were reported, in most instances, a determination could not be made as to whether tainting was due to poor handling or other problems, eg. acute (spill) versus chronic (long term chemical loading).

Because the incidence of tainted fish seems to be infrequent, a detailed fish tainting evaluation was not conducted.

One recurring comment did surface from this preliminary survey, that of growths and deformities in fish, particularly walleye, which may warrant future investigation.

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION	1
METHODS	2
Study Area	2
Preliminary Survey	2
Tainted Fish Evaluation	4
RESULTS AND DISCUSSION	6
Ontario Ministry of Natural Resources	6
Michigan Department of Natural Resources	6
City of Sault Ste. Marie, Ontario	7
Anglers Associations	8
Garden River First Nation	9
Anglers	9
CONCLUSIONS	10
RECOMMENDATIONS	12
REFERENCES	13

ST. MARYS RIVER REMEDIAL ACTION PLAN
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INTRODUCTION

The St. Marys River has been identified as an Area of Concern by the International Joint Commission because of problems associated with phosphorus, bacteria, heavy metals, trace organics, contaminated sediments, fish consumption advisories, and impacted biota. Water quality is impaired in part by the discharge of waste waters from three municipal waste water treatment plants (one in Michigan and two in Ontario) and two industries (St. Mary's Paper and Algoma Steel). Other sources of contaminants include atmospheric deposition, urban and rural run-off, sewer overflows, re-suspension of contaminated sediments, ground water, and spills from ships and industries (Ontario Ministry of the Environment and Michigan Department of Natural Resources, 1991).

A binational Remedial Action Plan (RAP) Team was formed in 1987 and is lead by the Ontario Ministry of the Environment (OME) and co-chaired by the Michigan Department of Natural Resources (MDNR). Other members of the team include representatives from the Ontario Ministry of Natural Resources (OMNR), U.S. Environmental Protection Agency (USEPA), Environment Canada, and the Department of Fisheries and Oceans Canada (DFO). Four members of a related 36 member Binational Public Advisory Committee (BPAC) act as delegates to the RAP Team to improve communication with the BPAC and the general public.

Although Stage I of the RAP for the St. Marys River stated that "tainting of fish . . . flavour is not considered to be a

problem" (OME and MDNR, 1991, p 12), there had been some hear say about a few past reports of tainted fish. For the purpose of this study, tainting was defined as an offensive odor or taste.

The objectives of this project were, first: to determine whether there was sufficient evidence that tainting of fish flesh was prevalent in the St. Marys River; and second: if tainted fish was determined to be an issue, to conduct a fish tainting evaluation in conjunction with OME.

METHODS

Study Area

The St. Marys River Area of Concern includes the area of the river which extends from Whitefish Bay at an imaginary line drawn between Point Iroquois, Michigan and Gros Cap, Ontario downstream to Quebec Bay, Ontario - Humbug Point, Michigan in the St. Joseph Channel and Hay Point, Ontario - Point aux Frenes, Michigan in the West Neebish Channel (Figure 1).

Preliminary Survey

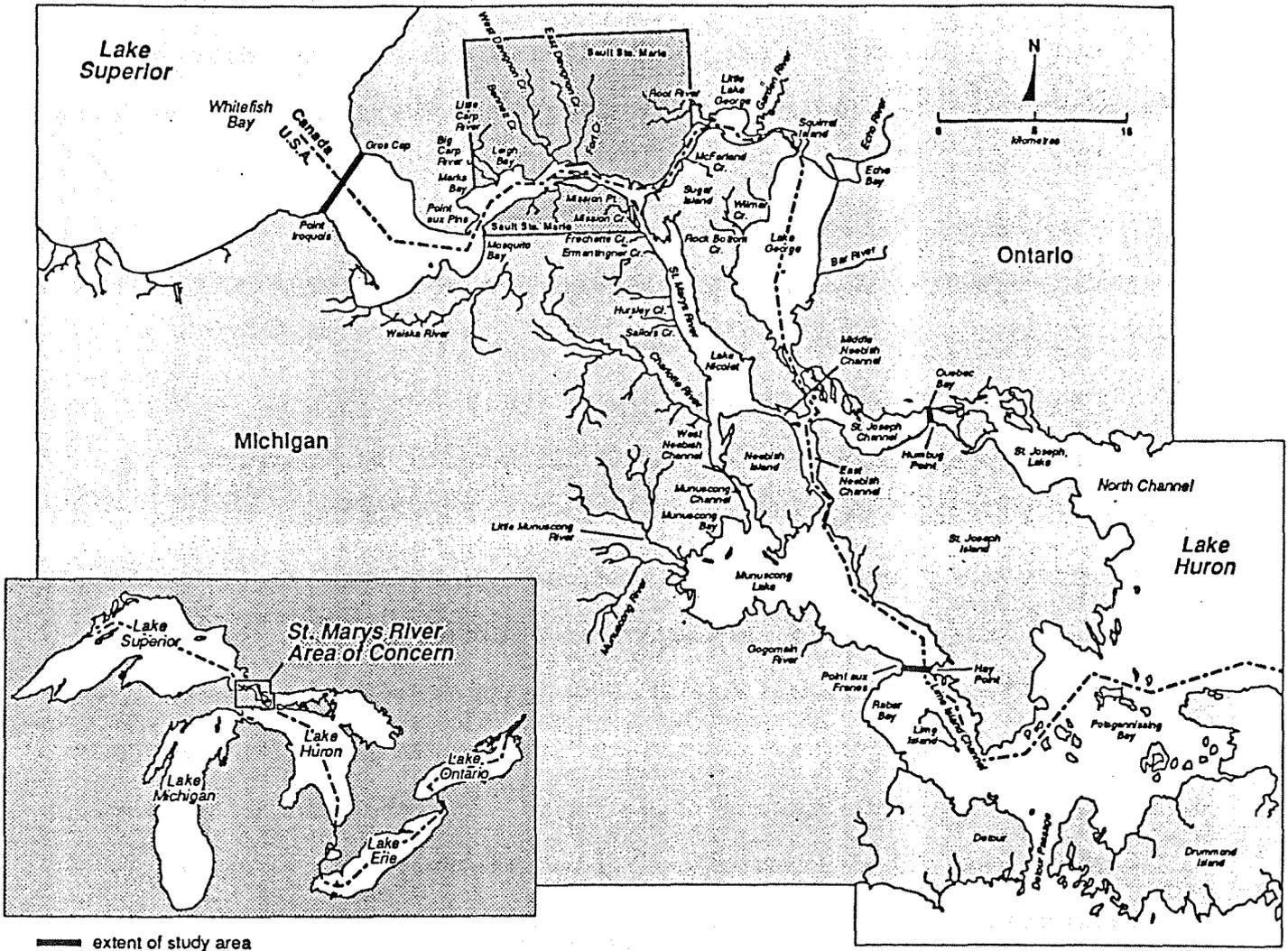
The preliminary survey consisted of contacting key staff in the three public agencies likely to have reports, OMNR, OME and MDNR, other public and private organizations which are associated with fish, and interviewing anglers who regularly fish the St. Marys River. A questionnaire was used when interviewing anglers (Appendix A) and questions were asked verbally.

Figure 1 From OME and MDNR, 1991.

St. Marys River Remedial Action Plan

Location map of the St. Marys River Area of Concern

(after UGLCCS 1988)



Key Fish and Wildlife staff in the OMNR were contacted and asked how long they had been working for the OMNR in a related capacity and if they had ever received any complaints, inquiries, or reports of tainted fish from the St. Mary's River. If a report was recalled, details such as the species that was tainted, where it was caught, when it was caught, and a description of the odour

or taste, if given, were noted.

The Stage I RAP (OME and MDNR, 1991) stated that incidental reports of tainting were investigated by the Michigan Department of Natural Resources (MDNR) but they did not find substantive evidence. The MDNR was contacted by phone to discuss that investigation and also to find out if they had done any other research on tainted fish.

The OME and the Municipal Fish Hatchery in Sault Ste. Marie, Ontario were contacted and staff were asked if they had received any reports of tainted fish from the public.

The local anglers associations (Sault Ste. Marie, Ontario and Michigan) were contacted and asked if any of the members had ever commented about tainted fish.

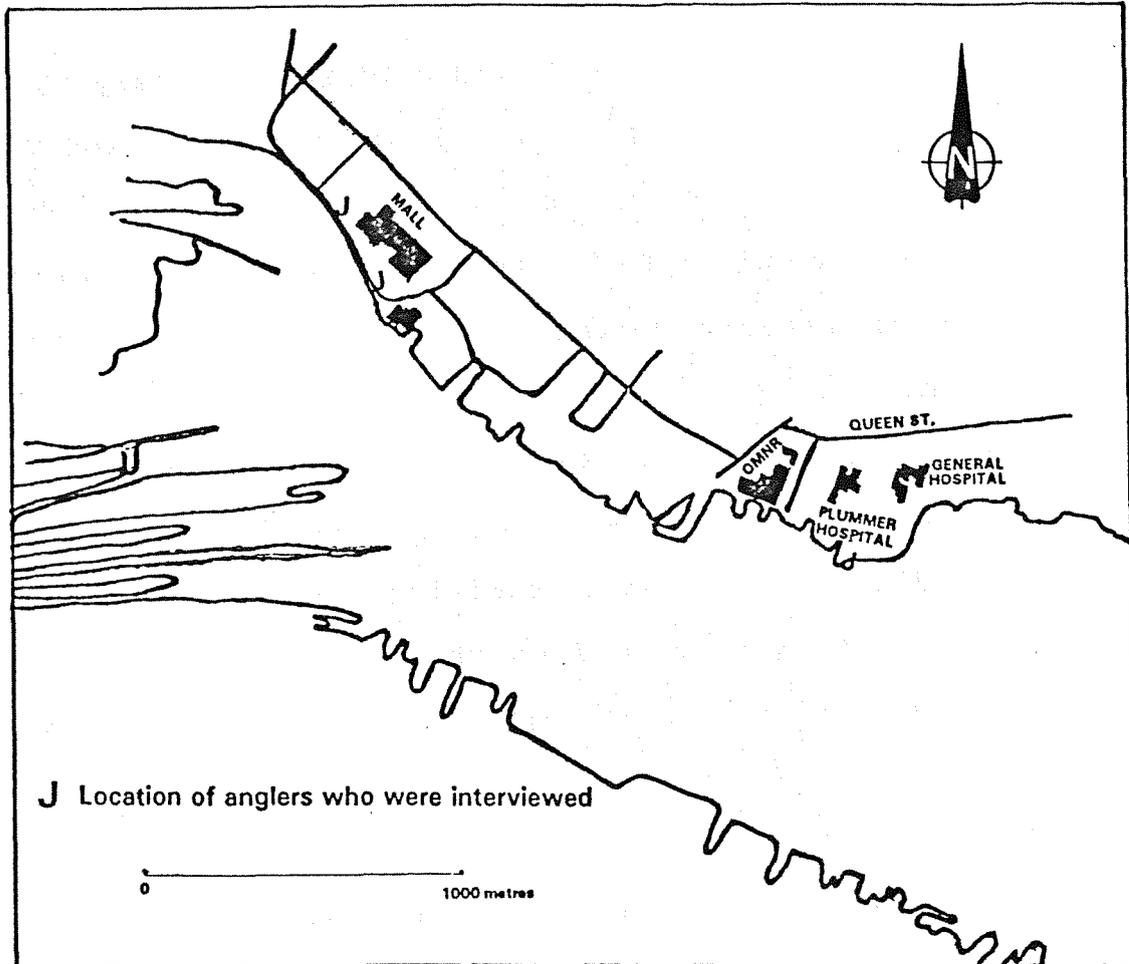
The Garden River First Nation was contacted to determine if any of their people had encountered tainted fish.

Finally, individual anglers were interviewed. Several well known local anglers were contacted either in person or by phone. For about an hour on each of three days, anglers fishing at several places along the river were interviewed (see Figure 2 for locations).

Tainted Fish Evaluation .

In the event that the preliminary survey demonstrated that fish tainting was a problem, an evaluation was planned in conjunction with OME. The methods used in the evaluation would be similar to those used for the Spanish Harbor (Jardine and Bowman,

Figure 2 Location of anglers interviewed on August 7, 10, and 11, 1992.



1992) and the St. Lawrence River (Jardine and Anderson, 1990) evaluations.

A sensory evaluation would be conducted on two groups of fish; control and exposed, using the triangle test to determine if there was a significant difference in odour between the two groups. The triangle test method involves presenting members of a panel with three samples, in which two are the same and one is different. The panellist is required to determine which sample is different.

RESULTS AND DISCUSSION

Ontario Ministry of Natural Resources

Gayle Maki has been the Fish and Wildlife Secretary since 1980 and Wendy Lambert has been on casual staff as Fish and Wildlife Clerk from 1986 to 1991. These two people represented the front line of Fish and Wildlife, receiving reports, complaints and inquiries of all nature. Neither recalled any incidents concerning tainted fish.

Klaas Oswald, a Conservation Officer in the Sault Ste. Marie District since 1984 and Walter Ceolin, a Conservation Officer here since 1975, did not recall ever receiving any complaints, inquiries or comments on tainted fish from the river. Ceolin mentioned, however, that he has observed approximately 15% of spawning age walleye (*Stizostedion vitreum*) at the Bar River that had jaw deformities.

Andre Dupont, Extension Fisheries Biologist since 1987 and with Fish and Wildlife previously from 1980 to 1985, has received the only report of a tainted fish by OMNR staff contacted. In the early 1980's, an angler reported that he had caught a yellow perch (*Perca flavescens*) from a pier at the Heritage Ship Canal and that it had an oily odour when it was being cooked.

Michigan Department of Natural Resources

To inquire about tainting reports on the American side, Steve Scott, Fisheries Biologist since 1987, was contacted. In 1990, Scott was asked by the RAP Team if he felt that tainting of fish

was an issue in the St. Marys River. He, in turn, asked the question of a group of about 50 anglers from the Sault Sportsman's Club. He recalled that one or two anglers remarked that they have had "flavored" fish occasionally. However, Scott felt that these incidents were more likely the result of the manner in which the fish were processed. He thought the species involved were steelhead (*Salmo gairdneri*) and lake whitefish (*Coregonus clupeaformis*).

Other than the comments received at the Sportsman's Club meeting, Scott has not received any reports of tainted fish from the public.

Ontario Ministry of the Environment

Maureen Burtch, who has been with OME for 11 years, and Frank Tesolin, who has been with OME for the past 18 years, are the Environment Officers responsible for the St. Marys River. They did not recall any reports of tainted fish from the public. Tesolin mentioned that he normally gets several reports each year of growths on fish but has not received any yet this past year.

City of Sault Ste. Marie, Ontario

Joe Cain, Supervisor of the Sport Fishing Development Program of the City of Sault Ste. Marie, Ontario, and Gregory Ball, Hatchery Manager of the Municipal Fish Hatchery in Sault Ste. Marie, Ontario, were asked if they had ever received any comments or inquiries concerning tainted fish and also, because they use

water from the river in the hatchery, they were also asked if they have ever tested their fish for tainting. Their response was negative to both questions.

Ball, a dedicated fisherman, has eaten fish from the river for the past 30 years. He has eaten all species of fish in the river including all the salmon species and trout species, as well as walleye, yellow perch, northern pike (*Esox lucius*) and lake whitefish. He indicated that he had never come across a fish he didn't like. He stressed that taste depended greatly on handling, preparation and cooking methods. He had not heard of other anglers having bad fish.

Anglers Associations

The past president of the Sault and District Anglers Association, Brian Thomas, who has had contact with many anglers who regularly eat fish from all parts of the river, said that although he had heard of several incidents of deformities, such as growths and missing appendages on walleye, he had not heard of any tainting. Thomas had not personally encountered any tainting in his experiences fishing primarily for salmon and trout on the St. Mary's River.

William Gregory, past president of the Sault Sportsman's Club in Sault Ste. Marie, Michigan, has talked with many anglers who, collectively, fish many species and all parts of the St. Marys River on a regular basis. He had not heard of any problem with tainting. Personally, he had fished the upper river and the rapids

extensively for 24 years, had eaten all of the sport fish species present in the river, and had not had a complaint about any of the fish.

Garden River First Nation

The Garden River First Nation Reserve is located on the shore of the lower St. Marys River. The receptionist at the Band office and Blain Belleau, who has dealt with the local OMNR office in the past, were asked if there were Band members who could be contacted who have regularly eaten fish from the river. Currently, few Band members fish the St. Marys River; most people obtain their fish from inland lakes in the area.

Anglers

A well known and avid fisherman of the St. Marys River for the past 12 years, Orest Witiw, was interviewed. He had fished the river extensively for all species of sport fish inhabiting the river and recalled no incidents of tainting. Witiw, who is employed at a local tackle store, is in daily contact with many anglers. He recalled only one incident of an angler who told him that he didn't like the taste of a walleye that he had caught in Munuscong Lake, Michigan and that it may have been a little "off".

Angler interviews were conducted at two locations (Figure 2) on August 7, 10 and 11, 1992 for about an hour each day. On these three days, 28 anglers were observed fishing and 16 of them were interviewed. The anglers had fished the St. Marys River regularly

for two years up to more than 30 years. Only four anglers had fished the river for less than 10 years. All of the anglers fish the rapids and all but three also fish either the upper river or the lower river or both. Most anglers fish for all sport fish inhabiting the river while three fish primarily for the trout and salmon species. Many fish the river all year round.

None of the 16 anglers interviewed recalled any fish that they had caught that were tainted. However, one angler stated that a friend had caught a walleye in the lower river that tasted "off". He said it was caught in an area adjacent to an area of land where a chemical spill had occurred the previous day.

Although anglers were not asked if they observed any abnormalities on any of the fish they caught, four of the 16 anglers interviewed mentioned catching the occasional fish, northern pike, lake whitefish and particularly walleye, with tumors or deformities. Four of the 16 anglers stated that the fish they caught did not exhibit any sort of abnormalities while the remaining eight anglers made no comment on this issue.

CONCLUSIONS

Five key people from the OMNR and one from the MDNR, the two agencies most likely to receive complaints on fish and wildlife matters, were queried as to how many reports of tainted fish from the St. Marys River were received. There was one incidence reported to the OMNR and possibly three discovered by the MDNR in more than five years. They involved three different species,

steelhead, whitefish, and yellow perch. The five people from OMNR collectively have 52 years of experience and one report of fish tainting. This represents a rate of 0.019 incidents per year (see table in Appendix B). Only one person from MDNR, with 5 years of experience, was contacted and he received three reports. This results in an incidence rate of 0.6 per year.

Two anglers from 20 contacted recalled that a friend told them about a walleye that they had each caught in the lower river that tasted "off". None of the 20 anglers contacted had recalled any tainted fish that they had caught themselves although several mentioned the occasional occurrence of tumors and deformities. These 20 anglers collectively have over 287 years of fishing experience on the St. Marys River. The two third party reports represent an incidence rate of 0.007 incidents of tainting per year.

From the 34 people contacted directly, the number of years of experience was obtained from, or applicable to, 30 of them. Collectively, they represent more than 385 years of experience. With a total of six direct and indirect reports of tainted fish, the incidence rate was 0.016 incidents per year, or one incident for every 61 years of experience.

The conclusion from the preliminary survey was that tainting of fish from the St. Marys River was not common. Furthermore, it could not be determined if tainting was due to poor handling or to other problems, either acute, as in chemical or industrial spills, or chronic, as in long term chemical loading.

Because the incidence of tainted fish seems to be infrequent, the detailed fish tainting evaluation was not conducted.

RECOMMENDATIONS

One recurring comment that did surface from this preliminary survey was that of growths and deformities in fish, particularly walleye. This concern may warrant future investigation.

Some research has been done in recent years on tumors in certain fish populations. A study was conducted by the U.S. Fish and Wildlife Service involving brown bullheads (*Ictalurus nebulosus*) in Munuscong Lake (Scott, S. personal conversation). Other research was undertaken by Smith, Portt, and Rokosh (1991) on white suckers (*Catostomus commersoni*) from St. Marys River, Jackfish Bay and Kaministiquia River. The Smith, Portt, Rokosh study was undertaken to complement epidemiological studies which have identified abnormal incidences of cancer in the three locations. The study concluded that the growth of tumors on benthic fish species (white suckers) was likely the result of localized chemical contamination of sediments, water, and benthic invertebrates. It was suggested that the induction of hepatic mixed function oxidases (MFO) observed in white suckers indicated the presence of chemicals with MFO-inducing properties and that hepatic MFO activity may be a useful biomarker for these chemicals.

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Smith, I.R., C.B. Portt, and D.A. Rokosh. 1991. Hepatic Mixed Function Oxidases Induced in Populations of White Sucker, *Catostomus commersoni*, from Areas of Lake Superior and the St. Marys River. J. Great Lakes Res. 17(3):382-393.

Appendix A: Questionnaire used as a guideline for interviewing anglers for the tainted fish preliminary survey, August, 1992.

1. Does Angler regularly fish the St. Mary's River?

IF YES, CONTINUE . . .

2. How many years, what time of year, species sought.

3. Has there ever been any objectionable taste or odour to the fish?

IF YES, CONTINUE . . .

IF NO, GO TO 12 . . .

4. Description of taste or odour?

5. How was fish handled, prepared?

6. What portion of the harvest exhibited the objectionable taste or odour?

7. Is it specific to any particular species or to all fish in general?

8. Is it specific to fish caught from a particular area of the River?

9. Is it more prevalent at certain times of the year?

10. Is it more prevalent in fish of a certain size range?

11. What other fish species are harvested that do not exhibit this phenomenon and where are efforts concentrated for each species?

12. Has the angler ever heard of anyone else having this type of complaint?

Appendix B: Table showing number of people contacted, collective number of years experience, and number of incidents received for each agency or group. Rate of incidence was calculated by dividing the number of incidents by the collective years of experience.

Agency/ Group	# of people contacted	# collective yrs experience	# reports received directly	# reports received indirectly	total incidents	rate of incidence
OMNR	5	52	1	0	1	0.019
MDNR	1	5	3	0	3	0.600
OME	2	29	0	0	0	0.000
Municipal Fish Hatchery	2	10	0	0	0	0.000
Angler Assoc.	2	NA	0	0	0	0.000
Garden River First Nation	2	NA	0	0	0	0.000
Interviewed River anglers	20	287*	0	2	2	0.007
TOTAL	34	385*	4	2	6	0.016

* Minimum number of years experience