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NOVA SCOTIA DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS

FISH SURVEY OF COKE OVENS BROOK AND MAID POND

By

Jim Foulds, Ph.D.

JULY 6, 2001

A member of the MacDonnell Group Technology and Consulting Solutions

CONESTOGA-ROVERS & ASSOCIATES

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Our File No. 3209
July 13, 2001

Conestoga Rovers and Associates
P.O. Box 1234, Station A
295 George Street, Suite 102
Sydney, Nova Scotia
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Attention: Rick Hoekstra, P. Eng.

Dear Rick:

Re: Fish Survey of Coke Ovens Brook and Maid Pond

Enclosed please find ten copies of our report "Fish Survey of Coke Ovens Brook and Maid Pond".

Yours truly,

VAUGHAN ENGINEERING LIMITED

Dave Forrester, PhD, P. Eng.
Project Manager

cc: Walter van Veen, CRA
Richard Morykot, TPW

Encl.

DF/sf

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FISH SURVEY OF COKE OVENS BROOK AND MAID POND

TABLE OF CONTENTS

Executive Summary

A survey for the presence of fish in the waters draining through the Sydney Landfill area and Coke Ovens property was requested by DFO in its review of the environmental assessment of the
Sydney Landfill Leachate Management Project. A fish sampling program was designed and carried out in June, 2001 and sampled waters in Maid Pond, Coke Ovens Brook and their tributaries.

Four species of fish were found. In Maid Pond, a population of catfish known as Brown Bullheads is well established. Throughout the pond and the entire length of Coke Ovens Brook, the presence of Mummichogs and Banded Killifish ("minnows" to most people) was recorded. Ninespine Sticklebacks (another type of minnow) was the other species seen, mainly in one tributary of Coke Oven Brook.

Although catfish are not officially recorded outside the mainland of Nova Scotia, there are many reports of them in similar habitats throughout the Eastern part of Cape Breton, from Fisheries personnel and local anglers. Mummichogs, Banded Killifish and Ninespine sticklebacks are common throughout Eastern Canada.

Based on outward appearance, the Mummichogs and Banded Killifish are in very poor condition generally with many tumour-like structures throughout their bodies and with a fungal growth on their scales. The catfish and ninespine sticklebacks appeared to be much better in outward appearance.

The physical habitat of Coke Ovens brook is highly degraded from inputs of polluted water from the adjacent landfill.

Introduction

As part of the environmental assessment of the Sydney Landfill Leachate Management Project, a fish survey was undertaken within the Coke Ovens Brook watershed. The purpose of the survey was to determine if fish species were found within Coke Ovens Brook, Maid Pond and/or any of their tributaries. The goal was to clarify earlier statements in reports that stated that fish were seen in these waters but without any information on which species were present or where they had been seen.

Methodology:

The survey consisted of a walk through of the entire area on June 14, 2001 followed by a day of actual sampling on June 19, 2001. A schematic map (not to scale) of the waters investigated and sampling sites visited is shown in Fig.1.

June 14, 2001:

The walk-through was done by Dr. Foulds (UCCB) and Richard Barrington (Vaughan Engineering). Beginning at Incinerator Brook, a tributary leading into Maid Pond, the general watercourse was "walked" from the incinerator - landfill area, around the toe ditch at the landfill and downstream through the fenced Coke Ovens site, under the Victoria St. overpass and down past the Sysco Gate to the South Pond of the Sydney Tar Ponds. Visual observations were made as to the general quality of the habitat and any fish seen were noted. Photographs (35 mm colour prints) were taken throughout the length of the brook.

June 19, 2001:

Fish sampling was carried out by Dr. Foulds, Richard Barrington and Doug Thomas (Vaughan Engineering). Fish were sampled by the use of dipping nets and a Smith Root Pack-Pak 24 volt electrofishing apparatus. Sampling was carried out at 27 sites (Fig.1). Electrofishing was done without barrier nets and sampled a variable area of stream at each site. "Seconds fished" was generally between 50 and 250 seconds per site.

Results:

This study has shown the presence of four different species of fish in these waters. Table 1 summarizes the observations made at each sampling site, including the number and species of fish found at each location.

Mummichogs [*Fundulus heteroclitus*] were found in almost all samples and to a lesser extent, the Banded Killifish [*Fundulus diaphanus*]. There was a wide variety in their colouration and fish were seen to change colours very quickly when placed in a bucket for observation. The condition of these fish were generally quite poor, with "tumour-like" growths protruding from the body of most fish seen (Fig. 2).

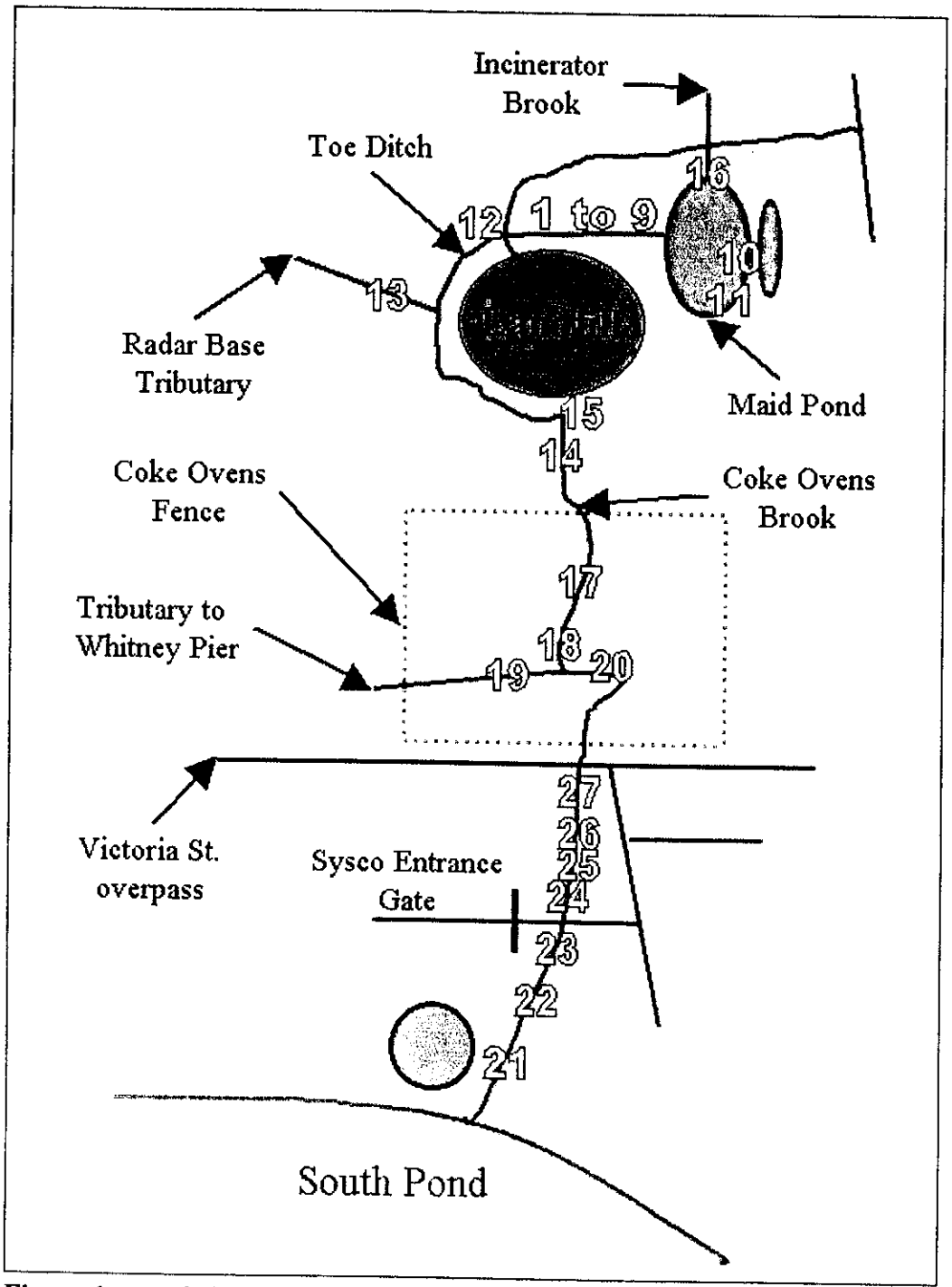

Figure 1 Coke Ovens Brook and Maid Pond.. Sampling sites numbered 1 through 27. Streets indicated in RED. Not to scale

Table 1 **Observations from fish sampling at 27 sites within the Coke Ovens Brook watershed.**

Site	Location (see Figure 1)	Observations
1	Toe ditch between landfill road and Maid Pond	no fish
2		fish seen - "minnows"
3		fish seen - minnows
4		3 fish caught by net - Banded Killifish [*Fundulus diaphanus*] many "tumours" (white) seen inside the fish - look unhealthy
5		fish seen - minnows - with tumours - look very sick
6		fish seen (many) - minnows
7		1 fish - looks very sick - many tumours - covered with small black dots - probably a Mummichog [*Fundulus heteroclitus*]
8		2 fish - Banded Killifish and Mummichog (55-65 mm) - killifish with tumours - Mummichog had no tumours visible
9		4 fish - 2 Banded Killifish and 2 Mummichog (55-80 mm) - all with tumours
10	Maid Pond - Southwest corner (Fig. 3)	14 - 3 catfish - Brown Bullheads [*Ictalurus nebulosus*]- 2 larger (155 mm) - look healthy - (Fig. 4) - 1 smaller (75 mm) - the rest were Mummichogs - all with tumours
11		3 fish - Mummichogs - tumours
12	Toe ditch heading North and West around landfill	2 fish - Mummichogs - 70 and 75 mm - tumours on both
13	Tributary from radar base	4 fish - all Ninespine Sticklebacks [*Pungitius pungitius*] 3 - 50 mm; 1 - 30 mm - appear healthy
14	Below washed out railway bridge (Fig. 5)	8 fish - 3 catfish (70 mm) - Brown Bullheads [*Ictalurus nebulosus*] - appear healthy + Banded Killifish and Mummichogs (65-70 mm) - with tumours
15	Pond backwater	Many Mummichogs and Banded Killifish seen - tumours visible
16	Incinerator Brook	7 fish - Mummichogs and Banded Killifish - all have tumours

Site	Location (see Figure 1)	Observations
17	Pool inside Coke Oven fenced area	4 fish seen - 2 captured - Banded Killifish (72 mm) (tumours) and Ninespine Stickleback (45 mm)
18	Downstream of road	no fish
19	Tributary from Whitney Pier (Fig. 6)	19 fish captured - many seen - school of over 100 - mostly Mummichogs - some Banded Killifish - tumours seen
20	Below entrance of tributary	4 fish - 1 Mummichog (90 mm) - healthy (Fig. 7) and 3 small Banded Killifish
21	Lower reaches - near cooling pond	Raw sewage - water grey in colour - highly turbid (cloudy) - 2 fish captured - Mummichogs
22	Lower reaches above round cooling pond	Raw sewage widespread - grey - turbid - no fish seen or captured
23	Just under the main entrance to Sysco	Raw sewage widespread - grey - turbid - 2 fish captured - others seen - Mummichogs (60-65 mm) - tumours on both
24	Above train track crossing over brook	Raw sewage widespread - grey - turbid - 1 fish - Mummichog (55 mm) - tumours
25	Above sewage drain from Massey Drive	Water clearer but still with evidence of raw sewage - 1 fish - Mummichog (65 mm) - very healthy looking - no tumours
26	Above sewage input from Massey Drive	Water clearer but still with evidence of raw sewage - 1 fish - Mummichog (55 mm) - black spots - tumours
27	Near overpass	no fish

Ninespine Sticklebacks [*Pungitius pungitius*] were found mainly in the tributary draining the radar base area, although one fish was captured further downstream, inside the fenced area of the coke ovens property. All sticklebacks appeared healthy.

The Brown Bullhead catfish [*Ictalurus nebulosus*] was found abundantly in the shallow, shoreline waters of Maid Pond (Fig. 3, 4) and, albeit in fewer numbers, further downstream in Coke Ovens Brook, just below the "toe ditch". All Bullheads appeared healthy.

The physical habitat of Coke Ovens Brook is highly degraded because of poor water quality. Iron staining of the bottom substrate develops as Coke Ovens Brook passes around the toe of the landfill. This type of habitat can be seen in Fig. 5. A better type of habitat is seen in Fig. 6. A mummichog fish is seen in Fig. 7.

Fig. 2 - Banded Killifish and Mummichogs showing "tumours"

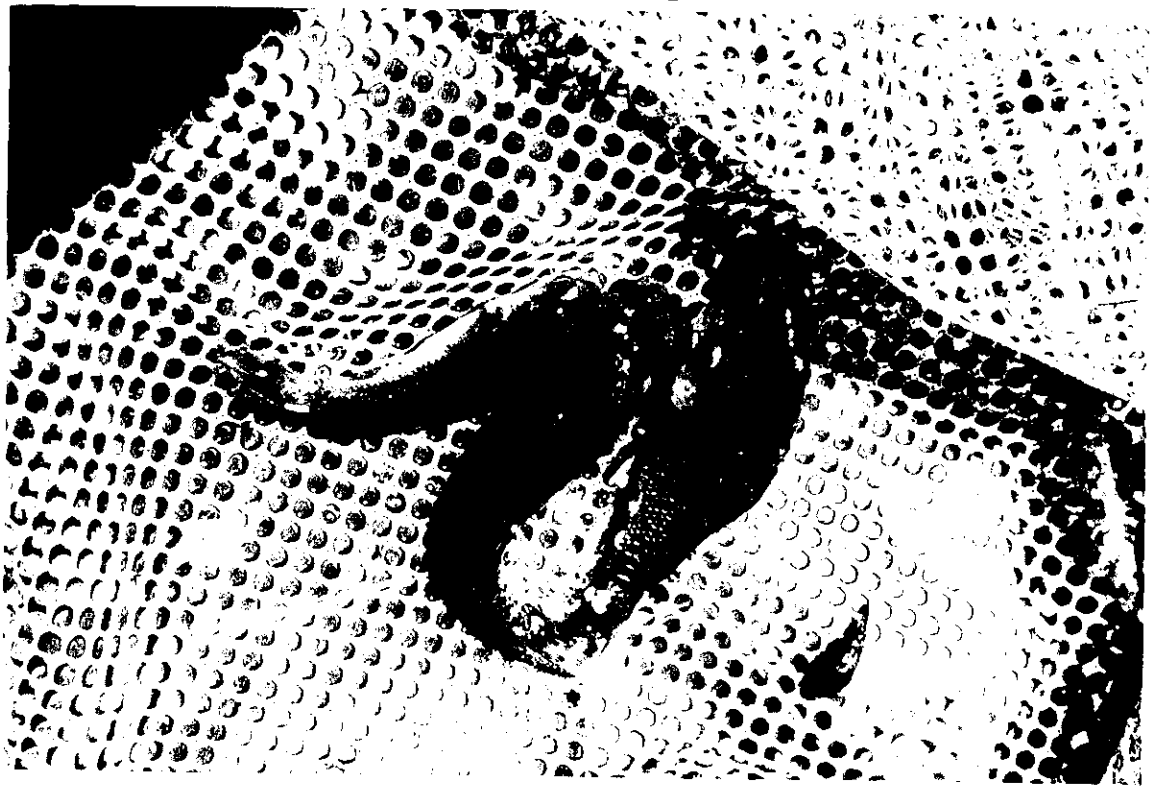

Fig. 3 - Maid Pond - Sites 10 and 11

Fig. 4 - Brown Bullheads from Maid Pond

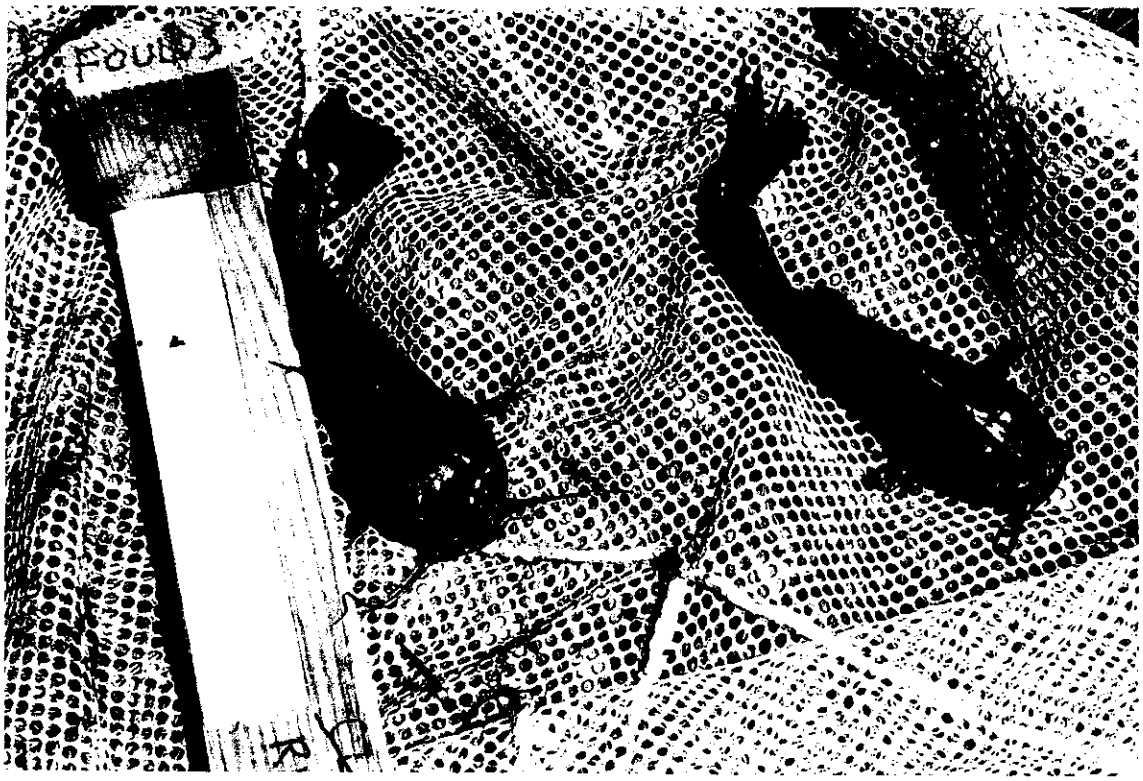

Fig. 5 - Coke Ovens Brook at Site 14

Fig. 6 - Site 19 - Tributary from Whitney Pier

Fig. 7 - Mummichog Fish

An incidental observation that was made, especially throughout the upper reaches of Coke Ovens Brook and Maid Pond was the presence of Leopard frogs.

Conclusions:

The most important conclusion from this study is that fish have been confirmed to be present within Maid Pond and Coke Ovens Brook and the tributaries leading into these waters. Other than the Brown Bullhead, the species found are not generally considered "valued" from a recreational species perspective. The Brown Bullhead (catfish) are a valued recreational fish species (for eating) on the mainland and in particular, throughout Quebec and Ontario. The Brown Bullhead is not recorded to be present in Nova Scotia outside of the mainland, but there are many reports from Fisheries personnel (Department of Fisheries and Oceans and Nova Scotia Department of Fisheries and Aquaculture) and local anglers of bullheads being caught throughout Eastern Cape Breton.

The condition of these fish is very poor generally. In particular, the mummichogs and banded killifish in Maid Pond and throughout the Coke Ovens Brook are covered in a fungus known as "Black Spot" and are filled with what appear to be "tumours" - often bulging out from the general body line. It is not known what the nature of these tumours is without further study. They may be encysted parasites or abnormal tissue growth. Due to the degraded water quality throughout the pond and main channel of the brook, it is not surprising that any organism's health would be compromised. Regardless, these fish seem to be maintaining their populations in the face of these very challenging conditions.

The Brown Bullhead was found in a variety of sizes (ages) and were very easy to see and capture along the shoreline of Maid Pond. Their health, at least outwardly, appeared to be good. Brown Bullheads are renowned for their ability to live in highly polluted waters and low oxygen conditions. They are also very heat tolerant, being able to exist in waters above 30 degrees Celsius.

Since sampling was done only along the edge of Maid Pond, it is not known what other fish species may be present in deeper water.

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