GREATER MONCTON PEST CONTROL COMMISSION

ANNUAL REPORT - 2004

UNITED EFFORTS

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Annual Report - 2004

UNITED EFFORTS

GENRAL DIRECTOR'S REPORT

LETTER OF SUBMISSION

Dear Members:

It is my pleasure to submit to you the Annual Report of the Greater Moncton Pest Control Commission for 2004.

We are continuing our efforts to streamline the annual report in order to provide a bilingual document, which deals with the essential component of our activities. Much of the background information can be obtained from Mr. Jeff Scott, the Assistant General Director.

I wish to thank you for giving me the opportunity to serve as your General Director and if you have comments or suggestions on Improving our operations, please do not hesitate to contact me.

Sincerely,

Louis LaPierre, Ph.D.
General Director
Greater Moncton Pest Control Commission

ACKNOWLEDGEMENT

I would like to take this opportunity to thank all of the staff for their sustained effort in mosquito control within the Greater Moncton Area. Again I would like to express our greatest appreciation to Mrs. Norma Comeau, our Secretary Treasurer, for her support and expertise in developing our payroll program. I would also like to thank Jeff Scott for his capable management of the field staff, and dedication to the expansion of our field program.

I also want to extend our appreciation to the City Engineer, Mr. J. G. Greenough, and his staff for their valuable support. I would also like to extend our sincere appreciation to the various departments with the City of Moncton for their support and assistance in providing us with the logistics to carry on our mission. We were very fortunate in being able once again to secure the assistance of devoted and energetic students.

I would also like to express my sincere appreciation to all the Board Members for their continued support. Without your dedicated support, the Commission could not achieve its goals and objectives.

Louis LaPierre, Ph.D
GENERAL DIRECTOR

SUMMARY OF INITIATIVES – 2004

WEST NILE VIRUS

Monitoring for the presence of West Nile virus was continued this year. However, we did not detect any signs of West Nile virus within the avian population. It is also important to note that no cases of West Nile virus were reported in the Province of New Brunswick this year.

INFORMATION AND EDUCATION

We have worked with the staff in developing two presentations on mosquito population control. One is designed for Grade 5 school level; the other is more technical and will target advanced audiences. We have also purchased equipment and material that will be used in public information sessions. During the coming year we will be planning sessions for the Malls within the three Communities and we will also plan to be present at some of the important events such as the Westmorland County Fair.

INVENTORY OF ADULT AND LARVAL MOSQUITOES

Following the completion of our two-year extensive mosquito identification program we have initiated a selective site-monitoring program that will enable us to assess any changes within the breeding populations.

PUBLIC OUTREACH

The Commission continues its efforts to promote itself as a public partner in mosquito control. This year we participated in radio and television interviews associated with the work of the Commission.

We are continuing to update our web site in order to provide relevant information to the citizens of the Greater Moncton Area.

MOSQUITO CONTROL

Our field program was successful in keeping the adult populations down to an acceptable level. We are continuing with our selective monitoring and breeding index program. The information obtained from the program has enabled us to strategically apply Vectobac, and greatly reduce to amount of Vectobac used within the natural environment.

MANAGEMENT PRIORITIES FOR 2005

- We will endeavor to work closely with the various Provincial and Federal Agencies in order to keep the residents of the Greater Moncton Area informed on further development of the West Nile virus.

- We will continue to closely monitor the results of the Environmental Impact Assessment on the opening of the Petitcodiac River. We will also monitor the impacts of the drainage of Jones Lake should the City of Moncton proceed with a plan to revert the present lake to a stream.

- We will also continue to work with the local press and the three Municipalities in order to develop a comprehensive education and information program for the general public concerning the existing mosquito control program and the additional efforts that are being considered for West Nile virus. We will initiate a public information program with visits to the malls within the three municipalities.

- We will work in updating our GIS files in order to make our operation is more responsive to the changing landscape. We will continue to update our land ownership files. This will facilitate the process of obtaining landowner's permission for our control program.

- If we want to respond to the increasing demands that are being placed on our services we will need to review our mobile field fleet of all-terrain vehicles.

- We will continue to work with officials from the City of Moncton in order to draft memoranda of understanding (M.O.U.) that will cover our operational agreements with the City of Moncton.

- We will initiate proceedings to have the Greater Moncton Pest Control Commission incorporated as a legal entity.

- We will continue to support the efforts of the three communities and the various citizens groups involved with the cleaning of the streams within the Greater Moncton Area.

OPERATIONAL REPORT

MOSQUITO CONTROL

Each spring begins with uncertainty with respect to when mosquito larvae will begin to emerge in the marshes. Our operations begin with the availability of staff after the completion of their university exams as opposed to the particular weather dynamics of the current year. The spring of 2004 did not pose unmet challenges and our operations were able to proceed in a timely manner.

In the following commentary, references are made to control sites that have been grouped and named. These sites are represented in Map 1 for your reference.

BREEDING ACTIVITY

Analysis of breeding activity is achieved by calculating a mosquito-breeding index (BI) for each site or grouped area. The BI is determined by the average number of larvae found in a standard sampling dipper multiplied by the total number of sample sites in a particular breeding area. The sample sites are established following a standard grid protocol and thus represent the available surface breeding area, which can be compared between sites. For two sites of comparable breeding surface areas, differences in larval concentrations will yield different BI numbers and reveal the difference in larval numbers of each site.

Two charts are included for revealing the nature of mosquito production in the Petitcodiac River marshes. The total sample sites show how the available breeding surface areas fluctuate from year to year. Factors affecting the available standing water can include changes in drainage characteristics from either natural or manmade sources, but most significantly from that particular year's weather patterns. Figure 1 looks at the total year's accumulation of standing water measurements and does not examine the fluctuating conditions within a particular season. When the total sample sites are compared with the average breeding index (BI) in Figure 2, the patterns of mosquito breeding are revealed.

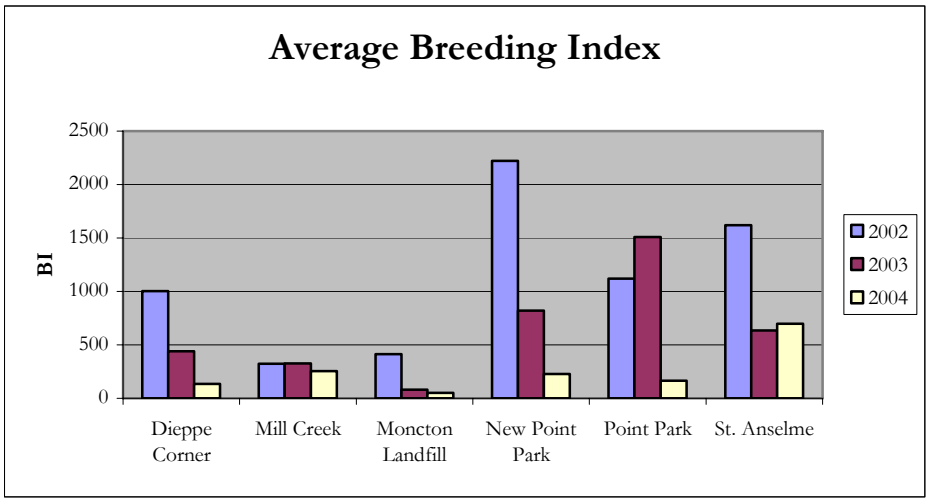

Figure 1 - The Breeding Index indicates the mosquito production by multiplying the average number of larvae in a sample dipper by the number of samples taken within a site.

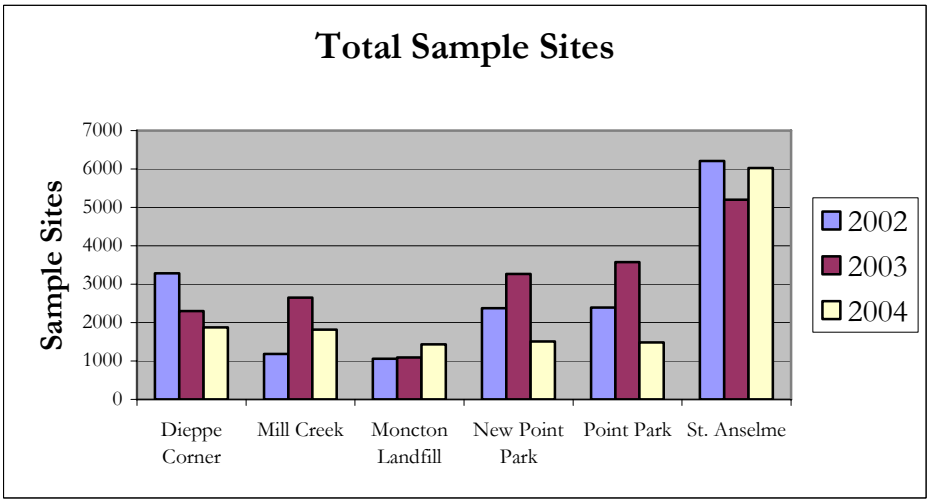

Figure 2 - The Total Sample Sites is an indicator of the total available surface area of standing water available for mosquito breeding within a site.

LARVICIDING

For the City of Dieppe, the key regions for mosquito control are the river marshes of St. Anselme and what we call Dieppe Corner. In these, we see that over the past three years there has been a variance in the larvicide used where there is a peak in 2002 followed by a drop in 2003 and rising again significantly in 2004 while not reaching the levels of use of 2002.

For the sites in the Moncton landfill area, we observe a decline in use since 2002. Also, in 2004 the amount used was close to ten times less that that of 2002 and three times less than 2003. It is, however, important to note that these areas have been becoming drier each year, likely due to the lower precipitation amounts these past years, thus affecting the available breeding area for mosquitoes.

In the marshes in and adjacent to the Town of Riverview, we see a significant decrease in larvicide use in the past two years. The Point Park area's decrease is more gradual but is still very low compared to what was used in previous years.

There is a trend of lesser use of larvicide in many areas. This could be explained by drier conditions in July of 2003 and below normal precipitation in almost all of 2004 as illustrated in figure 4 in the Weather Analysis. There has also been a change in surveillance and application protocol that results in reduced quantities of larvicide requirements. Enhanced surveillance reveals specific areas where mosquito larvae are resident. Applications are made to those specific areas instead of more general broadcasts. Calibrations have been refined on the Argo application equipment that uses less larvicide. Also, drier marsh conditions creating more isolated pockets of standing water did not require Argo use in Riverview, thus resulting in targeted larvicide applications.

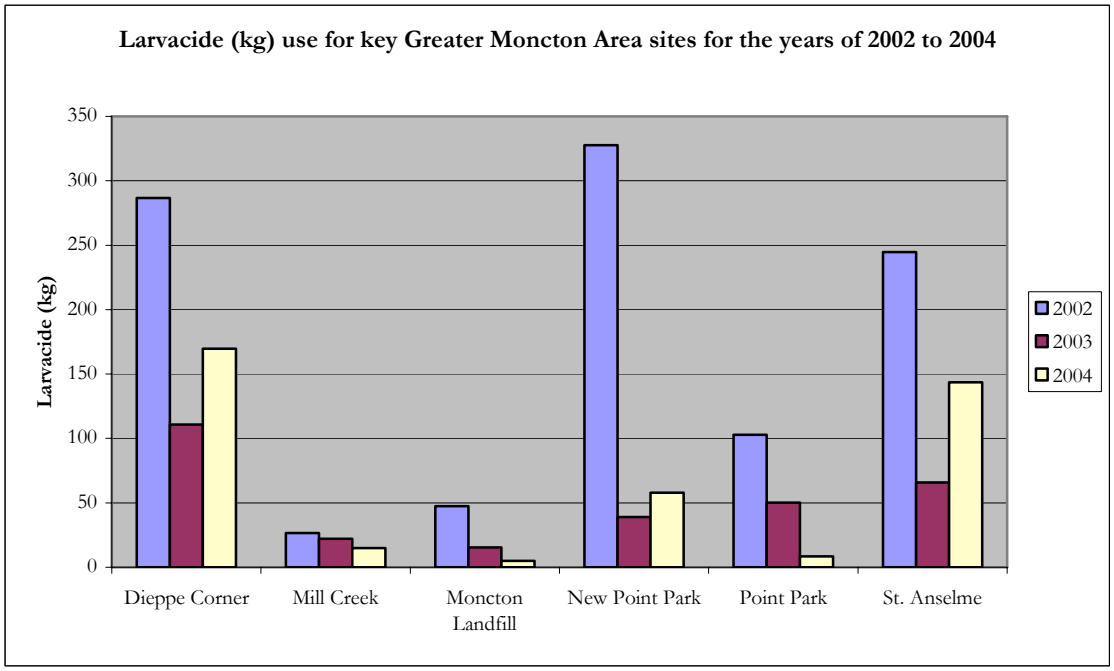

Figure 3 - Larvicide use required to establish mosquito control shows reduced requirements due to changes in surveillance and application protocol.

WEATHER ANALYSIS

The summer of 2004 was characterized by below normal precipitation. This is to counter most people's perception as there were many overcast days and the temperatures at or below normal as well. There were many days of rain but daily amounts were small. The result was that standing water areas were minimal as rain would seep into the ground or evaporate.

Each month of the 2004 mosquito control season (May – August) had below normal precipitation except for August. Some months were as much as 62% below normal and at a time of year (May) when most of the major mosquito production would normally occur. The month of August would have been below normal as well if it were not for the large rainfall during the last two days of the month where we received the normal rainfall amount in one storm event.

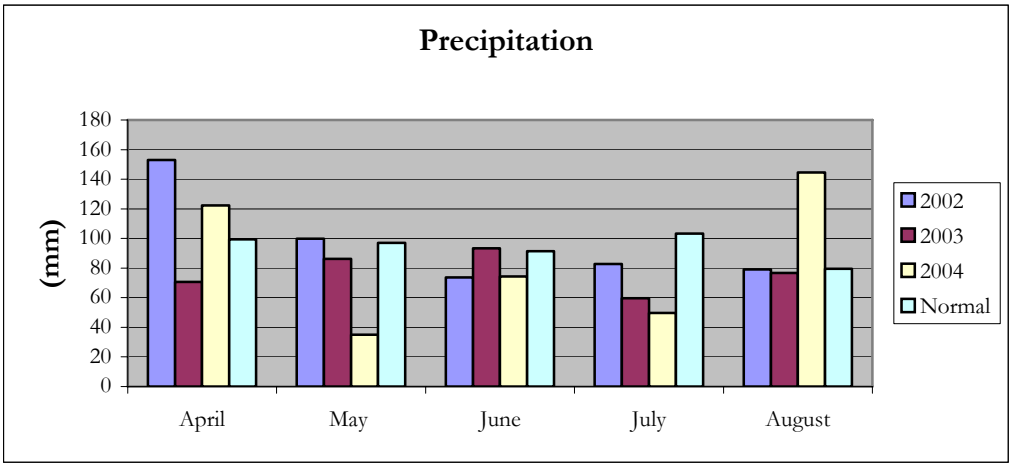

Figure 4 - Precipitation comparisons to 2004 normal figures.

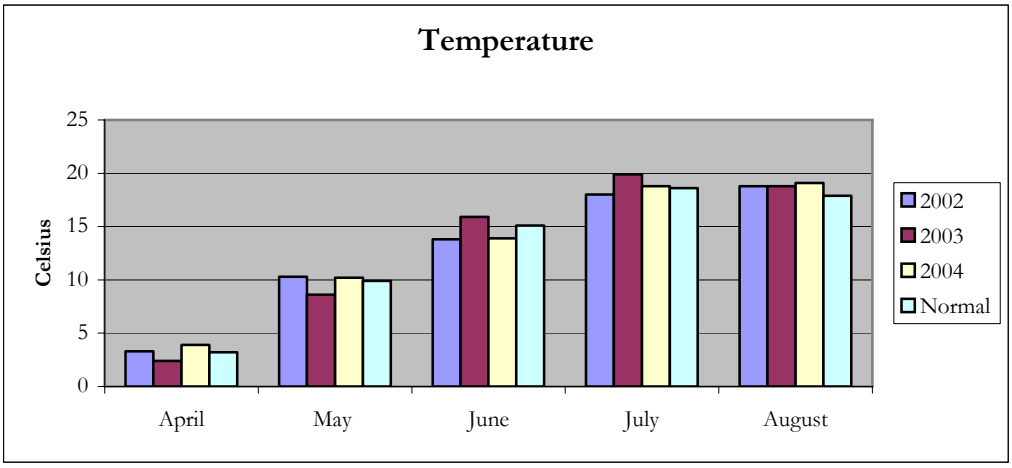

Figure 5 - Temperature comparisons to 2004 normal figures.

PROJECTS

MOSQUITO IDENTIFICATION AND POPULATION MONITORING

The goal of this study was to track the relative population densities of mosquitoes found in various locations around Greater Moncton, as well as to monitor the seasonality of the different species found. This kind of study is important for confirming the focus of our program. By applying an adaptive management concept we are able to adjust our field applications from the results of our monitoring data. This was the first year this type of study was conducted following a two-year intensive study of the species composition within Greater Moncton.

Identifying adult mosquitoes only, from 6 trap sites, identified a total of 22 species. A more intensive sampling program in 2003 led to creating a profile of 34 species by collecting adults from a total of 12 trap sites and also larvae from various breeding habitats.

This report includes a list of the identified species, an explanation of how they were collected and preserved, and a brief analysis of the data collected.

COLLECTION AND IDENTIFICATION PROGRAM

Collection

Adults were collected using two different types of traps. During a one-night period per week, six CO_2 baited CDC traps and one UV lighted CDC trap were active. The traps were set up in the afternoon and then collected the following morning; they were located in six permanent stations, each station chosen for its habitat characteristics and location in Greater Moncton. Each station had a CO_2 baited trap and one of the six stations had a UV light trap in addition to the CO2 baited CDC trap. After each rotation they were dismounted and prepared for the next rotation. The adult sampling began on May 28th and ended August 20th 2004.

Preparation and Preservation

Most of the adult mosquitoes in the traps were alive when the nets were taken down. The nets containing the live mosquitoes were put in a freezer where the adults were killed. Once dead, they were transferred to Petri dishes and brought to the lab for analysis. The mosquitoes were then counted, while taking into account the number of females and males in the sample. The next step was identification.

Identification

Adults were identified using The Insects and Arachnids of Canada, Part 6 The Mosquitoes of Canada Diptera: Culicidae (Wood et al, 1979).

The adults were identified using a dissecting microscope. The adult mosquitoes were brought to the lab in Petri dishes, counted and then readied for identification. They were sorted under the microscope and placed in other Petri dishes for identification using the key in Wood et el (1979). They were then sorted by species and placed in labeled polystyrene, round-bottomed tubes.

Results

A total of 4935 adult mosquitoes were collected and of these 1984 were identified between May 28th and August 20th, 2004. 22 different species were collected using the adult mosquito trapping. One additional species was added to the list this summer; *Aedes Atropalpus* and 12 species that we encountered last year were not collected this year; *Aedes cinerius, Ochlerotatus abserratus, Oclerotatus diantaeus, Ochlerotatus dicticus, Ochlerotatus flavescens, Ochlerotatus intrudens, Ochlerotatus sticticus, Ochlerotatus triserriatus, Anopheles walkeri, Culex salinarius, Culex territans, and Culiseta melanura.* Therefore the total list of species is now at 35.

The CO_2 traps were the most efficient method of capturing adult mosquitoes, capturing on average 63 mosquitoes in a one night period versus an average of 0 mosquitoes per one-night period for the light trap. The light trap did not attract any mosquitoes this summer, which has been attributed to the placement of the CO_2 trap at the same location being within 10 meters and thus attracting all of the mosquitoes away from the light trap. The light trap did catch the occasional insect such as flies and moths and therefore we are sure that it was functioning properly.

One aspect of the mosquito population that we were monitoring from the beginning of the project was which species of mosquito was present at which time of the season. This would give us a better understanding of the species cycle for the whole year. The appearance of each species of mosquito found throughout the season can be seen in Table 1. The numbers seen in Table 1 are representative of the total amount of mosquitoes collected this summer and not solely the amount identified. Ochlerotatus cantator was one of the first species to emerge in the spring; and also the last to persist to the end of the summer. *Coquilletidia perturbans* followed a similar pattern; accordingly each of these species was found in the most abundance throughout the summer with *Coquilletidia peturbans* being the most abundant, and *Ochlerotatus cantator* being the second most abundant.

Another aspect of the study was to see which types of mosquitoes were present in the different locations around Greater Moncton. It was expected that *Ochlerotatus cantator* would be found in the sites that were nearer the salt marshes as this is their expected breeding zone. Through the study it was found that *Ochlerotatus cantator* was found in all of the six sites. This may suggest that they have a broader breeding zone than expected or they have a longer dispersion radius.

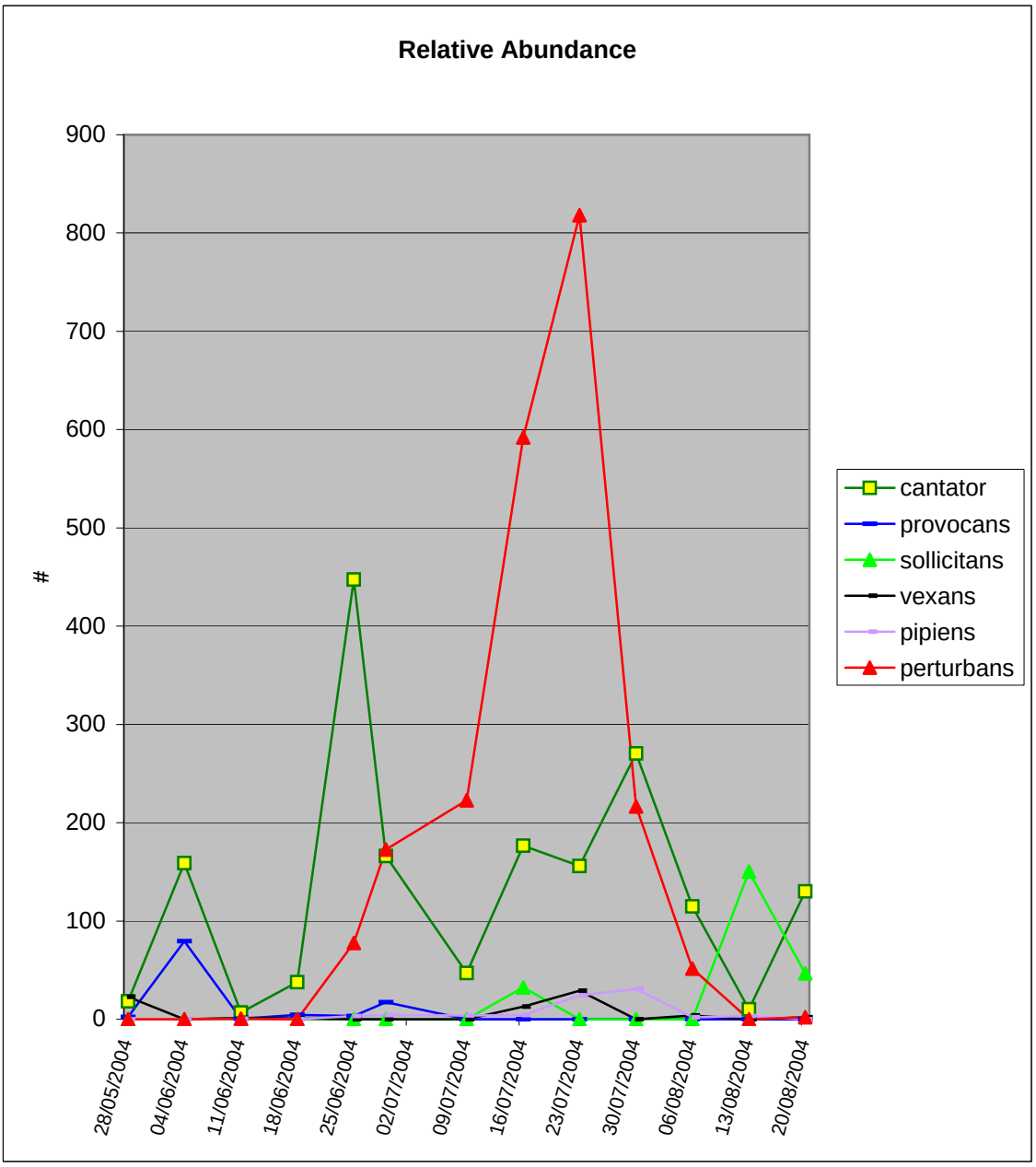

Figure 6 - Relative Abundances of Species of Interest

Table 1- Seasonality and Abundance of Mosquito Species within the Greater Moncton Area

Genus	Species	28-May-04	4-Jun-04	11-Jun-04	18-Jun-04	25-Jun-04	29-Jun-04	9-Jul-04	16-Jul-04	23-Jul-04	30-Jul-04	6-Aug-04	13-Aug-04	20-Aug-04	Totals
Aedes	atropalpus	0	0	0	0	0	2	0	0	0	0	0	0	0	**2**
Ochlerotatus	canadensis	0	0	0	0	3	6	1	2	0	0	0	0	0	**13**
Ochlerotatus	cantator	18	159	7	38	447	166	47	177	156	271	115	10	130	**1741**
Ochlerotatus	communis	5	0	0	0	0	0	0	0	0	0	0	0	0	**5**
Ochlerotatus	excrucians	2	80	1	3	19	2	0	0	15	12	2	0	2	**137**
Ochlerotatus	fitchii	0	0	1	2	0	0	1	0	0	0	0	0	0	**4**
Ochlerotatus	implicatus	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Ochlerotatus	pionips	0	119	1	1	0	0	0	0	0	0	0	0	0	**121**
Ochlerotatus	provocans	2	80	1	4	3	17	0	0	0	0	0	0	0	**107**
Ochlerotatus	punctor	0	0	0	5	23	45	4	0	0	0	0	0	0	**77**
Ochlerotatus	riparius	0	0	0	0	0	0	5	0	5	0	0	0	0	**10**
Ochlerotatus	sollicitans	0	0	0	0	0	0	0	32	0	0	0	150	47	**230**
Ochlerotatus	stimulans	2	0	0	0	0	0	1	0	0	0	0	0	0	**4**
Aedes	vexans	23	0	1	1	0	0	0	13	29	0	4	0	2	**73**
Anopheles	earlei	0	0	0	0	3	0	0	0	0	4	0	0	0	**7**
Anopheles	punctipennis	0	0	0	0	6	2	0	0	0	0	0	0	0	**9**
Culex	pipiens	0	0	1	0	3	4	4	4	24	31	2	3	0	**77**
Culex	restuans	9	40	0	0	0	0	0	0	0	0	0	0	0	**49**
Culistea	minnesotae	2	40	0	0	3	0	2	11	0	0	0	0	0	**58**
Culistea	morsitans	0	0	0	0	0	2	3	0	0	43	10	0	0	**57**
Coquilletidia	perturbans	0	0	1	0	78	173	223	592	818	216	51	0	2	**2154**
	Totals	**64**	**517**	**14**	**54**	**590**	**421**	**290**	**831**	**1047**	**576**	**184**	**164**	**183**	**4935**

Conclusion

The recent mosquito profile has enabled us to identify 35 species, 22 of which were collected and identified this summer, with *Aedes atropalpus* being added to the profile as a new species found this summer. Of the mosquitoes identified this summer *Ochlerotatus cantator* and *Coquilletidia pertubans* were the most abundant. The trapping date that showed the highest abundance of mosquitoes being collected was July 23rd, 2004. This trapping date falls in the middle of the collection dates and thus shows that the numbers rise from the beginning of the summer to a peak around this date and from that point start to fall until the end of the season. There are circumstances and outside factors that can attribute to the numbers being collected, such as the weather and temperature that should be taken into account.

To further understand and analyse the mosquito population, densities and seasonality, it would be useful to continue this study in the following summers. The knowledge and data gathered through this study will allow Greater Moncton Pest Control Commission to understand the reasons why a large portion of their focus should be placed on the salt marshes, as it seems these are a significant contributor to the population of mosquitoes.

CATCH BASIN MONITORING

Over the course of July and August 2004, a survey was conducted to determine if mosquitoes are emerging from the catch basins within the Greater Moncton area. Some catch basins can offer a high-quality environment for the development of mosquitoes due to the absence of predators and the quantity of organic matter.

Eight emerging traps were placed in catch basins of the Greater Moncton area (Moncton 4, Dieppe 2, Riverview 2) and are illustrated in Figure 7. During the survey, when accessible, information on location, temperature, and pH was noted. The traps consisted of a floating umbrella shaped net with non-pesticide flypaper. When mosquitoes transform to adult and emerge from the water they get trapped under the net and get caught on the flypaper. Image 1 shows the traps and the equipment used inside the catch basins.

Figure 7 - Survey team setting emergence traps in catch basins.

During this survey, mosquitoes were found only in four catch basins. These results could be due to the varying environments contained in each of the catch basins. The absence of mosquitoes in some of the catch basins observed could be due to the quantity of water and organic matter they contained. Table 2 shows the data collected in the catch basins during the survey. Further surveys could provide more details on the quantity of mosquitoes emerging from the catch basins in the Greater Moncton area.

Table 2 - Catch basin surveillance data, 2004

	Location (N:W)	Temperature (average)	pH (average)	Total of Mosquitoes
MONCTON				
Hilary-Patrick	N46.09860 W-064.83551	20	N/A	0
Snow- Lorne	N46.10040 W -064.82556	20.5	N/A	4
Chapman- Upton	N46.07912 W-064.79948	19.6	7.21	10
Burlington- West	N46.08652 W-064.79385	19.3	7.41	0
DIEPPE				
Melanson	N46.07126 W-064.71490	18	N/A	18
Centrale- Mathilde	N46.08514 W-064.72028	19	N/A	0
RIVERVIEW				
Point Park	N46.07901 W-064.07901	22	7.37	2
Ashburn	N46.05450 W-064.80570	19.1	7.49	5

LAKEBURN (DIEPPE) INVESTIGATION

An enhanced surveillance effort was conducted in the old Lakeburn area of Dieppe. This is located directly to the south of the old terminal of the Greater Moncton Airport. Reports over previous years indicated that the athletic fields in this area were difficult to enjoy due to perceived high mosquito populations.

The assumption leading to this investigation was that the mosquitoes were from local breeding sources, relatively close in proximity to the athletic fields. A surveillance crew was dispatched at various times in the summer to see if standing water sources could be found in the local wooded area and residential properties. The surveillance crews were not able to identify any additional breeding areas to the existing sites treated in our program. It was noted that in spring conditions, the flood plain of Fox Creek and some marsh areas to the west could be sources of mosquitoes. The marshes to the west will be examined to see if they should be brought into the program in 2005.

The most revealing information came from mosquito traps placed off of Melanson Road (Robichaud St) and directly in the Lakeburn Subdivision (See Map 2). The trap yields indicate that the majority of the mosquitoes are coming from the marshes of the Petitcodiac River. This was not expected and reveals dispersion patterns larger that at first believed. A confirmation of the mosquito identification was performed and based on the limited breeding habitat of the species captured, we are confident that the Petitcodiac marshes are the major producer of mosquitoes for much of the Dieppe area. The Director of the Commission will be seeking advice from experts as to effective means of gaining control of these mosquitoes.

MARSH BIRD NESTING SURVEY

In complying with its due diligence responsibilities, a bird nesting survey is conducted by the GMPCC, within the wetlands and other areas of mosquito control zones. The primary objective of the survey is to locate nests and estimate the distribution of avian species present within the Greater Moncton Area. Knowing the location of each species is important to support potential research initiatives by other agencies pertaining to the impact of the mosquito control program on the environment should the presence of West Nile virus be confirmed within our area.

Results

During the 2004 survey, a total of 16 species and 200 nests were located within the Greater Moncton area. These survey sites were divided into four categories according to their geographical distribution, i.e. Dieppe, Moncton, Riverview, Other. The last section consists of sites on the outskirts of the Greater Moncton Area. It is composed of two wetlands that we refer to as Dover and Ducks Unlimited, where active mosquito control is not done. The following chart illustrates the number of nest and species found within each location.

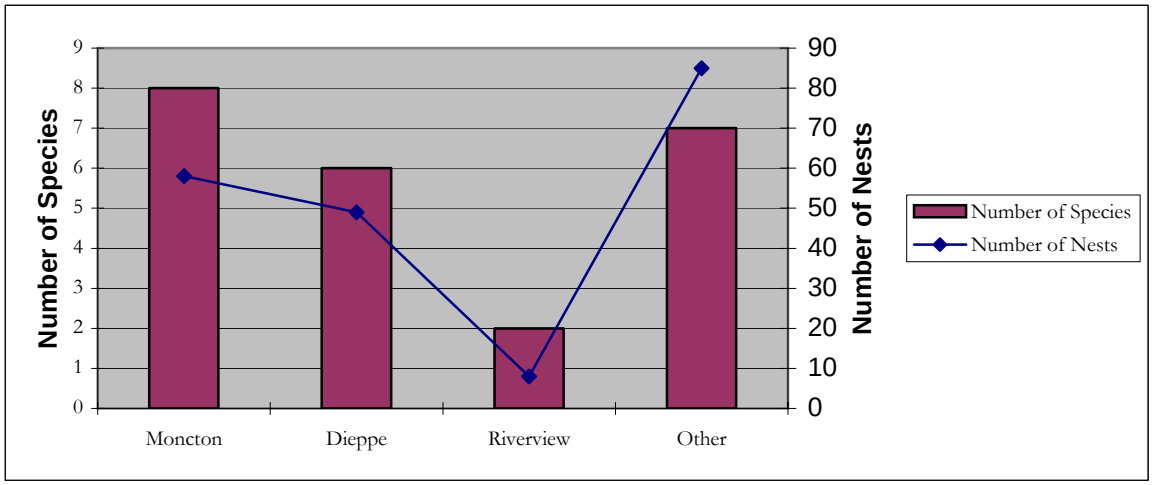

Figure 8 - Comparison of the number of nests and species in different locations in the Greater Moncton Area.

Nests were found by walking or canoeing through all the sites. Sometimes the behavior of certain species, such as the Red Winged Blackbird was very helpful in locating the nests. Once a nest was located, information on location and height of nest, as well as the number of eggs or chicks was noted. The following figure illustrates the number of nests found for the different species.

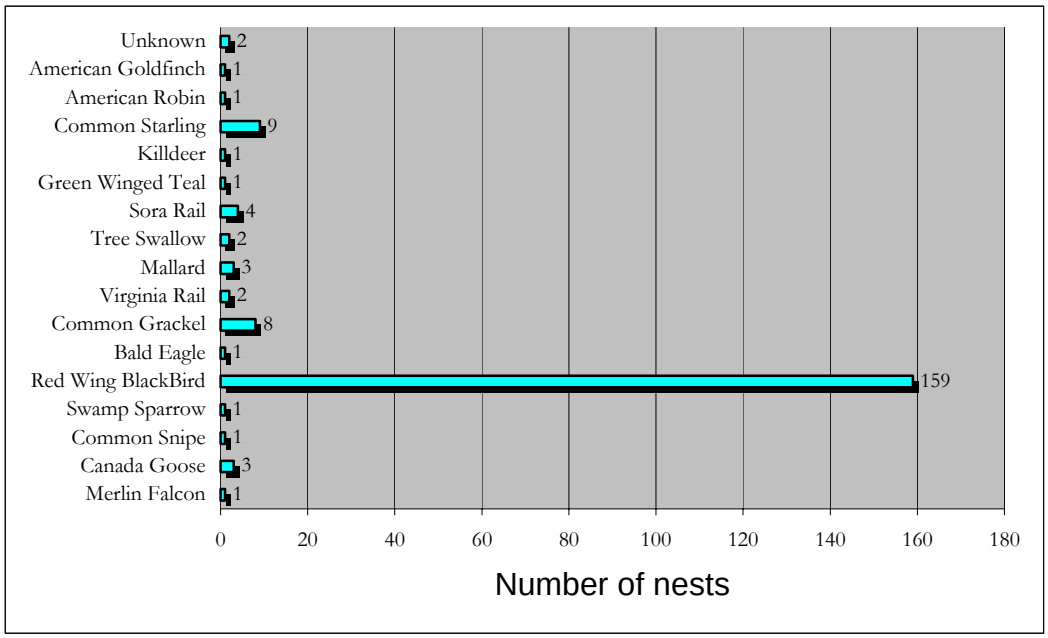

Figure 9 - Comparison of the number of nests found for each species.

The results indicate that fewer nests and species were found in the Riverview area than any other location. This variation might be due to the timing of our visits in relation to the bird-nesting season of some of the major species. Being the first marshes to be surveyed, the nesting activity may not have progressed to allow a complete survey. Observation within the Moncton area was timed to coincide with peak breading activities. A greater variety of habitat types were present within the Moncton area, therefore represents appropriate habitat for a greater number of species. The section consisting of non mosquito control sites has a greater number of species and individuals due to its characteristics. The Dover and Ducks Unlimited sites are large wetlands composed of mostly open water with dense vegetation patches and little human disturbance. This is ideal habitat for species such as Red Winged Black Birds and Common Grackles. When the Dieppe sites were surveyed, many of the chicks had already left the nest, making these very difficult to find. Many of the nests had also been destroyed by the activities of the fledglings. The overgrown vegetation made it very difficult to spot the nests that were built close to the ground.

One of the nests found in the Dieppe area was difficult to identify due to its non-typical characteristics. It was later determined to be in the Rail Family, but was unusually large for its kind. The nest as well as two dead chicks were analyzed by Donald McAlpine, a specialist at the NB Museum and were identified as Sora Rails. The nest, found by Michelle Carbonell and Nathalie LeBlanc is now part of the museum's collection.

Figure 10 - Photo of the Sora rail nest in its natural habitat in one of the Dieppe sites. The nest hole had an inside diameter of approximately 8 inches and the ramp leading up to the nest 13 inches.

Figure 11 - Removal of the nest by Donald McAlpine, curator of zoology at the NB Museum and his assistant Andrew Albert. Accompanied by Michelle Carbonell (left) and Nathalie LeBlanc (right) of the GMPCC bird survey crew.

Conclusion

The focus of this year's study was to continue expanding our knowledge of population estimates and distribution of marsh bird species in the Greater Moncton area. A considerable number of species and individuals were located in the marshes of Dieppe, Moncton, Riverview and surrounding areas.

APPENDIX

DIRECTORS AND COMMITTEES

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Catch Basin Monitoring
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Lakeburn (Dieppe) Investigation
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Marsh Bird Nesting Survey
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Staff list

Name	Duties	University	Area of Study	Residence
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