Nova Scotia
Department of Education

Curatorial Report Number 79

Frogwatch '94: Program Development and Results

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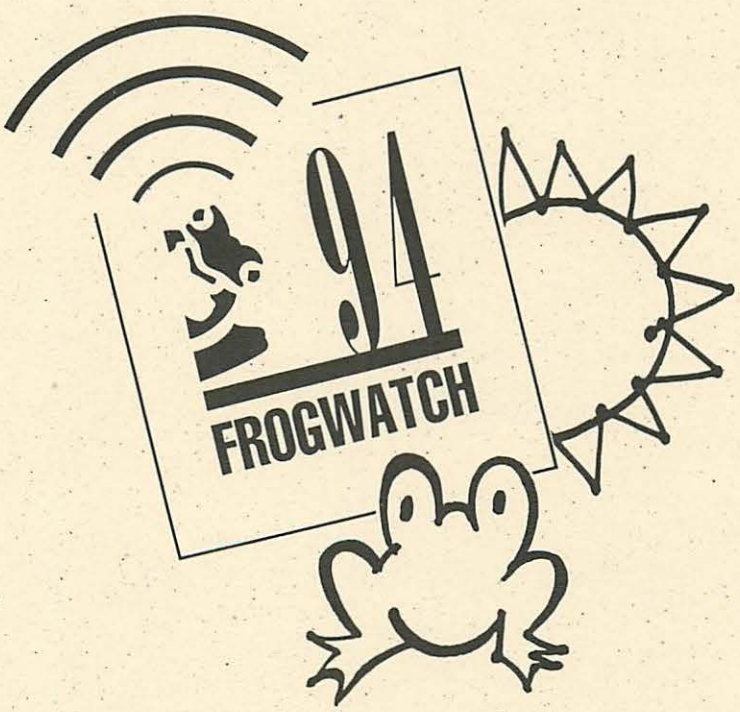

ABSTRACT

Frogwatch '94 was an environmental education project involving schools, youth groups and the general public in monitoring the calls of the Northern Spring Peeper. The pilot project ran in Halifax County in the spring of 1994. Frogwatch '94 was a joint effort between the Nova Scotia Museum of Natural History, The Clean Nova Scotia Foundation and Envirosphere Consultants Ltd. Core funding was provided by the Environmental Partners Fund. This report outlines the structure and delivery of the project and analyzes the results. It concludes with an evaluation of the program from educational, environmental and scientific perspectives and suggestions for a province-wide project in the spring of 1995. The appendices include a summary report that can be easily photocopied for distribution.

ACKNOWLEDGEMENTS

The project's success was based on the volunteer participation of hundreds of students, teachers, youth group members and leaders and individuals and families in Halifax County. We also had help from the science curriculum consultants in Halifax County.

The media were very supportive of the project and provided ongoing coverage. Frank Cameron from CBC deserves special thanks for placing Frogwatch information on the weather reports. The County of Halifax Planning Department, The Nova Scotia Department of Municipal Affairs and the Nova Scotia Geomatics Centre (formerly the Land Registration and Information Services) donated digital and mapped data of Halifax County. Earth and Ocean Research Limited donated their time and digital data to the project. In-kind contributions were also made by staff at The Clean Nova Scotia Foundation, the Nova Scotia Museum of Natural History and Envirosphere Consultants Ltd.

Photographs: Roger Lloyd, Education Media Services and Wayne Brinton, Second Cole Harbour Cub Pack.

Figures: Pat Stewart, Envirosphere Consultants Ltd.

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1. INTRODUCTION AND BACKGROUND

1.1 FROGWATCH '84 AT THE NOVA SCOTIA MUSEUM

This is not the first time that a frogwatch has been carried out in Nova Scotia. The Nova Scotia Museum conceived Frogwatch in 1984 in order to track the awakening from winter hibernation of the Northern Spring Peeper in Nova Scotia. Frogwatch '84 was part of the programming for the travelling exhibition organized and produced by the Nova Scotia Museum, *Amphibians and Reptiles: the Private Lives of Salamanders, Frogs, Turtles and Snakes*. Using a toll-free number, Nova Scotians were asked to report the first chorus of Spring Peepers in their area of the province. The Spring Peeper was chosen as the symbol for the Frogwatch because of the association that most Nova Scotians have with the familiar call of this particular frog and the coming of spring. In addition to its promotional value, Frogwatch '84 was of scientific interest and provided information on the distribution of the species. The responses to this informal survey were kept on record at the Museum. The idea of Frogwatch, along with the possibilities of using amateur volunteers to monitor species populations and distributions, had become well established.

1.2 DECLINING AMPHIBIAN POPULATIONS

The decade following 1984 saw increasing concern in the global scientific community about the decline in amphibian populations and the potential environmental hazards related to this phenomenon. The Declining Amphibian Populations Task Force (DAPTF) was set up under the Species Survival Commission of the World Conservation Union (IUCN) in 1989 to provide a global coordinating centre for individuals and groups concerned with these issues. An important role of the working groups in several countries around the world was to develop monitoring strategies to determine which amphibian species are in decline and to monitor the stresses that regulate population changes. Canada established The Canadian National Task Force on Declining Amphibian Populations (DAPCAN) in 1991 to study the situation in Canada. DAPCAN recommends two types of amphibian surveys - intensive monitoring studies (which are research oriented) and extensive monitoring projects (which identify changes in species abundance and diversity and result in the establishment and maintenance of a data-base). The task force also recommends studying factors that are known to cause or are suspected of having negative impacts on amphibian populations and distributions (Bishop and Pettit, 1991). Most of the surveys require the commitment of professionals as well as knowledgeable volunteers, such as field naturalists. Important contributions can also be made by less knowledgeable but enthusiastic volunteers. For example, in Ontario, individuals across the province participate in a back-porch survey as part of a province-wide amphibian monitoring program. Participants listen for frog calls

vicinity of their home. These less formal surveys involve people who are not interested in or cannot get to designated areas for regular controlled monitoring. Back-porch surveys provide a daily sample of calling frogs and help to determine day to day and year to year fluctuations. This background information complements the more formalized surveys (Gartshore et al, 1993), and the public participation develops an awareness among a sector of the population that might not otherwise be familiar with the issues.

In Nova Scotia, there is no documented evidence that the amphibian populations are in imminent danger. However, it is important within national and global programs (eg. DAPCAN) to have information on frog observations in all areas of Canada. In addition, there are benefits in developing baseline data to measure future changes and to take steps to prevent possible declines.

1.3 FROGWATCH '94

Frogwatch '94 developed out of the interests of the Nova Scotia Museum of Natural History and a Windsor-based consulting firm, Envirosphere Consultants Ltd. Both organizations recognized the need for a local environmental awareness project that addressed the concerns relating to declining amphibian populations (DAP) and general global environmental and climate changes. The Clean Nova Scotia Foundation became the third partner through its interest and mandate for involvement in projects having both environmental and educational objectives. All three organizations have experience with the development and delivery of educational material and programs in the environmental sciences. Core funding was provided by the federal government through the Environmental Partners Fund to carry out a pilot Frogwatch project to monitor the call of the Northern Spring Peeper in Halifax County. Successful completion of the project and acquisition of further funding could lead to a province-wide Frogwatch.

Species monitoring studies can have both scientific and educational spin-offs. Since amphibians are thought to be especially sensitive to environmental change, and in essence can be utlised as bioindicators and biomonitors, it seemed reasonable to develop a program that combined educational, environmental and scientific objectives. The main educational concepts which we wanted to address were the local and global anthropogenic causes of amphibian decline and basic ecological relationships. The Spring Peeper is an ideal candidate for an educational monitoring program because the peeping of this species is both an indicator of its presence and of environmental health. Its timing in the spring is closely linked to temperature and weather and its absence can be linked to habitat decline and possibly to broader environmental change (eg. acidification of water and global atmospheric warming).

The project team decided that interactive education (learning through doing) was the primary objective of Frogwatch '94 and that any scientific value attributed to the data collected would be secondary. Thus, the development of the survey part of the project followed more along the lines of extensive monitoring rather than

intensive monitoring as described in the context of the Ontario studies. An extensive survey provides information on peak periods of a species population and distribution. It involves standardized monitoring using professionals and trained volunteers. It also allows for less formalized monitoring techniques such as back-porch surveys, where large numbers of people can collect data daily from within the proximity of their own homes. This type of monitoring provides continuous data and works well as a component of an educational project.

Halifax County was selected as the target area for the pilot project and students and youth groups became the target audience. Most of the county is rural and even in the cities there are many suitable frog habitats. The program material was developed for older elementary and junior high level students. No one was excluded, however, and both younger and older people were encouraged to participate in various capacities. Because Frogwatch '94 participants listened for the Peeper in their immediate vicinity every day as opposed to travelling to a specific site periodically, younger volunteers could participate. Donald Sam, a local biologist, wrote the scientific material which was then incorporated into a workbook by the staff at the Museum of Natural History and Envirosphere Consultants Ltd.

Frogwatch '94 provided a structure for all levels of expertise to monitor the calls of the Northern Spring Peeper while at the same time providing them with a memorable outdoor experience. As a further benefit, the pilot project allowed the project team to ascertain the viability of using students and the general public in species monitoring studies.

1.4 FROGWATCH AND PHENOLOGY

Frogwatch observations and indeed all systematic observations of the occurence of natural phenomena are part of a widespread scientific and popular activity known as phenology. Phenology was a popular pursuit in Canada in the late 1800s and a comprehensive program of phenological observation was conducted in schools across Nova Scotia initiated by the Superintendent of Schools, A.H. MacKay (Sheenan, 1973). For over two decades, students recorded seasonal changes — the departure and return of the geese, the leafing of trees, the first open water in streams and lakes and the piping of frogs (Spring Peeper), among others. This parallel with Frogwatch '94 provides a time perspective on natural events. We incorporated MacKay's ideas by encouraging Frogwatch participants to observe the world around them more fully. MacKay's phenological program was successful because it was carried out within the school system. It is hoped that this sort of activity will once again complement the school curriculum, making science fun and accessible to all.

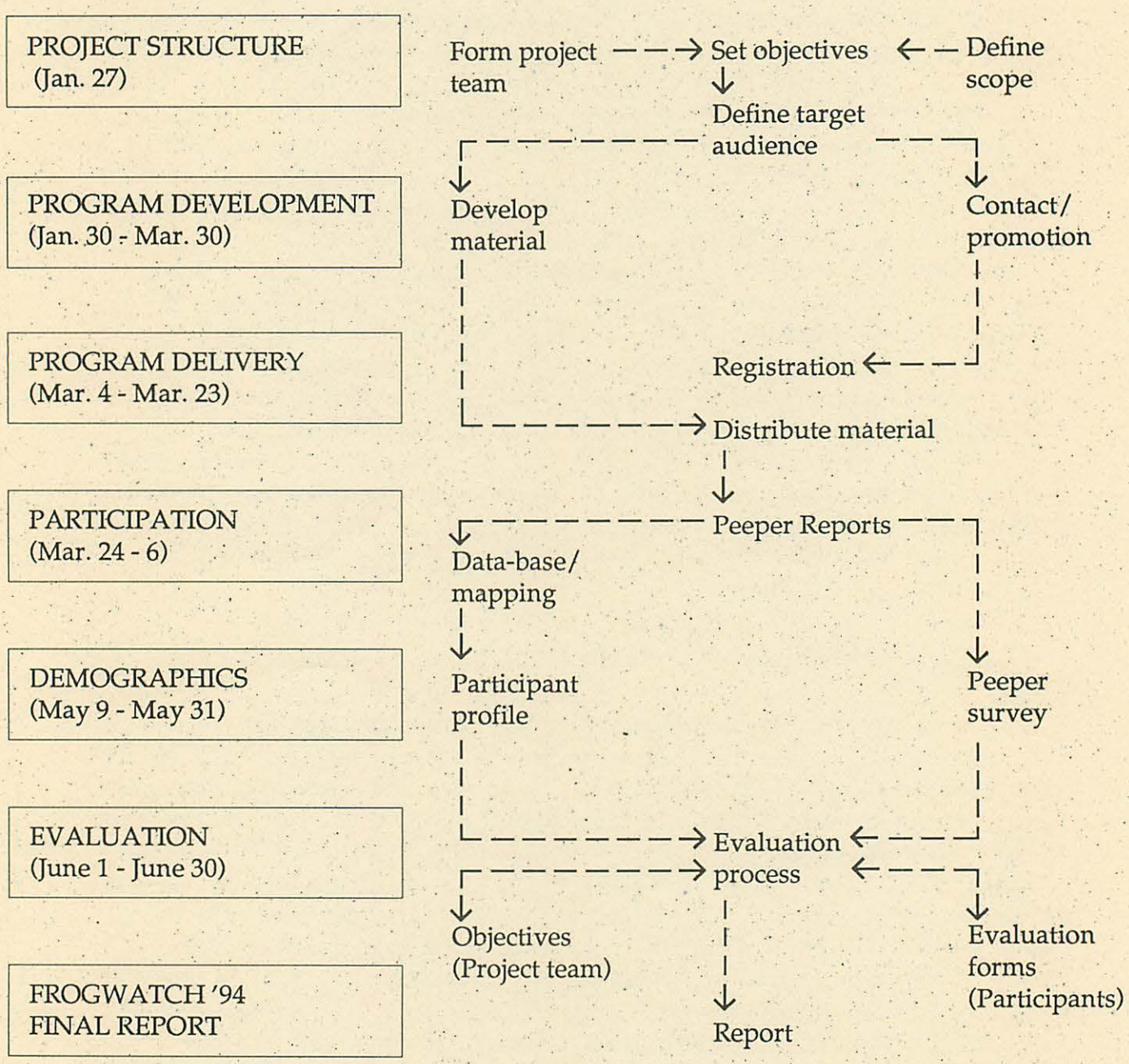

Figure A. Project structure flow chart showing the precedence and duration of Frogwatch'94 tasks. More detail on the programme structure is available as monthly interim reports on file at the Nova Scotia Museum of Natural History and The Clean Nova Scotia Foundation.

2. PROJECT STRUCTURE (See Figure A)

2.1 FORM PROJECT TEAM

Frogwatch '94 started in February 1994 with the formation of a project team. We determined objectives, the scope of the project and a target audience. The team included representatives from all three participating organizations:

The Clean Nova Scotia Foundation
- Martin Janowitz - Project administrator
- Paula Lee - Administrative assistant
- Pearl Matheson -Education consultant
- Sue Browne - Project coordinator

The Nova Scotia Museum of Natural History
- Stephen Archibald - Museum administrator
- John Gilhen - Science consultant
- David Carter - Designer
- Martha Devanney - Education consultant

Envirosphere Consultants Ltd.
- Pat Stewart - Science consultant
- Donald Sam -Project biologist

2.2 SET OBJECTIVES

2.2.1 EDUCATIONAL OBJECTIVES

Frogwatch '94 was primarily an educational project aimed at raising awareness about the environmental issues surrounding declining amphibian populations. It simplified local and global ecological concepts and presented them in the context of something familiar to Nova Scotians — the Northern Spring Peeper. Its main educational precept was 'learning through doing' and the program was designed to encourage as many outdoor and indoor activities and experiences as possible. The program was designed to be used in schools to complement existing science and environmntal curriculum and as an extra-curricular or family-oriented activity. Frogwatch also promoted science as fun and accessible.

2.2.2 ENVIRONMENTAL OBJECTIVES

Frogwatch '94 had short-term and long-term environmental goals. The program encouraged people to constantly be aware of their interactions with their environment and to observe natural and less natural changes around them. Activities associated with the program could lead to the identification of wetland pollution problems and community-based wetland clean-ups. Another important environmental objective was to develop Frogwatch material using recycled materials and to encourage the participants to avoid waste.

2.2.3 SCIENTIFIC OBJECTIVES

The focus activity of Frogwatch '94 was the monitoring of the Northern Spring Peeper's mating call which indicates distribution and potential for reproduction. The scientific merit of the data would be enhanced if this type of monitoring study continues annually. As a back-porch survey, it provides information on peak periods and distributions. This year's data was compared to historical records from the turn of the century and to the 1984 records (see Appendix G).

2.3 ESTABLISH PROJECT SCOPE

Frogwatch '94 was a pilot project. We chose Halifax County, not only for the convenience of proximity, but because there is a high percentage of schools in this part of the province, and because it represents urban as well as rural environments. In addition, the Peepers traditionally start to call inland first and, as the temperature rises, across the province from east to west. Halifax County is the largest county in Nova Scotia and has an east-west orientation. There is good representation of coastal and inland frog habitats and human communities. The pilot project would test the logistical problems related to conducting surveys in sparsely populated areas and to using students as volunteers for ongoing monitoring projects. The experience would go towards developing a province-wide survey the following year, if funding were available.

We decided that participants would be encouraged to listen for the Peepers from the beginning of the last week in March until June. This would expand the educational objectives of the project by incorporating other activities and would encourage other observations. It would be possible then to point out the correlation between weather conditions and peeping or lack of peeping. We especially requested records of the first call and the first chorus of calls in each locality. A chorus of calls occurs when single calls ovelap to the point where it is very difficult to count individual calls and represents probable mating activity.

2.4 DEFINE TARGET AUDIENCE

We targeted for participation grades 5 and 6 and junior high students and youth groups. The program requires a certain amount of individual initiative and activity and this age group requires less adult supervision than younger children. They tend to be enthusiastic and interested in environmental issues. We also encouraged other age groups, younger and older, to adapt the program to their level of interest and capabilities. We felt it beneficial to develop material that complements existing science curriculum objectives and youth group programs. In addition, we took advantage of the existing school system and youth group organizations which facilitated the distribution of material and provided a structure within which to develop a program.

3. PROGRAM DEVELOPMENT

"Spring peepers still sleeping, but listeners wanted for survey"
Article headline - Daily News, February 9, 1994

3.1 INITIAL CONTACT AND PROMOTION

The project coordinator alerted the media (Appendix A.1), distributed newsletter articles and contacted public and private schools and youth groups (Appendix A.2). The schools were contacted through the sub-system science coordinators for Halifax County and the cities of Halifax and Dartmouth. It was suggested that we approach the teachers through principals and also contact the students directly. All schools with the targetted grades were issued 11x 17 bright green posters to be displayed on bulletin boards accessible to the students. Principals and teachers received an outline of the project and registration information as well as a photocopy of the poster for the classroom (Appendix A.3). The initial contact packages were sent out through sub-system cordinators and in some cases directly to the principals with a request to circulate to the teachers. We sent a French cover letter to the principal of L'Ecole du Carrefour indicating that although the program would be in English we did have available some French support material (eg. Nova Scotia Museum Info Sheets) and that the staff at the Museum would be available to help in translation of Frogwatch '94 material.

Youth groups were contacted through the provincial program directors who introduced the project to their regional coordinators. A similar contact package was disributed through the regional offices of Scouts Canada, The Girl Guides of Canada and Nova Scotia 4-H Clubs.

The project coordinator set up a voice-mail box at the Museum to accomodate registration and queries. Several interviews of project personnel took place on radio and television (Appendix A.4).

3.2 DEVELOPMENT AND PRODUCTION OF EDUCATIONAL MATERIAL

The project material consisted of an Info Guide (Apendix B.1), project instructions (Appendix B.2), group summary sheets (Figure B.2), suggested extra activities (Appendix B.3) and references for support material (Appendix B.4). The project material accommodated different levels of interest and knowledge as well as time available to put into the activities. The Info Guide was written by the project biologist, edited by the project team and two curriculum developers in the school system and designed by the Interpretation Section at the Museum of Natural History. We printed 2200 guides. Each group leader received project instructions, suggested activities and references for support material available through the

Museum and The Clean Nova Scotia Foundation. Support material included a frog tape identifying the calls of local frogs including the call and the chorus of the Peeper. This tape was made available to teachers through Educational Media Services (N.S. Department of Education). Other participants could listen to the tape on the Peeper Hotline (see Section 3.2.1).

The program also included an evaluation form (Appendix B.6) designed to provide feedback from group leaders about Frogwatch '94 and to determine the viability of a province-wide Frogwatch in 1995. At the end of the program participants were given the option of receiving Honorary Frogwatcher certificates, a make-your own frogwatcher button kit (Appendix B.7) and/or a summary report (Appendix E).

3.2.1 REPORTING SYSTEM

We developed a hierarcheal system for the participants to report their information. We asked people to report first calls and first choruses to a central location at the Museum of Natural History — the Peeper Hotline. This was a voice-mail box with three seperate touch-tone codes instructing the caller to report a Spring Peeper, leave a message or listen to the frog calls. The Hotline number was prominent on the program material and was advertised several times through the media. The Hotline instructed them to report their name, phone number, I.D. Code, the locality of the frog site, the time and date that they heard the Peeper and whether it was a first call or a first chorus.

Other observations, such as weather, temperature and other species or phenomena noted were to be recorded in the Froglogs at the back of the Info Guides. The Froglogs allowed participants to keep a continuous record of the Peepers from when they started to listen to when they stopped listening. We suggested that the records should be kept until the Peepers had stopped calling for the summer. We also emphasized the importance of recording when no calls were heard during the breeding season in the spring.

Each group leader received a summary sheet to summarize the observations recorded on all the Froglogs kept by that group. These were to be returned to the project coordinator at the end of the project (see Figure B). Sample records were included to help the participants fill in the Froglogs and summary sheets.

Official

Froglog for Frogwatch '94 Reporters

School / Group Name: Eastern Consolidated

Reporter(s): Nicholas Fraser

Grade: 5

Location of frog site: Harrigan Cove HFX Co

Site description: _____

Date: Day / Month	Time of Survey	Type of Call	Air temp.	Weather description	Notes
5, April/94	5:37	—	+3	Foggy, cool	There was just a light breez
6, April/94	7:30	—	+4	Cloud, fog, Cool	breez and foghorn
7, April/94	6:00	—	+3	rain, cloud, fog	heavy breez
8, April/94	7:57	—	+4	Sunny	Sunny, breezy
9, April/94	8:98	—	+3	clear Night	It was not breezy, nor cold
10, April/94	8:00	—	+7	rain, cloud	Windy and rainy.
11, April/94	8:30	—	+6	sunny	birds were singing
12, April/94	7:11	—	+10	Sunny, breez	birds, trees heard
14, April/94	9:30	—	+5	Cloud, fog	Cloudy, Foggy heard fog horn
April/13/94	6:00	—	+9	sunny	still no Peeps
15/April/94	8:00	—	+2	Clear	A clear sky But no frogs
16/April/94	6:00	—	+8	foggy, damp	I heard a frog in afternoon
17/April/94		Peep	+5	Clear	A high pich Peep
18/April/94	8:57	several Peeps	+2	clear, chilly	several high pitch Peeps

Types: None, single peeps or choruses

Phone for weather report 426-9090

Your local temperature

See page 7 for instructions on filling out your Froglog.

Nova Scotia Department of Education
Nova Scotia Museum

The Clean Nova Scotia Foundation

Envirosphere CONSULTANTS LIMITED

ENVIRONMENTAL PARTNERS FUND
Environment Canada Environnement Canada
PARTENAIRES DE L'ENVIRONNEMENT

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Figure B.1. The Froglog recording sheets were filled in by the participants for the duration of the project. They were asked to record when they heard no Peepers as well as when they heard calls and choruses. Other optional observations were also requested. Each participant received one Froglog which they could copy. They were not required to return the Froglogs to the project coordinator.

For Group Leaders

Group Summary Sheet

School: _____

Group: Sunnylakers

ID# G022

Individual(s): _____

Grade(s): _____

Number of participants: 19

Your name: Bob Guscott

1994

# of Observers	# reporting Peepers	Date	Time	Peep	Chorus	Location(s) 63°37' 44°52'	Comments
10	ø	21 March	1900	ø	ø	Wellington	water high, ice blocks on shore saw a few ducks
10	ø	27 Mar	19:00	ø	ø	"	saw one duck
8	ø	4 Apr	20:15	ø	ø	"	stone flies out pussy willows out
5	3	12 Apr	20:30	3	ø	"	coltsfoot out
3	3	14 Apr	02:08	1	ø	Grand Lake bog	
5	5	14 Apr	21:45		1	Frenchmans Rd 63°38'42 44°58'16	
5	5	20 Apr	21:00		1	Wellington	Osprey back, horsetails up, swallows return
4	4	27 Apr	21:30		1	"	
4	4	10 May	21:15		1	"	red maple in flower
4	4	21 May	21:00		1	"	Serviceberry in flower

Call the Peeper Hotline 424-3563 — Date your group heard the first peep

Date your group heard the first chorus — Call the Peeper Hotline 424-3563

Figure B.2. Groups leaders were requested to summarize the observations in the Froglogs and to return the summary sheets to the project coordinator at the end of the program. This information provides a profile of Spring Peepers in each locality as well as an overview of participant interest and how long they continued observing.

4. PROGRAM DELIVERY

"I'd like the students to do it as part of environmental studies."
Halifax County Grade 5/6 teacher

4.1 REGISTRATION OF PARTICIPANTS

We set up a mailing data-base of registered participants. (FoxPro produces a d-Base style data-base.) Each locality received an identification number which included a letter code indicating whether the participants were part of a school group (eg. S004) , a youth group (eg. G027) or a family or individual (P145). Each locality was geographically referenced in latitude and longitude. These can be readily converted to Universal Transverse Mercator (UTM) numbers if so required. The localities also correspond to a grid number in the Nova Scotia Map Book (Province of Nova Scotia, 1992).

The data-base in this form could be transfered to a desktop Geographic Information System (GIS) to map the localities (see Appendix B.5). We used QUIKMap In Focus. (QUIKMap is produced by AXYS Software in Victoria, B.C. and In Focus is produced by Earth and Ocean Research in Dartmouth, N.S.) As base maps on the GIS we used a digital highway map of Nova Scotia at 1:450 000 sold by Earth and Ocean Research and a 1:2 000 000 digital map of North America supplied with the GIS.

By the end of March there were 131 registered groups comprising approximately 2500 participants, among 50 schools (about half of the schools in the County), 28 youth groups and 53 individuals or families. Although the majority of the participants were from Halifax County, there were several registered reporters from other parts of Nova Scotia.

4.2 DISTRIBUTION OF PROGRAM MATERIAL

Program materials were distributed to most schools in the county through the Nova Scotia Department of Education's Educational Media Services delivery system. Other participants received their material by mail. Each group received project instructions, an I.D. number and as many Info Guides as there were target-age participants in the group. Younger participants were encouraged to share with reading-buddies or with teachers and parents. The program material included an initial locality map showing all the registered participants' localities to show the geographic context of the project (see Appendix B.5). The material was distributed before March Break (March 11-21) in order to give teachers sufficient time to review it prior to starting the program on March 18.

4.3 FROGWATCH DISPLAY

A Frogwatch '94 display was exhibited in the lobby of the Nova Scotia Museum of Natural History in order to keep participants and the general public updated on the progress of the project. (see Plate 1). The display included a large map of the county which was updated weekly with Peeper reports, an explanation of the program, some information on declining amphibian populations and Peeper habitat information. There was also a temperature chart which was updated weekly comparing the 30-year normals for Halifax County between 1960 and 1990 and current daily averages. This information showed the correlation between temperature and the occurrence of Peepers.

Plate 1. The project team gathered for a press conference on April 7, 1994 at the Nova Scotia Museum of Natural History. The annual launching of the huge Spring Peeper (Frog Launch) onto the outside wall of the Museum was used to promote Frogwatch '94. The Frogwatch display was set up in the lobby and continued to inform Museum visitors about the progress and results of the project throughout the summer. The display included an observation bulletin board on which visitors were enouraged to write their own spring and summer observations.

5. PROGRAM PARTICIPATION

"I could hear them in my sleep!"
Froglog entry

5.1 PEEPER REPORTS AND DATA-BASE MANAGEMENT

The program started officially on March 25 which was the potential first call date in Halifax County. The Peeper Hotline was set up to receive Peeper reports of first calls and first choruses. The reports were transferred onto recording forms (Appendix D.1) and the latitudes and longitudes were worked out. They were entered into a second FoxPro data-base (see Figure C and Appendix C) and then mapped weekly as Peeper Reports using the GIS QUIKMap (see Figure D and Appendix D.2). The GIS produced maps in digital form (HPGL plot files) which contained symbols at the localation that peeping was heard. Each week the updated plot file was loaded into a Coreldraw file containing the master map, complete with scale, titles, etc. The two maps were superimposed and symbols were added to the master at sites where new peeping was reported. Then the plot file was deleted, leaving the updated master of the map which was used to produce the display version.

Record No.	067
ID Code	S023
Grid No.	31A2
Group	Eastern Consolidated
Contact	Brian Curley
Grade	5-6
Observers In Group	14
Observers On Site	5
Locality	Moser River
First Call	04/10/94
Site Call	pond
Time Call	7:15
Temp Call	5
Weather Call	raining
First Chorus	04/14/94
Time Chorus	11:00
Temp Chorus	5
Weather Chorus	warm
Latitude	44 58 16
Longitude	62 15 18
Comments	started as single peeps grew to chorus /chorus-just sounded cool

Figure C. An example of the data-base fields developed for Frogwatch '94.

Participants were instructed to fill in their Froglogs from the time they first started listening to when they stopped. These were summarized by group leaders onto the summary sheets and sent in to the project coordinator at the end of the project (see Figure B). The summary sheets are bound and kept on file at the Nova Scotia Museum of Natural History.

Many people who had not registered for the project also phoned in their reports or left them at the Info Desk in the Museum. These localities were also entered into the data-base and mapped.

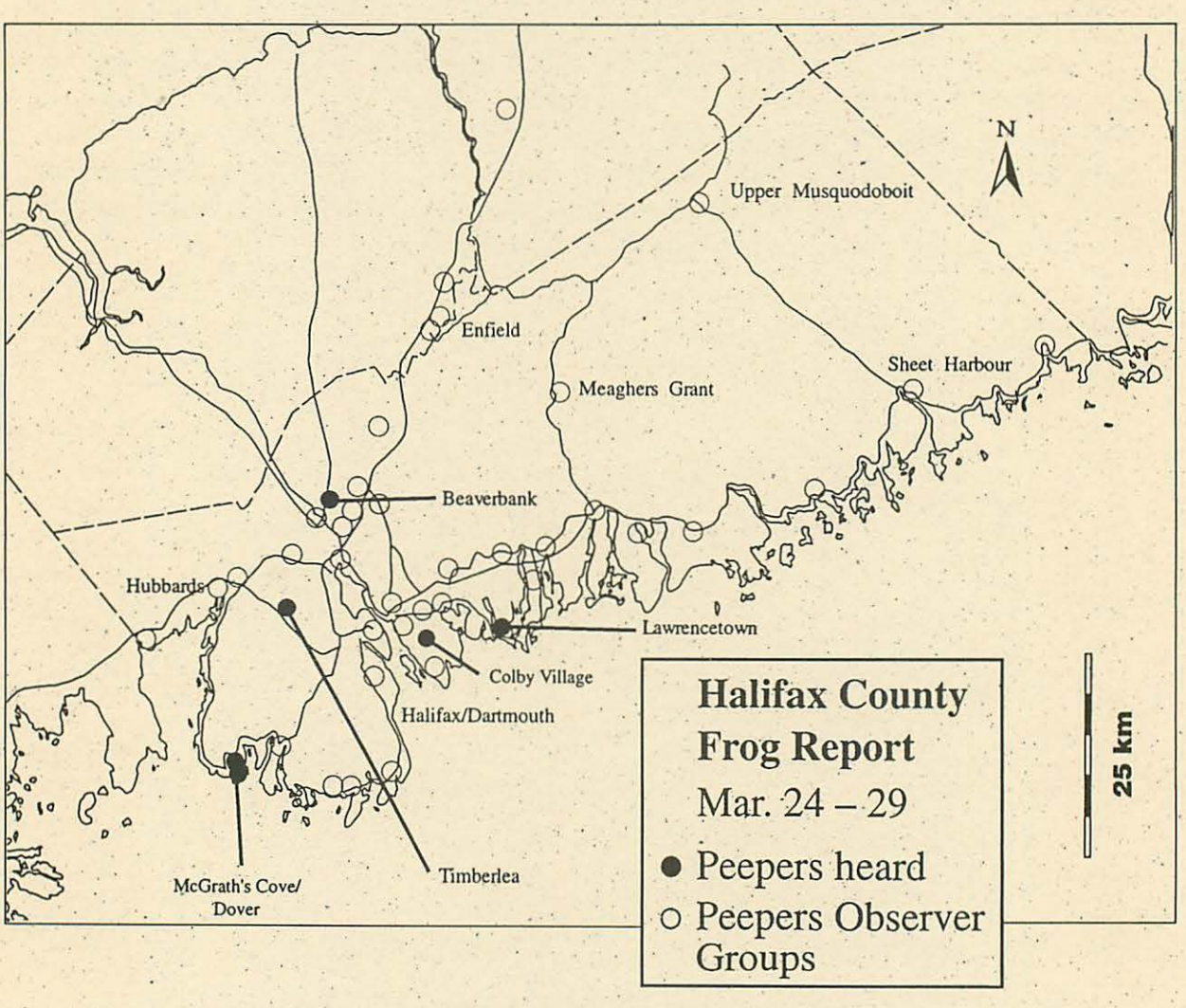


Figure D. The Peeper Reports showed the distribution of Spring Peepers in Halifax County as they woke up and started to call. The maps were aired weekly on CBC weather bulletins and were part of the Frogwatch '94 display at the Nova Scotia Museum of Natural History.
(See Appendix D.2 for a complete set of maps.)

Each group already had an I.D. code and a numeric listing (record number) assigned to it from the mailing list data-base. If a group encompassed more than one locality, the record entered for the new locality would have the same I.D. number to link the records and a different numeric value to indicate that this was a new locality. Only the first calls and first chorus for each locality for each group was entered into the data-base (see Figure E).

Record No.	ID Code	Grid No.	Group	Grade	Observers In Group	Observers On Site	Locality
067	S023	31A2	Eastern Consolidated	5-6	14	5	Moser River
257	S023	31A2	Eastern Consolidated	5-6	14	3	Harringan Cove
297	S023	31B2	Eastern Consolidated	5-6	14	1	Ecum Secum
298	S023	31A2	Eastern Consolidated	5-6	14	1	Quoddy
306	S023	31A2	Eastern Consolidated	5-6	14	1	Moose Head
310	S023	31B2	Eastern Consolidated	5-6	14	2	Necum Teuch

Figure E. An example of the I.D. system developed for Frogwatch '94. The records shown here are all for the same group — the Grade 5/6 class at Eastern Consolidated School. This group reported from six different locations. Each new locality is a separate record and was assigned a different record number. When two or more first call or first chorus dates were reported from the same location (see field heading Observers On Site), the earliest report was recorded in the data-base. The other reports were used to confirm the first reports and are on file in the summary sheets.

Non-registered participants (ones who had not received or did not wish to receive Frogwatch '94 material) were assigned an I.D. number and entered into the data-base. At this point we decided to rate the participants depending on whether they were registered (B), non-registered (C), scientists/project team (A), or people reporting observations other than Peepers (D).

5.2 PROGRAM SUPPORT

We advised teachers and group leaders that the project team was available to talk directly to the participants and to help with field trips. Two people (from the Museum of Natural History and The Clean Nova Scotia Foundation) developed a Frogwatch activity for the Grade 3/4 students at the Bicentennial Elementary School in Dartmouth. This was part of the school's celebration of Earth Day.

5.3 ONGOING PROMOTION

Promotion continued throughout the project (see Appendix A.4). The press appeared to be quite interested in the scientific and educational aspects of the program. Frank Cameron from CBC television agreed to show the Peeper maps on the weather reports once a week. We did this for five weeks until all the localities had reports.

Plate 2. The Second Cole Harbour Cub Pack were very keen frogwatchers. Brian Sutcliffe from CBC Radio Weekend Morning interviewed the boys and their leaders at their favourite frog site beside Bissett Lake in Dartmouth.

6. PROGRAM DEMOGRAPHICS

The program ran officially between March 25 and June 8. This section provides a profile of the participants and the results of the Peeper survey.

6.1 PROFILE OF PARTICIPANTS

The participants included three main categories: schools, youth groups and families or individuals. Each group in any of the categories had a contact person, group leader and observers. In some cases the observers might also be the group leader and contact person. In all cases, the number of people that registered for the program did not equal the number of people who actually participated. There were people who intended to participate but did not and there were people who joined later as unsolicited observers. The figures below are an approximation, as there were groups which did not return evaluation forms indicating how many observers actually participated and some groups did not provide the number of registered observers.

There were 51 schools registered and 24 completed the program. Table 6.1.a summarizes by grade the number of school groups that registered and that participated. There were 32 youth groups registered and 12 completed the program. Table 6.1.b summarizes the types of youth groups that registered and completed the program. Table 6.1.c summarizes the numbers of families or individuals who participated.The number of Observers indicates how many people were registered and how many participated in each group.

Grades	# Groups		# Observers	
	Registered	Participated	Registered	Participated
prim-3	15	11	83	150
4	4	2	138	33
5/6	46	17	845	418
7-9	8	5	483	260
Total	73	35	1549	861

Table 6.1.a Schools (S) The Number of Groups Registered refers to the total number of each grade grouping. This is followed by the number of these groups that completed the program.

Group	# Groups		# Observers	
	Registered	Participated	Registered	Participated
Beavers	3	0	65	0
Brownies	6	4	90	73
Cubs	5	2	54	22
Guides	8	4	107	65
Scouts	2	0	27	0
Pathfinders	1	0	5	0
4-H	4	1	?	?
Other	2	2	9	22
Total	32	13	357	182

Table 6.1.b Youth Groups (G)

# Groups Registered	# Groups Participated	# Observers Registered	# Observers Participated
66	31	103	55

Table 6.1.c Families/Individuals (P)

Six participants (D) reported other observations besides Peepers, such as sightings of different species of frogs.

"Last year a Wood Frog laid eggs in my kids' pool." D-rated Frogwatch '94 participant

6.2 SURVEY RESULTS - OCCURENCE OF SPRING PEEPERS IN 1994

Participants started to phone in Peeper reports on the Peeper Hotline by March 24. By May 2, most people had stopped using the Hotline to report Peepers (see Table 6.2.a). People also dropped off or phoned in reports through the Info Desk at the Museum.

Week	Reports
1 (March 24 -April 1)	9
2 (April 2 -April 9)	42
3 (April10 - April 17)	122
4 (April 18 - April 25)	24
5 (April 26 - May 2)	16
6 (May 3- May 10)	6
7 (May 11 - May 18)	4

Table 6.2.a The figures show approximately how many Peeper reports we received weekly on the Hotline. Most reports were received between April 2 and April 25.

6.2.1 LOCALITIES

There were 143 different localities in Halifax County registered on the data-base. These are mostly in developed areas in the county and some rural areas, such as in the northeast parts, were poorly represented. We did not get Peeper reports from 21 of the localities.

6.2.2 PEEPERS

The first call report on the Hotline was received on March 24 and the first chorus was reported on April 7 (see Table 6.2.2.a).

Type	Date	Locality
First call	March 24	Timberlea, Dartmouth, Mooseland
	March 26	East Dover
	March 27	McGrath's Cove, Dartmouth
	March 28	Beaverbank
	March 30	West Dover
First chorus	April 7	Antrim, Carroll's Corner, Dutch Settlement, Meaghers Grant

Table 6.2.2.a Distribution of first calls and first-choruses for Halifax County in 1994.

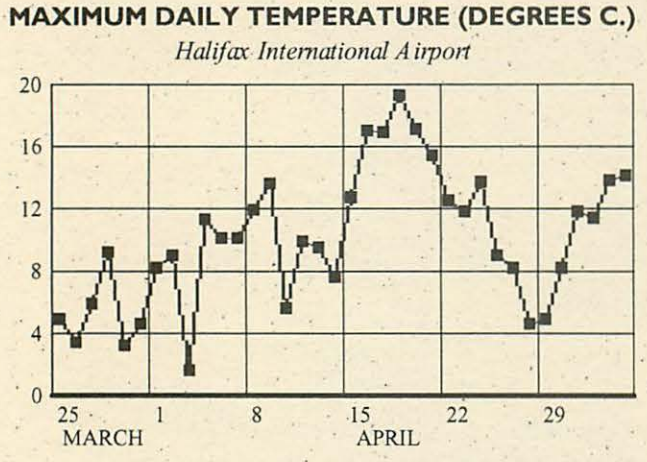
Early calls were observed in a wide range of location types (i.e coastal or inland and east Halifax County or west Halifax County). All the early call sites were in the eastern or central to eastern parts of the county. The inland sites were Timberlea, Beaverbank and Mooseland and coastal sites included East Dover, West Dover, McGrath's Cove and Dartmouth. In general, the coastal areas in the county reported Peepers a few days later than the inland sites (see Table 6.2.2.b). An early call on March 24 reported from Pleasant Valley in Colchester County was later confirmed to be industrial noises that sounded remarkably like Peepers. In other areas of the province, inland reports such as at the mouth of the Avon River were generally earlier than Atlantic coastal areas. On April 7 when the first chorus was reported, many of the inland localities reported first calls. The eastern coastal localities started to report first calls a few days later. By May 1 all localities in Halifax County had reported first calls and by May 3 all localities had reported first choruses.

Peak periods first call	
April 2-10	= various localities along coast moving east
April 13-17	= St. Margaret's Bay to Pennant
April 10-18	= eastern part of coast
April 4-9	= inland in many localities
Peak periods first chorus	
April 13-18	= Sackville, Metro, Eastern Passage
April 28	= Moser River, Quoddy, Ecum Secum, Necum Teuch

Table 6.2.2.b Peak periods of Peeper calls and choruses in Halifax County

6.3 TEMPERATURE

We collected temperature data from Environment Canada's weather stations around the county to demonstrate the variations in different environments and how the temperature changes related to the peak call periods. Figure F shows graphs of daily temperatures from an inland location and a sheltered coastal area. (See Appendix F for temperature graphs of other Halifax County locations.)



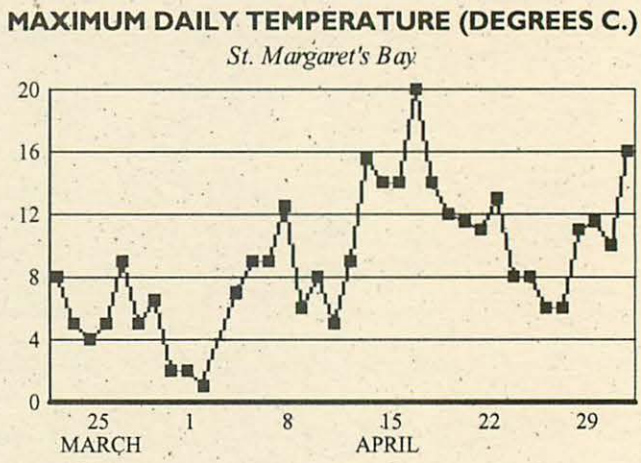


Figure F. Graphs of maximum daily temperatures from March 24 to April 30, 1994.

Figure F.1 illustrates temperature variations inland at Halifax International Airport. A temperature rise between April 4 and 9 coincided with a lot of first call reports in inland locations

Figure F.2 shows that the temperatures in St. Margarets Bay peaked between the 12 and 17 of April. During that period there were many first call reports in that area.

6.4 HISTORICAL DATA

We compared the records for Frogwatch '94 to the Halifax County records from Frogwatch '84 and to the MacKay records from 1904 and 1914. We chose these dates to provide a comparison of Peeper distributions one decade apart at the beginning and at the end of this century. The localities were mapped (Appendix G) and we compared the dates of Peeper calls in the four decades. Direct comparison was difficult as there were fewer localities for the 1904 and 1914 maps and the McKay records from which the dates were taken did not indicate whether the reports were of first calls or first choruses. However, it was possible to do a general comparison showing that calls were somewhat later in 1914. The patterns for the other years were relatively similar with a few early calls along the coast and the majority of calls being heard first inland then towards the coastal areas.

7. PROJECT EVALUATION

"I learnt about how a lot of things in nature are 'hidden' until you look and listen closely."
Evaluation form entry

The project team assessed Frogwatch '94 on how well the project fulfilled its educational, environmental and scientific objectives. We determined this by the number and profile of participants, by the usefulness of the Peeper call data and by the potential for spin-off initiatives. We also evaluated the project structure, program development and delivery and made recommendations for a province-wide Frogwatch.

A significant part of the evaluation process was based on comments from the participants. Evaluation forms (Appendix B.6) were distributed to all group leaders one month before the end of the project, reminding them to submit their summary sheets and also requesting critical comment on the project. This part of the process gave us feedback on Frogwatch '94 as well as an idea of the interest in a province-wide project. This section is structured to follow the flow of the report and each component is evaluated in order combining the assessments of the project team and the participants' comments.

Participants were asked to rate the project.

Overall the project was: 1_ 2_ 3_ 4_ 5_ (1 = unsatisfactory, 5 = excellent). 35% chose rate 3, 41% chose rate 4 and 24% chose rate 5.

7.1 EVALUATION OF PROJECT STRUCTURE

The project was carried out very quickly once funding became available in January, '94. A final decision regarding the feasibility of the project was made in late January. Within one month, the program material was written and participants contacted and registered.

7.1.1 PROJECT TEAM

The partnership functioned efficienty, each partner providing different expertise and resources. The project was based out of the Museum of Natural History which worked well because the public was able to identify with the institution. The Clean Nova Scotia Foundation added the environmental component ensuring that we thought about the "sustainability" of the project material; eg. minimal waste, recycled material, etc. Envirosphere Consultants Ltd. provided invaluable technical expertise.

7.1.2 OBJECTIVES

We evaluated our educational objectives based on the manner in which Frogwatch met the science curriculum objectives of the school system; how well it was integrated into the exisiting school programs; the types of activities that were carried out by the participants; the range of audience that we reached; and on the comments from the participants. The program material was evaluated by science curriculum advisors who determined that the material met the process skills and attitude standards of the science curriculum. It would need to be upgraded in order to fully meet the traditional content component. Teachers used Frogwatch both to supplement classroom activities and to create new ones. In order to complete the program, participants had to be involved in outdoor activities. Some adapted the activities to their schedules such as routine dog walks; others made a deliberate effort just for Frogwatch. In either case, the participants that responded to the evaluation forms have commented that they learnt "to stop and listen to nature." Other comments confirm that the majority of the participants learned something about their environment that they had not known before. The program reached a wide audience from toddlers to seniors and many of them expressed interest in participating again in another Frogwatch or similar project.

We evaluated our environmental objectives based on how the participants reacted to the changes they noted in their environment, how much waste was involved in the project and on potential spin-off initiatives. Many people were concerned with the lessening of Peeper calls over the years and they also noted habitat changes, such as infilling of wetlands and clearcutting. Participants also noted on their evaluation forms that Frogwatch has made them more aware of their immediate environment and that they know look at nature and changes differently. The program was promoted as part of the environmental education component in schools and youth groups. Several biologists within the Nova Scotia Department of Natural Resources have expressed interest in becoming involved in future projects and there is a potential to link Frogwatch to wetland and freshwater habitat restoration initiatives. We used recycled paper for all program material and most correspondence. By promoting the program through the media and through newsletters we reduced the amount of correspondence and the program material was designed to fit the most amount of information on the least amount of space. We wanted to recognize the participants efforts with a momento and decided to develop a make your own button kit which necessitated the use of all recycled materials (Appendix B.7).

We evaluated our scientific objectives based on the proportion of useful data and the kinds of data collected as well as the geographic distribution. Data included records of occurrence, routine scientific and observational data such as temperature and habitat and information on other species. We were able to note peaks and a general distribution pattern. In addition, this type of data indicated areas of concern that could warrent further scientific study. The survey succeeded as a back-porch survey, proving that there is a core of interested and competent volunteers. This

year's data can be used as a baseline for comparing future records in Halifax County and as GIS data-base it can be used as an overlay in biological or bio-physical studies.

7.1.3 PROJECT SCOPE

The project was manageable within the time frame and scope alloted. There were some logistical difficulties with setting up the data-base; namely, the project coordinator needed an extra person to help with registration. Some teachers suggested that they would need more forewarning in order to plan the program into their classroom activities. As a pilot project, we were able to test methods of distributing program material and promoting the project, as well as to work out some of the logistical problems.

7.1.4 TARGET AUDIENCE

The targetted audience responded well to the program. Students in grades 5 through 7 constituted the majority of the participants. Teachers were willing and able to use the material in their classrooms. Youth group leaders also used the material as part of their programs. Other participants included families with young children and adults. Listening in the evening was generally not a problem, although some teachers did note that not all students would participate outside of school hours. The program was easily adaptable to younger audiences and adults also seem to have enjoyed it.

7.2 EVALUATION OF PROGRAM DEVELOPMENT

7.2.1 PROGRAM PROMOTION

The media was a very effective way of promoting the program. The response to an announcement on Q 104 and articles in the Herald and Daily News was immediate. Over half the respondents polled said they heard about the program through the media. Others heard about it through school or through a trip to the Museum. Ongoing promotion resulted in 92 unsolicited Peeper reports from people who were not registered for the program.

The Halifax County sub-system science coordinators were reponsive to the program and some helped a great deal in promoting the project to the teachers and principals. Others would have liked more advance notice in order to introduce the project at the principal meetings. However, there was a 50 per cent response rate from the public schools. No private school participated even though they were contacted.

The provincial youth group coordinators referred the program to the leaders through regional coordinators. It is hard to assess how effective this was as most of the youth group leaders who participated said they heard about the program through the article distributed in their newsletter, through contact with the project coordinator, or through the media. There is no estimate on the percentage of individuals belonging to youth groups in Halifax County who participated.

7.2.2 PROGRAM MATERIAL

The evaluation form included questions on the ease with which participants were able to use the program material. The choice ranged from very easy to understand to impossible to understand. Most people (65%) found the project instructions very easy to understand; 25% found them easy to understand and 10% said they were average. 58% said that the reporting forms were very easy to understand; 31% found them easy to understand; and 11% found them average.

"Info Guide and other instructions very informative and interesting."
Halifax County father

The participants were also asked whether enough background material was provided and whether they used any of the suggested activities or resources. 97% said that enough background information was provided, 36% tried suggested activities and 22% developed other activities. The activities included writing poems, class assignments on frogs, field trips to ponds, observing other wetland plant and animal species.

"The students designed a hall display for other students to see and read about frogs."
Grade 7 teacher

The resources included the frog call tape and 40% used the Peeper Hotline frog call tape, while 11% made use of Educational Media Services to dub a frog call tape. 12% used the literature.

We asked the group leaders to suggest improvements to the program. Several comments relate to program material such as including or making available a video, slide show, French literature, longer reporting forms, material geared for younger children and a workshop. Teachers also indicated that they would welcome more teacher support.

7.3.3 REPORTING SYSTEM

The voice-mail system was generally sufficient for receiving Peeper reports. The project coordinator recorded the reports daily. During the peak period (April 10 to April 17) the number of reports exceeded the voice-mail system's capacity for accepting messages and people were forced to make reports through other phone lines at the Museum. Some people were confused by the amount of information requested of them when they phoned to leave a Peeper report. Ideally, they would only need to leave their I.D. code which we would then be able to match up to the data-base. However, since there was often more than one locality, and thus different people, connected to each I.D., that did not always work. We then needed the requested information to map the localities. We added the phone number request later because some people would leave a local name for a site that we could not find in any map book.

The Hotline did not work well for leaving messages for the project coordinator as people were frustrated about having to listen to the instruction about Frogwatch before they could leave a message. In addition, the Hotline was restricted to people with touch-tone phones.

There was some confusion among the participants as to whether reporting was the teacher/group leaders' or the frogwatchers' responsibility. Only 25 groups submitted the summary sheets. The rest returned their Froglogs and /or only reported first calls and choruses on the Hotline. Some sent back Froglogs without summary sheets. The returned reporting forms were used to update the data-base. Mostly, the forms were filled in a standard way with small, but manageable variations. There was some confusion as to what site description meant. e.g. nice, pleasant, quiet as opposed to pond or ditch. There was also some confusion as to what to put in Peeps and Chorus fields on the summary sheet e.g. some filled in yes or no others filled in the number of participants that heard the Peepers (which is what we wanted) and others filled the number of peeps they heard.

Very few people worked out their own geographic referencing coordinates and those that did generally used UTM system.

7.3 EVALUATION OF PROGRAM DELIVERY

7.3.1 REGISTRATION

The data-base worked well for registration. We included fields that allowed us to have a contact person list, as well as the name of the student or child that would receive the information. The mailing list data-base can output mailing labels.

7.3.2 MATERIAL DISTRIBUTION

The Educational Media Services delivery system was very useful in order to get material to students before March Break; however, it has a limited range in Halifax County, excluding the eastern and northern areas. They do not deliver outside Halifax County. Teachers suggested that the material should be available as a Museum loan kit.

7.3.3 FROGWATCH '94 DISPLAY

The display attracted interest from the public and the bulletin board allowed them to get involved in Frogwatch even if they were not participating as reporters. About 20 people that we know about registered for the program after viewing the display. The display stayed in the lobby during the summer of 1994, providing visitors with a summary of the program results.

7.4 EVALUATION OF PROGRAM PARTICIPATION

In general, we are satisified with the quality and quantity of participation. Over half the people who initially registered completed the program (refer to Section 5 for a participant profile). Teachers commented that some of their students were not reliable in their reports. They suggested that they (the students not the Peepers) would need more monitoring. Ninety-nine per cent of those polled said they would like to participate again next year. Teachers requested that the program be introduced in September to allow more planning time and modified for younger children. Most teachers thought Frogwatch would function best as a supplement to the curriculum rather than part of the curriculum. Students and youth groups were more inclined to try suggested activities or to develop new ones than were individuals or families.

7.4.1 PEEPER REPORTS

We assessed the number and continuity of Peeper reports and the distribution of localities. The observations provided us with a preliminary indication that there are indeed populations of Spring Peepers breeding in Halifax County and that they tend to start calling over a very wide area (namely south-central Nova Scotia) within a general time frame. By comparing this year's dates to those of other years, we determined that they started to call slightly earlier than usual this year. This is not conclusive by itself; however, given annual surveys, this type of data would determine patterns.

Comments received from the participants indicate that the numbers of frogs have decreased in the last 20 years. People attribute this phenomenon to observed habitat loss and change in predator composition. There were many reports of Wood Frogs breeding.

Geographically, the Peeper reports were more abundant around the Metro area. Most localities in the rural areas had at least one report. We did not receive any information from northeast Halifax County, mainly due to the lack of human communities in that area.

The crucial data, i.e first call and first chorus, was reported on the Peeper Hotline. Only 6 per cent of the participants polled used the Hotline to report the first call and chorus; however, we did receive many more reports on the Hotline from people who did not fill out the evaluation forms. Generally, most people phoned in their reports immediately, however,some phoned in reports that were two weeks old. Some participants did not use the Hotline at all and sent in their first call and first chorus data at the end of the project with the summary sheets and/or Froglogs. These reports were then missing from the weekly Peeper Report maps. They were entered into the data-base at the end of the project. Some participants continued to phone in reports on the Hotline even after they had reported the first chorus. These reports were not entered into the data-base. They are filed at the Museum.

In several localities, first chorus reports were received before first call reports. Some people only reported the first call and not the chorus. One early report on March 24 was later explained as industrial noise and not actually Peepers.

Although we suggested people listen until they no longer heard Peepers, the majority stopped listening after they heard the first chorus. Several teachers said that the students lost interest after that. In addition, school was finished in many areas before the Peepers actually stopped. Comments from teachers indicate that it was difficult to monitor the students' reports and that as it was not an obligatory part of school activities, only those who were very interested completed the program. We also asked that the participants record the dates that they did not hear Peepers at all during the breeding season and to check whether these days corresponded to low temperatures or very windy weather. The returned reporting forms indicated that the majority of the Frogwatchers who completed the program recorded when they did not hear the Peepers as well as when they did hear them.

The listening was incorporated into scheduled walks or activities. Most people did not have to go far from their homes to hear the Peepers. There were gaps in reporting when people wanted to listen at their cottage and only went on an irregular basis. Some of the youth groups only listened when they went out once a week as a group.

7.4.1 DATA - BASE MANAGEMENT

It took some time and numerous errors to develop a viable system for transferring the data between the various sources, i.e. from the Hotline to the recording forms for locality calculations to the GIS to mapped Peeper Reports and into the data-base. Once established, however, the system was efficient. The fields set up in the data-base functioned adequately for the scope of the Halifax County project; however, there would need to be some alterations in order for the system to function efficiently at a province-wide level. There are small details, such as setting up time fields to accommodate numbers instead of characters and using military time to record time. More time should be spent at the beginning of future projects to ensure that the system is set up in the most effictive manner. This year's data can be used in conjunction with GIS data-bases of resource information or natural history records. A province-wide data-base would need to be set up with a UTM conversion system.

7.4.3 PROGRAM SUPPORT

Although, we suggested that we were available for field trips and classroom support, the particiapnts did not request any such services. Several teachers did mention in the evaluation forms that they would have appreciated more teacher support such as a slide presentation, so this may have not been clear. The School for the Blind expressed interest in adapting part of the program, however, there was not time to follow up on this. There were no requests for French material and as far as we know, no French immersion classes participated.

7.4.4 ONGOING PROMOTION

The media support was very important throughout the whole project. The concepts were presented in several different interviews from scientific, environmental and general interest perspectives. π

8. CONCLUSIONS AND RECOMMENDATIONS

I would be definitely interested in an ongoing nature observation program. I have been very involved with trying to develop science kits at school. Such a program would be of great interest.
Frogwatch '94 individual participant - Pictou County

8.1 CONCLUSIONS

From an educational perspective Frogwatch '94 was very successful. It complemented school and youth group programs and the majority of teachers and youth group leaders are interested in participating again. The program received national publicity and it appears to be a relevant topic for the general public as well as for the media. It succeeded in raising awareness about the issues related to declining amphibian populations and at the same time provided an opportunity for a lot of people to enjoy an interactive outdoor experience. There is potential for expanding the program to include environmental restoration activities. From a scientific point of view, the data collected is a good indication of the peak breeding periods of the Spring Peeper. There are some discrepancies in the collection methods and there would need to be confirmation from more formalized surveys in order to develop base-line data. Frogwatch has the potential to be a two-tiered survey system, involving biologists as well as emphasising the educational values of the back-porch method. This type of program could be expanded to encompass other indicator species that symbolize different seasons and environmental issues. People are keen to become involved and to learn more about their environment and their place in the natural community. Frogwatch is simple, fun and oriented to all ages in addition to being educational and useful as a monitoring study. The following recommendations are based on the evaluation of the pilot project and will help to develop a province-wide Frogwatch.

8.2 RECOMMENDATIONS

Frogwatch should be developed into a province-wide project following these recommendations:

SURVEY METHODS

- *The project should run on two levels: the back-porch survey involving students, youth groups and families: and a formalized survey involving existing networks of field biologists such as the sub-division offices of the Nova Scotia Department of Natural Resources, and field naturalists such as the Federation of Nova Scotia Naturalists.*

- *The Wisconsin method for rating calls should be incorporated into the survey.*
  0= no calls.
  1=no overlap
  2=few overlaps
  3=many overlaps

- *All areas of the province should be covered in the survey, not just those areas where communities are located (see # 2)*

DATA COLLECTION

- *There needs to be clarification on a definite monitoring period.*

- *The site terminology needs to be standardized. It should follow established terminology such as in the Natural History of Nova Scotia.(Davis, Browne 1994) Participants should check off their site as it best matches the description provided.*

- *The data should be set up as a mapping project using GIS and there should be a Natural History of Nova Scotia Theme Region overlay.*

- *The data-base needs to be programd to automatically convert latitude and longitude coordinates to UTM.*

- *The data-base should be set up so each group could have more than one first call and chorus at the same location, e.g. Eastern Condolidated School had students from 10 locations so they all got a different numeric value per location with same I.D. number. However, there were more than one student at same location, but only one first call was entered. We could set up data-base to accommodate all the first calls at different sites in that location either as the same record or a different record.*

- *There is no need to work out locality coordinates upon registration since most localities vary from the original site once reports start to come in. There needs to be an extra person to work only on localities and entering reports in the data-base once the reports start to come in.*

- *The project coordinator should make sure that all participants are absolutely clear about the reporting system, particularly if a hierarchical system is used.*

- *Regional coordinators should be set up across the province to facilitate the transfer of information and to assist the participants where necessary. Systems such as that used in Ontario for the amphibian count and the breeding bird survey should be considered.*

- *Reports should be confirmed by biologists or field naturalists for a scientific survey.*

- *Emphasis should be placed on having reporters from uninhabited areas.*

TEACHER SUPPORT

- *The coordinator could run workshops at the program development stage to allow for input from teachers, youth group leaders and science curriculum developers. The program should be promoted at the science teachers' in-service in October.*

- *There needs to be more teacher support; e.g. give slide shows; help on field* trips.

PROGRAM PLANNING

- *The project requires advance planning to let teachers and youth group leaders know in September about the upcoming program to give them sufficient time to work it into their schedules. The project coordinator can advise teachers through curriculum updates in the Nova Scotia Teachers Union newsletter (The Teacher), where it can be highlighted as a supplement to science programs. There are also several provincial circulations to youth group leaders. Both the provincial and district curriculum advisors and youth groups coordinators should be consulted at the beginning of the project. Resources should be available for the teachers in December or early January.*

- *The program should comply with all science curriculum objectives for the province.*

- *The program should be promoted to literacy programs and the School for the Blind.*

- *The material should be available in French.*

- *The Hotline will need to be a toll-free number for long distance reporters and there needs to be a system to accommodate people without touch-tone phones.*

LOCAL INITIATIVES

- *There should be more emphasis on environmental upgrading such as local initiatives to restore wetlands, garbage clean-up initiatives and community involvement in lobbying for protective legislation. The clean-up activity could be similar to the beach sweep program developed by The Clean Nova Scotia Foundation.*

- *The program should be expanded to include more scientific observations and field work (eg. pH testing, water temperature monitoring).*

- *The project coordinator could run workshops with local environmental and community groups to initiate and help organize community clean-up projects.*

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It (Frogwatch '94) was something very different and unique that none of us had done before.
Frogwatch '94 participant

NEWS RELEASE
FOR IMMEDIATE RELEASE

Nova Scotia Museum of Natural History,
The Clean Nova Scotia Foundation, Envirosphere Consultants

At the Sound of the Peep

Students asked to lend an ear
Local Frogwatch Project addresses global concern

A local partnership has been set up to develop a Frogwatch Project for the Halifax County area. Students and youth groups are asked to monitor Spring Peepers as part of an international effort to raise awareness about declining amphibian populations.

The project is funded under the Federal Environmental Partners Fund. It is a joint venture between the Nova Scotia Museum of Natural History (government), The Clean Nova Scotia Foundation(non-profit) and Envirosphere Consultants (private). All 3 organizations have an interest in environmental education and community participation.

In 1984 the Nova Scotia Museum of Natural History ran a successful Frogwatch as part of the Amphibian & Reptiles Exhibit. A decade later, the Spring Peeper still holds a prominent position on the corner wall of the Museum building and in the hearts of Nova Scotians. This frog, that in real life could sit comfortably on your thumbnail, heralds Spring with its loud mating call.

(More)

Today, however, the call of the Peeper symbolizes a far larger concern about the global decline of amphibian populations. Amphibians are important indicators of ecosystem health and environmental change, such as habitat loss and wetland pollution. Although we haven't recorded a serious Peeper decline here in Nova Scotia, we need to monitor healthy populations now in order to detect any future problems. The results of the '94 survey will be compared to similar data collected in Nova Scotia at the turn of the century. If successful, Frogwatch '94 will be expanded for the entire province in 1995.

The Frogwatch program will include additional materials, observers' guides and a follow-up report for groups or classrooms.

The spring 1994 project is designed to make science fun and accessible at the same time as gathering valuable population and distribution data. It is tailored for junior high students and for youth groups, however anyone can participate. The project team needs help contacting the schools and youth groups in the Halifax County area. There's a very tight time schedule because the Peepers will peep without waiting for us.

—30—

Contact: Sue Browne at 424-3563
Frogwatch '94 Coordinator

Leave a message at the sound of the peep!

Frogwatch '94

SUE BROWNE, PROJECT COORDINATOR • TELEPHONE 424-3563

To: Grade 6 teachers and students and junior high science teachers and students in Halifax and Dartmouth Districts and Halifax County School Boards

From: Nova Scotia Museum of Natural History, The Clean Nova Scotia Foundation and Envirosphere Consultants Ltd.

Frogwatch '94 is a pilot project developed to monitor populations and distributions of the treefrog, the Spring Peeper, in the Halifax County area. The project has an educational focus and provides an outdoor environmental experience for the participants. We are soliciting the participation of Grade six and junior high teachers and students, as well as youth groups in Halifax County. The project can be approached as a supplement to the existing curriculum or as an extracurricular activity. The level of involvement can vary according to interest and time available. The project is designed so that it can become a part of the existing school work if so desired. However, it could also function as an outside activity for individuals or groups of students requiring minimal participation from the teachers. It will be necessary to set up coordinating bodies in each school to centralize the information and report back to the project coordinator.

Project Outline

Goals:

To monitor Spring Peeper populations and distributions
To increase awareness of species in their habitats
To increase awareness of amphibians as indicators of ecosystem health
To demonstrate how science can be fun and accessible
To involve the community in environmental education
To provide a learning experience for youth
To determine the potential of a province-wide project

Scope:

Spring Peepers emerge from winter rest and start peeping in March and April. Project participants will be monitoring Spring Peepers calls in their area. This could be as simple as listening at dusk outside the back door, or it could be as involved as a group field trip to an appropriate habitat. The critical information needed is when and where the first peep is heard and when and where the first continuous chorus of peeps is heard. These findings will be collected by the representatives in each area and called into the project coordinator to provide a continuous view of the Peeper's emergence across the County.

The project team is developing an observer's handbook which will summarize the natural history of the Spring Peeper, i.e. its life cycle and habitat requirements. The handbook will also outline a reporting system with log book and recording forms. Participants will be encouraged to make observations about the environment.

The project package will include program instructions and a list of suggested activities. Other supporting material will include tapes of the Peeper's call and comparisons with other amphibians, maps identifying potential habitats, historical reports and information on environmental issues. The project team will be available to talk to the participants directly and meetings can be set up at the Museum. Spring is the crucial time in the reproductive cycle of the Peeper. The project runs between February and May, 1994, with peak periods at the end of March/beginning of April and the beginning of May.

Background

A local cooperative venture, under the Environmental Partners Fund, has been set up to develop a pilot Frogwatch Project for the Halifax County area. The partners include the Nova Scotia Museum of Natural History (government), The Clean Nova Scotia Foundation (non-profit) and Envirosphere Consultants Ltd. (private). All three organizations are active in environmental education and community participation. The project is primarily for educational purposes aimed at increasing the participant's sensitivity to the environment and understanding of environmental change. The data collected will also contribute to amphibian monitoring records.

The idea of monitoring Spring Peepers as an indicator of Spring is not a new one. In the early 1900s, A.H. McKay, superintendent of schools for Nova Scotia, organized a province-wide program of natural history observations carried out in the one-room schoolhouses which dotted the province. For several decades, teachers and students watched and recorded changes in plant and animal life, weather and other natural phenomena, throughout the year. At the time, the practice of observing natural changes (known as phenology) was in vogue and a popular educational and leisure activity in North America. The original records which McKay compiled contain a wealth of information on the natural environment of the time.

One of the things these early observers noted was the "piping of frogs" — the Spring Peeper. The timing of the Peeper was one of the signs of spring. Linked as it is to temperature, it has also become a means of assessing the climate even today, especially when we are so concerned about such things as whether global warming is taking place.

In 1984 the Nova Scotia Museum of Natural History ran a successful Frogwatch as part of the exhibit - The Private Lives of Reptiles and Amphibians. Several local initiatives in Nova Scotia have also collected Spring Peeper data in various parts of the province.

In 1990 concern in the scientific community about decreasing amphibian populations initiated a national working group to monitor amphibian populations and distributions. Amphibians are seen as an indicator of wetland ecosystem health and a decrease in their population could be related to loss of habitat, high pollution levels or other ecosystem changes. In this context, Frogwatch information becomes important data for establishing a benchmark for environmental change.

Frogwatch '94 is a pilot project which, if successful and if funding permits, could become the prototype for a more extensive survey in 1995. The project team wants to again involve students and youth groups because they have both the necessary enthusiasm and interest in environmental issues. Frogwatch '94 is a simple way for youth to improve their experience of the environment and to contribute to our overall understanding of environmental changes. It is designed to make science fun and accessible while at the same time gathering valuable population and distribution data. It is tailored for junior high students and for youth groups, but anyone can participate.

To participate contact
Sue Browne at 424-3563
By February 24

Leave a message at the sound of the peep!

Frogwatch '94

SUE BROWNE, PROJECT COORDINATOR · TELEPHONE 424-3563

To: Youth group leaders in Halifax County

From: Nova Scotia Museum of Natural History, The Clean Nova Scotia Foundation and Envirosphere Consultants Ltd.

Frogwatch '94 is a pilot project developed to monitor populations and distributions of the treefrog, the Spring Peeper, in the Halifax County area. The project has an educational focus and provides an outdoor environmental experience for the participant. We are soliciting the participation of Grade six and junior high teachers and students, as well as youth groups in Halifax County. The project is designed to function as an outside activity for individuals or groups. The level of involvement can vary according to interest and time available. Within the youth groups, participants could become involved as part of such programs as Community and Environment Pathways in the Guides and related programs in the other organizations. It will be necessary to set up coordinating bodies within each group to centralize the information and report back to the project coordinator.

Project Outline

Goals:

To monitor Spring Peeper populations and distributions
To increase awareness of species in their habitats
To increase awareness of amphibians as environmental indicators of ecosystem health
To demonstrate how science can be fun and accessible
To involve the community in environmental education
To provide a learning experience for youths
To determine the potential of a province wide project

Scope:

Spring Peepers emerge from winter rest and start peeping in March and April. Project participants will be monitoring the Spring Peepers call in their area. This could be as simple as listening at dusk outside the back door, or it could be as involved as a group field trip to an appropriate habitat. The critical information needed is when and where the first peep is heard and when and where the first continuous chorus of peeps is heard. These findings will be collected by representatives of each group and called into the project coordinator to provide a continuous view of the Peepers' emergence across the County.

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To participate contact
Sue Browne at 424-3563
By February 24

Leave a message at the sound of the peep!

Frogwatch '94

The Spring Peeper is the tiny treefrog that for most of the year lives quietly in the woods.

However, In the Spring!!!!!

It is amazing what a loud noise these tiny creatures can make. This is their mating call.

Monitoring the calls helps us to keep track of Peeper populations.

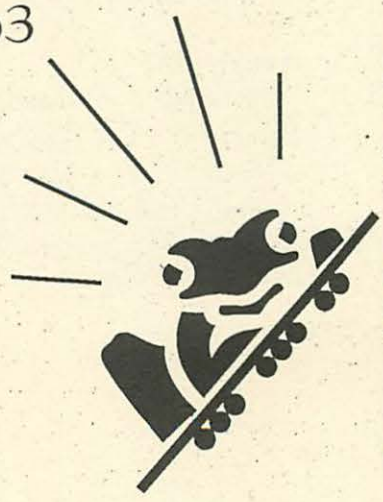
This is called a Frogwatch.

Frogwatch information plays an important role in helping us to understand environmental changes.

This Spring there will be a Frogwatch in the Halifax County area.

Frogwatch '94 needs volunteers.

If you want to become part of the project team call **Sue Browne at 424-3563** or leave a message at the sound of the Peep!



Frogwatch '94 is a joint venture between the Nova Scotia Museum of Natural History, The Clean Nova Scotia Foundation and Envirosphere Consultants. The project is funded under the Environmental Partners Fund.

Frogwatch '94 - Media Coverage

The following includes media coverage that we are aware of. The press were alerted 3 times during the projec; once at the beginning; next when the first calls were heard; on April 7 for the Frog Launch.
The Frog Launch was attended by representatives of all the Frogwatch partners:
The Clean Nova Scotia Foundation - Paula Lee, Anne Cosgrove
The Nova Scotia Museum of Natural History - Candace Stevenson
Envirosphere Consultants Ltd. - Pat Stewart
The Environmental Partners Fund - Bob Lohnes

Television
March 17 - MITV Maritime Today
March 29 - CBC Weather report on 6p.m. news (ongoing once a week for for one month)
April 7 - MITV 11 p.m. news, ASN 10 p.m. news, ATV Live At Five
April 20 - closing credits on Maritime Today
April 21 - CBC Midday
April ? - Channel 30 - several times on Earth Watch

Radio
February 24 - Q104
March 24 - CBC Info Morning
April 6 - Mainstreet
April 27 - Weekend Morning
April ? - Q104

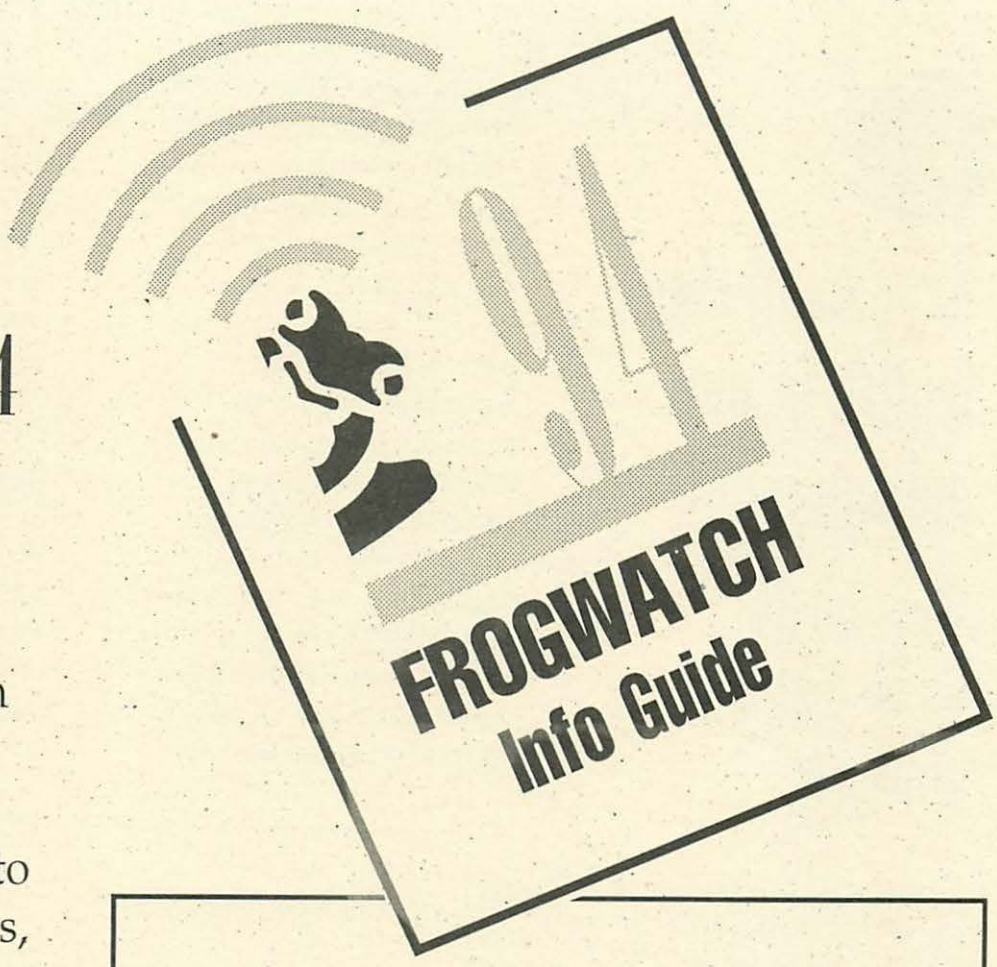
Newspapers
February 8 - Chronicle Herald
February 9 - Daily News
March - Masthead News

Magazines
January - Nova Scotia Scouter - back cover
February and July - Nova Scotia Renews - (The Clean Nova Scotia Foundation)
Spring/summer '94 - The Occasional (Nova Scotia Museum)

Newsletters
February '94 - Education Nova Scotia
February - The Teacher
April and July - Museum News
Spring - Ontario Declining Amphibian Populations Working Group newsletter
Spring - Federation of Nova Scotia Naturalists

1

Frogwatch '94 wants you.



Each spring Peepers wake from their winter sleep, begin peeping and start migrating to breeding areas, such as ponds and swamps.

We're asking *you* to help the environment by listening for the early spring calls of Spring Peepers in your neighbourhood.

You'll keep track of the spots and times you hear calling Peepers.

By joining Frogwatch '94 you will:

- be introduced to Nova Scotia's Northern Spring Peeper;
- learn about Nature and freshwater habitats;
- see, first-hand, the state of your local environment;
- share information with other frogwatchers in Halifax Co.;
- discover a lot of odd-looking, but friendly, creatures.

As a Frogwatch '94 reporter you will have the benefit of being in a thousand places at once. During the Peeper breeding season (late March - June) frogwatchers scattered throughout Halifax County will be keeping an ear out for the calls of the first Peepers and quickly phoning in their reports to the Peeper Hotline at 424-3563. Section 5 tells you how to become a frogwatcher.

The museum will *peepare* 'frog reports' to keep you updated on the awakening of Peepers across Halifax County.

Frogwatch '94 was developed by the Nova Scotia Museum of Natural History, The Clean Nova Scotia Foundation and Envirosphere Consultants Limited. Core funding was supplied by the Environmental Partners Fund.

2

Frogs and the health of our environment

Why should we be looking at frogs?

Right now scientists and naturalists are wondering whether there are fewer amphibians (frogs and salamanders). What they're finding is that in many cases there isn't enough information to say for sure. This is a big problem because, even if our amphibian populations are in danger, we might not know until it is too late to save them.

Before you can say that a species or group of animals is in trouble you must have enough information to show that their numbers are dropping and give a reason for that change. Unfortunately the job is not an easy one. The successes we've seen with identifying problems and solutions for other species—the rescue of the Piping Plover and the reintroduction of the Peregrine Falcon in Atlantic Canada, to name two — have all come about through hard work, dedication and long efforts.

For amphibians there are at least two threats that are making their lives more difficult. According to herpetologists (her-pe-tah-lah-gists), biologists who study amphibians and reptiles, loss of habitat is the biggest danger to amphibians. Habitats are where plants and animals live. Amphibians need healthy natural habitats (lakes, ponds, rivers and wetlands such as marshes, bogs and swamps) as well as artificial ones (drainage and irrigation ditches, farm and fire ponds, quarries, etc.) to reproduce and survive.

Today we realize that freshwater and wetland habitats are needed for a healthy environment. But this wasn't always the case. People once thought wetlands were useless and often drained or filled them in to make them 'useful'. Shocking as it may sound, people commonly

What are amphibians?

Amphibians are moist, soft-skinned creatures which live on land and water. In Nova Scotia there are two types, frogs and salamanders. A third type of amphibian legless, worm-like animals, known as Caecilians, live only in tropical areas. Like fish and reptiles (turtles, snakes, lizards), amphibians are cold-blooded, meaning their body temperature changes according to the temperature of their surroundings.

Most amphibians start out in water, first as eggs and then as swimming larvae such as tadpoles or polliwogs. Later they develop into adults which live mainly on land. Over 3,200 different types of amphibians exist in the world today.

FROGFACT

Frog-wise, there are about 2,800 frog species worldwide. Only 8 species occur in Nova Scotia: the Eastern American Toad, Northern Spring Peeper, Bullfrog, Green Frog, Mink Frog, Wood Frog, Pickerel Frog and Northern Leopard Frog

used marshes as convenient dump sites for old cars, garbage and even chemicals. Luckily, we know better now.

In addition to amphibians, all sorts of plant and animal wildlife, ducks, beaver, grasses, water lilies, dragonflies, to name a few, depend on freshwater and wetland habitats for their survival. These environments are part of the earth's foodchain, which includes all living organisms, everything from bacteria to humans. Without amphibians the foodchain would break down. For the sake of our planet's well-being, we must preserve and respect our freshwater and wetland habitats.

A second cause for the decline in amphibian populations, though less noticeable than damage to habitat, is our environment's declining health. Human progress has left scars on the environment. Acid rain, global warming (the 'green house effect'), chemical pesticides, and air pollution make for a sick planet. All creatures, including frogs, suffer when they live in an unhealthy environment.

In the eyes of amphibians, the world is shrinking and becoming more and more unfriendly.

3

Using wildlife to measure environmental quality.

We often use animals to study the quality of the environment. Animals that can help us understand things about the environment are called **biomonitors.** In the same way that a thermometer measures temperature, frogs and other species of animals and plants tell us about the state of the environment.

Beluga Whales are biomonitors for the St. Lawrence River. One hundred years ago thousands of healthy Beluga Whales lived in the St. Lawrence River. But by 1970 the river had become polluted and the whales were contaminated with toxic chemicals. Fearing that the Beluga would soon be extinct, people began to clean up the river. Cleanup efforts have improved the river's health and now the Belugas seem to be recovering, though their future still remains uncertain. The Beluga Whales in the St. Lawrence River are good monitors of the health of the river itself.

Other organisms can be **bioindicators.** Bioindicators act like signposts: they tell us about where we are, be it a place or time of year. Whereas biomonitors measure long term trends, bioindicators give us a single piece of information, like the arrival of spring.

You probably already know some bioindicators, but just don't realize it. Gardeners estimate when it is a good time to plant by observing when some plants emerge or flower. Spring Peeper calls are closely linked to temperature and weather. For many people, Peeper calls mark the arrival of spring. In sandy deserts clumps of lush green plants are bioindicators which point out hidden underground pockets of water. Nature is full of these links and relationships. The more we understand Nature's patterns the easier it will be to preserve the environment.

FROGFACT
A frog is a frog is a toad. Truefrogs, treefrogs, and toads are all members of the frog family – one big happy family.

You, as a reporter for Frogwatch '94, can help to solve some of our environmental problems. We simply need to know more about what is happening outside in our natural environment.

The health of Spring Peepers in Halifax County is a good biomonitor of the quality of freshwater and wetland habitats. Peepers are also bioindicators of spring and tell us where healthy habitats are located.

Your observations of Northern Spring Peepers will help scientists detect changes in the environment's health and make the world more friendly for frogs.

FROGFACT

Did you know that wetland areas, bogs in particular, help purify our drinking water and keep the earth's atmosphere in balance? The bog is Nature's own water filter. Contaminated water that passes through a bog comes out pure and drinkable. Bogs also produce gases essential to the health of the earth's upper atmosphere. Wetlands are more than just places for getting your feet wet! Pretty important stuff...

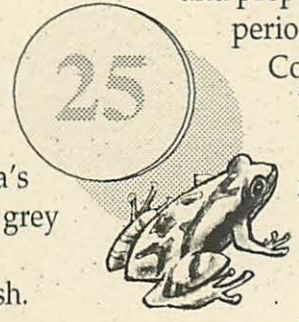
4

In search of the Northern Spring Peeper

The Northern Spring Peeper is Nova Scotia's smallest frog. It's also a treefrog, in fact, the only species of treefrog in Nova Scotia. Treefrogs are unique among frogs in that they can climb around on things. But don't go looking for Northern Spring Peepers high up in trees. They like to hang out near the ground.

What does it look like?

The Northern Spring Peeper is tiny, slightly larger than a 25¢ piece. Males are 20 - 34 mm in length and females aren't much bigger at 27 - 37 mm. The colour of Nova Scotia's Peepers ranges from grey to dark brown, and some are even reddish. Like chameleons, Peepers change their colour to suit their surroundings. Undersides are yellowish-white on brown ones and greyish-white on grey individuals.



Both sexes have a dark V-shaped mark above the head and a dark bar on the side of the head. Sometimes an X-shaped marking appears on the back. (Their scientific name, *Hyla crucifer crucifer*, refers to this cross-like marking.) Prominent round suction cups on the ends of their toes allow Peepers to cling like Spiderman to trees, grass, bushes — anything they want to climb.

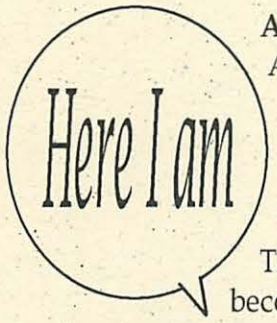
Where do they live and what do they do?

Adults spend the winter in damp places in the forest, under dead leaves and moss-covered logs. When things warm up, adults awake from their winter sleep and migrate to wet habitats such as meadows, forested wetlands (swamps), ponds and roadside ditches. There they take cover in grasses and shrubs and prepare for the breeding period of their life cycle. Courtship, mating and laying of eggs lasts for two months or more, depending on how warm and wet spring is.

During the breeding period, the tiny male Peepers loudly make their presence known to nearby female Peepers (and everybody else) by 'peeping'. Males try to outdo one another by boldly calling out: *'Here I am and, boy, am I ever handsome.'*

We humans simply hear:
'Peep - peep - peep.'
Most calling happens in the evening, especially on damp nights, and only when the air is sufficiently warm. A cold snap abruptly ends the night music. Males call mainly during the breeding season, but sometimes you'll hear the occasional *'peep'* later in summer.

Peepers use two main types of calls:



Advertising:
A loud, whistling peep that slurs upward at the end, lasting less than a second. The advertising call becomes less frequent and longer in duration when a female enters a male's territory.

Aggressive:
A harsh trill that slurs upward at the end. The call lasts a second or longer and is used to ward off intruding males.

The breeding season starts out with the calls of a few isolated males. Gradually, as breeding progresses, choruses of hundreds of males sing throughout the night.

Females lay 400 - 1600 single eggs on underwater vegetation or debris. After 1 - 3 weeks, tiny tadpoles (7 mm long) emerge. Tadpoles are an important food for insects, birds, fish, turtles, salamanders and other frogs. Few tadpoles actually make it to adulthood (froghood?) two months later.

After the breeding period, adult Peepers go back to damp wooded areas and live on the forest floor where they feast on spiders, ants and beettles.

FROGFACT

Jijawej
is the Mi'kmaq word for the Spring Peeper. It imitates the sound of the Peeper's call.

The word for a toad is *Sqolj*.

The frog is "the water-one"
— *Samuqwanej*

FROGFACT

Spring Peepers and Wood Frogs spend the winter shallowly burrowed in the ground where many of them become frozen solid. In spring they thaw out, wipe the sleep from their eyes and carry on as usual. They're two of just a few species known to be able to survive freezing. (Some turtles and insects also perform this remarkable feat).

Most living organisms can't survive freezing because at sub-zero temperatures body fluids turn into ice and burst the walls of their cells. Some fish, insects and spiders avoid freezing by producing antifreeze in their body. They live at subzero body temperatures without freezing.

On the other hand, the Spring Peeper and Wood Frog actually freeze solid, like popsicles. What's their secret? The sugar, glucose. The glucose in the cells of these frogs protects the cell walls from ice damage. The amazing Spring Peeper and Wood Frog freeze solid during winter – and survive to peep about it each spring!

5

Peeking at Peepers

Becoming a frogwatcher

You'll be searching for Peepers during their breeding season (late March to June). We're asking you to listen for calling Peepers and keep records of the dates and locations of frog spots; some of you will want to try to catch a glimpse of the tiny critters making all the fuss.

What Frogwatch reporters will do:

- Choose a spot to listen for the Peepers.
- Start listening at that spot during the last week of March.
- Each time you listen, record the time, date and what you heard in your Froglog.
- The first time you hear single peeps tell your group leader or teacher. They will call the Peeper Hotline to report your discovery.
- Keep listening in the same spot and recording your observations.
- Sometime during April the single calls will change to a chorus of many calls. When you first hear a chorus tell your teacher or group leader so they can call in your latest discovery.
- Keep track of your Peeper area until early June.

Warm temperatures thaw out frogs and trigger the start of breeding. Any wet place near woodlands is a good place to start checking; roadside ditches are good bets. In early spring, the best way to hear the very first peeps is to visit spots that thaw early. Peeper activity will occur earlier in locations more exposed to the sun. Further on into the Peeper season the Peepers will be most active at night, especially warm wet ones.

Peepers don't seem to mind flashlights. By homing in on one calling male, you might be able to come face to snout with a Peeper. They tend to cling to blades of grass. When doing this, think about your own safety and be careful not to trample over other frogs. Respect the frogs, their neighbours and their habitat.

A few words about safety.

In early spring ponds may still be iced up and outdoor conditions can be dangerous. And you'll probably be searching for Peepers at dusk.

To avoid surprises in the night, it is best to visit familiar places to do your listening. If you plan to explore new frog spots, get to know the area: i.e. check it out during the daytime before wandering there at dusk. Go with a friend.

CAUTION CAUTION CAUTION CAUTION

CAUTION CAUTION CAUTION CAUTION CAUTION

We're concerned for the environment, but we're also concerned about you. When searching for Peepers, please remember:

- Don't take ANY chances
- Stay out of the water
- Always work with at least one partner
- Get permission from landowners before entering their property
- Tell someone where you are going and when you expect to return
- Carry a flashlight at night
- Wear visible clothing when working at night
- If you do get lost, don't wander; wait for someone to come

CAUTION CAUTION CAUTION CAUTION CAUTION

CAUTION CAUTION CAUTION CAUTION

6 Filling out the Froglog

• Use the Froglog on the back of this guide to keep track of your observations.

You can photocopy (double sided) the one at the back of this book or make some more in a notebook. *Or* you can phone the Peeper Hotline if you really need us to send you some.

• Each time you check for Peepers in your area fill out an entry in your Froglog.

• You might want to take a small notebook with you when you go outside to do your listening and watching. Use it to record your rough field notes. Afterwards use your rough notes to fill in your Froglog neatly.

This sample shows you how to fill in your log.

• Your teacher or group leader will keep a summary sheet of your group's observations and send it to Frogwatch '94 Headquarters. We will use the summary sheets to report back to you on how frog-friendly Halifax County is.

Mapping your Peeper calls

We will be mapping your Peeper calls so you can see where and when the Peepers are calling in the rest of the County.

These weekly Peeper maps will be displayed at the Nova Scotia Museum of Natural History and also on ATV's weather reports.

424-3563 Peeper Hotline

Phone the Peeper Hotline for ATV's weather reports times. If you have any other questions ask your group leader or phone.

THE *Official*

Froglog for Frogwatch '94 Reporters

School / Group Name: _____

Reporter(s): _____

Grade: _____

Location of frog site: ENFIELD

Site description: BACK YARD POND

Date: Day / Month	Time of Survey	Type of Call	Air temp.		Weather description	Notes
MARCH 28	6-7pm	NONE	8	8	COLD, BREEZY	ICE ON POND
APRIL 1	7-8pm	SINGLE PEEPS	15	14	WARM, RAINY	SIGNS OF LIFE HEARD AN OWL

7

Sharing your discoveries

The success of Frogwatch '94 depends largely on how well you report your findings. We expect thousands of responses. To make sure that your observations can be used in Frogwatch '94, pay careful attention to the following points:

Make regular observations. It is best if you can get out for a few minutes each day during the two-to three-month breeding period. If not, it is better to check for Peepers once a week for twelve weeks, rather than to check ten times the first week and then two more times over the other eleven weeks.

Keep records of the times you listened and didn't hear any Peepers. This is important information. The fact you hear no frogs tells us something about that area.

Everyone must report their findings the same way. Follow the instructions for making your reports. If we all do it the same way, it makes it easier to analyse the data. For example, if one person reports they heard the first Peeper on a certain day, a second person reports the first call on a particular week, and a third person reports the month they heard the first peep, we can't really say much about the dates of first calling.

Don't guess. If you are not sure about something, it is better to say so than to make something up.

Note any things you think might have influenced your findings (e.g. recent rain, presence of nearby buildings, a sudden drop in temperature)

Report your findings to your group leader as soon as you can. Everybody in Frogwatch '94 is anxious to know what you heard!

FROGFACT

Frogs are in trouble all over the world and it's not just because of what humans have done to the environment. Catching and selling wild frogs is a big business. We eat frogs legs and study preserved specimens in biology classes; these frogs have to come from somewhere. Fortunately, we are recognizing that these activities are harming amphibian populations.

Some food for thought...

Q

Question:

What's the difference between polliwogs and tadpoles?

Answer:

Polliwogs are young toads; whereas tadpoles become frogs.

A

8 Activities

Most of us rarely notice the sights, sounds, smells and feel of Nature. When you take the time to really be in Nature, your senses open up. Tuning in to Nature can inspire you in many ways. While making your observations for Frogwatch, you might take the opportunity to make your visit with Nature more personal.

Some suggestions:

- Remain quiet and still for a few minutes. Let your senses open up to the surroundings. Listen to the sounds of the evening. Feel the cool damp air and the moist ground. Smell the musty woods and earthy-fresh spring fields.

- Write a poem about the sounds of Peepers in the still damp night.

- Draw the Spring Peeper you spotted clinging to a blade of dewy grass.

- Life in a froggy neighbourhood is more than just frogs. Look around carefully and describe what else shares space with the frogs: plants, things with eyes, rocks, garbage, etc.

- Most of us know the fairy tale of the Frog Prince. Are there other tales, legends, myths about frogs?

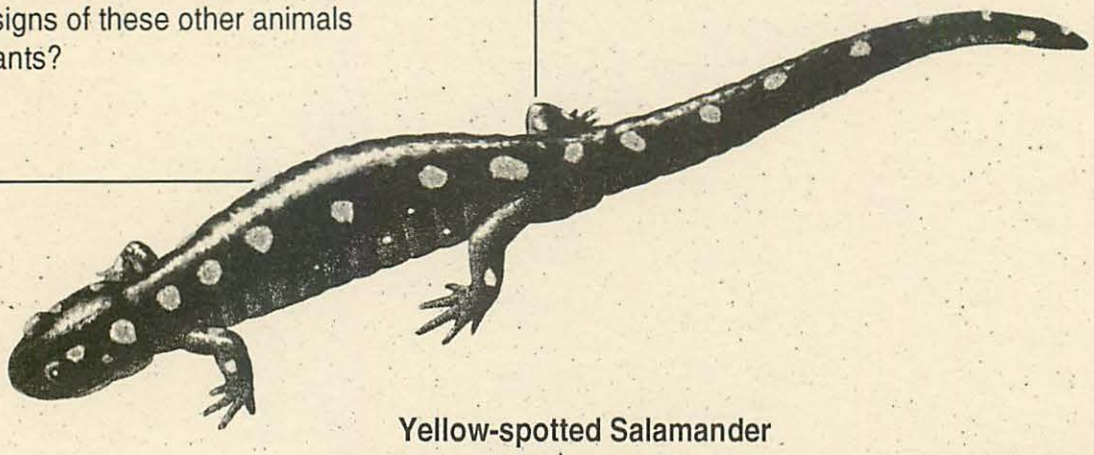
Can you come up with a legend of your own?

FROGFACT

There are some peculiar frogs in the world. A chemical on the skin of Central America's Poison-arrow frogs causes instant paralysis, a loss of muscle control. An Australian frog switches off the digestive juices in its stomach, then swallows its own eggs. Weeks later it spits out hatched baby frogs. Strange as it may sound, medical researchers are studying these frogs to develop drugs for stomach ulcers, and new pain killers.

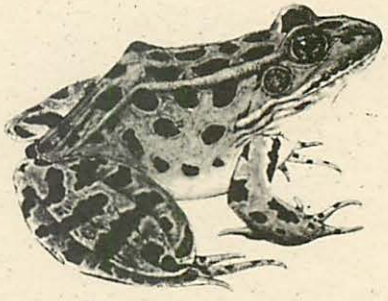
Other species that share the Peepers' spring home

Were you lucky enough to see any signs of these other animals or plants?



Yellow-spotted Salamander

See Amphibians and Reptiles of Nova Scotia poster

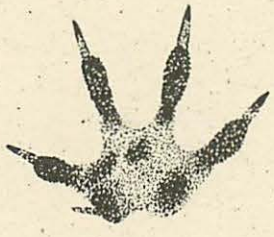


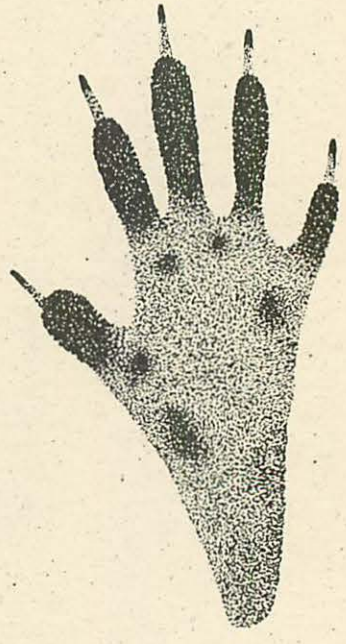
Northern Leopard Frog

See Amphibians and Reptiles of Nova Scotia poster

Pussy-willow

See *Spring Wildflowers*





Muskrat tracks

See *Animal Signatures*

9 I want to know more!

If Frogwatch '94 didn't completely satisfy your curiosity about amphibians, check out some of the titles below. We've described a few good ones to get you started.

Museum Publications

Info Sheets - (one set per group) Frogs, Springwatch, Salamanders, Snakes, Turtles (also in French)

Species Status Sheet - Spring Peeper (one set per group) *letter-size fact sheet of important information with particular reference to the species' status in N.S.*

Amphibians and Reptiles of Nova Scotia, Fred Scott, (1984) N.S. Museum, Halifax. *Poster with full-colour scientific illustrations* $2.95

Amphibians and Reptiles of Nova Scotia, John Gilhen, (1984) N.S. Museum, Halifax. *This book features full-colour illustrations of all our native reptiles and amphibians. Of interest to the general reader and the specialist.* $19.95 (soft cover)

Spring Wildflowers, A.Roland and A.R. Olson (1993) N.S. Museum, Nimbus co-publication, Halifax. *A well-organized field guide featuring pen-and ink-drawings of almost 250 flowering plants.* $9.95

Animal Signatures, E. Claridge and B. Milligan (1992) N.S. Museum and Nimbus co-publication, Halifax. *A handy field guide on how to recognize animal signs.* $6.95

The museum publications can be picked up at the Nova Scotia Museum of Natural History, 1747 Summer St, Halifax (424-7353) or they can be ordered through the Government Bookstore at 1 Government Place, Box 637, Halifax, B3J 2T3. (424-7580)

The Clean Nova Scotia Foundation has information on environmental issues and education. Literature and videos are can be borrowed for one week at a time by visiting 1675 Bedford Row, Halifax or calling 420-3474.

Other handy books

Pond and River (Eyewitness Books), Steve Parker (1988) Stoddart Publishing, Toronto. *Discovery series with hundreds of real-life photographs and easy to read text. A close-up view of freshwater plants and animals.*

Stokes Nature Guide to Amphibians and Reptiles, Thomas Tyning (1990) Little, Brown & Co., Boston. *General handbook on the natural history and behaviour of amphibians and reptiles. Easy to read.*

Quick Reference: Peeper profile

DESCRIPTION

Grey to dark brown, and sometimes even reddish. Undersides yellowish-white on brown ones and greyish-white on grey individuals; dark V-shaped mark above the head and a dark bar on side of the head; suction cups on the ends of the toes;
Length: male: 20 - 34 mm; female: 27 - 37 mm

LIFE CYCLE

Breeding season: March to June.

Breeding habitat: Wet meadows, roadside ditches, woodland ponds, lakes and bogs.

Eggs deposited: Up to 1600, attached singly to underwater vegetation.

Eggs hatch: Normally within a week.

Tadpole stage: 45 - 60 days.

Life span of adults: About 3 years.

CALLS

Advertisement: *('Here I am')*. Loud, whistling peep that slurs upward at the end, lasting less than a second.

Aggressive: *('Get off of my turf')*. Harsh trill that slurs upward at end, lasts a second or longer; used to ward off intruding males.

THE *Official*

Froglog for Frogwatch '94 Reporters

School / Group Name: _____

Reporter(s): _____

Grade: _____

Location of frog site: _____

Site description: _____

Date: Day / Month	Time of Survey	Type of Call	Air temp.		Weather description	Notes

Types: None, single peeps or choruses

Phone for weather report 426-9090

Your local temperature

See page 7 for instructions on filling out your Froglog.

Nova Scotia Department of Education
Nova Scotia Museum

The Clean Nova Scotia Foundation

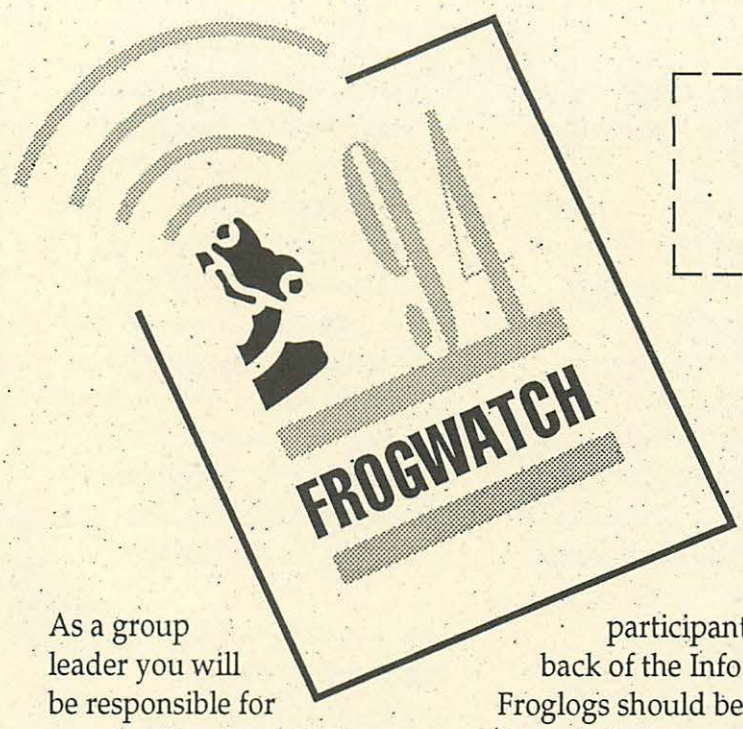
Envirosphere CONSULTANTS LIMITED

ENVIRONMENTAL PARTNERS FUND
Environment Canada / Environnement Canada
PARTENAIRES DE L'ENVIRONNEMENT

For Group Leaders

ID #

Instructions for Frogwatch '94



What you can do for us

Welcome to Frogwatch '94.
For several months this spring students, teachers, youth groups and other interested groups and individuals throughout Halifax County will be listening for signs of the Northern Spring Peeper. The map on the back of the activities (Other froggy things to do) indicates where other groups and individuals are listening for Peepers.

Frogwatch '94 is a pilot for a province-wide project to gather information on amphibians and their habitats to help in assessing the health of our environment. It is designed to increase awareness and to provide participants with a memorable outdoor experience. It will run between mid-to-late March and early June with a period of intense observation of about a month at the beginning.

As a group leader you will be responsible for coordinating the activities for your group. We hope that the following instructions make your job easier.

- We have assigned **identification numbers** to all registered groups and individuals. Your number is in the upper right hand corner of this page. Please refer to it whenever you give us information on the Peepers.

- The **Frogwatch '94 Info Book(s)** are for the members of your group. The Info Book gives background information on the project and includes some facts about Peepers and other amphibians and freshwater habitats. The Info Book also includes a list of resource materials and some suggested activities.

- There are two forms provided for recording information. The **Froglog** observation sheet for the participants is at the back of the Info Book. The Froglogs should be copied so that you have enough for the duration of the project. Ideally, each person should make daily observations at dusk at an outdoor location near their home. We will be mapping the locations and it would help us to have the latitudes and longitudes if you have the time to help your group figure them out.

- They should start listening from mid-March until they have heard a continuous chorus of Peepers. If possible, the participants should be encouraged to continue their observations and listen for other frogs, etc. until early June. We realize that some people may lose interest, however we would like to get as much data as possible. Your group should give you the information on their Froglogs at least once a week to record on the summary sheets.

Frogwatch '94 was developed by the Nova Scotia Museum of Natural History, The Clean Nova Scotia Foundation and Envirosphere Consultants Limited. Core funding was supplied by the Environmental Partners Fund.

• The **summary sheets** are for you as group leader. They are to be filled in weekly, if possible, and they summarize the information recorded on the froglogs. The summary sheets will be used in preparing the final report. We have included a sample to give an idea of the type of information we need. When you feel there are diminishing returns from the participants' efforts, send the completed summary sheets to:
Sue Browne, Frogwatch '94,
c/o Nova Scotia Museum
of Natural History,
1747 Summer St., Halifax,
B3H 3A6.

• Aside from the written observations we are also interested in immediate information on when the first calls and the first chorus of calls were heard. As soon as the first single call and chorus are heard, please telephone the **Peeper Hotline, 424-3563. (This number may be long-distance for some callers.)**

Leave your I D number, name, whether you are reporting a first single call or a first chorus, the time and date that the call was heard, and the location of the call, i.e. nearest geographic reference - community/large lake and latitude and longitude of the location if available.

It is only necessary to phone in when the first participant in your group hears a call or chorus. The subsequent Peeper records can be submitted on the summary sheets at the end of the project. If, however, the individuals in your group are spread out over a considerable distance, such as in a rural area, you can report multiple Peeper records of the first call/ first chorus to the Hotline.

• **Peeper calls will be mapped** for the whole county and displayed in the Museum lobby. Smaller maps can be distributed, on request, via fax or mail. The maps will also be displayed weekly on the ATV weather report (times and dates will be announced on the Peeper Hotline).

There is a recording of different frog calls available to help you identify what you hear. You can hear the different calls by phoning the Peeper Hotline. Teachers can get a tape of the calls by sending a blank audio cassette to Education Media Services, Department of Education, 3770 Kempt Rd., Halifax, B3K 4X8, 424-2443. Cite the Frogwatch '94 audio tape. It is approximately five minutes long.

Near the end of Frogwatch '94 we will send you an **evaluation form.** We hope you can find the time to fill it in. The information will be used to design future Frogwatches and related projects.

424-3563

Peeper Hotline

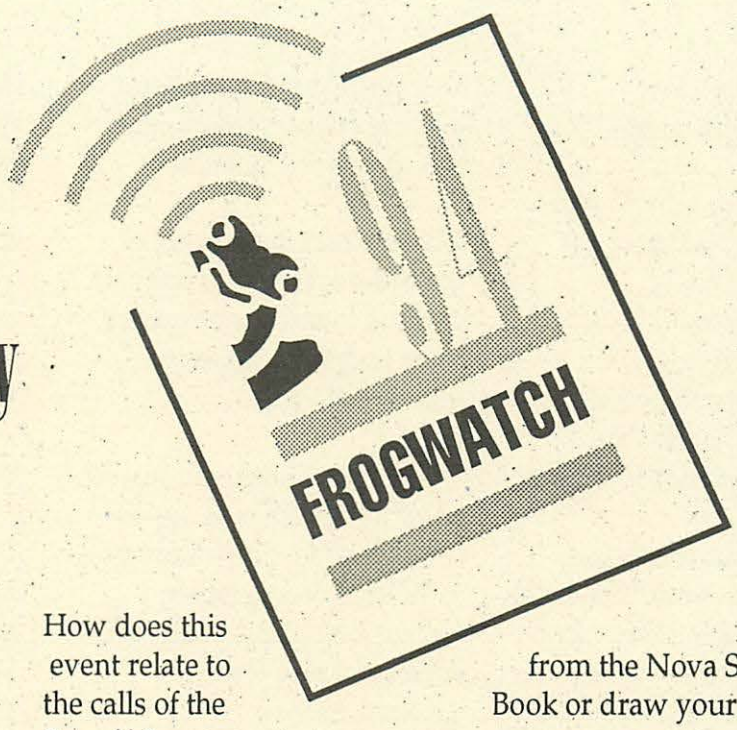
Questions?

Leave a message for Sue on the Peeper Hotline.

Have Fun!

For Group Leaders

Other fun froggy things to do



Frogwatch '94 can be as involved as you want it to be. Here are some suggestions for group activities. Please tell us if you think of any others.

1. Peepers and Temperature

In this activity you relate temperature changes to the calls of the Spring Peeper.

Set up a graph with dates along the bottom and temperature up the side. Plot the regional temperatures. You can get daily regional temperatures by phoning Environment Canada's weather report at 426-9090. Have your group measure the local temperature and compare it to the regional temperature. If you are near trees take temperatures in the woods and in open areas, such as fields and wetlands. Note when the ice leaves the ponds in the woods and open areas.

How does this event relate to the calls of the Peepers?
On top of the plotted temperatures, indicate when you heard the calls and choruses of the Spring Peeper.

Is there a connection between temperature and Peeper calls?

What was the average temperature when the choruses started?

2. Peeper Mapping

In this activity you map the location of the calls as they are heard in your area. Set up a wall-sized map of your area. Maps of different scales can be obtained from the N.S. Department of Natural Resources map library in Burnside. (780 Windmill Road, next to Ron's Army and Navy, 424-3177.) The library also has aerial photographs. There are fees for these items. Alternatively, you could photo-copy a map from the Nova Scotia Map Book or draw your own map.

Encourage your group to determine the longitude and latitude location of their school, home or meeting place. Then have them figure out the longitudes and latitudes of their Peeper observation sites. Have them record this information in their froglogs and plot the locations on the map.

Plot the records of the Peepers calls for the duration of the project. You could use different coloured dots for each week.

Is there a noticeable distribution pattern?

Are there some very concentrated areas?

Is this because there are more recorders there, or because there are better habitats for Peepers there?

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Does the distribution pattern change over time?

Your group could map other things, such as the locations of good frog habitats. Discuss the pros and cons related to distribution mapping, eg. inconsistent recording, easy access to certain areas and not to others.

We are mapping the Peeper data you send us for the whole County. Peeper Bulletins will be posted at the Museum and will be aired on the ATV weather report. Phone the Peeper Hotline for times and dates. Compare your map to the County map. Is there a difference between records made inland and along the coast?

3. Frog Hopping - From Home to Home

In this activity you study the different places frogs live in(habitats) at different times of the year.Locate a likely open water frog habitat near to your home, school or meeting place. Perhaps it is one already familiar to your group, where frogs have been heard before. Visit the area during the day and determine the type of habitat.(See Frogwatch '94 Info Book) The Info Book describes the spring migration from woodland to open water for breeding. Have your group try and figure out a likely route that the Peepers took to get to the open water habitat.

Observe and make notes of the different types of habitats. Try and identify the types of plant and animal species that live there.

Observe how different plants grow in wet areas as opposed to drier areas. Cattails are good indicators of amphibian habitats. Note last years' dried stalks and new shoots growing in May.

Note other differences between the plants that live at the very edge of the water habitat, in the water, and further away from the edge? Are there shrubs further away? Where do the trees start?

Discuss what other animals use these habitats? Do they live there all year round? Or do they only come there in the spring? If so, where do they live at other times of the year?

Determine whether the habitat is natural or whether it is influenced by human activity.

Emphasize how important it is to be respectful of other species and their habitat. Make sure to put things back and to handle species as little as possible. Try to leave the habitat as you found it ,or better (e.g. take away any garbage).

Ask your group whether humans also change habitats at different times of the year or for different rituals. Figure out if there would be a problem if you couldn't get to a place that you go to routinely. What would happen if your habitat was changed drastically?

4. Spring Changes

In this activity you watch and record the signs of spring's arrival. Introduce your group to the science of phenology - the study of natural changes over time.

Make a list of all the natural changes that your group expects to see in the spring. These could include weather changes, new growth, the return of certain animals, etc. Compare this list with what the group actually does see.

Discuss why it is important to keep records of things changing over time.

Visit the HUGE Peeper at the Nova Scotia Museum of Natural History

The Museum is also recording Peepers this spring. In the lobby we will be displaying our own records of spring changes as well as mapping all the reported Peeper calls in the County.

Resources

Simmons, M., D. Davis, L. Griffiths and A. Muecke (1984) Natural History of Nova Scotia N.S., Department of Education and Department of Lands and Forests, Halifax, 2 Vols., 807 pp. A resource book summarizing Nova Scotia's natural environment. Information on species, habitats, natural processes and landscapes. The information is also presented geographically.

Erskine, John (1971) In Forest and Field, N.S. Museum, Halifax.

Roland A.E. and D.A. Benson (1955) Summer Key To The Woody Plants of Nova Scotia, Department of Lands and Forests, N.S.

Donly, J.F. (1960) Identification of Nova Scotia Woody Plants in Winter, Department of Lands and Forests, N.S.

Saunders, G.L. (1970) Trees Of Nova Scotia, A Guide To The Native And Exotic Species, Department of Lands and Forests, N.S.

Peterson, R.T and M. McKenny (1968) A Field Guide to Wildflowers Northeastern and Northcentral North America, Houghton Mifflin Co., Boston.

Tufts, R.W (1986) Birds of Nova Scotia, 3rd Edition, N.S. Museum and Nimbus Publishing Ltd. co-publication.

Milne, L. and M. Milne, (1980) The Audubon Society Field Guide to North American Insects and Spiders, Alfred A. Knopf, New York.

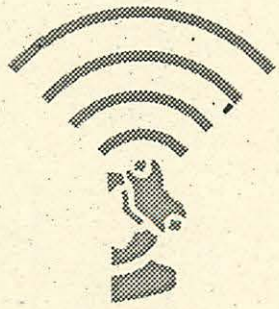
Lamoureux, G. et collaborateur (1975) Plantes sauvages printanieres Guide d'identification Fleurbec, Fleurbec, Ste. Augustin, Quebec.

Fleurbec (1987) Plantes Sauvages des lacs, rivieres et tourbieres Guide d'identification Fleurbec, Fleurbec, Ste. Augustine, Quebec.

Questions?

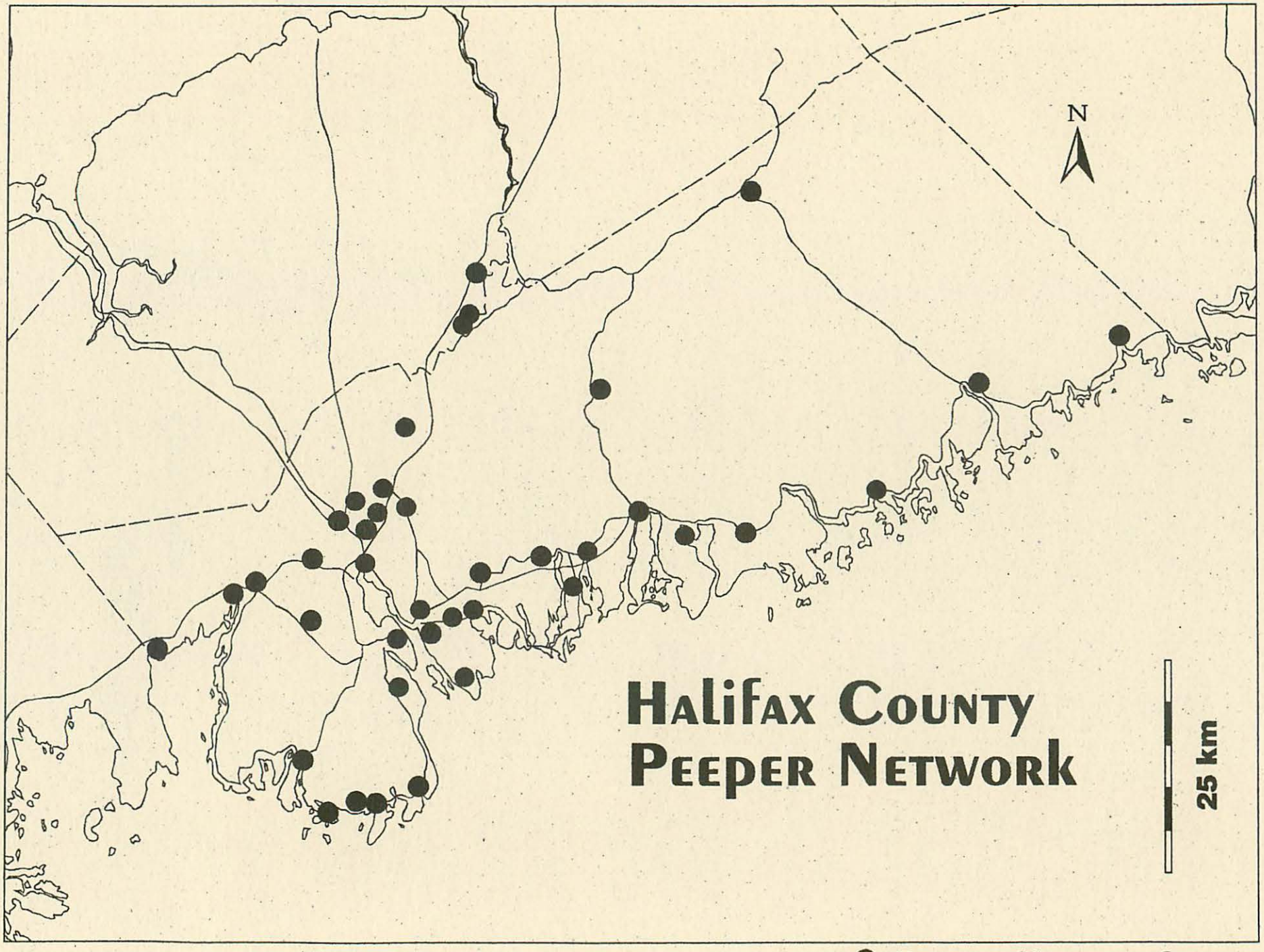
Leave a message for Sue on the Peeper Hotline.

Have Fun!



424-3563

Peeper Hotline


N
HALIFAX COUNTY
PEEPER NETWORK
25 km
Peeper Observer Groups

Frogwatch '94 is a pilot project for Halifax County.
Your input will help us determine whether we pursue similar projects in the future. This form should be completed by group leaders and mailed along with the completed summary sheets by June 08/94 to:

Sue Browne, Frogwatch '94,
Nova Scotia Museum of Natural History,
1747 Summer St., Halifax, N.S., B3H 3A6.

ID Number

Frogwatch '94 Evaluation Form

1. Overall the project was: 1___ 2___ 3___ 4___ 5___
(Unsatisfactory) (Excellent)
Comments_____

2. I participated as: an individual ❑ a family ❑
a youth/environmental group ❑ name_____
a school class ❑ grade____ Did you participate with reading buddies? Yes ❑ No ❑
How many participants were in your group? _____
What age range did they fall into? (check one or more) under 5 ❑ 6 - 10 ❑ 11-14 ❑ 15-18 ❑ adult ❑

3. I heard about the project through: school ❑ T.V./radio/newspaper ❑ friend/family ❑
youth group ❑ other_____

4. The project instructions were: very easy to understand ❑ easy to understand ❑
average ❑ difficult to understand ❑ impossible to understand ❑
Comments_____
The reporting forms were: very easy to understand ❑ easy to understand ❑
average ❑ difficult to understand ❑ impossible to understand ❑
Comments_____

5. My group filled in their froglogs: only at the beginning ❑ to the end of the project ❑ daily ❑
weekly ❑ occasionally ❑ not at all ❑ other_____

6. Was enough background information provided? Yes ❑ No ❑
Comments_____

7. We used the Peeper Hotline: to report calls ❑ to leave messages ❑ to ask questions ❑
to listen to the frog calls ❑ never ❑ didn't have access to a touch tone phone ❑
Comments_____

8. Did you or your group try any of the suggested activities? Yes ❑ No ❑
Which ones?_____
Did you develop any other activities? Yes ❑ No ❑ Please attach a summary.

9. Did you use any of the suggested resources? Yes ❑ No ❑ Literature_____
_____ Audio: Peeper telephone tape ❑ Media Services ❑

10. What did you or your group enjoy the most about the project? _____

_____

11. What did you or your group learn the most?_____

_____

12. We are sometimes asked to suggest names for television or radio interviews. Would you object to having your name put forward to the media for publicity purposes? Yes ❑ No ❑

13. Would you do this again next year? Yes ❑ No ❑

Comments_____

_____

14. Would you be willing to participate in additional scientific activities such as testing pH levels in water? Yes ❑ No ❑

15. If you are a teacher, do you think Frogwatch compliments the existing science curriculum? Yes ❑ No ❑

If yes, do you envision Frogwatch as part of the curriculum? ❑ as a supplement? ❑

Comments_____

16. Are you interested in the idea of an ongoing nature observation programme that students and others can participate in year round? Yes ❑ No ❑

Comments_____

_____

17. What would make your job as group leader easier? _____

_____

18. Please attach any additional comments or observations that you have not been able to tell us which you think might be important.

We really appreciate your help this year and would like to offer one or both of the items listed below to the frogwatchers. Check off what you would like to receive and how many. We are concerned with waste, so please order only what you need.

- **Make your own frogwatcher button kit ❑ quantity ____**
- **Frogwatch '94 Certificate of Participation (approximately 4"x 6") ❑ quantity ____**
- **Frogwatch '94 Summary Report ❑ quantity ____**

Mail item(s) to: Name:_____

Address:_____

_____ **Postal Code:**_____

Thank-you Peep Peep,

Sue Browne, Frogwatch Coordinator

Honorary Frogwatch Reporter

Cut design on dotted line

Honorary Frogwatch Reporter Button

Make your own and help protect the environment model

Read these tips and use your imagination to make your own button.

- Think about how buttons are usually made: there is a design on the front; something stiff as a back piece and a pin attached to the back.

- Use this design for the front of the button or draw it yourself. Do you remember what colour a Peeper is?

- Find materials to make the rest of the button. You could reuse an old button, recycle some thick cardboard or something else that you can glue or attach to the front design. You could even make your own glue out of flour and water. A safety pin might work as the pin on the back or attach a string and turn the button into a necklace.

Frogwatch '94 was developed by the Nova Scotia Museum of Natural History, The Clean Nova Scotia Foundation and Envirosphere Consultants Limited. Core funding was supplied by the Environmental Partners Fund.

In recognition of your outstanding effort on behalf of the environment, Frogwatch '94 is glad to award

June 15th 1994

the title of

Honorary Frogwatch Reporter

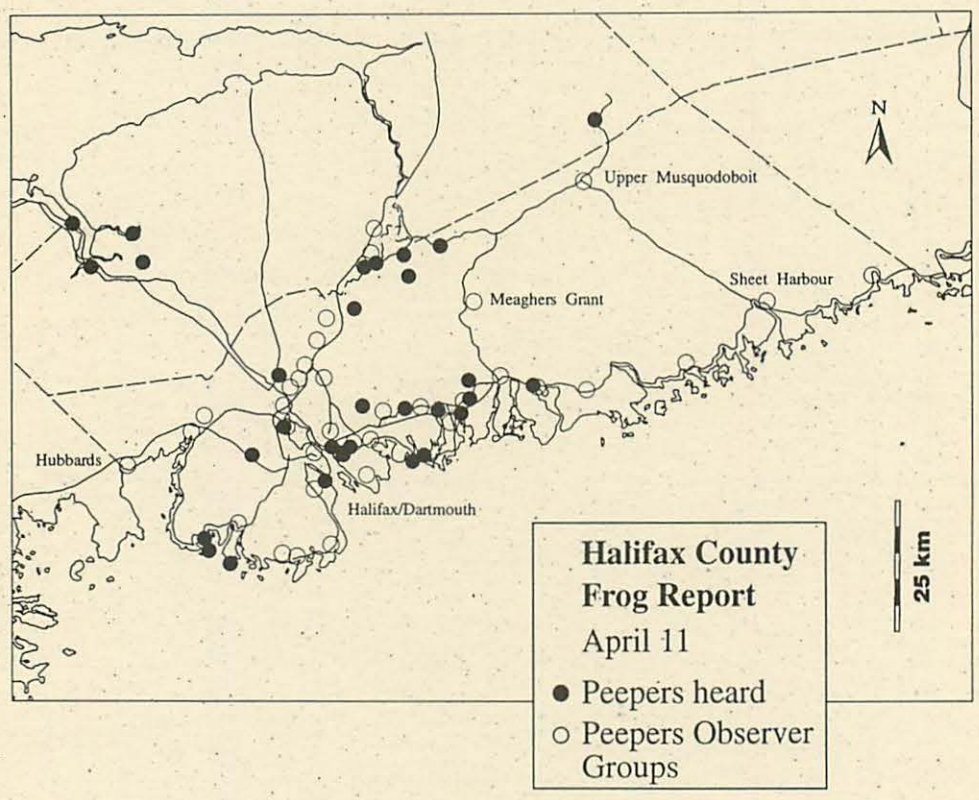
Candace Stevenson	Martin Janowitz	Pat Stewart
Executive Director	Executive Director	President
Nova Scotia Museum	The Clean Nova Scotia Foundation	Envirosphere Consultants Ltd.

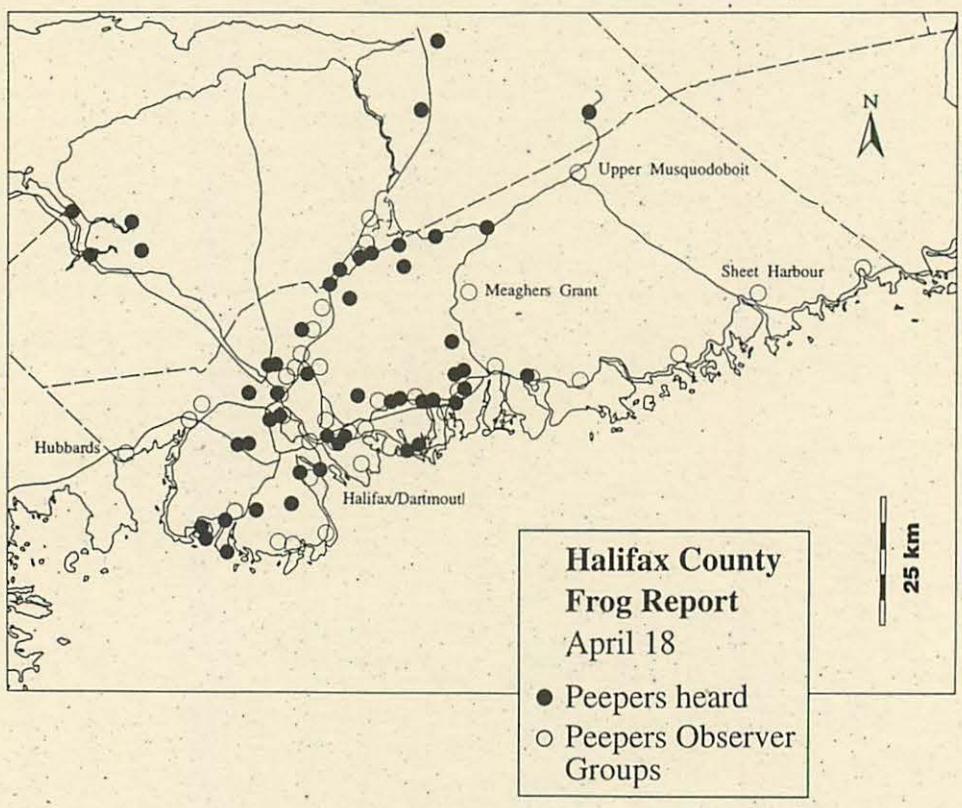
List of Frogwatch '94 data-bases

The data-bases are located at the Nova Scotia Museum of Natural History on FoxPro (fpw26).

1. Frog1904.dbf - MacKay records of the "piping of frogs" in Halifax County in 1904
2. Frog1914.dbf - MacKay records of the "piping of frogs" in Halifax County in 1914
3. Frog1984.dbf - Nova Scotia Museum records of Spring Peepers in Halifax County in 1984
4. Frog1994.dbf - Frogwatch '94 records of Spring Peepers in Halifax County
5. Frogs1.dbf - Frogwatch '94 mailing list

Date	Place	Lat	Lat min	Lat sec	Long	Long min	Long sec	#	ID	Pat	NSM map	Call	Chorus
April 15	Ship Harbour	44	48	34	62	53	22	261	S002	✓	✓		✓
April 19	Upper Lakeville	44	47	04	62	57	36	263	S002	✓	✓		✓
April 19	Hantsport	45	03	56	64	10	48	263	P093	✓			✓
April 20	Western Shore	44	31	34	64	18	39	264	P137	✓			✓
April 20	Lower Sackville	44	45	03	63	44	00	267	P140	✓	✓		✓
April 20	Dartmouth	44	40	48	63	34	00	268	P141	✓	✓	✓	
April 21	Bissett Lake	44	39	25	63	28	30	269	G031	✓	✓		✓
April 20	Lower Sackville	44	45	03	63	44	00	270	P142	✓	✓	✓	
April 16	Whites Lake	44	32	42	63	45	40	196	S005	✓	✓		✓
March 24	Mooseland	44	56	38	62	47	44	049	S010	✓	✓	✓	
April 20	Pat Mouton	43	55	34	64	50	40	271	P143	✓		✓	
April 15	Tantallon	44	39	58	63	53	39	266	P139	✓	✓		✓
April 23	Prospect Village	44	28	16	63	47	39	267	P144	✓	✓	✓	
April 22	Enfield	44	56	34	63	32	21	272	P145	✓	✓		✓
April 16	McGratha Cove	44	30	24	63	51	42	026	S005	✓	✓		✓
April 16	Shad Bay	44	31	34	63	47	18	273	S005	✓	✓		✓
April 19	Brookside	44	32	30	63	43	00	126	S049	✓	✓	✓	
April 19	Beaverbank	44	47	50	63	41	18	274	S041	✓	✓		✓


N
Upper Musquodoboit
Sheet Harbour
Meaghers Grant
Hubbards
Halifax/Dartmouth
25 km
Halifax County
Frog Report
April 11
Peepers heard
Peepers Observer
Groups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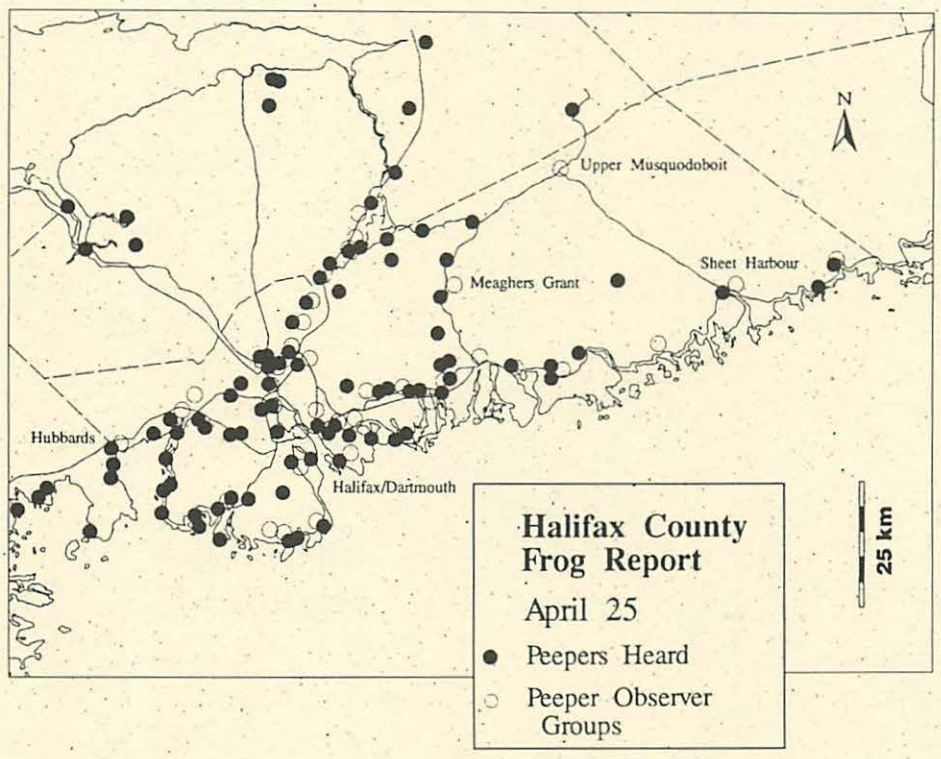
Sheet Harbour
Meaghers Grant
Hubbards
Halifax/Dartmoutl
25 km
Halifax County
Frog Report
April 18
Peepers heard
Peepers Observer
Groups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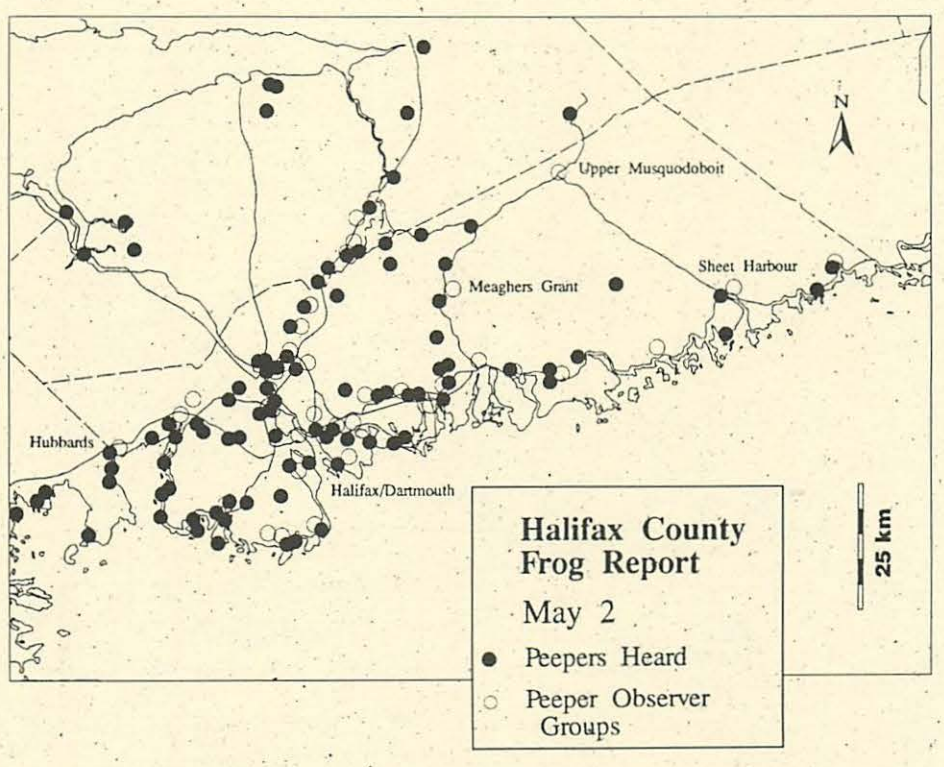
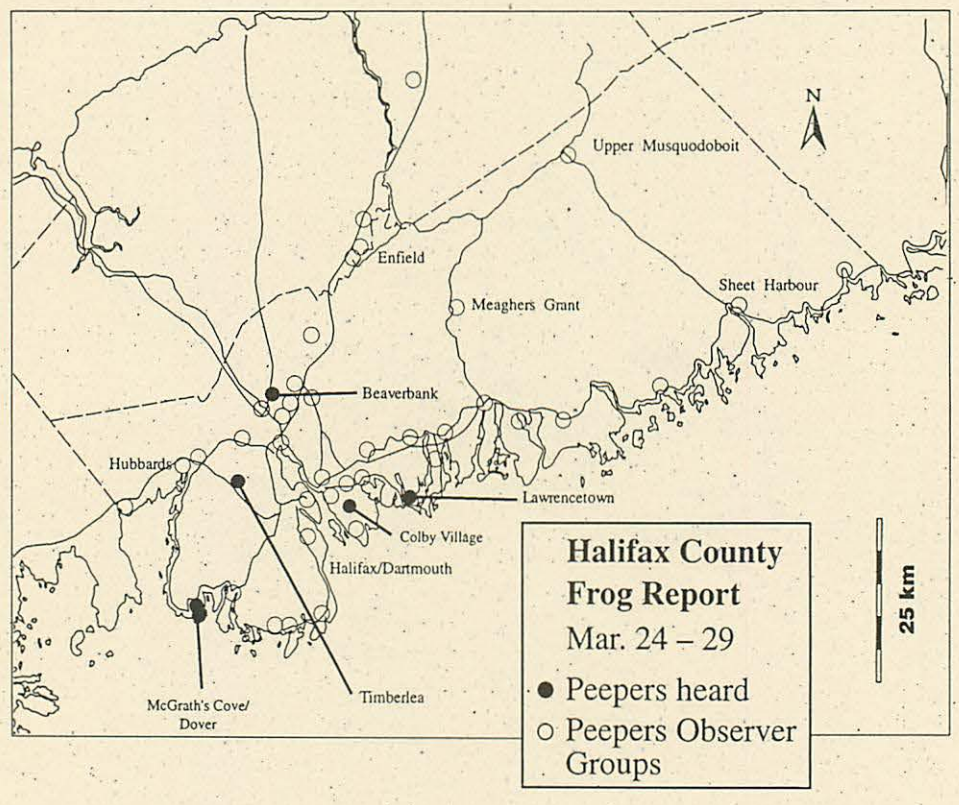
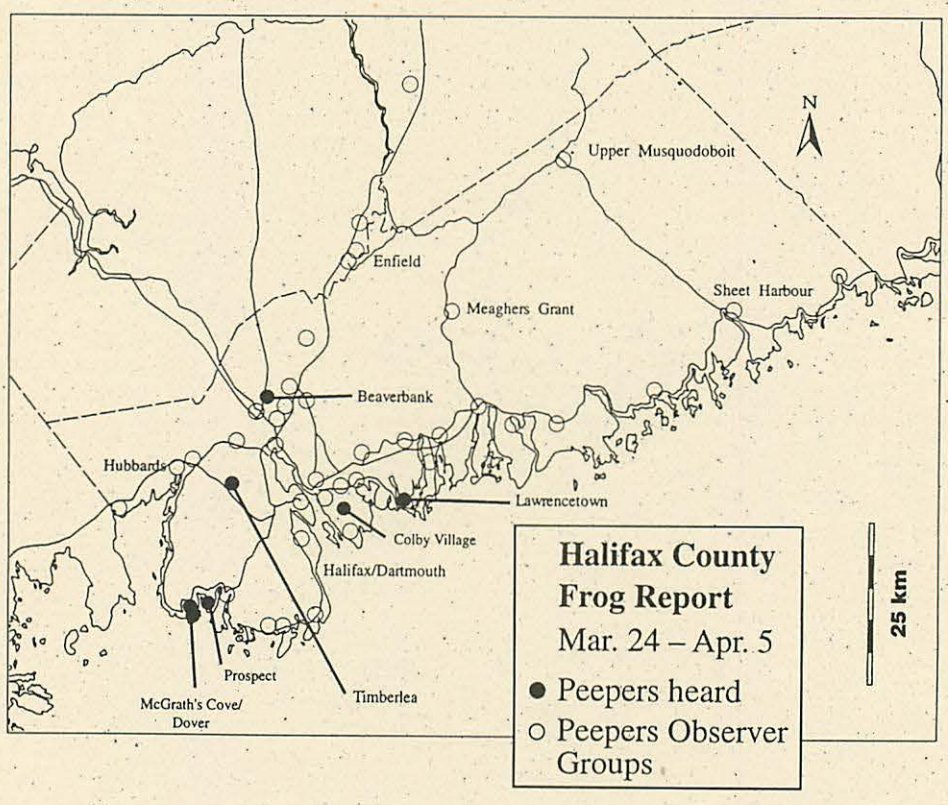
Upper Musquodoboit
Sheet Harbour
Meaghers Grant
Hubbards
Halifax/Dartmouth
Halifax County
Frog Report
April 25
Peepers Heard
Peeper Observer
Groups
25 km


N
Upper Musquodoboit
Sheet Harbour
Meaghers Grant
Hubbards
Halifax/Dartmouth
Halifax County
Frog Report
May 2
Peepers Heard
Peeper Observer
Groups
25 km


N
Upper Musquodoboit
Enfield
Meaghers Grant
Sheet Harbour
Beaverbank
Hubbards
Lawrencetown
Colby Village
Halifax/Dartmouth
Timberlea
McGrath's Cove/
Dover
Halifax County
Frog Report
Mar. 24 – 29
Peepers heard
Peepers Observer
Groups
25 km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Enfield
Meaghers Grant
Sheet Harbour
Beaverbank
Hubbards
Lawrencetown
Colby Village
Halifax/Dartmouth
Prospect
Timberlea
McGrath's Cove/
Dover
Halifax County
Frog Report
Mar. 24 – Apr. 5
Peepers heard
Peepers Observer
Groups
25 km

A Final Peep

Frogwatch '94 Summary Report

June 15,1994

To: All Frogwatch '94 Participants

From: Sue Browne,
Frogwatch Coordinator

Frogwatch '94 was a great success both from the perspectives of the project team and the participants. This report summarizes the events and results of the programme. A more complete version will be published as a Curatorial Report by the Nova Scotia Museum in the summer or fall of this year. All the data collected during the programme is accessible through the Museum on data-base in Fox Pro format. In addition, the participants' summary sheets and Froglogs will be bound and filed at the Museum.

Introduction

Frogwatch '94 developed out of the interests of the Nova Scotia Museum of Natural History and a Windsor -based environmental consulting firm (Envirosphere Consultants Ltd). Both organizations recognized the need for a local environmental awareness project that addressed concerns relating to global changes and particularly to declines in amphibian populations. At the same time, such a project would need to be fun and informative and involve students and families. The Clean Nova Scotia Foundation became the third partner in the project, which well suited their environmental and educational objectives. The project was carried out very quickly as funding only became available at the beginning of January, 1994. A final decision regarding the feasibility of the project was made in late January. Within one month, the programme material was written and participants were contacted and registered.

Programme Material

The programme material was researched and written by a local biologist, Donald Sam. Science curriculum consultants in Halifax County reviewed it before the interpretation staff at the Nova Scotia Museum of Natural History designed and produced a final version. We printed 2200 Info Guides and distributed the programme material to 51 schools, 32 youth groups and 66 families and individuals across Halifax County by March Break. In addition, 92 people participated as non-registered reporters. We set up a Peeper Hotline and a data-base at the Museum to accommodate the reports (see Figure 1). The first call and first chorus reports on the Hotline were entered into the data-base.

Frogwatch '94 was developed by the Nova Scotia Museum of Natural History, The Clean Nova Scotia Foundation and Envirosphere Consultants Limited. Core funding was supplied by the Environmental Partners Fund.

Numeric 182
I D Code S041
Grid No. (N.S. Map Book) 20E3
Group Beaverbank Monarch Drive
Rating (Whether A - a scientist; B - a registered participant; C - an unsolicited participant; or D - other observations.)
County Halifax
Contact Carolyn Welch
Phone 864-2257
First call 03/28/94
Time call p.m. 6:30
Time call a.m.
Site call pond
Temp. call °C 7
Weather call cloudy
First chorus 04/18/94
Time chorus p.m. 6:15
Time chorus a.m.
Site chorus pond
Temp. chorus °C 5
Weather chorus cold
Locality Beaverbank
Lat. degree 44
Lat. minute 47
Lat. second 52
Long. degree 63
Long. minute 41
Long. second 18
Comments The chorus had aggressive and advertising Peeps. I saw some ducks.

(Above) Figure 1
Frogwatch '94 Data-base Fields.
This figure shows what type of information was entered into the Peeper data-base. The I.D. code allowed us to easily identify and map each locality and group. For groups such as school classes, where reports were made from more than one locality , we assigned a different number (numeric) to each locality, but kept the same I.D.code.

Programme Results

There were 1552 observers participating in Frogwatch '94. The majority were students in Grades 5 to 7; however, primary to Grade 4 students were also involved. Most of the students did their observing outside of school hours. The teachers adapted Frogwatch to their science and environmental programmes, in some cases creating new activities and in others fitting Frogwatch into an existing theme. The youth group frogwatchers were mostly from Brownies, Cubs and Guides. They participated as part of the merit badge system and also for general interest. Two environmental groups, the River Lake R's from Wellington and the Sackville Rivers Association, also took part. There was a lot of interest among individuals and families with young children.

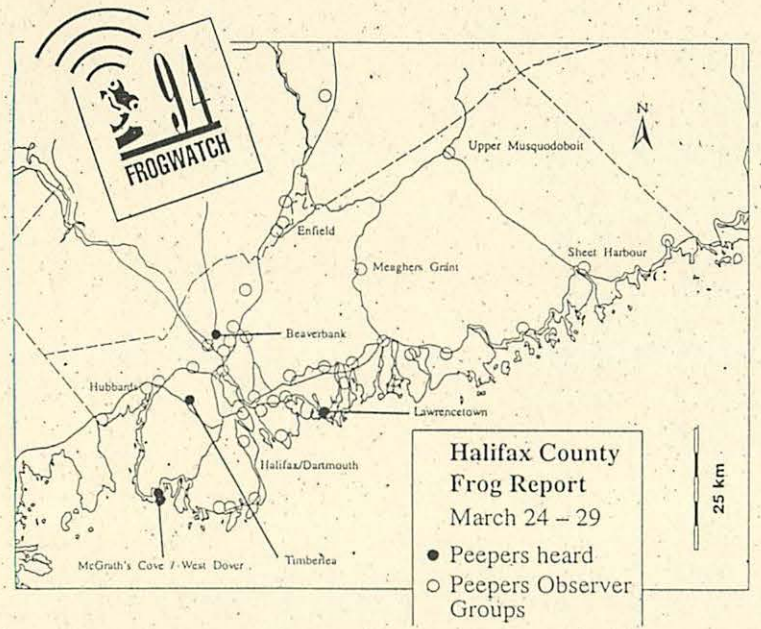
The first Peeper call was heard on March 24 in Timberlea, Dartmouth and Mooseland. This early date was supported by calls on March 26 in East Dover, March 27 in McGrath's Cove and Dartmouth, March 28 in Beaverbank and March 30 in West Dover. There was also a report from Pleasant Valley in Colchester County on March 27; however, the reporter later decided that he had actually heard some industrial noises.

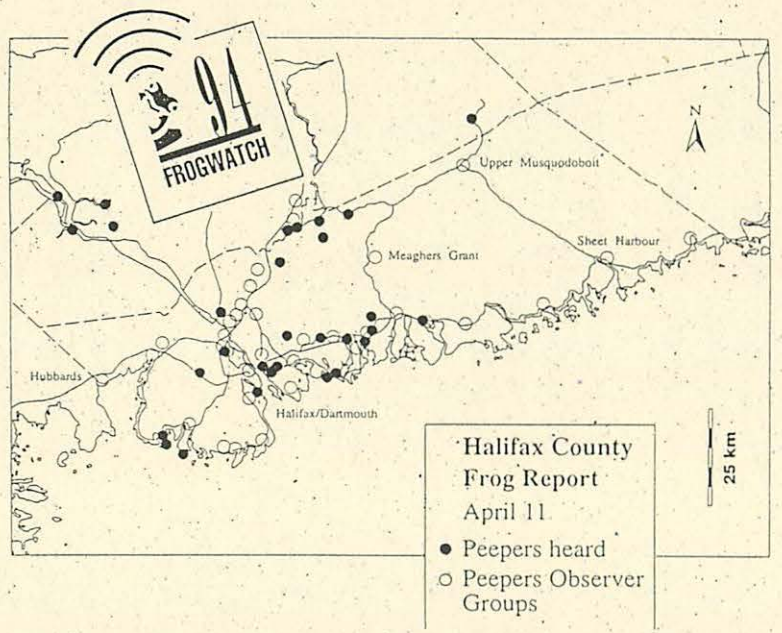
The next wave of reports along the coast was between April 2 and 30 moving east. The majority of first calls occurred along the coast between April 13 and 17 around St. Margarets Bay and between Pennant Point and Halifax. The most eastern part of Halifax County first reported a call on April 10 at Moser River.

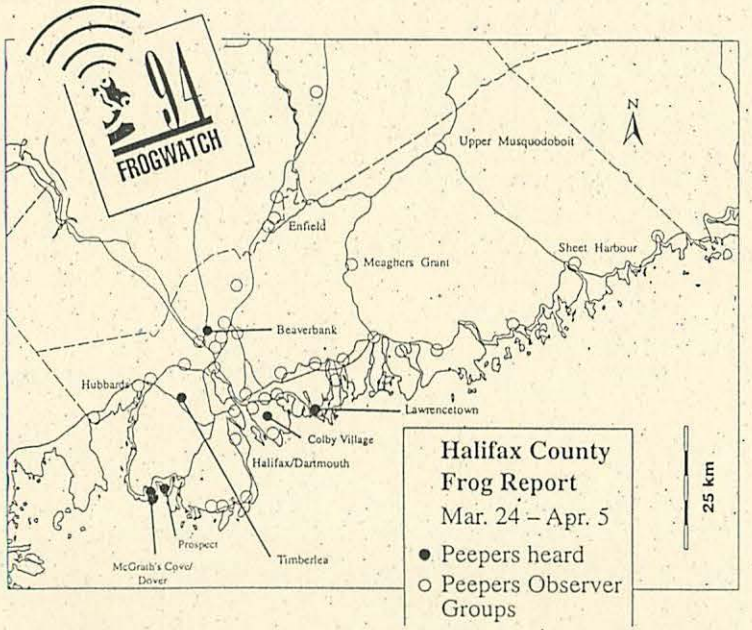
In other parts of the County, the peak first call period was between April 4 and April 7. This period coincided with a steady rise in temperature peaking on April 7 when the first chorus was heard around Antrim, Carrol's Corner, Dutch Settlement and Meagher's Grant. On April 7 there were also many first calls reported.
The latest choruses occurred around the Moser River, Ecum Secum, Quoddy, Harrigan Cove and Necum Teuch area. Some were reported on April 15, 16 and 17, however, most choruses in this area started around the 25 of April to May 2. By the middle of May choruses had been reported from most of the locations in Halifax County.

Reporters noted that peeping was sporadic at the beginning and that sometimes none would be heard for a day or two in places that they had been heard before. However, once the choruses started, there was generally continuous peeping daily.

(Next page) Figure 2.
Frog Report Maps.
These maps were developed from the information we received on the Peeper Hotline. They show the distribution pattern of calling Peepers across the County this spring. The maps were part of the Frogwatch display at the Nova Scotia Museum of Natural History.


FROGWATCH
Upper Musquodoboit
Enfield
Meaghers Grant
Sheet Harbour
Beaverbank
Hubbards
Lawrencetown
Halifax/Dartmouth
McGrath's Cove / West Dover
Timberlea
N
25 km
Halifax County
Frog Report
March 24 – 29
Peepers heard
Peepers Observer
Groups


FROGWATCH
Upper Musquodoboit
Meaghers Grant
Sheet Harbour
Hubbards
Halifax/Dartmouth
N
25 km
Halifax County
Frog Report
April 11
Peepers heard
Peepers Observer
Groups


FROGWATCH
Upper Musquodoboit
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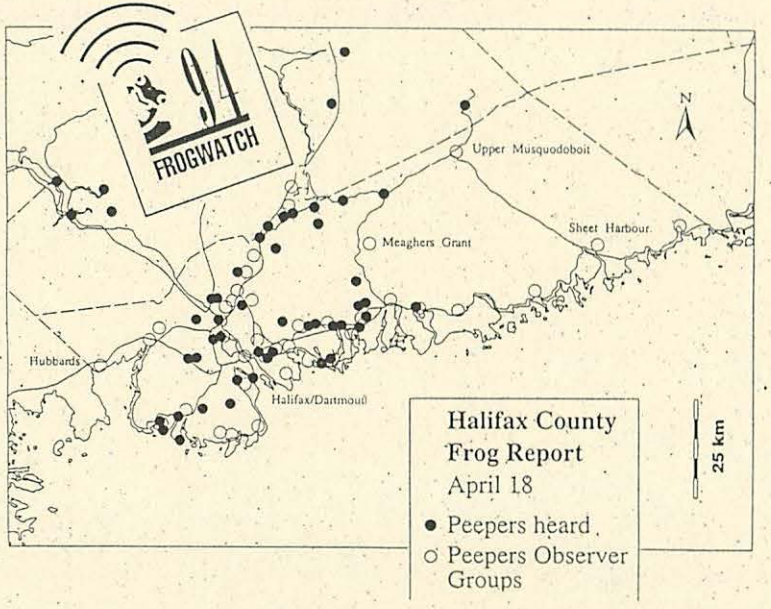
Meaghers Grant
Sheet Harbour
Beaverbank
Hubbards
Lawrencetown
Colby Village
Halifax/Dartmouth
Prospect
McGrath's Cove/
Dover
Timberlea
N
25 km
Halifax County
Frog Report
Mar. 24 – Apr. 5
Peepers heard
Peepers Observer
Groups


FROGWATCH
Upper Musquodoboit
Meaghers Grant
Sheet Harbour
Hubbards
Halifax/Dartmouth
N
25 km
Halifax County
Frog Report
April 18
Peepers heard
Peepers Observer
Groups

Project Evaluation

Frogwatch '94 was very successful, primarily because the participants enjoyed it and have expressed interest in doing this sort of thing again. From the comments we received on the Peeper Hotline and also from the evaluation forms, the project has met our educational, environmental and scientific objectives as well. There is now a body of people in Halifax County and around the province who are very much aware of Spring Peepers and amphibians in general and who understand better the implications of ecological changes. These people have fully experienced spring this year and will probably never again hear a Peeper without being reminded of the greater environmental context.

The observations have provided us with a preliminary indication that there are indeed Spring Peepers breeding in Halifax County and that they tend to start calling over a very wide area (namely south-central Nova Scotia) within the same time frame. There are local variations across the County (see Figure 3 on next page). By comparing this year's data to other years, we have determined that the Peepers started to call earlier than usual this year. This is not conclusive, but it is interesting enough to look at in more detail. It is unusual to hear calls that early along the coast as it generally takes longer to warm up in coastal areas than inland. However, it sometimes happens that a few Peepers will start to call early and then stop until the temperature reaches a peak. This occurred around April 7 when the temperature shot up dramatically and again between April 15 and 17 when the temperature went above 12^{0}C.

We did not receive any information from northeast Halifax County. This is mostly due to the lack of communities in these parts.

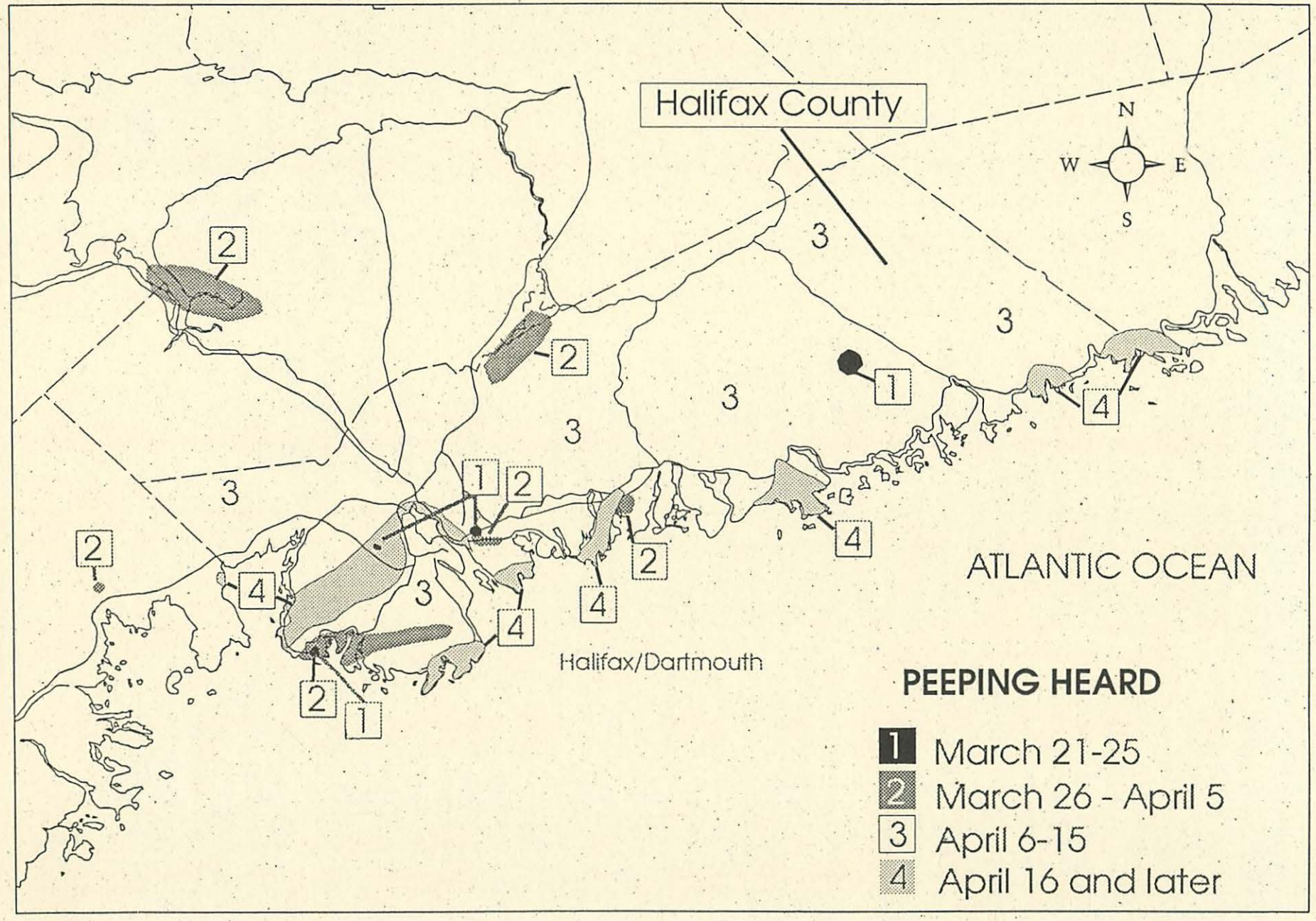
Comments that we received indicate that the numbers of frogs calling have decreased over the last twenty years. People have related this phenomena to loss of wetland habitat, development and change in predator composition. These comments, although not scientifically proven, can be used to justify further studies.

Many frogwatchers continued to listen for calls after they heard the first chorus in their area. They recorded when they did not hear calls as well as when they did hear them. This continuity allows us to determine the relationships between the Peepers and the weather patterns. In addition, Many observers noted that the Peepers would be calling in one site and gradually spread out to other sites further away from the woods over a few days over sometimes weeks. This allows us to track migration patterns from winter habitat to spring breeding areas. People also noted that frogs would call from one pond but not from another one in the same vicinity. This type of information is interesting because it suggests variations in habitat suitability. In some cases, one pond or marsh might warm up faster due to depth of water or lack of shade. There might also be some discrepancies in water quality, i.e. one wet area might be polluted or too silty as a result of erosion. The observations can determine areas were more in depth studies are required.

It was also interesting to note the number of other observations that were made during the programme. People reported spring changes, other species, weather patterns and human influences on the environment. These observations help us to determine the bigger picture.

(Next page) Figure 3
Isoline map of Peeper calls.

This map summarizes the general time periods during which Peepers started to call in Halifax County. In general, they were later in coastal areas; however it is necessary to see the whole province to determine more accurate breeding distribution patterns.


Halifax County
N
W
E
S
ATLANTIC OCEAN
Halifax/Dartmouth
PEEPING HEARD
1 March 21-25
2 March 26 - April 5
3 April 6-15
4 April 16 and later

Conclusions

As a pilot project Frogwatch '94 has demonstrated that there are a lot of enthusiastic and capable volunteers who are willing to contribute to our understanding of our environment. We had reports from all over the province as well as Halifax County. We hope to run a province-wide project next year, again involving schools and youth groups, as well as families and individuals. This year's data would be a good base for comparison.

The Frogwatch data can be used to initiate or support more detailed scientific studies and there are obvious educational benefits. People all over Canada are aware of Frogwatch '94 as a result of the publicity the project has received both by the local and national media. The efforts of all the Frogwatchers in Nova Scotia have been part of several initiatives in other provinces to understand our changing amphibian populations and the larger environment. A summary of the projects methodology and findings will be sent to both the Canadian and the international Task Forces on Declining Amphibian Populations.

The Frogwatch programme is only one way of encouraging people to observe and experience nature. There are many community projects in Nova Scotia that allow people to get involved in the decisions that affect them and their environment. Check out your local community groups or call The Clean Nova Scotia Foundation and find out how you can get involved.

Things of Special Note

All the observers were very diligent and keen and deserve a warm thanks. As project coordinator, I noted four groups in particular who deserve special recognition. One is the Second Cole Harbour Cub Pack whose leaders and members were exceedingly conscious of the environment around them. The second is a Grade 3 student at Beaverbank Monarch Drive, Jillian Nicholson, who observed and reported for the full duration of the project. Thirdly, I was very impressed with Mary Le Blanc's Grade 7 class at Caledonia Junior High who designed a hall display to extend the programme beyond their classroom. And finally, Brian Curley's students at Eastern Consolidated School in Moser River had the most localities in any one group.

Highlights

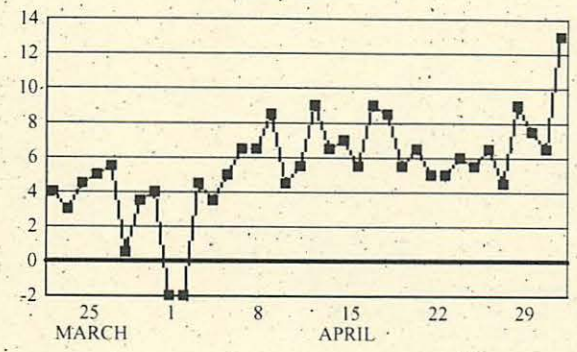
Peeper Calls

First Call - March 24 - Timberlea, Dartmouth and Mooseland

First Chorus - April 7 - Antrim, Carrol's Corner, Dutch Settlement and Meagher's Grant

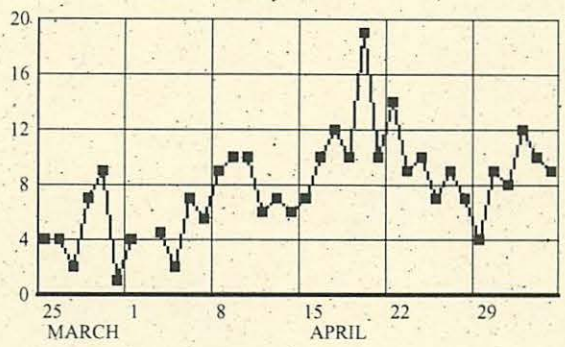
MAXIMUM DAILY TEMPERATURE (DEGREES C.)

Sandy Cove



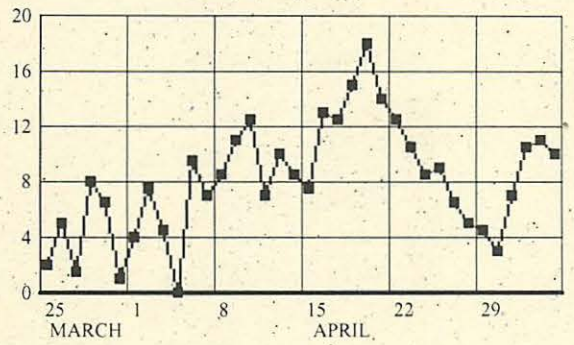
MAXIMUM DAILY TEMPERATURE (DEGREES C.)

Malay Falls



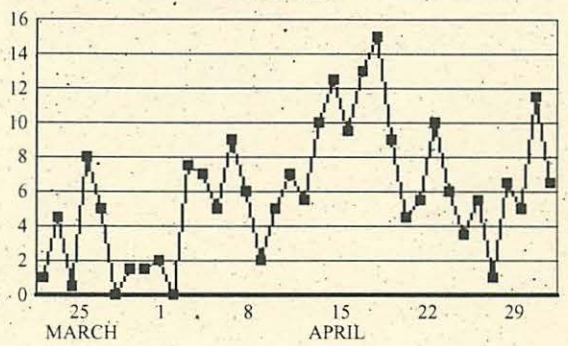
MAXIMUM DAILY TEMPERATURE (DEGREES C.)

Middle Musquodoboit



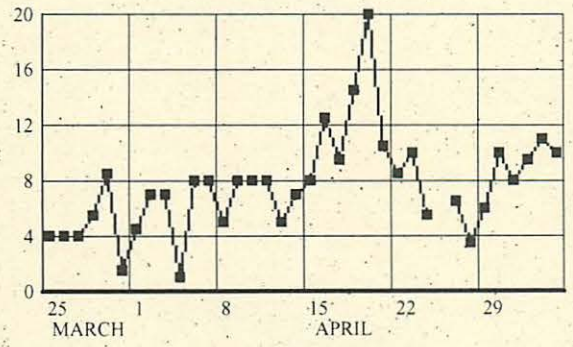
MAXIMUM DAILY TEMPERATURE (DEGREES C.)

Pockwock



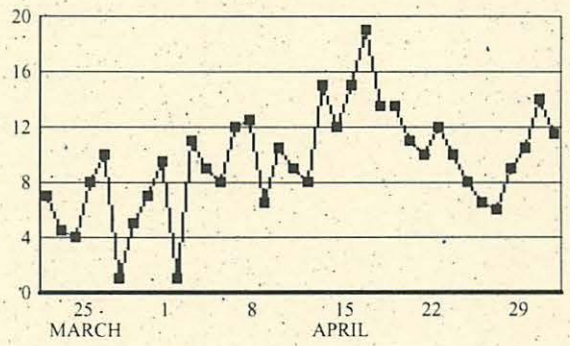
MAXIMUM DAILY TEMPERATURE (DEGREES C.)

Bayswater



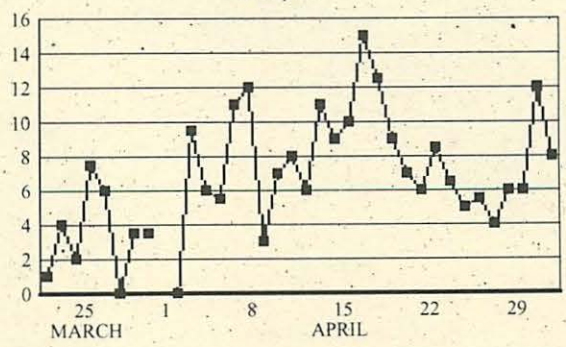
MAXIMUM DAILY TEMPERATURE (DEGREES C.)

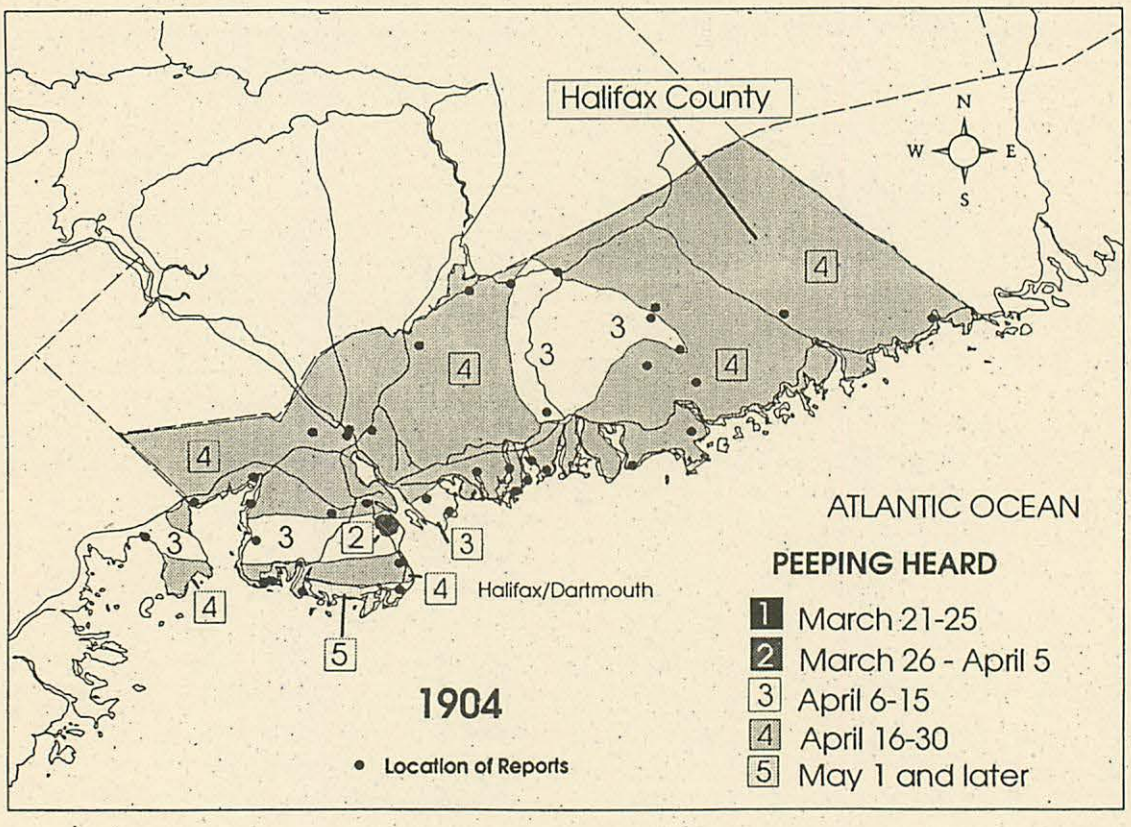
Halifax Citadel



MAXIMUM DAILY TEMPERATURE (DEGREES C.)

Westphal




Halifax County
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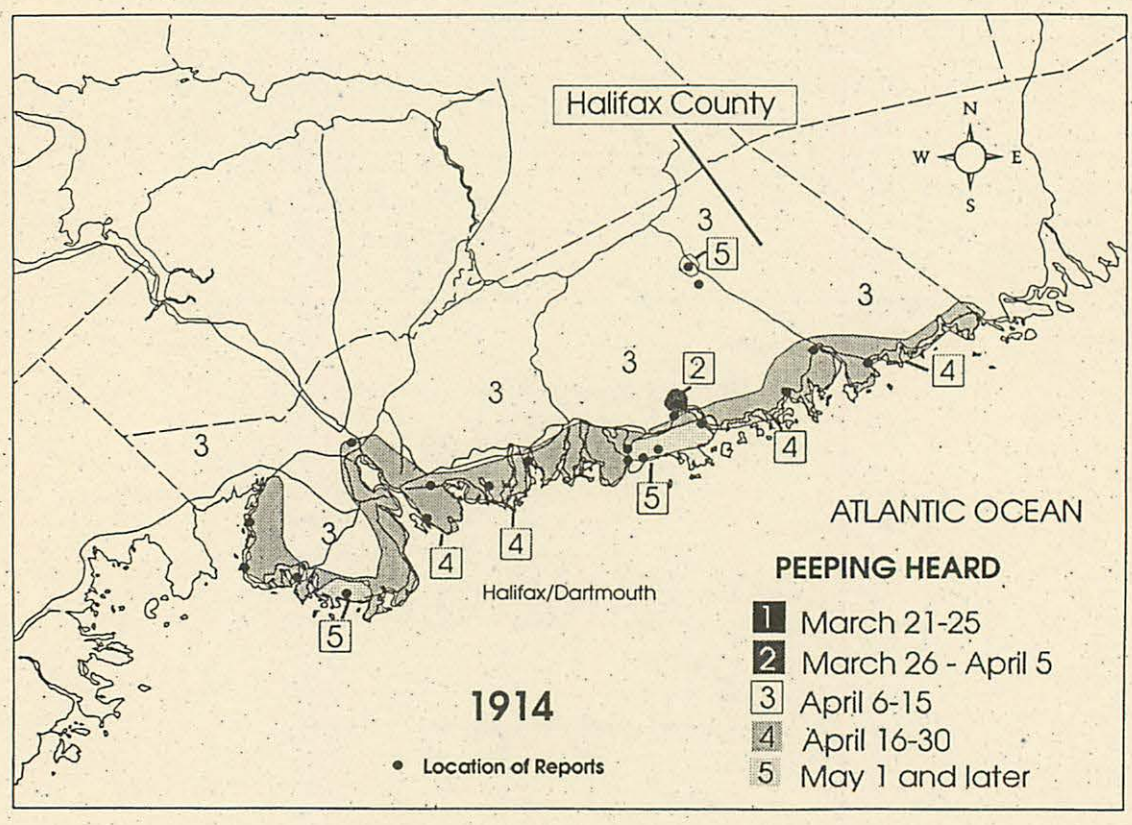
ATLANTIC OCEAN
PEEPING HEARD
1 March 21-25
2 March 26 - April 5
3 April 6-15
4 April 16-30
5 May 1 and later
Halifax/Dartmouth
1904
Location of Reports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PEEPING HEARD
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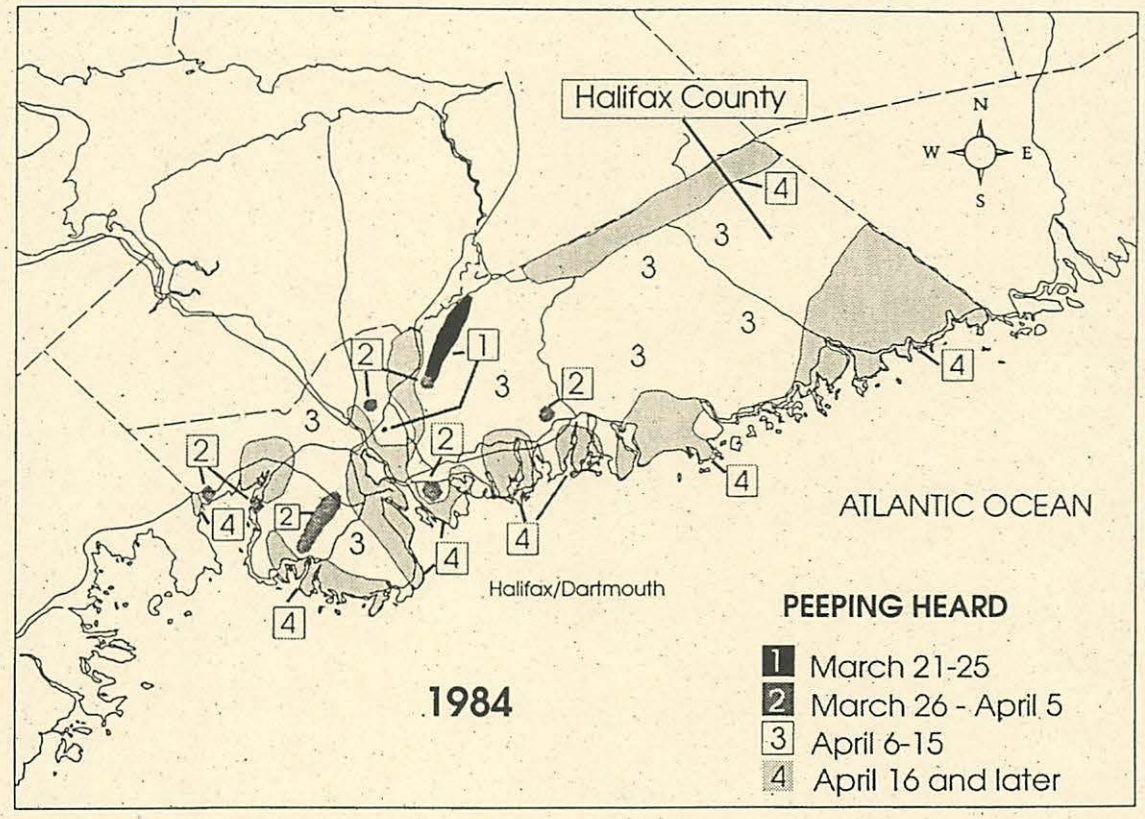
4 April 16-30
5 May 1 and later
Halifax/Dartmouth
1914
Location of Reports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Halifax/Dartmouth
1984
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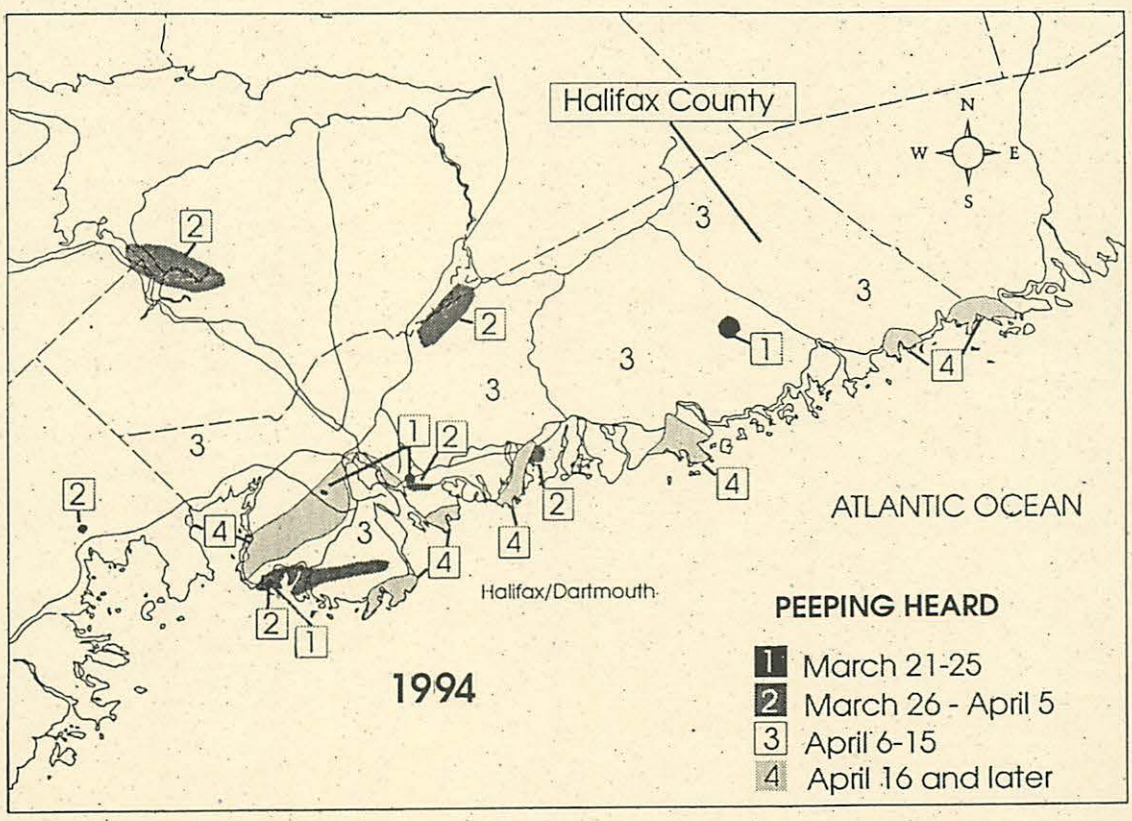
3 April 6-15
4 April 16 and later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ATLANTIC OCEAN
Halifax/Dartmouth
1994
PEEPING HEARD
1 March 21-25
2 March 26 - April 5
3 April 6-15
4 April 16 and later