



ATLAS DES OISEAUX NICHEURS DES **MARITIMES** BREEDING BIRD ATLAS

**Final Report to the
Nova Scotia Habitat Conservation Fund**



Rose-breasted Grosbeak. Photo Dan Busby

Project: NSHCF11_12

**Communicating Maritimes Breeding Bird Atlas Results
to Nova Scotians**

Kate Bredin
Coordinator
Maritimes Breeding Bird Atlas

Communicating Maritimes Breeding Bird Atlas Results to Nova Scotians

Introduction

The Maritimes Breeding Bird Atlas (MBBA) is a region-wide multi-stakeholder, project to determine the distribution, abundance and status of all birds breeding in the Maritimes Provinces. Five years of volunteer-based Atlas fieldwork were launched in 2006 and concluded in 2010. Over 450 Nova Scotia volunteers participated in this important environmental initiative, and the information they gathered will help identify conservation priorities and protect Nova Scotia bird biodiversity for years to come. Volunteers amassed a comprehensive dataset of 260,000 breeding bird records, and 3500 records for bird species at risk. This information has enormous potential to educate Nova Scotians about changes in bird biodiversity and the role of habitat conservation in preserving wild bird populations across the province. However, for this to happen, the public must be aware this information exists, and have ready access to it in visually rich, user-friendly and easily-understood forms. Our project was to transform this wealth of geo-referenced breeding bird data into effective communication products to educate Nova Scotians about changes in our bird populations, and to guide habitat conservation and stewardship actions throughout the province.

Objectives for 2011-2012

Our first overall project objective was to transform the detailed and extensive information in the Maritimes Breeding Bird Atlas database into easily-understood, readily-accessible and visually-rich communication products, in order to 1) educate Nova Scotians about the importance of preserving bird biodiversity and bird habitats, and 2) inform and direct habitat conservation actions for birds and other wildlife. Our second overall objective was to encourage and promote the use of this knowledge to enhance wildlife habitat conservation in the province, thereby maximizing the full educational and conservation potential of the Maritimes Atlas.

Our specific project objectives for 2011-12 were the following:

- 1) Analyze the finalized MBBA dataset to determine changes in bird distribution and abundance;
- 2) Produce maps of species distribution and abundance, and changes in these parameters, over the 20 years since the first Maritimes Atlas;
- 3) Draft text, create additional graphics, and select photographs to accompany the maps and the determinations of changes in abundance and distribution;
- 4) Further develop the bilingual Atlas web-site to make Atlas results readily available in informative, appealing, and engaging formats;
- 5) Develop online bird data query tools that provide detailed Atlas information;
- 6) Develop online bird data transfer tools so users can download data and information for bird species or geographic areas of interest;
- 7) Compose and produce material to lay the groundwork for the upcoming publication, in both English and French, of the Maritimes Breeding Bird Atlas book
- 8) Provide information through communication products and presentations to groups and citizens who will use MBBA information, including municipal governments, planning commissions, provincial agencies, industry, naturalist clubs, environmental events, and educators throughout Nova Scotia;
- 9) Evaluate impacts of this communication through further communication to assess whether groups and stakeholders used Atlas data in planning and delivering conservation activities;
- 10) Promote the conservation applications of Maritimes Breeding Bird Atlas information.

2011-12 Activities and Results

1. The finalized MBBA dataset was analyzed to determine changes in the probability of detection of 157 species of NS breeding birds (species for which there was adequate data) over the 20 year time period between the first Maritimes Atlas (1986-1990) and this second Atlas (2006-2010). The results from this change in probability of detection analysis are presented in Appendix 1. These results indicate population trends and important changes that have occurred in species and groups of birds throughout the province and the region over the past 20 years.
2. Up to date maps of the distribution and level of breeding (possible, probable or confirmed) of all Nova Scotia species of breeding birds were created by the MBBA Data Manager by importing the most recent set of breeding bird records from the Atlas database into a GIS mapping program. These updated maps are readily available on the Atlas website (www.mba-aom.ca) and provide the most current and comprehensive information on breeding bird distribution for the province. Relative abundance maps were created from point count data at BSC headquarters using GIS software and statistical mapping methods to smooth out data from individual and adjacent squares to create an averaged surface. These maps will be available in the hard-cover Atlas publication and on-line at the MBBA website.
3. We featured two web-based articles describing important results from the Maritimes Atlas on the bilingual Atlas website. The first outlined important changes in bird populations of Nova Scotia and the Maritimes over the 20 years between the first and second Atlases. The second feature article provided an overview of the results of Atlas habitat analyses. For these habitat analyses we collaborated with NS DNR to generate a habitat description for each MBBA point count location, based on the set of habitat types, or variables, in the Nova Scotia land cover data. From this information we were able to describe each species' habitat association based on the following habitat characteristics: 1) Forest Type (i.e., dominant tree species plus the age of the forest stand); 2) Forest Harvest Regime (e.g., clear cut, plantation, etc.); 3) Human Land Use (e.g., cultivated grassland, cropland, hedgerow, etc.); and, 4) Wetland Type (e.g., bog, fen, freshwater marsh, etc.). The end result was a set of habitat descriptions for Nova Scotia species that more closely describes their habitat use within this province, rather than relying on rather general habitat descriptions from more distant parts of a species range. These articles are reprinted in Appendix 2. Appendix 2 also contains an article from Birdwatch Canada, which summarized important changes that have occurred in a number of groups of birds throughout the province and the region, and which highlighted some interesting changes that have occurred in populations of a number of Nova Scotia (and Maritime) species.
4. We have developed and refined online data query and data transfer tools that provide detailed Atlas information for bird species of interest or geographic areas of interest. For example, French and/or English speaking data users can download detailed record information on Nova Scotia listed bird species at risk or species of conservation concern directly from the MBBA website by clicking the "Download Atlas Data" button on the bilingual Atlas home page at: <http://www.mba-aom.ca/english/index.html> or <http://www.mba-aom.ca/francais/index.html>
5. Our project has educated and informed Nova Scotians about breeding bird distribution, abundance and status in their province and helped them plan sustainable, healthy environments for birds and other wildlife. The number and diversity of on-line requests for Atlas data through the Atlas website attests to this result: Nova Scotians are requesting and using Maritimes

Breeding Bird Atlas Data! Table 1 summarizes requests for MBBA data over the past 1.5 years, indicating types of requests within four categories, and showing which requests apply to Nova Scotia lands. Of a total of 144 data requests, 55.5 % (80 requests) concerned lands in Nova Scotia, or bird species that breed within the province.

More than half of all requests for MBBA data were used for Environmental Assessment (59%), indicating that Nova Scotian (and Maritime) Consulting Companies are consistently using georeferenced MBBA rare species data to determine whether lands proposed for development and infrastructure projects contained habitat for rare breeding birds, and should be protected from such development. Conservation Planning for habitat protection made up another 14.5% of MBBA data requests. In summary, almost three quarters (73.5%) of recent requests for Atlas data were directly related to the conservation of habitats important to the preservation of avian biodiversity throughout the region.

6. We have composed and produced material that lays the groundwork for the publication of the bilingual Maritimes Breeding Bird Atlas book. Species accounts for 229 species of breeding birds have been drafted by volunteer authors and Atlas staff, and accounts have undergone scientific and copy editing. Draft text has been prepared for Introductory and Summary Chapters of the book, including Acknowledgements, Methods, Atlas Coverage, Abundance, Birdscapes of the Maritimes, Changes in Distribution and Abundance, Conservation Applications of Atlas Data, and Bird Conservation Priorities in the Maritimes.
7. We provided information through reports and presentations, to a number of organisations operating in Nova Scotia, including provincial and federal agencies, environmental consulting companies, ENGOS, and educators, to inform and educate people about the wealth of information available through the MBBA website and upcoming book and about the importance of bird biodiversity in Nova Scotia.

We prepared the following summary reports for both existing and potential users of Atlas data:
1) Two Documents in both English and French to assist users of Atlas data in understanding, using and applying bird data and information as downloaded from the Atlas web site. These documents are available (in either English or French) from the data download portal on the MBBA website: <http://www.bsc-eoc.org/birdmon/mbba/resources.jsp> These documents are also reproduced in Appendix 3.

2) Two summary documents on: a) all bird species at risk in the Maritimes, and, b) forest birds of conservation concern in the Maritimes, that included maps, graphs, tables and text illustrating and summarizing core breeding areas, abundance and distribution, changes in distribution and range since the first Atlas, and, habitat preferences for these species.

3) One-page summary document for forest companies to encourage and assist them to use Atlas data on bird species at risk in their forest management and harvest activities.

4) One-page summary document for municipalities and municipal planning commissions to inform them about Atlas species at risk data and map products, and to encourage and assist them to use Atlas data on bird species at risk in sustainability planning.

Documents in numbers 2), 3) and 4) are provided in a separate Supplementary Materials Appendix to reduce the length and digital size of this Report.

8. We consulted, collaborated and met with, and/or made presentations to, the following organizations operating in the province to inform and educate Nova Scotia citizens about Atlas

information and the importance of bird biodiversity in the province:

The Nature Conservancy of Canada, Nova Scotia Nature Trust, Canadian Parks and Wilderness Society, Dalhousie University of Department of Biology (Cindy Staicer, Dalhousie Integrated Science Program), School for Resource and Environmental Studies, Dalhousie University, AbitibiBowater Inc., Nova Scotia Department of the Environment, Nova Scotia Power, Environment Canada Environmental Assessment personnel, Sustainable Forestry Initiative, Canadian Wildlife Service Migratory Bird and Habitat personnel, Halifax Regional Municipality, Canadian Wind Energy Association, and Wind Energy Companies in the Maritimes including Sprott Power, Shear Wind, Atlantic Wind Power Corporation, RMS Energy, and Eon Wind.

9. We promoted the education and conservation applications of Breeding Bird Atlas information through the MBBA “Latest News” electronic newsletter (see number 3 above). In addition the following article appeared on the nation-wide Bird Studies Canada “Latest News” electronic newsletter on 6 July 2012:

Thank You, NS HCF and NB WTF

The [Maritimes Breeding Bird Atlas](#) recently received its final funding contributions from two loyal provincial trust funds: the Nova Scotia Habitat Conservation Fund (NS HCF) and the New Brunswick Wildlife Trust Fund (NB WTF). These funds have supported the project annually for the past eight years, starting with an initial planning year in 2005, through five years of fieldwork (2006-10), and during two years of final product development (2011 and 2012).

The NS HCF has donated almost \$14,000 for 2012-13, while the NB WTF has contributed \$15,000, for delivery of the two fully bilingual atlas products. The hardcover book will be entitled *Atlas of the Breeding Birds of the Maritimes 2006-2010*. A reconfigured, interactive website will make the Maritimes atlas results readily available for provincial and federal wildlife agencies, environmental consultants, and industry users, to assist with environmental effects assessment and monitoring for breeding birds and their habitats throughout the region.

The NB WTF has contributed more than \$125,000 over the past eight years, while the NS HCF has contributed almost \$80,000. Sincere thanks to these organizations for their significant contributions to the Maritimes atlas, and other Bird Studies Canada programs in the Atlantic Provinces!

Table 1. Requests for Maritimes Breeding Bird Atlas data over the last 1.5 years, showing date submitted, organisation submitting request, activity category that each request was used for, and whether the request concerned lands in Nova Scotia. Summary statistics are shown at the end of the table.

Date submitted	Organisation Submitting Request	Category	covers NS lands
8/23/2012	CBCL Ltd	Environmental Assessment	NS
8/22/2012	Stantec NB	Environmental Assessment	
8/13/2012	Fisher Eng	Environmental Assessment	
8/13/2012	Govt of NS, DOE	Conservation Planning	NS
8/13/2012	Fisher Eng	Environmental Assessment	NS
8/8/2012	Genivar	Environmental Assessment	
8/8/2012	Genivar	Environmental Assessment	
7/31/2012	Stantec NB	Environmental Assessment	
7/30/2012	Stantec NB	Environmental Assessment	
7/23/2012	NCC Atlantic	Conservation Planning	NS
7/20/2012	BSC Atlantic	BSC Communication and Education	NS
7/20/2012	STRUM Environmental	Environmental Assessment	NS
7/9/2012	Simon Fraser U	Research and Education	NS
6/21/2012	UNB	Research and Education	
6/20/2012	UNB	Research and Education	
6/11/2012	Stantec NS	Environmental Assessment	NS
6/4/2012	Eon Wind	Environmental Assessment	NS
6/4/2012	Eon Wind	Environmental Assessment	NS
6/4/2012	Eon Wind	Environmental Assessment	NS
5/29/2012	PhD thesis	Research and Education	NS
5/25/2012	STRUM Environmental	Environmental Assessment	NS
5/23/2012	Eon Wind	Environmental Assessment	NS
5/22/2012	Eon Wind	Environmental Assessment	NS
5/15/2012	McCallum Environmental	Environmental Assessment	NS
5/11/2012	Stantec NB	Environmental Assessment	
5/11/2012	Stantec NB	Environmental Assessment	
5/11/2012	Stantec NB	Environmental Assessment	
5/4/2012	Dillon Consulting	Environmental Assessment	
5/2/2012	Dalhousie U	Research and Education	NS
5/2/2012	Dalhousie U	Research and Education	NS
5/2/2012	McCallum Environmental	Environmental Assessment	NS
5/2/2012	McCallum Environmental	Environmental Assessment	NS
4/27/2012	Dalhousie U	Research and Education	NS
4/24/2012	EC CWS	Conservation Planning	
4/17/2012	ActivaEnvironnement	Environmental Assessment	
4/12/2012	ActivaEnvironnement	Environmental Assessment	
4/11/2012	ActivaEnvironnement	Environmental Assessment	
4/4/2012	EC CWS	Conservation Planning	NS

3/30/2012	EC CWS	Conservation Planning	
3/29/2012	BSC Atlantic	BSC Communication and Education	NS
3/27/2012	Stantec NS	Environmental Assessment	NS
3/27/2012	Stantec NS	Environmental Assessment	NS
3/27/2012	Stantec NS	Environmental Assessment	NS
3/27/2012	Stantec NS	Environmental Assessment	NS
3/26/2012	BSC Atlantic	BSC Communication and Education	NS
3/20/2012	Nova Scotia Nature Trust	Conservation Planning	NS
3/19/2012	Nova Scotia Nature Trust	Conservation Planning	NS
3/13/2012	McCallum Environmental	Environmental Assessment	
3/12/2012	U Vic, EC CWS - oil in CA waters	Research and Education	NS
3/12/2012	U Vic, EC CWS - oil in CA waters	Research and Education	NS
3/12/2012	NCC	Conservation Planning	NS
3/2/2012	McCallum Environmental	Environmental Assessment	NS
3/1/2012	Fundy Engineering	Environmental Assessment	
3/1/2012	John Kearney Assoc	Environmental Assessment	NS
2/22/2012	BSC Atlantic (CHSW)	BSC Communication and Education	NS
2/7/2012	BSC Atlantic (CHSW)	BSC Communication and Education	NS
2/6/2012	Biodiversity Research Inst. (RUBL)	Research and Education	NS
2/6/2012	BSC National (BANS)	Conservation Planning	NS
2/6/2012	BSC National (BANS)	Conservation Planning	NS
2/2/2012	Stantec NS	Environmental Assessment	NS
2/2/2012	Stantec NS	Environmental Assessment	NS
1/30/2012	Stantec NS	Environmental Assessment	NS
1/30/2012	Stantec NS	Environmental Assessment	NS
1/19/2012	Fleming College, ON	Research and Education	
1/18/2012	GEMTEC	Environmental Assessment	
1/17/2012	Stantec NS	Environmental Assessment	NS
1/13/2012	GEMTEC	Environmental Assessment	
1/5/2012	Boise State University (RTHU)	Research and Education	NS
12/6/2011	Dillon Consulting	Environmental Assessment	
12/5/2011	Stantec NB	Environmental Assessment	
11/30/2011	Stantec NS	Environmental Assessment	NS
11/21/2011	Stantec NB	Environmental Assessment	
11/21/2011	Village de Memramcook	Conservation Planning	
11/16/2011	BSC National	Conservation Planning	
11/16/2011	BSC Atlantic	BSC Communication and Education	NS
11/16/2011	Stantec NB	Environmental Assessment	
11/16/2011	BSC Atlantic	BSC Communication and Education	NS
11/16/2011	BSC Atlantic	BSC Communication and Education	NS
11/16/2011	Stantec NB	Environmental Assessment	
11/14/2011	BSC Atlantic	BSC Communication and Education	NS
11/11/2011	BSC Atlantic	BSC Communication and Education	NS

11/10/2011	Roy Consultants	Environmental Assessment	
11/10/2011	Village de Memramcook	Conservation Planning	
11/9/2011	Village de Memramcook	Conservation Planning	
11/8/2011	Dalhousie U	Research and Education	NS
11/7/2011	NS AC	Research and Education	NS
11/4/2011	Stantec NS	Environmental Assessment	NS
11/4/2011	Stantec NS	Environmental Assessment	NS
11/3/2011	Stantec NS	Environmental Assessment	NS
11/3/2011	Stantec NS	Environmental Assessment	NS
11/3/2011	Stantec NS	Environmental Assessment	NS
11/3/2011	Stantec NS	Environmental Assessment	NS
11/2/2011	BSC Atlantic	BSC Communication and Education	NS
11/2/2011	GEMTEC	Environmental Assessment	
11/2/2011	GEMTEC	Environmental Assessment	
11/2/2011	BSC Atlantic	BSC Communication and Education	
11/2/2011	BSC Atlantic	BSC Communication and Education	
10/27/2011	Parks Canada	Conservation Planning	
10/27/2011	Parks Canada	Conservation Planning	
10/20/2011	Dillon	Environmental Assessment	
10/19/2011	Stantec NB	Environmental Assessment	
10/17/2011	Stantec NS	Environmental Assessment	NS
10/13/2011	Stantec NS	Environmental Assessment	NS
10/12/2011	Stantec NB	Environmental Assessment	
10/11/2011	Stantec NB	Environmental Assessment	
10/6/2011	Stantec NB	Environmental Assessment	
9/23/2011	Stantec NB	Environmental Assessment	
8/5/2011	Stantec NS	Environmental Assessment	NS
7/27/2011	BSC National	Conservation Planning	NS
7/19/2011	BSC National	Conservation Planning	NS
7/19/2011	Stantec NB	Environmental Assessment	
7/19/2011	BSC National	Conservation Planning	NS
6/24/2011	Stantec NB	Environmental Assessment	
6/23/2011	SNC Lavalin	Environmental Assessment	
6/21/2011	John Wile	Environmental Assessment	NS
6/20/2011	SNC Lavalin	Environmental Assessment	
6/6/2011	Saving Cranes Org	Conservation Planning	NS
5/20/2011	UPEI Dept Biology	Research and Education	NS
5/19/2011	ActivaEnvironnement	Environmental Assessment	
5/18/2011	Boreal Avian Modelling Project	Research and Education	NS
5/10/2011	Boreal Avian Modelling Project	Research and Education	NS
5/9/2011	Cybera	Environmental Assessment	
5/9/2011	Stantec NB	Environmental Assessment	
5/4/2011	Caribou Wind Farm	Environmental Assessment	

5/4/2011	Stantec NB	Environmental Assessment	
5/3/2011	Caribou Wind Farm	Environmental Assessment	
4/25/2011	Stantec NB	Environmental Assessment	
4/18/2011	UPEI Dept Biology	Research and Education	
4/14/2011	EC CWS	Environmental Assessment	NS
4/6/2011	Stantec NB	Environmental Assessment	
4/6/2011	Stantec NB	Environmental Assessment	
4/6/2011	Stantec NB	Environmental Assessment	
4/5/2011	Stantec NB	Environmental Assessment	
4/1/2011	BSC National	Conservation Planning	NS
3/24/2011	Stantec NB	Environmental Assessment	
3/16/2011	AMEC	Environmental Assessment	
3/16/2011	AMEC	Environmental Assessment	
2/21/2011	BSC Atlantic	BSC Communication and Education	NS
2/15/2011	Dalhousie U Dept Biology	Research and Education	NS
2/11/2011	BSC Atlantic	BSC Communication and Education	NS
2/8/2011	NBCC/ GIS/ Student	Research and Education	
2/4/2011	Dalhousie U	Research and Education	NS
1/21/2011	BSC Atlantic	BSC Communication and Education	NS
1/21/2011	BSC Atlantic	BSC Communication and Education	NS
Total Number of Requests Concerning NS lands			80
Percent Requests Concerning NS lands			55.5
Activity Category			Percent of all Requests
BSC Communication and Education			11.8
Conservation Planning			14.6
Environmental Assessment			59.0
Research and Education			14.6

Appendix 1. Table of changes in the probability of detection of Maritimes breeding birds over the 20 year period between the first (1986-1990) and second Atlas (2006-2010) field work periods.

The probability values range from 0-1, where 0 = no chance of detecting the species after 20 hours of search effort (i.e. 0% chance of detection) and 1 = guaranteed detection of the species in the province (i.e. 100% chance of detection) after 20 hours of search effort. Note: the probability values are calculated within a species' range in a province, not within the province as a whole; therefore the detection values tend to be higher than if they were calculated for the province as a whole. The values for the change in detection are the average annual % change in the probability of observation over the 20 years between both Atlases. For example, if you searched for 20 hours, on average your chance of detecting a Bald Eagle in NS after 20 hours of searching has increased by approximately 5 % since the 1st Atlas. A negative value in the Change column means the species declined in the specified geographic area (province or Maritimes as a whole) over the 20 years between Atlases, whereas a positive value indicates that the species increased in the specified geographic area. Full species names of the four letter American Ornithologists Union abbreviations are provided immediately following the Table.

Species (AOU Code)	Geographic Region: Province or Maritimes overall	First Atlas	Second Atlas	Average Annual % Change between Atlas Periods -ve = decrease +ve = increase	Significance of Change (p>0.05)
ABDU	NB	0.57	0.42	-1.54	Yes
ABDU	NS	0.53	0.56	0.24	No
ABDU	PEI	0.77	0.62	-1.12	No
ABDU	Maritimes Overall	0.56	0.50	-0.64	Yes
ALFL	NB	0.51	0.79	2.25	Yes
ALFL	NS	0.44	0.73	2.50	Yes
ALFL	PEI	0.37	0.56	2.11	Yes
ALFL	Maritimes Overall	0.46	0.74	2.37	Yes
AMBI	NB	0.33	0.34	0.10	No
AMBI	NS	0.25	0.32	1.35	Yes
AMBI	PEI	0.28	0.30	0.42	No
AMBI	Maritimes Overall	0.29	0.33	0.58	No
AMCO	NB	0.14	0.16	0.86	No
AMCO	NS	0.27	0.09	-5.63	No
AMCO	PEI	0.12	0.21	2.83	No
AMCO	Maritimes Overall	0.19	0.14	-1.25	No
AMCR	NB	0.74	0.81	0.46	Yes
AMCR	NS	0.73	0.89	1.01	Yes
AMCR	PEI	0.82	0.83	0.04	No
AMCR	Maritimes Overall	0.74	0.85	0.70	Yes
AMGO	NB	0.63	0.84	1.41	Yes
AMGO	NS	0.73	0.84	0.71	Yes
AMGO	PEI	0.52	0.72	1.59	Yes
AMGO	Maritimes Overall	0.66	0.83	1.11	Yes
AMKE	NB	0.50	0.46	-0.35	No
AMKE	NS	0.41	0.35	-0.79	Yes
AMKE	PEI	0.39	0.40	0.20	No
AMKE	Maritimes Overall	0.45	0.40	-0.56	Yes

AMRE	NB	0.84	0.90	0.37	Yes
AMRE	NS	0.74	0.81	0.44	Yes
AMRE	PEI	0.61	0.52	-0.78	No
AMRE	Maritimes Overall	0.77	0.82	0.34	Yes
AMRO	NB	0.95	0.98	0.13	Yes
AMRO	NS	0.92	0.98	0.27	Yes
AMRO	PEI	0.84	0.77	-0.46	No
AMRO	Maritimes Overall	0.93	0.97	0.18	Yes
AMWI	NB	0.30	0.36	1.01	No
AMWI	NS	0.11	0.42	6.73	Yes
AMWI	PEI	0.31	0.31	-0.08	No
AMWI	Maritimes Overall	0.24	0.37	2.15	Yes
AMWO	NB	0.40	0.34	-0.86	Yes
AMWO	NS	0.25	0.36	1.90	Yes
AMWO	PEI	0.23	0.30	1.44	No
AMWO	Maritimes Overall	0.31	0.35	0.53	No
ARTE	NB	0.31	0.12	-4.71	No
ARTE	NS	0.49	0.21	-4.06	Yes
ARTE	PEI	0.35	0.42	0.88	No
ARTE	Maritimes Overall	0.43	0.20	-3.83	Yes
ATTW	NB	0.42	0.13	-5.91	Yes
ATTW	NS	0.36	0.06	-8.17	Yes
ATTW	PEI	0.05	0.00	-12.50	No
ATTW	Maritimes Overall	0.33	0.12	-4.82	Yes
BAEA	NB	0.12	0.53	7.83	Yes
BAEA	NS	0.19	0.50	4.87	Yes
BAEA	PEI	0.09	0.54	9.52	Yes
BAEA	Maritimes Overall	0.15	0.51	6.43	Yes
BANS	NB	0.69	0.14	-7.52	Yes
BANS	NS	0.61	0.15	-6.69	Yes
BANS	PEI	0.56	0.34	-2.45	Yes
BANS	Maritimes Overall	0.64	0.16	-6.55	Yes
BAOR	NB	0.52	0.14	-6.47	Yes
BAOR	NS	0.25	0.15	-2.50	Yes
BAOR	PEI	0.24	0.08	-5.54	No
BAOR	Maritimes Overall	0.40	0.14	-5.12	Yes
BARS	NB	0.89	0.32	-5.00	Yes
BARS	NS	0.82	0.45	-3.01	Yes
BARS	PEI	0.75	0.24	-5.49	Yes
BARS	Maritimes Overall	0.84	0.37	-4.06	Yes

BAWW	NB	0.57	0.68	0.93	Yes
BAWW	NS	0.68	0.79	0.76	Yes
BAWW	PEI	0.35	0.50	1.76	Yes
BAWW	Maritimes Overall	0.59	0.72	0.99	Yes
BBCU	NB	0.26	0.18	-1.83	Yes
BBCU	NS	0.10	0.32	6.04	Yes
BBCU	PEI	0.14	0.32	4.08	Yes
BBCU	Maritimes Overall	0.19	0.23	1.00	No
BBWA	NB	0.46	0.44	-0.23	No
BBWA	NS	0.38	0.28	-1.47	Yes
BBWA	PEI	0.29	0.07	-7.12	Yes
BBWA	Maritimes Overall	0.42	0.33	-1.11	Yes
BBWO	NB	0.42	0.18	-4.25	Yes
BBWO	NS	0.24	0.22	-0.47	No
BBWO	PEI	0.31	0.07	-7.06	Yes
BBWO	Maritimes Overall	0.32	0.20	-2.44	Yes
BCCH	NB	0.79	0.94	0.92	Yes
BCCH	NS	0.79	0.96	0.99	Yes
BCCH	PEI	0.71	0.75	0.22	No
BCCH	Maritimes Overall	0.78	0.94	0.92	Yes
BDOW	NB	0.18	0.39	4.01	Yes
BDOW	NS	0.25	0.43	2.67	Yes
BDOW	PEI	0.13	0.38	5.39	Yes
BDOW	Maritimes Overall	0.21	0.41	3.49	Yes
BEKI	NB	0.59	0.62	0.28	No
BEKI	NS	0.46	0.60	1.38	Yes
BEKI	PEI	0.71	0.66	-0.35	No
BEKI	Maritimes Overall	0.53	0.61	0.69	Yes
BHCO	NB	0.71	0.09	-9.76	Yes
BHCO	NS	0.54	0.09	-8.85	Yes
BHCO	PEI	0.52	0.12	-7.04	Yes
BHCO	Maritimes Overall	0.62	0.09	-9.07	Yes
BHVI	NB	0.46	0.85	3.13	Yes
BHVI	NS	0.43	0.84	3.43	Yes
BHVI	PEI	0.12	0.61	8.36	Yes
BHVI	Maritimes Overall	0.41	0.82	3.60	Yes
BLBW	NB	0.52	0.49	-0.24	No
BLBW	NS	0.43	0.50	0.70	Yes
BLBW	PEI	0.21	0.47	4.14	Yes
BLBW	Maritimes Overall	0.45	0.49	0.51	Yes
BLGU	NB	0.58	0.41	-1.68	No

BLGU	NS	0.30	0.40	1.44	No
BLGU	PEI	0.18	0.39	3.86	No
BLGU	Maritimes Overall	0.31	0.40	1.22	No
BLJA	NB	0.71	0.81	0.70	Yes
BLJA	NS	0.69	0.82	0.86	Yes
BLJA	PEI	0.68	0.73	0.38	No
BLJA	Maritimes Overall	0.70	0.81	0.74	Yes
BLPW	NB	0.38	0.27	-1.72	Yes
BLPW	NS	0.28	0.27	-0.26	No
BLPW	PEI	0.09	0.22	4.34	No
BLPW	Maritimes Overall	0.31	0.27	-0.72	No
BOBO	NB	0.79	0.32	-4.41	Yes
BOBO	NS	0.75	0.25	-5.39	Yes
BOBO	PEI	0.77	0.33	-4.22	Yes
BOBO	Maritimes Overall	0.77	0.29	-4.83	Yes
BOCH	NB	0.43	0.41	-0.33	No
BOCH	NS	0.50	0.40	-1.18	Yes
BOCH	PEI	0.34	0.37	0.34	No
BOCH	Maritimes Overall	0.45	0.40	-0.66	Yes
BOOW	NB	0.17	0.18	0.32	No
BOOW	NS	0.22	0.26	0.77	No
BOOW	PEI	0.02	0.51	16.39	Yes
BOOW	Maritimes Overall	0.11	0.28	4.57	Yes
BRCR	NB	0.25	0.35	1.59	Yes
BRCR	NS	0.19	0.37	3.42	Yes
BRCR	PEI	0.11	0.30	5.02	Yes
BRCR	Maritimes Overall	0.21	0.36	2.59	Yes
BTBW	NB	0.21	0.69	6.22	Yes
BTBW	NS	0.23	0.38	2.51	Yes
BTBW	PEI	0.16	0.26	2.27	No
BTBW	Maritimes Overall	0.21	0.51	4.48	Yes
BTNW	NB	0.54	0.70	1.27	Yes
BTNW	NS	0.49	0.79	2.37	Yes
BTNW	PEI	0.27	0.67	4.61	Yes
BTNW	Maritimes Overall	0.49	0.74	2.11	Yes
BWHA	NB	0.33	0.41	1.18	Yes
BWHA	NS	0.19	0.31	2.35	Yes
BWHA	PEI	0.16	0.16	0.02	No
BWHA	Maritimes Overall	0.26	0.36	1.59	Yes
BWTE	NB	0.43	0.17	-4.54	Yes
BWTE	NS	0.31	0.24	-1.37	No

BWTE	PEI	0.61	0.29	-3.74	Yes
BWTE	Maritimes Overall	0.41	0.22	-3.20	Yes
CAGO	NB	0.04	0.57	14.21	Yes
CAGO	NS	0.05	0.47	11.93	Yes
CAGO	PEI	0.17	0.52	5.74	Yes
CAGO	Maritimes Overall	0.06	0.51	11.66	Yes
CAWA	NB	0.59	0.31	-3.15	Yes
CAWA	NS	0.41	0.24	-2.70	Yes
CAWA	PEI	0.25	0.16	-2.17	No
CAWA	Maritimes Overall	0.47	0.27	-2.86	Yes
CEDW	NB	0.81	0.87	0.34	Yes
CEDW	NS	0.52	0.73	1.71	Yes
CEDW	PEI	0.54	0.76	1.75	Yes
CEDW	Maritimes Overall	0.64	0.79	1.08	Yes
CHSP	NB	0.82	0.56	-1.88	Yes
CHSP	NS	0.52	0.36	-1.90	Yes
CHSP	PEI	0.63	0.47	-1.42	Yes
CHSP	Maritimes Overall	0.66	0.45	-1.93	Yes
CLSW	NB	0.63	0.18	-6.02	Yes
CLSW	NS	0.45	0.16	-4.94	Yes
CLSW	PEI	0.15	0.05	-5.24	No
CLSW	Maritimes Overall	0.54	0.17	-5.56	Yes
CMWA	NB	0.36	0.23	-2.10	Yes
CMWA	NS	0.30	0.18	-2.66	Yes
CMWA	PEI	0.28	0.20	-1.66	No
CMWA	Maritimes Overall	0.33	0.21	-2.20	Yes
COGR	NB	0.80	0.74	-0.39	No
COGR	NS	0.66	0.79	0.87	Yes
COGR	PEI	0.77	0.70	-0.47	No
COGR	Maritimes Overall	0.73	0.76	0.17	No
COLO	NB	0.41	0.44	0.40	No
COLO	NS	0.44	0.55	1.10	Yes
COLO	PEI	0.06	0.23	7.01	No
COLO	Maritimes Overall	0.42	0.50	0.86	Yes
COME	NB	0.41	0.33	-1.10	Yes
COME	NS	0.27	0.38	1.76	Yes
COME	PEI	0.08	0.36	7.74	No
COME	Maritimes Overall	0.33	0.36	0.42	No
CONI	NB	0.48	0.29	-2.46	Yes
CONI	NS	0.41	0.32	-1.28	Yes
CONI	PEI	0.25	0.08	-5.64	Yes

CONI	Maritimes Overall	0.43	0.30	-1.83	Yes
CORA	NB	0.80	0.77	-0.17	No
CORA	NS	0.68	0.79	0.75	Yes
CORA	PEI	0.56	0.59	0.26	No
CORA	Maritimes Overall	0.72	0.77	0.30	Yes
COTE	NB	0.38	0.27	-1.70	No
COTE	NS	0.37	0.37	-0.05	No
COTE	PEI	0.29	0.40	1.64	No
COTE	Maritimes Overall	0.36	0.34	-0.38	No
COYE	NB	0.76	0.95	1.13	Yes
COYE	NS	0.75	0.91	1.01	Yes
COYE	PEI	0.69	0.70	0.06	No
COYE	Maritimes Overall	0.75	0.92	1.02	Yes
CSWA	NB	0.44	0.76	2.78	Yes
CSWA	NS	0.39	0.57	1.91	Yes
CSWA	PEI	0.15	0.38	4.61	Yes
CSWA	Maritimes Overall	0.38	0.63	2.52	Yes
DCCO	NB	0.23	0.37	2.30	Yes
DCCO	NS	0.33	0.35	0.36	No
DCCO	PEI	0.13	0.35	4.98	Yes
DCCO	Maritimes Overall	0.28	0.35	1.17	Yes
DEJU	NB	0.66	0.75	0.64	Yes
DEJU	NS	0.78	0.91	0.74	Yes
DEJU	PEI	0.47	0.70	2.06	Yes
DEJU	Maritimes Overall	0.69	0.82	0.82	Yes
DOWO	NB	0.52	0.60	0.71	Yes
DOWO	NS	0.48	0.63	1.34	Yes
DOWO	PEI	0.35	0.39	0.60	No
DOWO	Maritimes Overall	0.49	0.59	0.99	Yes
EABL	NB	0.15	0.32	3.95	Yes
EABL	NS	0.10	0.25	4.46	Yes
EABL	PEI	1.00	0.11	-10.28	No
EABL	Maritimes Overall	0.14	0.30	3.84	Yes
EAKI	NB	0.63	0.25	-4.44	Yes
EAKI	NS	0.40	0.21	-3.20	Yes
EAKI	PEI	0.63	0.16	-6.70	Yes
EAKI	Maritimes Overall	0.53	0.22	-4.23	Yes
EAPH	NB	0.23	0.48	3.71	Yes
EAPH	NS	0.11	0.35	5.80	Yes
EAPH	PEI	0.18	0.07	-4.31	No
EAPH	Maritimes Overall	0.19	0.41	4.02	Yes

EASO	NB	0.12	0.27	4.36	No
EASO	NS	0.98	0.00	-83.49	No
EASO	PEI	0.03	0.31	11.90	Yes
EASO	Maritimes Overall	0.07	0.25	6.34	Yes
EAWP	NB	0.52	0.37	-1.61	Yes
EAWP	NS	0.48	0.44	-0.46	No
EAWP	PEI	0.47	0.42	-0.56	No
EAWP	Maritimes Overall	0.50	0.40	-1.02	Yes
EUST	NB	0.84	0.63	-1.45	Yes
EUST	NS	0.70	0.69	-0.09	No
EUST	PEI	0.71	0.76	0.35	No
EUST	Maritimes Overall	0.76	0.67	-0.61	Yes
EVGR	NB	0.73	0.16	-7.31	Yes
EVGR	NS	0.40	0.32	-1.15	Yes
EVGR	PEI	0.35	0.11	-5.69	Yes
EVGR	Maritimes Overall	0.54	0.22	-4.36	Yes
FOSP	NB	0.50	0.42	-0.93	No
FOSP	NS	0.29	0.33	0.77	No
FOSP	PEI	0.19	0.00	-82.10	No
FOSP	Maritimes Overall	0.36	0.36	0.00	No
GADW	NB	0.08	0.35	8.01	Yes
GADW	NS	0.02	0.48	17.28	Yes
GADW	PEI	0.06	0.36	8.99	Yes
GADW	Maritimes Overall	0.06	0.39	9.81	Yes
GBBG	NB	0.38	0.33	-0.65	No
GBBG	NS	0.52	0.30	-2.70	Yes
GBBG	PEI	0.23	0.29	1.16	No
GBBG	Maritimes Overall	0.47	0.31	-2.06	Yes
GBHE	NB	0.30	0.29	-0.16	No
GBHE	NS	0.38	0.24	-2.26	Yes
GBHE	PEI	0.07	0.43	9.45	Yes
GBHE	Maritimes Overall	0.31	0.27	-0.75	Yes
GCFL	NB	0.38	0.19	-3.47	Yes
GCFL	NS	0.18	0.15	-1.06	No
GCFL	PEI	0.00	0.22	462.54	No
GCFL	Maritimes Overall	0.32	0.17	-3.00	Yes
GCKI	NB	0.41	0.69	2.66	Yes
GCKI	NS	0.44	0.60	1.60	Yes
GCKI	PEI	0.25	0.50	3.43	Yes
GCKI	Maritimes Overall	0.40	0.63	2.24	Yes

GHOW	NB	0.25	0.25	-0.03	No
GHOW	NS	0.31	0.26	-0.78	No
GHOW	PEI	0.26	0.17	-2.22	No
GHOW	Maritimes Overall	0.28	0.25	-0.52	No
GRAJ	NB	0.49	0.43	-0.62	No
GRAJ	NS	0.51	0.32	-2.26	Yes
GRAJ	PEI	0.34	0.18	-3.01	No
GRAJ	Maritimes Overall	0.49	0.36	-1.54	Yes
GRCA	NB	0.59	0.45	-1.35	Yes
GRCA	NS	0.49	0.34	-1.87	Yes
GRCA	PEI	0.19	0.21	0.59	No
GRCA	Maritimes Overall	0.50	0.37	-1.53	Yes
GRCO	NB	0.10	0.14	1.81	No
GRCO	NS	0.62	0.21	-5.15	Yes
GRCO	PEI	0.25	0.29	0.71	No
GRCO	Maritimes Overall	0.48	0.23	-3.59	Yes
GRHE	NB	0.20	0.15	-1.25	No
GRHE	NS	0.28	0.09	-5.49	No
GRHE	PEI	0.09	0.00	-20.56	No
GRHE	Maritimes Overall	0.18	0.14	-1.34	No
GRSC	NB	0.12	0.24	3.24	No
GRSC	NS	0.17	0.13	-1.24	No
GRSC	PEI	0.06	0.14	4.44	No
GRSC	Maritimes Overall	0.12	0.19	2.14	No
GWTE	NB	0.30	0.26	-0.73	No
GWTE	NS	0.25	0.31	1.03	No
GWTE	PEI	0.46	0.58	1.16	No
GWTE	Maritimes Overall	0.29	0.31	0.26	No
HAWO	NB	0.47	0.72	2.15	Yes
HAWO	NS	0.45	0.68	2.03	Yes
HAWO	PEI	0.39	0.44	0.65	No
HAWO	Maritimes Overall	0.46	0.67	1.96	Yes
HERG	NB	0.35	0.37	0.23	No
HERG	NS	0.42	0.32	-1.36	Yes
HERG	PEI	0.11	0.34	5.77	Yes
HERG	Maritimes Overall	0.38	0.33	-0.67	No
HETH	NB	0.59	0.90	2.13	Yes
HETH	NS	0.63	0.89	1.77	Yes
HETH	PEI	0.28	0.49	2.86	Yes
HETH	Maritimes Overall	0.57	0.85	2.06	Yes
HOFI	NB	0.14	0.21	1.83	No

HOFI	NS	0.16	0.14	-0.76	No
HOFI	PEI	0.08	0.10	0.67	No
HOFI	Maritimes Overall	0.15	0.17	0.64	No
HOLA	NB	0.41	0.11	-6.46	Yes
HOLA	NS	0.09	0.13	2.06	No
HOLA	PEI	0.18	0.03	-8.13	No
HOLA	Maritimes Overall	0.34	0.10	-5.76	Yes
HOME	NB	0.20	0.34	2.73	Yes
HOME	NS	0.11	0.35	5.78	Yes
HOME	PEI	0.00	0.00	0.00	No
HOME	Maritimes Overall	0.15	0.34	4.11	Yes
HOSP	NB	0.68	0.11	-8.58	Yes
HOSP	NS	0.72	0.17	-7.05	Yes
HOSP	PEI	0.64	0.18	-6.02	Yes
HOSP	Maritimes Overall	0.70	0.15	-7.43	Yes
KILL	NB	0.80	0.23	-5.94	Yes
KILL	NS	0.55	0.24	-4.04	Yes
KILL	PEI	0.60	0.17	-6.13	Yes
KILL	Maritimes Overall	0.66	0.23	-5.11	Yes
LEFL	NB	0.54	0.67	1.11	Yes
LEFL	NS	0.34	0.58	2.71	Yes
LEFL	PEI	0.32	0.28	-0.71	No
LEFL	Maritimes Overall	0.42	0.59	1.63	Yes
LEOW	NB	0.21	0.19	-0.43	No
LEOW	NS	0.14	0.20	1.80	No
LEOW	PEI	0.06	0.26	7.80	Yes
LEOW	Maritimes Overall	0.15	0.20	1.64	No
LISP	NB	0.49	0.34	-1.85	Yes
LISP	NS	0.33	0.38	0.71	No
LISP	PEI	0.21	0.21	0.09	No
LISP	Maritimes Overall	0.39	0.34	-0.63	Yes
MALL	NB	0.19	0.51	5.13	Yes
MALL	NS	0.13	0.47	6.47	Yes
MALL	PEI	0.15	0.45	5.71	Yes
MALL	Maritimes Overall	0.16	0.48	5.66	Yes
MAWA	NB	0.63	0.91	1.84	Yes
MAWA	NS	0.60	0.84	1.68	Yes
MAWA	PEI	0.37	0.57	2.18	Yes
MAWA	Maritimes Overall	0.59	0.85	1.83	Yes
MERL	NB	0.13	0.47	6.78	Yes
MERL	NS	0.16	0.36	4.27	Yes

MERL	PEI	0.13	0.34	4.69	Yes
MERL	Maritimes Overall	0.14	0.40	5.31	Yes
MODO	NB	0.35	0.76	3.95	Yes
MODO	NS	0.17	0.78	8.05	Yes
MODO	PEI	0.13	0.67	8.62	Yes
MODO	Maritimes Overall	0.23	0.77	6.15	Yes
MOWA	NB	0.41	0.34	-0.97	Yes
MOWA	NS	0.36	0.35	-0.02	No
MOWA	PEI	0.33	0.38	0.71	No
MOWA	Maritimes Overall	0.38	0.35	-0.49	No
NAWA	NB	0.51	0.79	2.17	Yes
NAWA	NS	0.32	0.51	2.40	Yes
NAWA	PEI	0.20	0.38	3.29	Yes
NAWA	Maritimes Overall	0.39	0.61	2.26	Yes
NOFL	NB	0.84	0.87	0.20	No
NOFL	NS	0.73	0.85	0.76	Yes
NOFL	PEI	0.70	0.74	0.29	No
NOFL	Maritimes Overall	0.78	0.85	0.47	Yes
NOGO	NB	0.24	0.23	-0.35	No
NOGO	NS	0.19	0.23	0.95	No
NOGO	PEI	0.16	0.22	1.49	No
NOGO	Maritimes Overall	0.21	0.22	0.36	No
NOHA	NB	0.46	0.29	-2.21	Yes
NOHA	NS	0.49	0.31	-2.19	Yes
NOHA	PEI	0.48	0.46	-0.30	No
NOHA	Maritimes Overall	0.48	0.32	-2.02	Yes
NOMO	NB	0.29	0.15	-3.43	Yes
NOMO	NS	0.28	0.08	-6.08	Yes
NOMO	PEI	0.07	0.16	3.96	No
NOMO	Maritimes Overall	0.26	0.12	-3.65	Yes
NOPA	NB	0.56	0.90	2.35	Yes
NOPA	NS	0.51	0.80	2.21	Yes
NOPA	PEI	0.41	0.64	2.21	Yes
NOPA	Maritimes Overall	0.53	0.83	2.31	Yes
NOPI	NB	0.32	0.19	-2.49	Yes
NOPI	NS	0.23	0.11	-3.83	No
NOPI	PEI	0.40	0.12	-5.77	Yes
NOPI	Maritimes Overall	0.31	0.16	-3.24	Yes
NOWA	NB	0.50	0.44	-0.63	No
NOWA	NS	0.30	0.30	-0.04	No
NOWA	PEI	0.07	0.25	6.40	Yes

NOWA	Maritimes Overall	0.39	0.36	-0.32	No
NSHO	NB	0.11	0.31	5.16	Yes
NSHO	NS	0.16	0.25	2.44	No
NSHO	PEI	0.13	0.17	1.45	No
NSHO	Maritimes Overall	0.12	0.26	3.81	Yes
NSTS	NB	0.38	0.32	-0.93	No
NSTS	NS	0.31	0.31	-0.03	No
NSTS	PEI	0.13	0.42	6.09	Yes
NSTS	Maritimes Overall	0.28	0.33	0.85	No
NSWO	NB	0.12	0.34	5.13	Yes
NSWO	NS	0.13	0.32	4.75	Yes
NSWO	PEI	0.10	0.40	7.36	Yes
NSWO	Maritimes Overall	0.12	0.34	5.33	Yes
OSFL	NB	0.49	0.31	-2.23	Yes
OSFL	NS	0.32	0.38	0.86	Yes
OSFL	PEI	0.30	0.23	-1.42	No
OSFL	Maritimes Overall	0.39	0.34	-0.71	Yes
OSPR	NB	0.48	0.37	-1.22	Yes
OSPR	NS	0.39	0.41	0.23	No
OSPR	PEI	0.40	0.38	-0.21	No
OSPR	Maritimes Overall	0.43	0.39	-0.46	No
OVEN	NB	0.70	0.82	0.81	Yes
OVEN	NS	0.52	0.73	1.76	Yes
OVEN	PEI	0.42	0.56	1.43	No
OVEN	Maritimes Overall	0.58	0.76	1.31	Yes
PAWA	NB	0.15	0.58	6.80	Yes
PAWA	NS	0.30	0.57	3.29	Yes
PAWA	PEI	0.12	0.31	4.86	Yes
PAWA	Maritimes Overall	0.22	0.56	4.70	Yes
PBGR	NB	0.17	0.38	3.99	Yes
PBGR	NS	0.19	0.27	1.82	Yes
PBGR	PEI	0.30	0.27	-0.44	No
PBGR	Maritimes Overall	0.20	0.30	1.88	Yes
PHVI	NB	0.22	0.49	4.13	Yes
PHVI	NS	0.16	0.19	0.88	No
PHVI	PEI	0.07	0.27	6.83	Yes
PHVI	Maritimes Overall	0.20	0.42	3.82	Yes
PIPL	NB	0.39	0.35	-0.61	No
PIPL	NS	0.31	0.35	0.61	No
PIPL	PEI	0.24	0.49	3.61	Yes
PIPL	Maritimes Overall	0.29	0.39	1.49	No

PISI	NB	0.53	0.23	-4.01	Yes
PISI	NS	0.45	0.30	-1.90	Yes
PISI	PEI	0.12	0.13	0.44	No
PISI	Maritimes Overall	0.45	0.26	-2.65	Yes
PIWO	NB	0.30	0.52	2.76	Yes
PIWO	NS	0.32	0.49	2.16	Yes
PIWO	PEI	0.10	0.26	4.71	No
PIWO	Maritimes Overall	0.30	0.50	2.50	Yes
PUFI	NB	0.74	0.78	0.30	No
PUFI	NS	0.56	0.75	1.46	Yes
PUFI	PEI	0.36	0.57	2.31	Yes
PUFI	Maritimes Overall	0.61	0.75	0.99	Yes
RBGR	NB	0.74	0.31	-4.16	Yes
RBGR	NS	0.47	0.23	-3.52	Yes
RBGR	PEI	0.63	0.32	-3.43	Yes
RBGR	Maritimes Overall	0.61	0.28	-3.85	Yes
RBGU	NB	0.18	0.26	1.84	No
RBGU	NS	0.19	0.08	-4.32	No
RBGU	PEI	0.08	0.30	7.11	No
RBGU	Maritimes Overall	0.18	0.22	1.08	No
RBME	NB	0.30	0.24	-1.15	No
RBME	NS	0.16	0.34	3.81	Yes
RBME	PEI	0.32	0.13	-4.42	Yes
RBME	Maritimes Overall	0.23	0.27	0.83	No
RBNU	NB	0.56	0.80	1.82	Yes
RBNU	NS	0.54	0.63	0.80	Yes
RBNU	PEI	0.35	0.68	3.32	Yes
RBNU	Maritimes Overall	0.53	0.70	1.44	Yes
RCKI	NB	0.58	0.59	0.09	No
RCKI	NS	0.57	0.63	0.45	No
RCKI	PEI	0.45	0.37	-0.89	No
RCKI	Maritimes Overall	0.56	0.58	0.19	No
RECR	NB	0.16	0.25	2.10	Yes
RECR	NS	0.22	0.20	-0.62	No
RECR	PEI	0.21	0.14	-1.96	No
RECR	Maritimes Overall	0.20	0.21	0.21	No
REVI	NB	0.65	0.92	1.74	Yes
REVI	NS	0.57	0.87	2.12	Yes
REVI	PEI	0.55	0.69	1.20	No
REVI	Maritimes Overall	0.60	0.88	1.90	Yes

RIPH	NB	0.20	0.37	3.21	Yes
RIPH	NS	0.27	0.47	2.86	Yes
RIPH	PEI	0.30	0.10	-5.56	Yes
RIPH	Maritimes Overall	0.25	0.39	2.28	Yes
RNDU	NB	0.30	0.37	1.01	No
RNDU	NS	0.27	0.42	2.35	Yes
RNDU	PEI	0.33	0.37	0.57	No
RNDU	Maritimes Overall	0.29	0.40	1.61	Yes
ROPI	NB	0.46	0.55	0.91	Yes
ROPI	NS	0.38	0.54	1.74	Yes
ROPI	PEI	0.57	0.42	-1.46	No
ROPI	Maritimes Overall	0.43	0.53	1.02	Yes
RTHA	NB	0.30	0.38	1.19	Yes
RTHA	NS	0.38	0.44	0.70	Yes
RTHA	PEI	0.13	0.33	4.61	Yes
RTHA	Maritimes Overall	0.32	0.41	1.17	Yes
RTHU	NB	0.47	0.70	2.08	Yes
RTHU	NS	0.40	0.72	2.95	Yes
RTHU	PEI	0.39	0.56	1.85	Yes
RTHU	Maritimes Overall	0.43	0.70	2.46	Yes
RUBL	NB	0.45	0.19	-4.26	Yes
RUBL	NS	0.47	0.13	-6.23	Yes
RUBL	PEI	0.27	0.09	-5.58	Yes
RUBL	Maritimes Overall	0.44	0.15	-5.31	Yes
RUDU	NB	0.00	0.38	477.46	No
RUDU	NS	0.00	0.30	24.88	No
RUDU	PEI	0.22	0.04	-8.00	No
RUDU	Maritimes Overall	0.05	0.21	7.60	No
RUGR	NB	0.50	0.52	0.22	No
RUGR	NS	0.47	0.59	1.09	Yes
RUGR	PEI	0.45	0.39	-0.70	No
RUGR	Maritimes Overall	0.48	0.54	0.58	Yes
RWBL	NB	0.86	0.40	-3.79	Yes
RWBL	NS	0.62	0.52	-0.84	Yes
RWBL	PEI	0.76	0.65	-0.78	No
RWBL	Maritimes Overall	0.74	0.47	-2.22	Yes
SAVS	NB	0.63	0.53	-0.92	Yes
SAVS	NS	0.51	0.51	0.05	No
SAVS	PEI	0.58	0.70	0.95	No
SAVS	Maritimes Overall	0.56	0.53	-0.30	No
SCTA	NB	0.44	0.21	-3.55	Yes

SCTA	NS	0.25	0.14	-2.97	Yes
SCTA	PEI	0.00	0.27	31.43	No
SCTA	Maritimes Overall	0.37	0.19	-3.12	Yes
SEOW	NB	0.30	0.21	-1.58	No
SEOW	NS	0.17	0.16	-0.05	No
SEOW	PEI	0.21	0.13	-2.42	No
SEOW	Maritimes Overall	0.21	0.18	-0.92	No
SORA	NB	0.23	0.25	0.50	No
SORA	NS	0.22	0.34	2.23	Yes
SORA	PEI	0.23	0.23	0.12	No
SORA	Maritimes Overall	0.22	0.29	1.20	Yes
SOSP	NB	0.75	0.80	0.34	No
SOSP	NS	0.83	0.90	0.41	Yes
SOSP	PEI	0.85	0.77	-0.46	No
SOSP	Maritimes Overall	0.80	0.84	0.29	Yes
SPSA	NB	0.67	0.37	-2.87	Yes
SPSA	NS	0.52	0.43	-0.93	Yes
SPSA	PEI	0.70	0.22	-5.74	Yes
SPSA	Maritimes Overall	0.60	0.39	-2.19	Yes
SSHA	NB	0.29	0.26	-0.55	No
SSHA	NS	0.22	0.25	0.64	No
SSHA	PEI	0.24	0.20	-0.72	No
SSHA	Maritimes Overall	0.25	0.25	-0.13	No
SWSP	NB	0.38	0.56	1.91	Yes
SWSP	NS	0.36	0.63	2.82	Yes
SWSP	PEI	0.33	0.61	3.09	Yes
SWSP	Maritimes Overall	0.37	0.60	2.48	Yes
SWTH	NB	0.64	0.73	0.68	Yes
SWTH	NS	0.44	0.55	1.07	Yes
SWTH	PEI	0.45	0.36	-1.03	No
SWTH	Maritimes Overall	0.53	0.60	0.68	Yes
TEWA	NB	0.64	0.27	-4.18	Yes
TEWA	NS	0.58	0.15	-6.41	Yes
TEWA	PEI	0.34	0.12	-4.93	Yes
TEWA	Maritimes Overall	0.58	0.20	-5.11	Yes
TRES	NB	0.88	0.62	-1.72	Yes
TRES	NS	0.79	0.75	-0.21	No
TRES	PEI	0.64	0.50	-1.25	No
TRES	Maritimes Overall	0.81	0.67	-0.95	Yes
VEER	NB	0.61	0.59	-0.20	No
VEER	NS	0.46	0.31	-1.93	Yes

VEER	PEI	0.23	0.25	0.52	No
VEER	Maritimes Overall	0.52	0.43	-0.94	Yes
VESP	NB	0.32	0.14	-4.03	Yes
VESP	NS	0.25	0.14	-2.85	Yes
VESP	PEI	0.29	0.16	-2.87	No
VESP	Maritimes Overall	0.29	0.14	-3.50	Yes
VIRA	NB	0.19	0.25	1.29	No
VIRA	NS	0.16	0.20	0.89	No
VIRA	PEI	0.12	0.21	2.74	No
VIRA	Maritimes Overall	0.17	0.22	1.32	No
WAVI	NB	0.26	0.22	-0.95	No
WAVI	NS	0.11	0.22	3.73	No
WAVI	PEI	0.00	0.00	0.00	No
WAVI	Maritimes Overall	0.23	0.22	-0.29	No
WBNU	NB	0.19	0.31	2.34	Yes
WBNU	NS	0.21	0.27	1.24	No
WBNU	PEI	0.32	0.03	-11.82	Yes
WBNU	Maritimes Overall	0.21	0.27	1.18	Yes
WIFL	NB	0.12	0.22	3.28	Yes
WIFL	NS	0.02	0.26	14.33	Yes
WIFL	PEI	0.17	0.17	-0.06	No
WIFL	Maritimes Overall	0.09	0.24	5.28	Yes
WILL	NB	0.22	0.37	2.70	Yes
WILL	NS	0.39	0.47	1.05	No
WILL	PEI	0.18	0.55	5.88	Yes
WILL	Maritimes Overall	0.30	0.46	2.21	Yes
WISN	NB	0.46	0.31	-1.97	Yes
WISN	NS	0.47	0.33	-1.75	Yes
WISN	PEI	0.55	0.28	-3.29	Yes
WISN	Maritimes Overall	0.47	0.32	-1.97	Yes
WIWA	NB	0.41	0.26	-2.26	Yes
WIWA	NS	0.27	0.18	-1.96	Yes
WIWA	PEI	0.14	0.13	-0.21	No
WIWA	Maritimes Overall	0.35	0.23	-2.13	Yes
WIWR	NB	0.49	0.66	1.57	Yes
WIWR	NS	0.30	0.53	2.84	Yes
WIWR	PEI	0.18	0.38	3.88	Yes
WIWR	Maritimes Overall	0.37	0.58	2.17	Yes
WODU	NB	0.24	0.35	1.91	Yes
WODU	NS	0.16	0.41	4.97	Yes
WODU	PEI	0.31	0.34	0.41	No

WODU	Maritimes Overall	0.20	0.38	3.19	Yes
WPWI	NB	0.30	0.12	-4.34	Yes
WPWI	NS	0.21	0.09	-3.87	No
WPWI	PEI	0.08	0.11	1.37	No
WPWI	Maritimes Overall	0.26	0.12	-3.82	Yes
WTSP	NB	0.86	0.97	0.59	Yes
WTSP	NS	0.73	0.93	1.24	Yes
WTSP	PEI	0.68	0.65	-0.23	No
WTSP	Maritimes Overall	0.78	0.93	0.86	Yes
WWCR	NB	0.32	0.37	0.61	No
WWCR	NS	0.38	0.20	-3.12	Yes
WWCR	PEI	0.22	0.09	-4.42	Yes
WWCR	Maritimes Overall	0.34	0.26	-1.38	Yes
YBFL	NB	0.43	0.45	0.31	No
YBFL	NS	0.27	0.41	2.14	Yes
YBFL	PEI	0.12	0.28	4.42	Yes
YBFL	Maritimes Overall	0.33	0.42	1.22	Yes
YBSA	NB	0.58	0.65	0.54	Yes
YBSA	NS	0.36	0.42	0.73	No
YBSA	PEI	0.19	0.48	4.65	Yes
YBSA	Maritimes Overall	0.45	0.53	0.86	Yes
YRWA	NB	0.73	0.85	0.75	Yes
YRWA	NS	0.71	0.88	1.03	Yes
YRWA	PEI	0.52	0.67	1.27	No
YRWA	Maritimes Overall	0.70	0.85	0.95	Yes
YWAR	NB	0.65	0.59	-0.43	No
YWAR	NS	0.62	0.68	0.47	No
YWAR	PEI	0.67	0.64	-0.27	No
YWAR	Maritimes Overall	0.64	0.64	0.01	No

Table of four letter American Ornithologists Union (AOU) abbreviations with corresponding full species names for Maritimes breeding birds in alphabetical order.

ABDU American Black Duck	EAME Eastern Meadowlark	PBGR Pied-billed Grebe
ALFL Alder Flycatcher	EAPH Eastern Phoebe	PEFA Peregrine Falcon
AMBI American Bittern	EASO Eastern Screech-Owl	PHVI Philadelphia Vireo
AMCO American Coot	EATO Eastern Towhee	PIGR Pine Grosbeak
AMCR American Crow	EAWP Eastern Wood-Pewee	PIPL Piping Plover
AMGO American Goldfinch	ECDO Eurasian Collared-Dove	PISI Pine Siskin
AMKE American Kestrel	EUST European Starling	PIWA Pine Warbler
AMOY American Oystercatcher	EUWI Eurasian Wigeon	PIWO Pileated Woodpecker

AMPI	American Pipit	EVGR	Evening Grosbeak	PUFI	Purple Finch
AMRE	American Redstart	FISP	Field Sparrow	PUGA	Purple Gallinule
AMRO	American Robin	FOSP	Fox Sparrow	PUMA	Purple Martin
AMWI	American Wigeon	GADW	Gadwall	RAZO	Razorbill
AMWO	American Woodcock	GBBG	Great Black-backed Gull	RBGR	Rose-breasted Grosbeak
ARTE	Arctic Tern	GBHE	Great Blue Heron	RBGU	Ring-billed Gull
ATPU	Atlantic Puffin	GCFL	Great Crested Flycatcher	RBME	Red-breasted Merganser
ATSP	American Tree Sparrow	GCKI	Golden-crowned Kinglet	RBNU	Red-breasted Nuthatch
ATTW	American Three-toed Woodpecker	GCTH	Gray-cheeked Thrush	RBWO	Red-bellied Woodpecker
BAEA	Bald Eagle	GHOW	Great Horned Owl	RCKI	Ruby-crowned Kinglet
BAGO	Barrow's Goldeneye	GLIB	Glossy Ibis	RECR	Red Crossbill
BANS	Bank Swallow	GOEA	Golden Eagle	REDH	Redhead
BAOR	Baltimore Oriole	GRAJ	Gray Jay	REVI	Red-eyed Vireo
BARS	Barn Swallow	GRCA	Gray Catbird	RHWO	Red-headed Woodpecker
BAWW	Black-and-white Warbler	GRCO	Great Cormorant	RIPH	Ring-necked Pheasant
BBCU	Black-billed Cuckoo	GRHE	Green Heron	RLHA	Rough-legged Hawk
BBWA	Bay-breasted Warbler	GRPA	Gray Partridge	RNDU	Ring-necked Duck
BBWO	Black-backed Woodpecker	GRSC	Greater Scaup	ROPI	Rock Pigeon
BCCH	Black-capped Chickadee	GRYE	Greater Yellowlegs	ROST	Roseate Tern
BCNH	Black-crowned Night-Heron	GWTE	Green-winged Teal	RSHA	Red-shouldered Hawk
BDOW	Barred Owl	HARD	Harlequin Duck	RTHA	Red-tailed Hawk
BEKI	Belted Kingfisher	HAWO	Hairy Woodpecker	RTHU	Ruby-throated Hummingbird
BGGN	Blue-gray Gnatcatcher	HELG	Helmeted Guineafowl	RUBL	Rusty Blackbird
BHCO	Brown-headed Cowbird	HERG	Herring Gull	RUDU	Ruddy Duck
BHGU	Black-headed Gull	HETH	Hermit Thrush	RUGR	Ruffed Grouse
BHVI	Blue-headed Vireo	HOFI	House Finch	RWBL	Red-winged Blackbird
BITH	Bicknell's Thrush	HOLA	Horned Lark	SACR	Sandhill Crane
BLBW	Blackburnian Warbler	HOME	Hooded Merganser	SAVS	Savannah Sparrow
BLGU	Black Guillemot	HOSP	House Sparrow	SCTA	Scarlet Tanager
BLJA	Blue Jay	HOWA	Hooded Warbler	SEOW	Short-eared Owl
BLKI	Black-legged Kittiwake	HOWR	House Wren	SEPL	Semipalmated Plover
BLPW	Blackpoll Warbler	INBU	Indigo Bunting	SESA	Semipalmated Sandpiper
BLSC	Black Scoter	IPSP	Ipswich Sparrow	SEWR	Sedge Wren
BLTE	Black Tern	KILL	Killdeer	SNEG	Snowy Egret
BOBO	Bobolink	KIRA	King Rail	SORA	Sora
BOCH	Boreal Chickadee	LAGU	Laughing Gull	SOSA	Solitary Sandpiper
BOGU	Bonaparte's Gull	LALO	Lapland Longspur	SOSP	Song Sparrow
BOOW	Boreal Owl	LCSP	Le Conte's Sparrow	SPGR	Spruce Grouse
BOWA	Bohemian Waxwing	LEBI	Least Bittern	SPSA	Spotted Sandpiper
BRCR	Brown Creeper	LEFL	Least Flycatcher	SSHA	Sharp-shinned Hawk
BRTH	Brown Thrasher	LEOW	Long-eared Owl	STGR	Sharp-tailed Grouse
BTBW	Black-throated Blue Warbler	LESA	Least Sandpiper	SUTA	Summer Tanager
BTNW	Black-throated Green Warbler	LESC	Lesser Scaup	SWSP	Swamp Sparrow
BWHA	Broad-winged Hawk	LEYE	Lesser Yellowlegs	SWTH	Swainson's Thrush
BWTE	Blue-winged Teal	LHSP	Leach's Storm-Petrel	TBMU	Thick-billed Murre
		LISP	Lincoln's Sparrow	TEWA	Tennessee Warbler

BWWA	Blue-winged Warbler	LOSH	Loggerhead Shrike	TRES	Tree Swallow
CAEG	Cattle Egret	LOWA	Louisiana Waterthrush	TUTI	Tufted Titmouse
CAGO	Canada Goose	MALL	Mallard	TUVU	Turkey Vulture
CARW	Carolina Wren	MASH	Manx Shearwater	UPSA	Upland Sandpiper
CATE	Caspian Tern	MAWA	Magnolia Warbler	VEER	Veery
CAWA	Canada Warbler	MAWR	Marsh Wren	VESP	Vesper Sparrow
CCSP	Clay-colored Sparrow	MBDH	Mallard x Am. Black Duck Hybrid	VIRA	Virginia Rail
CEDW	Cedar Waxwing	MERL	Merlin	WAVI	Warbling Vireo
CHSP	Chipping Sparrow	MODO	Mourning Dove	WBNU	White-breasted Nuthatch
CHSW	Chimney Swift	MOWA	Mourning Warbler	WCSP	White-crowned Sparrow
CHUK	Chukar	NAWA	Nashville Warbler	WIFL	Willow Flycatcher
CLSW	Cliff Swallow	NHOW	Northern Hawk Owl	WILL	Willet
CMWA	Cape May Warbler	NOBO	Northern Bobwhite	WIPH	Wilson's Phalarope
COEI	Common Eider	NOCA	Northern Cardinal	WIPT	Willow Ptarmigan
COGO	Common Goldeneye	NOFL	Northern Flicker	WISN	Wilson's Snipe
COGR	Common Grackle	NOGA	Northern Gannet	WITU	Wild Turkey
COHA	Cooper's Hawk	NOGO	Northern Goshawk	WIWA	Wilson's Warbler
COLO	Common Loon	NOHA	Northern Harrier	WIWR	Winter Wren
COME	Common Merganser	NOMO	Northern Mockingbird	WODU	Wood Duck
COMO	Common Moorhen	NOPA	Northern Parula	WOTH	Wood Thrush
COMU	Common Murre	NOPI	Northern Pintail	WPWI	Whip-poor-will
CONI	Common Nighthawk	NOWA	Northern Waterthrush	WTSP	White-throated Sparrow
CORA	Common Raven	NOWH	Northern Wheatear	WWCR	White-winged Crossbill
CORE	Common Redpoll	NRWS	Northern Rough-winged Swallow	WWDO	White-winged Dove
COTE	Common Tern	NSHO	Northern Shoveler	YBCH	Yellow-breasted Chat
COYE	Common Yellowthroat	NSTS	Nelson's Sparrow	YBCU	Yellow-billed Cuckoo
CSWA	Chestnut-sided Warbler	NSWO	Northern Saw-whet Owl	YBFL	Yellow-bellied Flycatcher
CWWI	Chuck-will's-widow	OROR	Orchard Oriole	YBSA	Yellow-bellied Sapsucker
DCCO	Double-crested Cormorant	OSFL	Olive-sided Flycatcher	YERA	Yellow Rail
DEJU	Dark-eyed Junco	OSPR	Osprey	YHBL	Yellow-headed Blackbird
DICK	Dickcissel	OVEN	Ovenbird	YRWA	Yellow-rumped Warbler
DOWO	Downy Woodpecker	PAWA	Palm Warbler	YTVI	Yellow-throated Vireo
EABL	Eastern Bluebird			YWAR	Yellow Warbler
EAKI	Eastern Kingbird				

Appendix 2. Two articles describing important results from the Maritimes Atlas on the bilingual MBBA website and a PDF of an article that appeared in BirdWatch Canada

Atlas Latest News

20 February 2012 - Sneak Peak at Atlas Data Analyses

Although you don't often hear from the Atlas office these days, we are plugging away at analysing Atlas data in preparation for the upcoming book. One of the more interesting – but time consuming – of the recent analyses we have conducted is the Habitat Association Analysis.

The goal of this extensive analysis was to use information about Maritimes-specific species-habitat characteristics from the data you collected over five years of Atlas field work. We did not want to rely on published habitat descriptions that often refer to distant parts of a species range and that may not describe a species' unique habitat preferences here in the Maritimes. Our objective was to develop a Maritimes-specific product!



In the Maritimes, Blackpoll Warblers are most often associated with sapling balsam fir and black spruce often in industrial forests. Photo: Dan Busby

Here is how we did the analysis: First we compiled a list of every bird detected on a point count. Since each point count location was associated with a unique UTM co-ordinate, we could match the point count georeferences to spatial land cover and forest inventory data provided by the three provincial natural resource departments. By combining these two spatial data sets, we were able to generate a habitat description for each point count location, based on the set of habitat types, or variables, listed in the provincial land cover data.

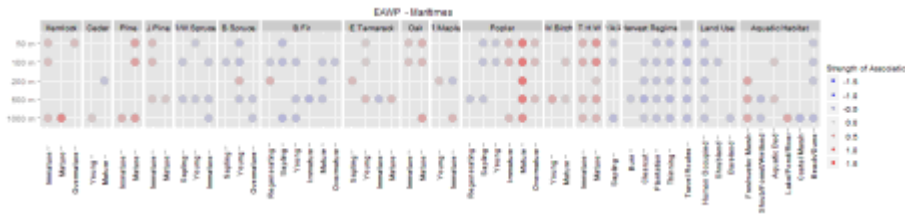


This enabled us to describe each species' habitat association based on the following habitat characteristics: 1) Forest Type (i.e., dominant tree species plus the age of the forest stand); 2) Forest Harvest Regime (e.g., clear cut, plantation, etc.); 3) Human Land Use (e.g., cultivated grassland, cropland, hedgerow, etc.); and, 4) Wetland Type (e.g., bog, fen, freshwater marsh, etc.). Although this sounds complicated, it can be more easily understood by looking at some of the graphs that our Editorial Assistant, Margaret Campbell has generated.

Eastern Wood-Pewees are most often associated with shade tolerant hardwood forests in the Maritimes. Photo: Ally Manthorne

Here is the graph for Eastern Wood-Pewee in the Maritimes (click [here](#) to see the provincial habitat graphs for Eastern Wood-Pewee). Major habitat classes are listed along the top of the graph, with more detailed habitat characteristics within the habitat class along the

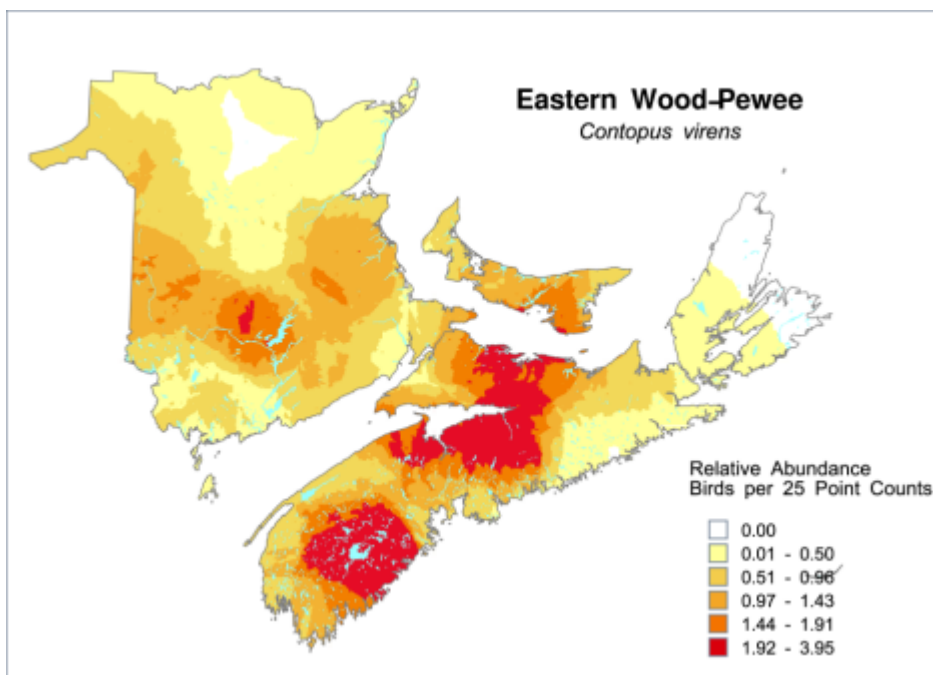
bottom of the graph. Each line in the dot graph represents the habitat association within circular areas, or buffers, of different sizes (50 – 1000m) around each point count location. Red dots indicate that there was a positive association between the species and that habitat type – in other words the species tends to be more frequently detected in that particular habitat. Blue dots indicate that the species-habitat association is negative, or, that the species is less frequently detected in that particular habitat. Darker dots (of either red or blue) indicate that the species-habitat association, or lack thereof, is stronger.



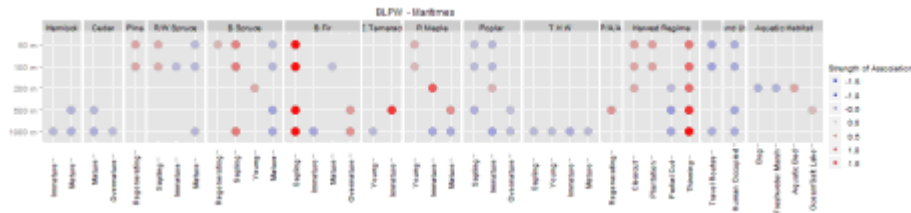
Click on the graph to enlarge the image on your screen

From the Eastern Wood-Pewee habitat graph it can be seen that Eastern Wood-Pewee are most strongly associated with mature shade tolerant hardwood forest, especially with older stands of poplar and pine. It generally avoids young coniferous forests, harvest regimes, human occupied areas and travel routes.

Our Atlas GIS specialist at BSC headquarters, Andrew Couturier, has mapped the relative abundance of breeding bird species across the Maritimes using the point count data. It is interesting to look at the relative abundance map of the Eastern Wood-Pewee in light of its habitat preferences and where they occur in the Maritimes: areas of concentration can be seen in Maritime regions with mature deciduous forest, but also in southern Nova Scotia where there are stands of mature pine. It might seem obvious from your time on the ground Atlassing that Eastern Wood-Pewee like these habitats, and tend to occur in these parts of the Maritimes. It is very useful for conservation planning, however, to have this type of field knowledge corroborated by analyses of Atlas data, and visually displayed in maps and graphs, especially for a species like Eastern Wood-Pewee that has been steadily declining.

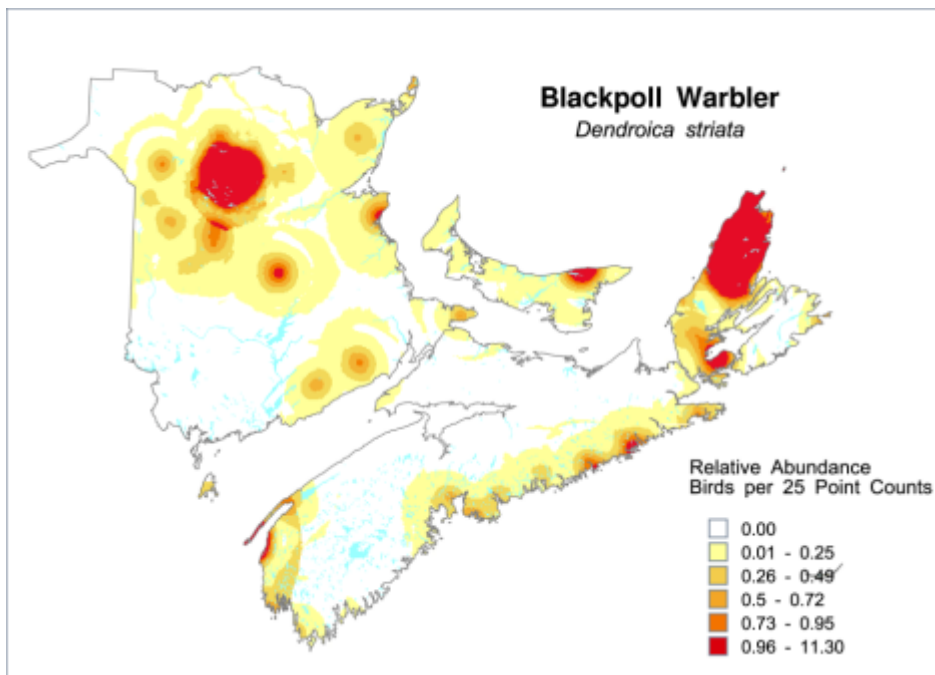


Here is the Blackpoll Warbler habitat graph for the Maritimes: (Click [here](#) to see the provincial habitat graphs). It shows (as you likely know!), that Blackpoll Warblers are strongly associated with sapling balsam fir as well as sapling and young black spruce stands. In addition, Blackpoll Warblers are found in clear cuts and industrial plantations that have undergone pre-harvest thinning.



Click on the graph to enlarge the image on your screen

The abundance map for Blackpoll Warbler nicely illustrates where Blackpoll Warbler typically occur in the Maritimes: at high elevations and in coastal landscapes throughout the region; habitats with a predominance of black spruce and balsam fir forests.



As you can see, we have been quiet but busy at Atlas headquarters over the past while. We have also been analysing and mapping changes in the probability of detection between the first and second Atlases. All of these intriguing maps and graphs will be in the upcoming book: stay tuned for our Maritimes Atlas pre-publication sale sometime this spring! We are excited about the book, and with this glimpse of what's to come, we hope you are too!



Populations of Black-throated Blue Warblers are increasing in the Maritimes. Photo: Dan Busby.

Thanks to 49,000 hours of field work and untold hours of data entry from 1000 volunteers, the results from the second Maritimes Breeding Bird Atlas reveal significant changes in bird populations over the 20 years since the first Atlas (1986-1990). Some of the changes have been disturbing, others encouraging, and several were totally unexpected!

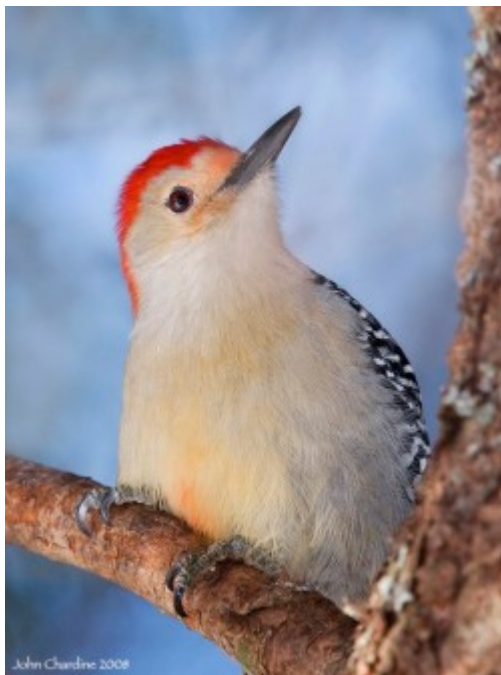
Aerial insectivores like swallows, martins, and swifts are declining across North America, especially in the northeast, possibly due to reduced availability of insect prey. In the first Atlas, breeding evidence for [Cliff Swallow](#) was detected in 594 Atlas squares, but dropped to 365 squares during the second Atlas (click the species name to see the map). Similarly, squares with breeding evidence for [Bank Swallows](#) declined from 792 to 433. The number of squares with breeding [Purple Martins](#) crashed from 82 in the first Atlas to 18 in the second, while squares with [Chimney Swift](#) dropped from 470 to 291. Photo: Purple Martins by Ruth Strohmer



Declines in grassland species like Bobolink, documented throughout North America, were also observed here: Atlas squares with [Bobolink](#) decreased from 785 to 599. Agricultural intensification and earlier and more frequent cutting of hay fields likely contributed to this trend. **Declines in mature hardwood forest species** such as [Wood Thrush](#) (183 squares to 65) were also noted, probably related to the reduction and fragmentation of preferred, mature hardwood habitat. Species like [Tennessee Warbler](#), (934 squares down to 600) and [Evening Grosbeak](#) (842 to 607) whose populations often erupt in response to Spruce Budworm, have also decreased, as forest management efforts now more effectively suppress budworm outbreaks.

On the other hand, several species increased significantly between Atlases. The **unexpected proliferation of some woodland species** may be related to forestry practices in the Maritimes. For example, squares occupied by [Palm Warblers](#) doubled from 214 to 412. Clear-cutting creates expanses of regenerating conifers that may augment this species' preferred habitat of scattered low conifers in damp areas. [Black-throated Blue Warblers](#) were detected in 398 squares in the first Atlas but 943 in the second! Expanding areas of sapling regeneration in forest clearings and edges from forestry activities, coupled with natural regeneration of old fields, may have triggered this increase, similar to what was seen in Ontario.

Photo: Palm Warbler by Ally Manthorne



Some bird species appear to be expanding northward due to the effects of climate change, particularly those at the north-eastern edge of their range here. These include [Turkey Vulture](#) (increased from 7 squares to 130), [Eastern Bluebird](#) (115 to 249), and [Northern Cardinal](#) (18 to 130). New breeding species in the Maritimes also include 'southerners' like [Chuck-wills-widow](#) (breeding evidence in 1 square), [Red-bellied Woodpecker](#) (6 squares), [Carolina Wren](#) (11 squares), and [Yellow-throated Vireo](#) (8 squares).

Photo: Red-bellied Woodpecker by John Chardine

Atlas results also give us good news about species that were once on the brink! Populations of raptors such as the [Peregrine Falcon](#) declined sharply in the 1960s and 70s due to the negative effects of DDT. During the first Atlas, Peregrines were present in only 11 squares, but they were recorded in 43 squares in the second Atlas, with breeding confirmed in 26 squares! The number of squares occupied by four other raptor species also increased markedly: [Bald Eagle](#) (325 first Atlas, 809 second), [Broad-winged Hawk](#) (412 first, 645 second), [Red-tailed Hawk](#) (541 first, 829 second), and [Merlin](#) (233 first, 621 second).

Stay tuned for more intriguing results as the Atlas moves toward publication. In the meantime, detailed species maps are already available on the Atlas web-site, at www.mba-aom.ca.

Maritimes Breeding Bird Atlas

Changes in Maritime Breeding Birds: Clues from an Atlas by Kate Bredin

The soon-to-be-published second Maritimes Breeding Bird Atlas holds a wealth of fascinating information about changes in bird populations in Canada's Maritime provinces, particularly when results from the first Atlas (1986-1990) are compared to the second (2006-2010). Some of the changes have been disturbing, others encouraging, and several were totally unexpected!

Aerial insect foragers like swallows, martins, and swifts are declining continent-wide, especially in northeastern North America, possibly due to reduced availability of insect prey. Among swallow species in the Maritimes, Cliff and Bank show the greatest declines. In the first Atlas, breeding evidence for Cliff Swallow was detected in 594 Atlas squares, but dropped to 365 squares during the second Atlas. Similarly, squares with breeding evidence for Bank Swallows declined from 792 to 433. The number of squares with Purple Martin crashed from 82 in the first Atlas to 18 in the second, while squares with Chimney Swift dropped from 470 to 291.

Declines in grassland species like Bobolink, documented throughout North America, were also observed in the Maritimes, where Atlas squares with breeding evidence decreased from 765 to 599. Agricultural intensification and earlier and more frequent cutting of hay fields may have contributed to this trend. Declines in mature hardwood forest species such as Wood Thrush (183 squares to 65) were also noted, probably related to the reduction and fragmentation of preferred, mature hardwood habitat.

On the other hand, several species increased significantly between Atlases. The remarkable increase in Canada Goose numbers may be having a negative ecological impact in the Maritimes, and on Maritimers. In the first Atlas, Canada Geese were recorded in 61 squares compared to 408 in the second Atlas! Released in New Brunswick in the late 1990s, Canada Geese spread rapidly and now breed along coastal and inland waters throughout the Maritimes, and are currently viewed as being a nuisance in many communities.

Increases in some woodland species may be related to forestry activities.



Black-throated Blue Warbler/Parula Group Photo: Dan Budy

For example, squares occupied by Palm Warblers doubled from 214 to 412 between Atlases. Clear-cutting practices create expanses of regenerating conifers and may augment this species' preferred habitat of scattered low conifers in damp areas. Black-throated Blue Warblers were detected in 398 squares in the first Atlas but 943 in the second. Ontario Atlas results showed a similar increase, which was attributed to expanding areas of sapling regeneration in forest clearings and edges from forestry activities, coupled with natural regeneration of old fields. Similar changes could be driving Black-throated Blue Warbler increases in the Maritimes.

Some bird species may be expanding northward due to the effects of climate change, particularly those at the northeastern edge of their range. These include Turkey Vulture (increasing from 7 squares to 130), Eastern Bluebird (115 to 249), and Northern Cardinal (18 to 130). New breeding species in the Maritimes also include 'southerners' like Chock-wills-widow (breeding evidence in 1 square), Red-bellied Woodpecker (6 squares), Carolina Wren (11 squares), and Yellow-throated Vireo (8 squares).

Atlas results also give us welcome good news about species that were once on the brink. Populations of raptors, such as the Peregrine Falcon, declined sharply in the 1960s and 70s due to the negative effects



Turkey Vulture/Unbeatable Photo: Dan Budy

of DDT. During the first Atlas, Peregrines were present in only 11 squares but were recorded in 43 in the second Atlas, with breeding confirmed in 26! The number of squares occupied by four other raptor species also increased markedly: Bald Eagle (325 first Atlas, 809 second), Broad-winged Hawk (412 first, 645 second), Red-tailed Hawk (541 first, 829 second), and Merlin (233 first, 621 second).

Stay tuned for more intriguing results from 49,000 hours of field work that more than 1000 volunteers logged throughout New Brunswick, Nova Scotia, and Prince Edward Island. The second Maritimes Breeding Bird Atlas will be published in hard-copy format in both English and French in late 2012. In the meantime, detailed species maps are already available on the Atlas web-site, at www.mba-ami.ca.

Appendix 3. Two documents in English and French to assist users of Atlas data in understanding, using and applying bird data and information as downloaded from the Atlas web site.



Using Atlas Data

The purpose of this document is to assist agencies and individuals using Atlas data in interpreting the large geospatial dataset and maps available online at www.naturecounts.ca and www.mba-aom.ca. It outlines briefly the type of information that Atlas data provide, the spatial scale at which that information is provided (which varies by dataset), limitations of the data and suggestions on how to interpret the information. Our hope is that once users better understand the database's enormous potential, as well as its limitations, users will then be able to incorporate and use this data effectively to meet their planning or research needs.

Distribution / Breeding Evidence Data (Distribution maps)

Breeding evidence maps and data provide information at the “square-level”, specifically species presence and the level of breeding evidence obtained for each 10 by 10 km atlas square surveyed. Data and maps are both available online. Distribution maps provide the user with the species' Maritimes distribution pattern and should be interpreted at a broad-scale. They also provide context for interpreting the relevance of a species' presence within a particular area or ecoregion.

Whether using the maps or breeding evidence downloaded by square, please approach the data with the following caveats in mind:

Presence vs. absence - The amount of effort dedicated to surveying each square varied, but, in general, one of every four squares, i.e., Atlas priority squares, received a minimum of 20 hours of survey effort. It is important to note that these data provide *presence* information, but not absence data, (i.e., if a species was not recorded in an Atlas square, this does not necessarily mean that it does not breed there). For those species for which abundance maps are available (see below), distribution patterns should be interpreted using both the distribution and abundance maps, together with information on the species habitat needs and the available habitat in the area of interest.

Breeding evidence - During Atlas data collection, volunteers were encouraged to concentrate on gathering species distribution information per square, rather than obtaining higher levels of breeding evidence. As a result, records for “confirmed” breeding are almost certainly under-represented in the database because Atlassers did not focus on collecting this data. Species records with “possible” or “probable” breeding evidence should therefore not be disregarded. In fact, in applying Atlas results, environmental assessment biologists, policy makers and managers often do not differentiate between “possible”, “probable” and “confirmed” levels of breeding evidence. We recommend that the precautionary principle be applied, by considering all levels of breeding evidence equally in designing management plans or forest harvest regimes, especially for forest species at risk like Canada Warbler and Olive-sided Flycatcher.

Rare species and colonial data

Rare and colonial bird data include records of Maritimes-rare species, regionally-rare species (i.e., designated as rare in specific Atlas regions), COSEWIC-designated species at risk, SARA-listed species at risk and colonial nesting species. All these data records are available online. Once the data have been downloaded, users will need to refine their focal species selection according to their needs. Rare and colonial bird data will provide the user with specific UTM coordinates for rare bird sightings (if available), as well as additional details surrounding the observation including breeding evidence observed, habitat information and distance from the rare species (which may be important for evaluating the value of the UTM coordinates provided).

It should be noted that over the course of Atlas field work, additional species were assessed as “at risk” by COSEWIC and/or became SARA-listed. The list of species requiring rare bird forms during data collection was updated if this occurred. Thus for species like Canada Warbler, Olive-sided Flycatcher, Chimney Swift and Common Nighthawk that were listed in 2007,

additional data as required by the rare species forms (e.g., UTM coordinates) are only available from 2008 onwards. It should also be noted that volunteers were not asked to re-visit locations where rare or at-risk species were sighted, nor was their search for rare species extensive. Volunteers were encouraged to visit all habitat types within a square but not to spend more time in one habitat type (e.g., that might be likely to contain additional species at risk) than in others. Similar to the raw breeding evidence data, rare bird forms provide presence, not absence information. Interpreting species at risk data, particularly for “widespread” species at risk such as Canada Warbler, should be done in concert with distribution and relative abundance maps, as well as with species-habitat associations generated from Atlas data analyses (see below).

Point Count data (relative abundance maps)

Point count data are available online and all species detections are geo-referenced (i.e., at the point level, rather than 10 by 10 km square). Abundance maps are not available online but are available from the Atlas office for conservation planning purposes.

A total of 13,492, 5-minute, unlimited radius point counts were conducted over the five-year Atlas field work period. The majority of point counts were conducted on roads, at randomly selected locations. Off-road counts were also done to ensure that the habitats sampled on point counts were representative of the habitats available. In general at least 10 point counts were conducted in priority (i.e., one of every four) squares to ensure even and adequate coverage across the Maritimes. Detailed summaries of point count effort, including the number of point counts per square, are available on square summary sheets from the Atlas website.

The primary objective of point counts was to facilitate contour mapping of the relative abundance of as many species as possible. In general, the point count methodology better samples landbirds than other species guilds such as waterfowl. However, point count maps are available for many species other than landbirds and the reliability of the abundance map for each species should be considered on a case by case basis. Relative abundance mapping provides a means to compare species abundance across different areas of the Maritimes, highlights areas, or “hot spots”, where individual species are found in relatively high densities, and can be used to prioritize areas for conservation efforts.

Additional Analyses

Staff and committee members completed a number of additional analyses using the Atlas data. The results of the following analyses are not available online, but will be available in the final Atlas publication. Please request the results of these analyses from Atlas staff if required to inform and help direct conservation planning efforts.

Probability of Detection

For each species, we calculated the probability of detection (i.e. the chance of observing a particular species in any given square) for the first and second Atlases, as well as the change in the probability of detection between the two Atlas periods. The probability of detection is correlated with species abundance and population size. Results of these analyses have also been mapped to highlight areas where the probability of detection changed between Atlas periods.

Species-habitat Associations

For georeferenced species records, such as those from point counts and/or for which rare bird forms were submitted, species-habitat associations were calculated at varying spatial scales (territory to landscape level) by combining provincial forest resource inventory databases with bird species locational data. The results of these analyses are plotted in graphs depicting the direction (positive or negative) and strength of association between species and habitat variables for NB, NS, PE and the Maritimes as a whole. These analyses provide Maritimes- and province-specific habitat information for 145 species (i.e., those with sufficient data).



The Maritimes Breeding Bird Atlas is a cooperative project of Bird Studies Canada, Environment Canada, the NB and NS Departments of Natural Resources, PEI Department of Agriculture and Forestry, the NS Bird Society, Nature NB, the PEI Natural History Society and the 1,000 volunteers who gathered the data. Project supporters are listed at www.mba-aom.ca.

Maritimes Breeding Bird Atlas (2006-2010)

www.naturecounts.ca

www.mba-aom.ca

“Read me”

General Instructions

Once you’ve downloaded the raw data from www.naturecounts.ca and/or www.mba-aom.ca you should first follow these general instructions to view the data.

Since the raw data files are often very large, you will download a ZIP archive containing the data you requested. Each ZIP file has a unique name based on the data-set you download and your request number. Once you have extracted the files (by unzipping the ZIP archive) you will find three files:

data_policy.html

This is the Maritimes Breeding Bird Atlas Data Access Policy on how Atlas data can be used, and how results based on Atlas data should be published, cited and acknowledged.

field_names.txt

This is a file that summarizes all data fields (i.e. column headers) in the raw data file. Each data file has 169 data fields but not all fields will contain relevant information. Many will be blank. A PDF file with a full description of field names can be found at: www.birdscanada.org/birdmon/default/resources.jsp

bmde_data.txt

This is the raw data file. The file is a tab delineated text file. You can view the file using either a spreadsheet program (i.e. MS Excel) or a data base program (i.e. MS Access).

Nature Counts Data Sets Relevant Data Columns

All MBBA data sets downloaded from www.naturecounts.ca or www.mba-aom.ca will have the following common fields of information in the data table:

Field_name	Field_number	Description
ScientificName	7	Scientific name of species
Country	25	Canada
StateProvince	26	New Brunswick, Nova Scotia, PEI
YearCollected	37	Year of observation
ProtocolType	59	Details of data collection method
ProtocolURL	63	Web link to Breeding Bird Atlas home page for information on data collection methods
CommonName	152	Common name of species
SpeciesCode	163	AOU 4-letter species code

In addition to these common fields, there will also be several variables that are specific to each type of data you download.

Raw Breeding Evidence:

The ZIP filename will always have a prefix that identifies the data-type followed by a number that identifies your specific request:

bmde_req_mbba2be_raw_00000.zip

The data provided are the observed breeding evidence of all species detected within a 10x10km square during the atlas survey period.

Each visit to the square is reported using a unique card identifier

Survey effort, the number of hours spent searching a square per visit, is included and can be used to calculate probability of observation.

Data represent presence of a species but not necessarily species absence (i.e. a species may be present but not detected in a square during the survey period)

Relevant Data Columns

Field_name	Field_number	Description
DecimalLatitude	33	Centroid co-ordinate of the 10x10km square
DecimalLongitude	34	Centroid co-ordinate of the 10x10km square
SurveyAreaIdentifier	64	Unique identifier: Atlas square ID + Visit Card ID
SamplingEventIdentifier	72	Visit Card ID number
RouteIdentifier	74	Atlas Square ID number
EffortMeasurement1	82	Effort hours: number of hours spent searching a square during a particular visit
BreedingBirdAtlasCode	165	Recorded breeding evidence codes observed on each visit/encounter with a species

Rare Species and Colonial Data

The ZIP filename will always have a prefix that identifies the data-type followed by a number that identifies your specific request:

bmde_req_mbba2rc_00000.zip

The data provided are detailed records of observations of regionally rare species or colonial nesting species.

Data may be only a single encounter or may include repeated visits to update the status of an individual record.

Data Include Breeding Evidence Codes, details of which can be found at:

www.mba-aom.ca/jsp/codes.jsp?lang=en&pg=breeding

Details of specific encounter distances, observer skill level, observational aids, habitat features and other observations are included in a text description in the “Remarks” column.

Not all records include geo-references or detailed descriptions; as a result users should expect to further refine their selection of datasets.

Relevant Data Columns

Field name	Field number	Description
MonthCollected	38	Month of specific observation of a species
DayCollected	39	Date of specific observation of a species
Remarks	55	Detailed description of the encounter with a species provided by field observer. May include details related to location of nest, habitat description, distance to bird, observer experience and aids used to detect the species (i.e. binoculars, telescope) etc.
SurveyAreaIdentifier	64	Unique identifier: Atlas square ID + rare/colonial species record card ID number + visit number
SamplingEventIdentifier	72	Unique rare/colonial species record card ID number + visit number
ObservationCount	130	Number of individual birds detected
UTMZone	148	UTM_Zone recorded on rare/colonial species record card
UTMNorthing	149	UTM_Northing recorded on rare/colonial species record card
UTMEasting	150	UTM_Easting recorded on rare/colonial species record card
BreedingBirdAtlasCode	165	Recorded breeding evidence codes observed on each encounter with a species

Point Count Data

The ZIP filename will always have a prefix that identifies the data-type followed by a number that identifies your specific request:

bmde_req_mbba2pc_00000.zip

Data provided are species-specific counts of the number of individual birds detected at specific point count locations over a fixed time interval

Point count locations are all geo-referenced (UTM, NAD83)

Point counts were conducted over a 5 minute interval, during the breeding season (primarily June) any time between 30 minutes before sunrise and 5 hours after sunrise depending on location, in generally clear conditions with little wind or precipitation. For more details of point count methodology consult the MBBA Guide for Atlassers.

Relevant Data Columns

Field_name	Field_number	Description
MonthCollected	38	Month of point count survey
DayCollected	39	Date of point count survey
SamplingEventIdentifier	72	Unique Point Count ID number
RouteIdentifier	74	Unique Atlas Square ID number
TimeIntervalStarted	78	Start time of point count 24:00hrs
EffortMeasurement1	82	Length of point count in minutes
ObservationCount	130	Number of individuals detected
UTMZone	148	Point count location UTM_Zone
UTMNorthing	149	Point count location UTM_Northing
UTMEasting	150	point count location UTM_Easting

Highest Breeding Evidence per Square

The ZIP filename will always have a prefix that identifies the data-type followed by a number that identifies your specific request:

Bmde_req_mbba2be_summ_00000.zip

Data provided are the highest observed breeding evidence of any species detected within a 10x10km square during the atlas survey period.

Total survey effort, the combined number of hours spent searching a square by all observers, and all visits, can be used to calculate probability of observation at the 10x10km scale.

Data represent presence of a species but not necessarily species absence (i.e. a species may be present but not detected in a square during the survey period).

Relevant Data Columns

Field_name	Field_number	Description
DecimalLatitude	33	Centroid co-ordinate of the 10x10km square
DecimalLongitude	34	Centroid co-ordinate of the 10x10km square
SurveyAreaIdentifier	64	Unique Atlas Square ID number
SamplingEventIdentifier	72	Unique Atlas Square ID number
RouteIdentifier	74	Unique Atlas Square ID number
EffortMeasurement1	82	Total effort hours: total number of hours spent searching a square during the atlas period
BreedingBirdAtlasCode	165	Highest recorded breeding evidence codes observed for a species in a square



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Utilisation des données de l'Atlas

Le présent document a pour objectif d'aider les agences et les individus qui utilisent les données de l'Atlas à interpréter les ensembles de données géospatiales et les cartes disponibles en ligne sur les sites www.naturecounts.ca et www.mba-aom.ca. Il expose brièvement le type de renseignements que fournissent les données de l'Atlas, l'échelle spatiale utilisée (qui varie selon l'ensemble de données), les limites des données et des suggestions pour interpréter les renseignements. Nous espérons que les utilisateurs saisissent l'extraordinaire potentiel de la base de données et ses limites et qu'ils puissent comprendre les données et les utiliser de façon efficace afin de répondre à leurs besoins de planification et de recherche.

Données sur les indices de nidification et la distribution (cartes de distribution)

Les cartes et les données sur les indices de nidification fournissent des renseignements sur le carré, plus particulièrement sur la présence de certaines espèces et sur le niveau de nidification dans chaque carré de 10 km par 10 km recensé dans le cadre de l'Atlas. Les données et les cartes sont disponibles en ligne. Les cartes de distribution informent l'utilisateur de la représentation de la distribution des espèces des Maritimes et devraient être interprétées à grande échelle. Elles permettent également d'interpréter la pertinence de la présence d'une espèce dans une zone ou une écorégion précise.

Avant d'interpréter les données des cartes ou des indices de nidification pour chaque carré, veuillez vous rappeler ce qui suit :

Présence et absence : Les efforts consacrés à l'observation dans chaque carré peuvent varier, mais, en général, dans un carré sur quatre (carrés prioritaires dans le cadre du projet de l'Atlas), on déploie un minimum de 20 heures d'effort. Il est important de noter que ces données indiquent la *présence* d'une espèce, mais pas son absence (c'est-à-dire qu'une espèce peut nicher dans un certain carré de l'Atlas même si elle n'y est pas observée). Des cartes d'abondance sont disponibles pour les espèces présentes (voir ci-dessous), et la représentation de la distribution devrait être interprétée à l'aide des cartes de distribution et d'abondance, ainsi qu'avec l'information sur les besoins des espèces en matière d'habitats et les habitats disponibles dans la zone étudiée.

Indices de nidification : Durant la collecte de données dans le cadre de l'Atlas, les bénévoles avaient comme objectif de recueillir de l'information sur la distribution des espèces dans un carré plutôt que des indices de nidification de niveau élevé. Par conséquent, l'indice de nidification « confirmé » est presque assurément sous-représenté dans la base de données parce que les Participants n'avaient pas en tête de récolter ces données en priorité. Par conséquent, ne négligez pas les indices « possible » et « probable ». En fait, lorsqu'il est question d'appliquer les résultats de l'Atlas, les biologistes en analyse de l'environnement et les responsables et gestionnaires des politiques ne distinguent souvent pas les indices de nidification « possible », « probable » et « confirmé ». Nous recommandons donc de faire preuve de prudence en considérant tous les indices de nidification de façon égale lors de l'élaboration de plans d'aménagement ou d'exploitation forestière, particulièrement dans le cas d'espèces en péril vivant dans les forêts, comme la paruline du Canada ou la moucherolle à côtés olive.

Données sur les espèces rares et coloniales

Les données sur les espèces rares et coloniales renseignent sur les espèces d'oiseaux rares des Maritimes et à l'échelle régionale (c'est-à-dire considérées comme rares dans certaines régions précises de l'Atlas), les espèces désignées en péril par le COSEPAC, les espèces en péril de la liste de la LEP et la nidification d'espèces coloniales. Tous ces renseignements sont accessibles en ligne. Une fois qu'ils auront téléchargé les données, les utilisateurs devront restreindre leur recherche d'espèces en fonction de leurs besoins. Les données sur les espèces rares et coloniales présentent à l'utilisateur des coordonnées UTM d'observation d'oiseaux rares (s'il y a lieu), de même que des détails entourant l'observation, comme la nidification, l'habitat, la distance entre l'observateur et l'oiseau rare (ce qui permet d'évaluer les coordonnées UTM fournies).

Il est important de noter que, durant le travail sur le terrain dans le cadre de l'Atlas, d'autres espèces ont été désignées comme en péril par le COSEPAC ou ont été ajoutées à la liste de la LEP. Par conséquent, la liste des espèces pour lesquelles il est nécessaire de remplir un formulaire sur les espèces rares a été mise à jour lorsque cette situation se produisait. Donc, pour des espèces telles que la paruline du Canada, la moucherolle à côtés olive, le martinet ramoneur et l'engoulevent d'Amérique, qui ont été ajoutées à la liste en 2007, les données du formulaire sur les espèces rares (comme les coordonnées UTM) ne sont

disponibles qu'à partir de 2008. Il est également important de savoir que les bénévoles n'étaient pas obligés de retourner sur les sites où ils avaient observé des espèces rares et qu'ils n'avaient pas à donner priorité à la recherche de telles espèces. Ils devaient plutôt visiter toutes sortes d'habitats à l'intérieur d'un carré et ne pas passer plus de temps dans un type d'habitat que dans un autre, au cas où davantage d'espèces en péril s'y trouveraient, par exemple. Tout comme les données brutes sur l'indice de nidification, les formulaires sur les oiseaux rares indiquent la présence d'une espèce, non son absence. L'interprétation des données des espèces en péril, particulièrement les espèces en péril répandues, comme la paruline du Canada, devrait s'accompagner de la lecture des cartes de distribution et d'abondance, de même que des associations entre les espèces et les habitats provenant des analyses de données de l'Atlas (voir plus bas).

Données sur les points d'écoute (cartes d'abondance relative)

Les données sur les points d'écoute sont disponibles en ligne et toutes les observations des espèces sont associées à des géoréférences (c'est-à-dire des coordonnées plutôt que des carrés de 10 km par 10 km). Les cartes d'abondance ne sont pas accessibles en ligne, mais vous pouvez les consulter au bureau de l'Atlas à des fins de planification de la conservation.

Au total, 13 492 points d'écoute de cinq minutes et d'un rayon illimité ont été effectués au cours de la période de cinq ans de collecte de données de l'Atlas sur le terrain. La majorité de ces points d'écoute ont été effectués sur des routes choisies au hasard. Les points d'écoute ont également été effectués ailleurs que sur des routes pour garantir que l'échantillon d'habitats était représentatif. En général, au moins 10 points d'écoute étaient effectués dans les carrés prioritaires pour couvrir uniformément et adéquatement toute la région des Maritimes. Des comptes-rendus des efforts déployés pour les points d'écoute, comprenant le nombre de points d'écoute par carré, sont indiqués dans les résumés de carrés sur le site Internet de l'Atlas.

L'objectif premier des points d'écoute est de faciliter l'établissement de la carte d'abondance relative pour le plus d'espèces possible. En général, la méthodologie des points d'écoute permet de mieux échantillonner les oiseaux terrestres que les autres guildes d'oiseaux, comme les oiseaux aquatiques. Toutefois, les cartes de points d'écoute sont disponibles pour d'autres oiseaux que les oiseaux terrestres et la fiabilité de la carte d'abondance pour chacune de ces espèces devrait être évaluée au cas par cas. Établir des cartes d'abondance relative permet de comparer l'abondance des espèces dans différentes régions des Maritimes, de mettre en évidence certaines zones, ou « points chauds », dans lesquelles une certaine espèce est observée en relativement grande quantité et d'établir dans quelles régions les efforts de conservation doivent être déployés en priorité.

Analyses supplémentaires

Les employés et les membres du comité de l'Atlas ont effectué un grand nombre d'analyses à partir des données qu'ils ont récoltées. Les résultats des analyses suivantes ne sont pas accessibles en ligne, mais vous les trouverez dans la publication finale de l'Atlas. Vous pouvez faire une demande auprès de l'Atlas pour obtenir les résultats de ces analyses si vous désirez vous en servir pour informer et aider aux efforts en matière de planification de la conservation.

Probabilité d'observation

Pour chaque espèce, nous avons calculé une probabilité d'observation (c'est-à-dire la possibilité d'observer une espèce particulière dans chacun des carrés) pour le premier et le deuxième Atlas, de même que l'évolution de cette probabilité entre les deux Atlas. La probabilité d'observation est en corrélation avec l'abondance de l'espèce et la taille de la population. Les résultats de ces trois analyses ont été transposés sur une carte pour illustrer les zones où la probabilité d'observation a changé entre les deux Atlas.

Associations entre les espèces et les habitats

À partir des géoréférences des espèces, recueillies grâce aux points d'écoute et aux formulaires sur les oiseaux rares, des associations entre les espèces et les habitats ont été établies selon différentes échelles spatiales (par rapport au territoire ou au paysage, par exemple) en combinant les données des inventaires forestiers provinciaux et les données sur l'emplacement des espèces. Les résultats de ces analyses sont traduits en graphiques qui indiquent la direction (positive ou négative) et la force des associations entre les espèces et les habitats pour le Nouveau-Brunswick, la Nouvelle-Écosse, l'Île-du-Prince-Édouard et la région des Maritimes dans son ensemble. Ces analyses donnent de l'information sur les habitats propres aux Maritimes et aux provinces pour 145 espèces (celles pour lesquelles les données amassées étaient suffisantes).



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Atlas des oiseaux nicheurs des Maritimes (2006-2010)

www.naturecounts.ca

www.mba-aom.ca

« À lire »

Instructions générales

Une fois que vous aurez téléchargé les données brutes des sites www.naturecounts.ca et www.mba-aom.ca, vous devriez d'abord suivre ces instructions générales pour les visionner.

Puisque les données brutes sont souvent très volumineuses, vous devez les télécharger en fichier archivé compressé. Chaque fichier compressé est nommé en fonction des données que vous téléchargez et du numéro de votre demande. Une fois le fichier téléchargé, décompressez-le. Vous obtiendrez trois fichiers :

data_policy.html

Il s'agit de la Politique de partage des données de l'Atlas des oiseaux nicheurs des Maritimes qui explique comment utiliser les données de l'Atlas et comment les résultats qu'on en tire peuvent être publiés, cités et reconnus.

field_names.txt

Ce fichier résume tous les champs de données (c'est-à-dire les en-têtes des zones de données) du fichier de données brutes. Chaque fichier de données est composé de 169 champs de données, mais ces champs ne contiennent pas tous des renseignements pertinents. Plusieurs d'entre eux seront vides. Vous pouvez trouver un fichier PDF contenant une description de tous les champs à l'adresse :

www.birdscanada.org/birdmon/default/resources.jsp.

bmde_data.txt

Ce fichier contient les données brutes. Il s'agit d'un fichier texte séparé par des tabulations. Vous pouvez le visionner en utilisant une feuille de calcul électronique (comme Microsoft Excel) ou un programme de base de données (comme Microsoft Access).

Colonnes pertinentes de tous les ensembles de données de NatureCounts

Tous les tableaux de données de l'Atlas des oiseaux nicheurs des Maritimes téléchargés à partir des sites www.naturecounts.ca ou www.mba-aom.ca auront en commun les champs suivants :

Nom de champ	Numéro de champ	Description
ScientificName	7	Nom particulier de l'espèce
Country	25	Canada
StateProvince	26	Nouveau-Brunswick, Nouvelle-Écosse, Île-du-Prince-Édouard
YearCollected	37	Année de l'observation
ProtocolType	59	Détails sur la méthode de collecte de données Lien Internet vers la page d'accueil de l'Atlas des oiseaux nicheurs pour obtenir des renseignements sur les méthodes de collecte de données
ProtocolURL	63	
CommonName	152	Nom commun de l'espèce
SpeciesCode	163	Code à quatre lettres de l'espèce de l'AOU

En plus de ces champs communs à tous les tableaux, vous verrez plusieurs champs particuliers à chaque type de données.

Données brutes sur l'indice de nidification :

Le fichier compressé comportera toujours un préfixe qui identifie le type de données, suivi d'un numéro qui identifie votre demande particulière :

bmde_req_mbba2be_raw_00000.zip

Les données fournies concernent l'indice de nidification de toutes les espèces détectées dans un carré de 10 km par 10 km au moment du recensement dans le cadre de l'Atlas.

Chaque visite dans le carré est rapportée au moyen d'une carte d'identité unique.

Les efforts consacrés à l'observation sont calculés selon le nombre d'heures à chercher dans chaque carré, pour chaque visite. Ces résultats sont consignés et peuvent être utilisés pour calculer la probabilité d'observation.

Les données indiquent la présence d'une espèce, mais ne prouvent pas nécessairement l'absence d'une autre espèce (c'est-à-dire qu'une espèce peut être présente dans un carré sans être recensée).

Colonnes pertinentes

Nom_de_champ	Numéro_de_champ	Description
DecimalLatitude	33	Coordonnée du centre du carré de 10 km x 10 km
DecimalLongitude	34	Coordonnée du centre du carré de 10 km x 10 km
SurveyAreaIdentifier	64	Identifiant unique : Numéro du carré de l'Atlas + numéro de la carte de visite
SamplingEventIdentifier	72	Numéro de la carte de visite
RouteIdentifier	74	Numéro du carré de l'Atlas
EffortMeasurement1	82	Heures d'effort : Nombre d'heures passées à chercher dans un carré au cours d'une visite précise
BreedingBirdAtlasCode	165	Codes des indices de nidification consignés lors de chaque visite ou rencontre avec une espèce

Données sur les espèces rares et coloniales

Le fichier compressé comportera toujours un préfixe qui identifie le type de données, suivi d'un numéro qui identifie votre demande particulière :

bmde_req_mbba2rc_00000.zip

Les données fournies sont des renseignements détaillés sur les observations d'espèces rares à l'échelle régionale ou de la nidification d'espèces coloniales.

Ces observations peuvent être le fruit d'une rencontre isolée ou de visites répétées visant à mettre à jour le statut d'un dossier individuel.

Les données comprennent les codes des indices de nidification, dont les détails sont disponibles sur le site à l'adresse suivante :

<http://www.mba-aom.ca/jsp/codes.jsp?lang=fr&pg=breeding>

Dans la colonne « Remarks » du document, vous trouverez des renseignements sur la distance d'observation, le niveau de compétence de l'observateur, les instruments utilisés pour l'observation, les caractéristiques de l'habitat et d'autres détails.

Les dossiers ne comprennent pas tous des géoréférences ou des descriptions détaillées; les utilisateurs devront donc peaufiner leur sélection de données.

Colonnes pertinentes

Nom_de_champ	Numéro_de_champ	Description
MonthCollected	38	Mois durant lequel une espèce a été observée
DayCollected	39	Date à laquelle une espèce a été observée
Remarks	55	Description détaillée de la rencontre avec une espèce fournie par un observateur sur le terrain. Elle peut comprendre des renseignements sur l'emplacement du nid, l'habitat, la distance entre l'observateur et l'oiseau, l'expérience de l'observateur, les instruments utilisés pour détecter l'espèce (comme des jumelles ou un télescope), etc.
SurveyAreaIdentifier	64	Identifiant unique : Numéro du carré de l'Atlas + numéro de la fiche de l'espèce rare ou coloniale + numéro de la carte de visite
SamplingEventIdentifier	72	Numéro de la fiche de l'espèce rare ou coloniale + numéro de la carte de visite
ObservationCount	130	Nombre d'oiseaux individuels observés
UTMZone	148	Coordonnées UTM inscrites sur la carte des espèces rares ou coloniales
UTMNorthing	149	Ordonnée UTM inscrite sur la carte des espèces rares ou coloniales
UTMEasting	150	Abscisse UTM inscrite sur la carte des espèces rares ou coloniales
BreedingBirdAtlasCode	165	Codes des indices de nidification consignés lors de chaque rencontre avec une espèce

Données des points d'écoute

Le fichier compressé comportera toujours un préfixe qui identifie le type de données, suivi d'un numéro qui identifie votre demande particulière :

bmde_req_mbba2pc_00000.zip

Les données fournies sont liées au nombre d'oiseaux de chaque espèce vus ou entendus à un endroit désigné pendant un certain temps.

Les sites de points d'écoute sont tous associés à des géoréférences (UTM, NAD83).

Les points d'écoute avaient tous une durée de cinq minutes et ont eu lieu au cours de la période de reproduction (principalement en juin), à tout moment de la journée, à compter de 30 minutes avant le lever du soleil et jusqu'à cinq heures après son coucher, selon l'emplacement, et habituellement par temps clément, avec peu de vent ou de précipitations. Pour en savoir davantage sur la méthodologie des points d'écoute, consultez le Guide du participant de l'Atlas des oiseaux nicheurs des Maritimes.

Colonnes pertinentes

Nom_de_champ	Numéro_de_champ	Description
MonthCollected	38	Mois durant lequel le point d'écoute est effectué
DayCollected	39	Date à laquelle le point d'écoute est effectué
SamplingEventIdentifier	72	Numéro unique du point d'écoute
RouteIdentifier	74	Numéro unique du carré de l'Atlas
TimeIntervalStarted	78	Heure de début du point d'écoute en format 24 h
EffortMeasurement1	82	Durée du point d'écoute en minutes
ObservationCount	130	Nombre d'oiseaux individuels observés
UTMZone	148	Coordonnées UTM du site du point d'écoute
UTMNorthing	149	Ordonnée UTM du site du point d'écoute
UTMEasting	150	Abscisse UTM du site du point d'écoute

Indice de nidification le plus élevé par carré

Le fichier compressé comportera toujours un préfixe qui identifie le type de données, suivi d'un numéro qui identifie votre demande particulière :

Bmde_req_mbba2be_summ_00000.zip

Les données fournies concernent l'indice de nidification le plus élevé des espèces observées dans un carré de 10 km par 10 km au moment du recensement dans le cadre de l'Atlas.

La somme des efforts consacrés à l'observation est calculée selon le nombre d'heures que chaque observateur passe à chercher dans chaque carré, pour chaque visite. Ces résultats sont consignés et peuvent être utilisés pour calculer la probabilité d'observation dans un carré de 10 km par 10 km.

Les données indiquent la présence d'une espèce, mais ne prouvent pas nécessairement l'absence d'une autre espèce (c'est-à-dire qu'une espèce peut être présente dans un carré sans être recensée).

Colonnes pertinentes

Nom_de_champ	Numéro_de_champ	Description
DecimalLatitude	33	Coordonnée du centre du carré de 10 km x 10 km
DecimalLongitude	34	Coordonnée du centre du carré de 10 km x 10 km
SurveyAreaIdentifier	64	Numéro unique du carré de l'Atlas
SamplingEventIdentifier	72	Numéro unique du carré de l'Atlas
RouteIdentifier	74	Numéro unique du carré de l'Atlas
EffortMeasurement1	82	Heures d'effort totales : Nombre d'heures totales passées à chercher dans un carré durant la période du recensement de l'Atlas
BreedingBirdAtlasCode	165	Codes des indices de nidification les plus élevés consignés pour une espèce dans un carré



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