

Marsh Bird and Amphibian Communities in the Hamilton Harbour AOC, 1995 – 2002.



Purpose of the MMP

The Marsh Monitoring Program (MMP) was established to provide baseline surveys of marsh bird and amphibian populations and their habitats in marshes within Areas of Concern (AOCs) in the Great Lakes basin, sites where rehabilitation and restoration efforts have taken place or are planned in AOCs, and in many other Great Lakes basin wetlands. Marsh bird surveys were first implemented in the Canadian and bi-national AOCs in 1994. In 1995, the program expanded throughout the basin to include surveys of calling amphibians. To date, over 650 MMP volunteers have surveyed marsh bird and/or amphibian populations and their habitats. Information about abundance and diversity of these species provides useful, and easily obtainable indicators of habitat quality, structure and areal extent.

Purpose of the Report

This report summarizes results of MMP surveys done in the Hamilton Harbour AOC from 1995 to 2002. It also explains how the set of indicators used by the MMP assesses marsh quality and describes the significance of MMP results for this AOC. Results herein provide an opportunity to determine whether or not amphibian and/or marsh bird community status at Hamilton Harbour AOC wetlands are impaired. This report should be read in conjunction with the context and analyses description in the Marsh Monitoring Program: Areas of Concern Summary Reports 1995 – 2002.

Highlights of the MMP's Hamilton Harbour Results

Indicator Species

The presence of the following suite of marsh bird and amphibian species indicates high quality marsh habitat.

A **T** indicates those species found in the Hamilton Harbour AOC marshes.

Birds

- American Bittern (AMBI)
- T** American Coot (AMCO)
- Black Tern (BLTE)
- Blue-winged Teal (BWTE)
- T** Common Moorhen (COMO)
- Common Snipe (COSN)
- T** Least Bittern (LEBI)
- T** Marsh Wren (MAWR)
- T** C. Moorhen/ A.Coot (MOOT)
- T** Pied-billed Grebe (PBGR)
- T** Sora
- T** Virginia Rail (VIRA)

Amphibians

- Bullfrog (BULL)
- T** Chorus Frog (CHFR)
- Mink Frog (MIFR)
- T** Northern Leopard Frog (NLFR)
- T** Spring Peeper (SPPE)

- Since the program's initiation, three amphibian, two marsh bird and seven routes surveyed for both amphibians and marsh birds have been monitored in the Hamilton Harbour AOC. During the period from 1995 through 2002, number of routes surveyed were relatively stable, but showed moderate annual decreases between 1998 and 2000. However, increased volunteer survey effort in 2001 increased the number of routes surveyed.
- Overall, eight amphibian species were recorded, including three amphibian indicator species (Chorus Frog, Northern Leopard Frog, Spring Peeper). The most common species occurring at Hamilton Harbour marshes was Spring Peeper (an indicator species) occurring at all marshes, but Northern Leopard Frog (also an indicator species) occurred at nine of ten routes. In general, species were recorded at various levels (Call Level Codes 1, 2 and 3).
- Overall, 24 species of marsh nesters were recorded in the Hamilton Harbour AOC – a high level of diversity. Eight of 12 marsh bird indicator species were recorded in the Hamilton Harbour AOC. Red-winged Blackbird was the most abundant nesting species, followed by Canada Goose, Yellow Warbler and Mallard. Great Blue Heron was the most abundant water forager species and Tree Swallow was the most abundant aerial forager.

- Of the three amphibian indicator species present (Chorus Frog, Northern Leopard Frog, Spring Peeper) all species relative occurrence scored within the average of those at Great Lakes basin non-AOC routes. Abundance of all eight marsh bird indicator species (American Coot, Common Moorhen, Least Bittern, Marsh Wren, Common Moorhen/American Coot, Pied-billed Grebe, Sora, Virginia Rail) that occurred in the Hamilton Harbour scored within the average of those at Great Lakes basin non-AOC routes.
- Marsh bird indicator species diversity and marsh nesting bird species diversity in the Hamilton Harbour AOC scored below the average of those at Great Lakes basin non-AOCs. Further, total amphibian species diversity and amphibian indicator species diversity scored below the average of those at Great Lakes basin non-AOC routes. Overall, this AOC is apparently impaired in its ability to support marsh dependent species.

MMP Methods

Table 1. Marsh Monitoring Program Survey Methods

Survey	Time commitment	Skills Required	Survey Duration	Weather conditions
Birds	2 evenings, 10 days apart, between May 20 and July 5	ability to identify about 50 common birds	10 minutes at each station	warm, dry weather with little or no wind
Amphibians	3 nights, 15 days apart, between April 1 and July 15	ability to learn about 10 amphibian calls	3 minutes at each station	warm, dry weather with little or no wind

A route, consisting of up to eight semi-circular stations (100 m radius for marsh birds and unlimited distance for amphibians), is established in each marsh being surveyed. Stations are usually accessed by foot, but can be surveyed by canoe or boat. Marshes must be a minimum of two hectares and if very large, may support more than one route. Stations must be 500 metres apart for amphibians surveys and 250 metres apart for marsh bird surveys. Numbers of marsh birds heard calling or seen in the station are recorded. At amphibian stations, one of three Call Level Codes is used to record calling intensity of each species; abundance estimates are also made. Participants are also asked to identify if they hear each amphibian inside and/or outside of the 100 m semi-circle. Each MMP volunteer is provided with a training kit that fully explains survey methods. The kit also includes a copy of the MMP Training Tape that aids volunteers in learning songs and calls of common marsh birds and amphibians. For further information about these methods, please refer to the 2003 edition of the *MMP Training Kit and Instructions for Surveying Marsh Birds, Amphibians and their Habitats*, which is available from Bird Studies Canada.

MMP in the Hamilton Harbour AOC

Since the program's initiation, three amphibian, two marsh bird and seven routes surveyed for both amphibians and marsh birds have been monitored in the Hamilton Harbour AOC. During the period from 1995 through 2002, number of routes surveyed were relatively stable, but showed moderate annual decreases between 1998 and 2000. However, increased volunteer survey effort in 2001 increased the number of routes surveyed.

A number of habitat rehabilitation projects have been proposed in the Hamilton Harbour AOC that address loss of marsh habitat, in addition to shoreline and riverine habitats. Such sites should be monitored by the MMP.

There are additional marshes in the Hamilton Harbour AOC where routes could be established and existing routes where complementary marsh bird or amphibian surveys would permit a more definitive evaluation of the AOC's wetland-dependent wildlife. Volunteer recruitment to fill these needs is ongoing.

To become involved, please contact the MMP Volunteer Coordinator, Bird Studies Canada at (888) 448-2473 (phone), (519) 586-3532 (fax), or by email at aqsurvey@bsc-eoc.org.

Results

Marshes in the Hamilton Harbour AOC ranged from small to huge in size, which is in itself a positive aspect. Habitat data were collected for ten Hamilton Harbour marshes. Four of these marshes were classified as coastal marshes (thus affected by fluctuations in Lake Ontario water levels) and six marshes were classified as inland marshes. Three Hamilton Harbour marshes (Cootes Paradise #1, Cootes Paradise #2, Grindstone Marshes) have been further classified as habitat rehabilitation sites in the Hamilton Harbour.

The number of amphibians in the Hamilton Harbour AOC ranged from one to seven per route (Table 3). Overall, eight amphibian species were recorded, including three amphibian indicator species (Chorus Frog, Northern Leopard Frog, Spring Peeper). Two amphibian indicator species (Bullfrog and Mink Frog) were not recorded in Hamilton Harbour marshes. According to the Ontario Herpetofaunal Summary, the Hamilton Harbour AOC supports American Toad, Bullfrog, Chorus Frog, Gray Treefrog, Green Frog, Northern Leopard Frog, Pickerel Frog, Spring Peeper and Wood Frog. All nine species have been recorded on the Canadian Wildlife Service's Road Call Count and Backyard Survey programs, so their absence from MMP routes does not necessarily mean they are not present in this AOC. The most common species occurring at Hamilton Harbour marshes was Spring Peeper (an indicator species) which occurred at all marshes. Northern Leopard Frog (also an indicator species) occurred at nine of ten routes. In general, amphibian species were recorded at moderate to high levels (Call Level Codes 1, 2 and 3).

The number of marsh nesters occurring at Hamilton Harbour AOC routes ranged from five to 17 (Table 4). Overall, 24 species of marsh nesters were recorded in the Hamilton Harbour AOC – a very high level of diversity. Further, eight (American Coot, Common Moorhen, Least Bittern, Marsh Wren, Common Moorhen/American Coot, Pied-billed Grebe, Sora, Virginia Rail) of 12 of the marsh bird indicator species were recorded in the Hamilton Harbour AOC. According to the Ontario Breeding Bird Atlas database, this AOC formerly supported 10 of the 12 marsh bird indicator species; Pied-billed Grebe has not historically been present in this AOC. Ten of 24 marsh nesting species densities at Hamilton Harbour routes were equal to or higher than those at Great Lakes basin non-AOC routes. Red-winged Blackbird was the most abundant nesting species, followed by Canada Goose, Yellow Warbler and Mallard.

Seven water foragers and seven aerial foragers were recorded in the Hamilton Harbour AOC – again a very high level of diversity (Table 4). Two species of conservation interest in Ontario (Black-crowned Night Heron and Great Egret) were present. Great Blue Heron was the most abundant water forager species and Tree Swallow was the most abundant aerial forager. Densities were higher at Hamilton Harbour routes than at Great Lakes basin non-AOC route averages for six of seven water foraging species, but were lower for all seven aerial foraging species.

Conclusions

Of the three amphibian indicator species present (Chorus Frog, Northern Leopard Frog, Spring Peeper) all species relative occurrence scored within the average of those at Great Lakes basin non-AOC routes (Table 5). Abundance of all eight marsh bird indicator species (American Coot, Common Moorhen, Least Bittern, Marsh Wren, Common Moorhen/American Coot, Pied-billed Grebe, Sora, Virginia Rail) that occurred in the Hamilton Harbour AOC scored within the average of those at Great Lakes basin non-AOC routes. Thus, no amphibian or marsh bird indicator species abundance and occurrence scored above the average of those at Great Lakes basin non-AOCs.

Marsh bird indicator species diversity and marsh nesting bird diversity in the Hamilton Harbour AOC scored below the average of those at Great Lakes basin non-AOC routes (Table 6). Further, total amphibian species diversity and amphibian indicator species diversity scored below the average of those at Great Lakes basin non-AOC routes. The Hamilton Harbour AOC appears to be impaired in its ability to support a high diversity of amphibian and marsh bird species (Table 6). Overall, this AOC is apparently impaired in its ability to support marsh dependent species.

Recommendations

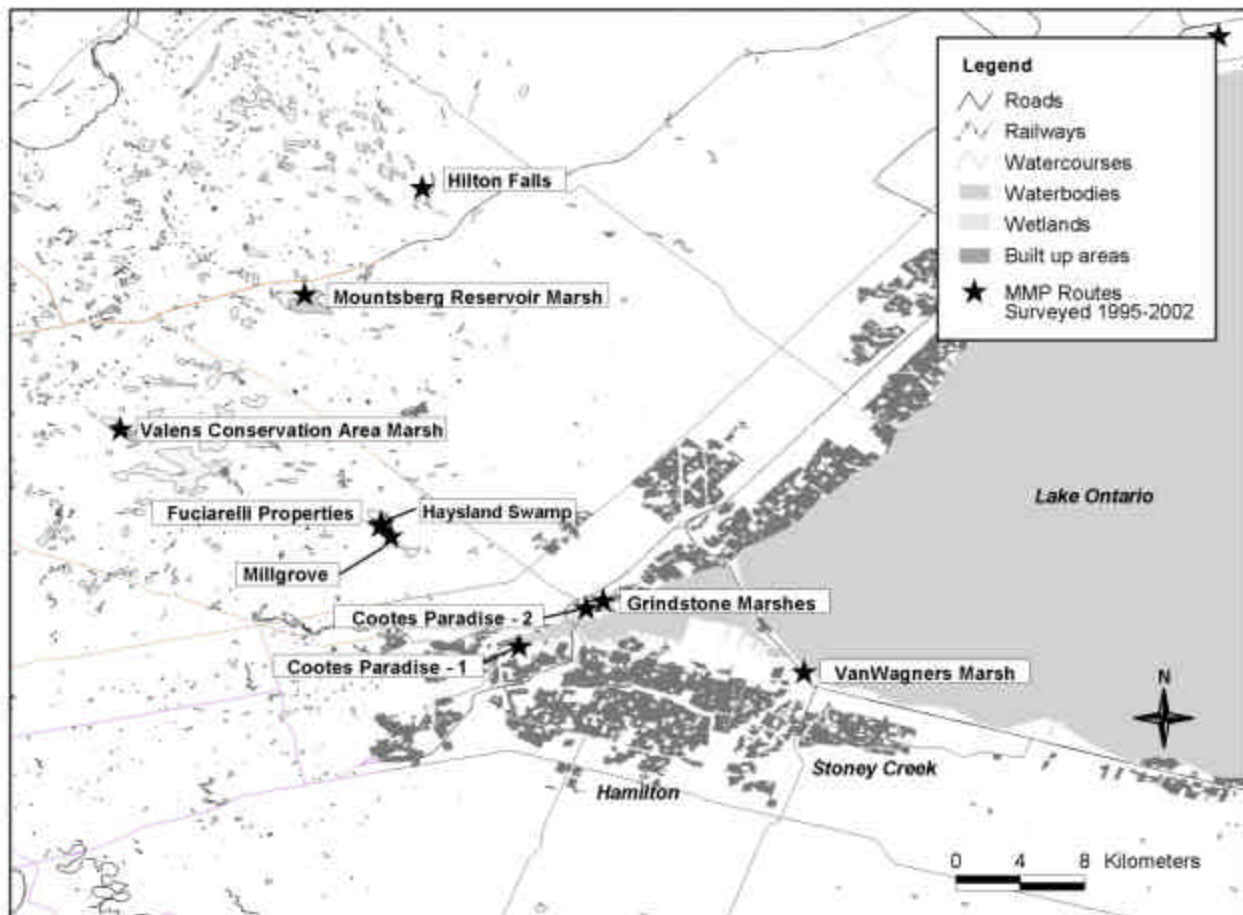
Efforts should be made to continue to rehabilitate marsh habitat and to monitor marsh bird and amphibian populations to properly address the effects of habitat loss. MMP routes should be established at all marsh rehabilitation projects. Efforts should be made to encourage all MMP volunteers surveying routes within AOCs to rigorously collect habitat information at their survey stations. Complementary amphibian and marsh bird surveys should be conducted at all new and existing routes to permit a more definitive quantitative analysis of this AOC's wetland-dependent wildlife.

Volunteer Efforts

Eleven participants contributed over 248 person hours between 1995 and 2002 to the program at this AOC. In addition, many volunteer hours at non-AOC routes were contributed to produce results that were used for comparison purposes. Our thanks extend to the dedicated participants who conducted the Hamilton Harbour surveys: Jim Aikenhead, Anne Marie Cipriani, Michael Clark, Chris Ellen, David Featherston, Brian Geerts, Erin James, Shelley King, Libor Michalak, Brian Pomfret and Andrew Scheifele.

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MMP routes in Hamilton Harbour AOC.

Table 2. Marsh Monitoring Program Routes in the Hamilton Harbour AOC.

Year	Route Type	# Routes	# Volunteers
1995	Amphibian	2	2
	Bird	1	1
	Both	3	2
1996	Amphibian	1	1
	Bird	0	0
	Both	3	2
1997	Amphibian	1	1
	Bird	0	0
	Both	3	2
1998	Amphibian	1	1
	Bird	0	0
	Both	2	1
1999	Amphibian	0	0
	Bird	1	1
	Both	1	1
2000	Amphibian	0	0
	Bird	0	0
	Both	2	1
2001	Amphibian	1	1
	Bird	0	0
	Both	5	4
2002	Amphibian	0	0
	Bird	0	0
	Both	4	2
Total	Amphibian	3	3
	Bird	2	2
	Both	7	7

Table 3. Amphibian species composition and abundance (maximum Call Level Code¹) at Hamilton Harbour AOC MMP routes from 1995 through 2002. Shading denotes indicator species.

Amphibian Species	Route Number ²										Hamilton Harbour (maximum)
	1	2	3	4	5	6	7	8	9	10	
American Toad	2	2	-	2	3	1	1	1	-	-	3
Chorus Frog	-	-	1	1	1	1	3	-	2	-	3
Gray Treefrog	2	1	2	-	3	3	1	3	3	-	3
Green Frog	2	2	1	2	2	3	2	-	2	-	3
Northern Leopard Frog	2	2	1	2	2	1	1	1	1	-	2
Pickrel Frog	-	-	-	-	-	1	-	-	1	-	1
Spring Peeper	1	1	2	1	3	3	2	3	3	1	3
Wood Frog	1	-	-	-	1	-	1	-	3	-	3

¹ Call Level Code 1: Individuals can be counted; calls not simultaneous. Call Level Code 2: Calls distinguishable, some simultaneous calling. Call Level Code 3: Full chorus; calls continuous and overlapping.

¹ Route Name	Route Number
Cootes Paradise #1	1
Cootes Paradise #2	2
Fuciarelli Properties	3
Grindstone Marshes	4
Haysland Swamp	5
Hilton Falls	6
Milgrove	7
Mountsberg Reservoir Marsh	8
Valens Conservation Area	9
VanWagners Marsh	10

Table 4. Marsh bird species composition and abundance (mean number per 10 stations) in the Hamilton Harbour AOC from 1995 through 2002. Means for Hamilton Harbour routes and Great Lakes basin non-AOC routes are given for comparison. Shading denotes indicator species and 'p' indicates that a species was present only outside of the survey stations.

Marsh Bird Species	Route Number ¹								Hamilton Harbour AOC Mean	Great Lakes Basin Mean
	1	2	3	4	5	6	7	8		
<i>Marsh Nesters</i>										
Alder Flycatcher								1.0	0.14	0.34
American Coot							3.3		0.54	0.99
Canada Goose	12.3	44.5	20.0	10.0			p	14.0	12.53	4.56
Common Grackle	2.5	5.3		8.0	5.0	6.7			3.35	7.70
Common Moorhen	0.8								0.10	1.56
Common Yellowthroat	4.5	3.0		3.0	11.0		1.7		3.18	6.41
Eastern Kingbird	1.8	0.5			1.0		1.7		0.71	1.51
Gadwall		p							p	0.12
King Rail				1.0					0.14	0.01
Least Bittern	1.3	0.8		1.0		3.3	p		0.68	0.43
Mallard	3.0	14.3	13.3	13.0	2.0	13.3	8.3		7.87	5.36
Marsh Wren	4.3	1.5	p	5.0			6.7	5.0	3.21	8.30
Moorhen/Coot						13.3			1.08	0.73
Mute Swan	1.5	5.5	3.3						1.22	0.66
Northern Harrier							p		p	0.09
Pied-billed Grebe						3.3	1.7		0.54	1.69
Red-winged Blackbird	49.5	48.8	46.7	60.0	36.0	86.7	43.3	20.0	46.79	44.89
Song Sparrow	17.3	16.3		1.0	4.0	3.3	11.7	1.0	7.50	5.16
Sora	2.0	1.3		1.0					0.57	1.06
Swamp Sparrow	1.5	0.3		5.0	8.0	6.7	5.0	6.0	4.16	10.22
Trumpeter Swan	0.3								0.03	0.05
Virginia Rail	5.8	1.5		6.0	6.0	6.7			3.14	3.12
Willow Flycatcher	0.3						1.7		0.30	0.62
Yellow Warbler	13.0	13.5		29.0	10.0	16.7		p	10.20	6.31
<i>Water Foragers</i>										
Black-crowned Night Heron	0.3	1.8	3.3						0.54	0.42
Belted Kingfisher	0.3	1.0	p	3.0	2.0		3.3		1.39	0.53
Caspian Tern	2.0	4.3	10.0	4.0					2.20	0.33
Common Tern	0.5	2.3	p					8.0	1.45	0.84
Great Egret	0.3	p							0.03	0.47
Great Blue Heron	1.8	8.3	3.3	1.0	2.0	p	1.7	3.0	2.70	1.66
Green Heron	0.3	1.0		1.0			1.7		0.57	0.52
<i>Air Foragers</i>										
Bank Swallow	1.5	7.5		7.0	4.0				2.70	2.95
Barn Swallow	1.5	3.8					11.7		2.60	8.86
Chimney Swift	1.5	2.5							0.54	1.04
Common Nighthawk		0.3							0.03	0.27
N. Rough-winged Swallow		3.8							0.51	1.70
Purple Martin								2.0	0.27	1.77
Tree Swallow	19.0	22.8		10.0	13.0	p	30.0	27.0	17.26	32.59

¹Route Name Route Number
Cootes Paradise #1 1
Cootes Paradise #2 2
Grindstone Marshes 3
Haysland Swamp 4
Hilton Falls 5
Mountsberg Reservoir Marsh 6
Valens Conservation Area 7
VanWagners Marsh 8

Table 5. Status assessment of marsh bird and amphibian indicator species abundance in the Hamilton Harbour AOC from 1995 through 2002. ' - ' denotes values below the Great Lakes basin non-AOC average. ' 0 ' denotes values within the Great Lakes basin non-AOC average. ' + ' denotes values above the Great Lakes basin non-AOC average. Blank indicates that the species was not present and ' p ' indicates that a species was present only outside of the sample stations.

Route Name	Marsh Bird Indicator Species												Amphibian Indicator Species				
	AMBI	AMCO	BLTE	BWTE	COMO	COSN	LEBI	MAWR	MOOT	PBGR	SORA	VIRA	BULL	CHFR	MIFR	NLFR	SPPE
Cootes Paradise #1					0		0	0	-		0	+				+	-
Cootes Paradise #2							0	-			0	-				+	-
Fuciarelli Properties														0		0	0
Grindstone Marshes								p						0		+	-
Haysland Swamp							0	0			0	0		0		0	0
Hilton Falls												0		0		0	0
Millgrove														0		0	0
Mountsberg Reservoir Marsh							0		0	0		0				0	0
Valens Conservation Area		+					p	0	0	0				0		0	0
VanWagners Marsh								0									-
Hamilton Harbour Overall Assessment		0			0		0	0	0	0	0	0		0		0	0

Table 6. Status of Hamilton Harbour marshes from 1995 to 20021. ' - ' denotes values below the Great Lakes basin non-AOC average. ' 0 ' denotes values within the Great Lakes basin non-AOC average. ' + ' denotes values above the Great Lakes basin non-AOC average.

Route Name ²	Survey Type	Year	Number of Stations	Assessment of Marsh Bird and Amphibian Species Diversity				Overall Assessment ³
				Marsh Nesting Bird Diversity	Marsh Bird Indicator Species Diversity	Amphibian Species Diversity	Amphibian Indicator Species Diversity	
Cootes Paradise #1 <small>R, C, Huge</small>	Amph Bird	1996 - 2002	5 5	0	-	-	-	1
Cootes Paradise #2 <small>R, C, Huge</small>	Amph Bird	1996 - 2002	5 5	0	-	-	-	1
Fuciarelli Properties <small>I, Small</small>	Amph	1995	3			-	0	1
Grindstone Marshes <small>R, C, Medium</small>	Amph Bird	1995 - 1998	4 3	-	-	-	-	0
Haysland Swamp <small>I, Large</small>	Amph Bird	2001 - 2002	5 5	0	-	-	-	1
Hilton Falls <small>I, Large</small>	Amph Bird	2001 - 2002	4 4	0	-	0	0	3
Millgrove <small>I, Large</small>	Amph	1995	3			+	-	2
Mountsberg Reservoir Marsh <small>I, Medium</small>	Amph Bird	2001	3 3	+	+	-	0	5
Valens Conservation Area <small>I, Medium</small>	Amph Bird	1995, 2001	3 6	-	-	-	0	1
VanWagners Marsh <small>C, Medium</small>	Amph Bird	1996 - 1997	5 5	-	-	-	-	0
Hamilton Harbour Overall Assessment				-	-	-	-	0

¹ See the Marsh Monitoring Program's 1997 Final Technical Report for a detailed description of the scoring system.

² R = rehabilitation site, C = coastal, I = inland. Tiny (2 - 2.5 ha), Small (2.5 - 5 ha), Medium (5 - 25 ha), Huge (> 50 ha).

³ A score of 0, 1 or 2 indicates impairment, a score of 3, 4 or 5 indicates no apparent impairment and a score of 6, 7 or 8 indicates an above average marsh.