

Marsh Bird and Amphibian Communities in the Bay of Quinte 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 Bay of Quinte 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 Bay of Quinte 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 Bay of Quinte 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 Bay of Quinte AOC marshes.

Birds

T American Bittern (AMBI)
T American Coot (AMCO)
T Black Tern (BLTE)
T Blue-winged Teal (BWTE)
T Common Moorhen (COMO)
T 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

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

- Since the program's initiation, eight amphibian, six marsh bird, and five routes surveyed for both amphibians and marsh birds have been monitored in the Bay of Quinte AOC. During the period from 1995 through 2002, the number of routes surveyed showed moderate annual decreases with only two routes surveyed for both amphibian and marsh bird species in 2001. However, increased volunteer survey effort in 2002 caused increases in the number of routes surveyed, with two amphibian routes and three routes surveyed for both amphibian and marsh birds.
- Overall, nine amphibian species were recorded, including four amphibian indicator species (Bullfrog, Chorus Frog, Northern Leopard Frog, Spring Peeper). The most common species were Bullfrog (an indicator species), Gray Treefrog and Green Frog, each occurring at ten of 12 routes surveyed. In general, species were recorded at various levels (Call Level Codes 1, 2 and 3) among routes.
- Overall, 26 species of marsh nesters were recorded in the Bay of Quinte AOC – a very high level of diversity. Red-winged Blackbird was the most abundant nesting species, followed by Swamp Sparrow, Common Grackle and Yellow Warbler. Great Blue Heron was the most abundant water forager species and Tree Swallow was the most abundant aerial forager.
- All 12 of the marsh bird indicator species were recorded in the Bay of Quinte AOC. Abundance of five marsh bird indicator species

scored below non-AOC average, while abundance of seven indicator species scored within non-AOC averages (Table 5). Four of five amphibian indicator species were recorded in the Bay of Quinte AOC, and all four amphibian species scored within non-AOC averages.

- Marsh bird indicator species diversity and marsh nesting bird species diversity in the Bay of Quinte AOC scored below the average of those at Great Lakes basin non-AOCs. In contrast, total amphibian species diversity scored within average, whereas amphibian indicator species diversity scored below 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 amphibian 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 Bay of Quinte AOC

Since the program's initiation, eight amphibian, six marsh bird, and five routes surveyed for both amphibians and marsh birds have been monitored in the Bay of Quinte AOC. During the period from 1995 through 2002, number of routes surveyed showed moderate annual decreases with only two routes surveyed for both amphibian and marsh bird species in 2001. However, increased volunteer survey effort in 2002 caused increases in the number of routes surveyed, with two amphibian routes surveyed and three routes surveyed for both amphibian and marsh bird species.

A number of habitat rehabilitation projects have been proposed in the Bay of Quinte 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 Bay of Quinte 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 Bay of Quinte AOC ranged from tiny to huge in size, which is in itself a positive aspect. Habitat data were collected for 17 Bay of Quinte marshes. Thirteen of these marshes were classified as coastal marshes (thus affected by fluctuations in Lake Ontario water levels) and four marshes were classified as inland marshes. Three Bay of Quinte marshes (Belleville, Belleville Marsh #1, Belleville Marsh #2) have been further classified as provincially significant under the Ontario provincial wetlands evaluation system.

The number of amphibians recorded at Bay of Quinte AOC routes ranged from one to nine per route (Table 3). Overall, nine amphibian species were recorded, including four amphibian indicator species (Bullfrog, Chorus Frog, Northern Leopard Frog, Spring Peeper). According to the Ontario Herpetofaunal Summary, Mink Frog has not been reported in this AOC, but the species range of Mink Frog does include this AOC. The most common species were Bullfrog (an indicator species), Gray Treefrog and Green Frog, each occurring at ten of 12 routes surveyed. In general, species were recorded at various levels (Call Level Codes 1, 2 and 3).

The number of marsh nesters at routes ranged from four to 23 (Table 4). Overall, 26 species of marsh nesters were recorded in the Bay of Quinte AOC – a very high level of diversity. Further, all 12 of the marsh bird indicator species were recorded in the Bay of Quinte AOC. According to the Ontario Breeding Bird Atlas database, the Bay of Quinte formerly supported all 12 marsh bird indicator species. With the exception of Common Grackle, Northern Harrier and Swamp Sparrow densities of all marsh nesting species were lower than the Great Lakes basin non-AOC route means. Red-winged Blackbird was the most abundant nesting species, followed by Swamp Sparrow, Common Grackle and Yellow Warbler.

Four water foragers and five aerial foragers were recorded in the Bay of Quinte AOC (Table 4) – again a high level of diversity. Great Blue Heron was the most abundant water forager species and Tree Swallow was the most abundant aerial forager. However, none of the water or aerial forager species had higher densities at routes in this AOC than at Great Lakes basin non-AOC routes.

Conclusions

Of the four amphibian indicator species present (Bullfrog, Chorus Frog, Northern Leopard Frog, Spring Peeper) species relative abundance scored within the average of that at Great Lakes basin non-AOC routes (Table 5). Abundance of seven marsh bird indicator species (American Bittern, American Coot, Black Tern, Blue-winged Teal, Common Snipe, Least Bittern and Sora) scored within the average of that at Great Lakes basin non-AOC routes. Abundances of five species (Common Moorhen, Marsh Wren, Common Moorhen/American Coot, Pied-billed Grebe and Virginia Rail) scored below the average of that at Great Lakes basin non-AOC routes (Table 5). Thus, neither amphibian nor marsh bird indicator species scored above the average of those at Great Lakes basin non-AOC routes.

Marsh bird indicator species diversity and marsh nesting bird species diversity in the Bay of Quinte AOC scored below the average of those at Great Lakes basin non-AOC routes (Table 6). Total amphibian species diversity scored within the average of those at Great Lakes basin non-AOCs. Amphibian indicator species diversity scored below the average of that at Great Lakes basin non-AOC routes. The Bay of Quinte AOC appears to be impaired in its ability to support a diverse array of amphibian and marsh bird species (Table 6). Overall, this AOC is apparently impaired in its ability to support marsh dependent species.

Recommendations

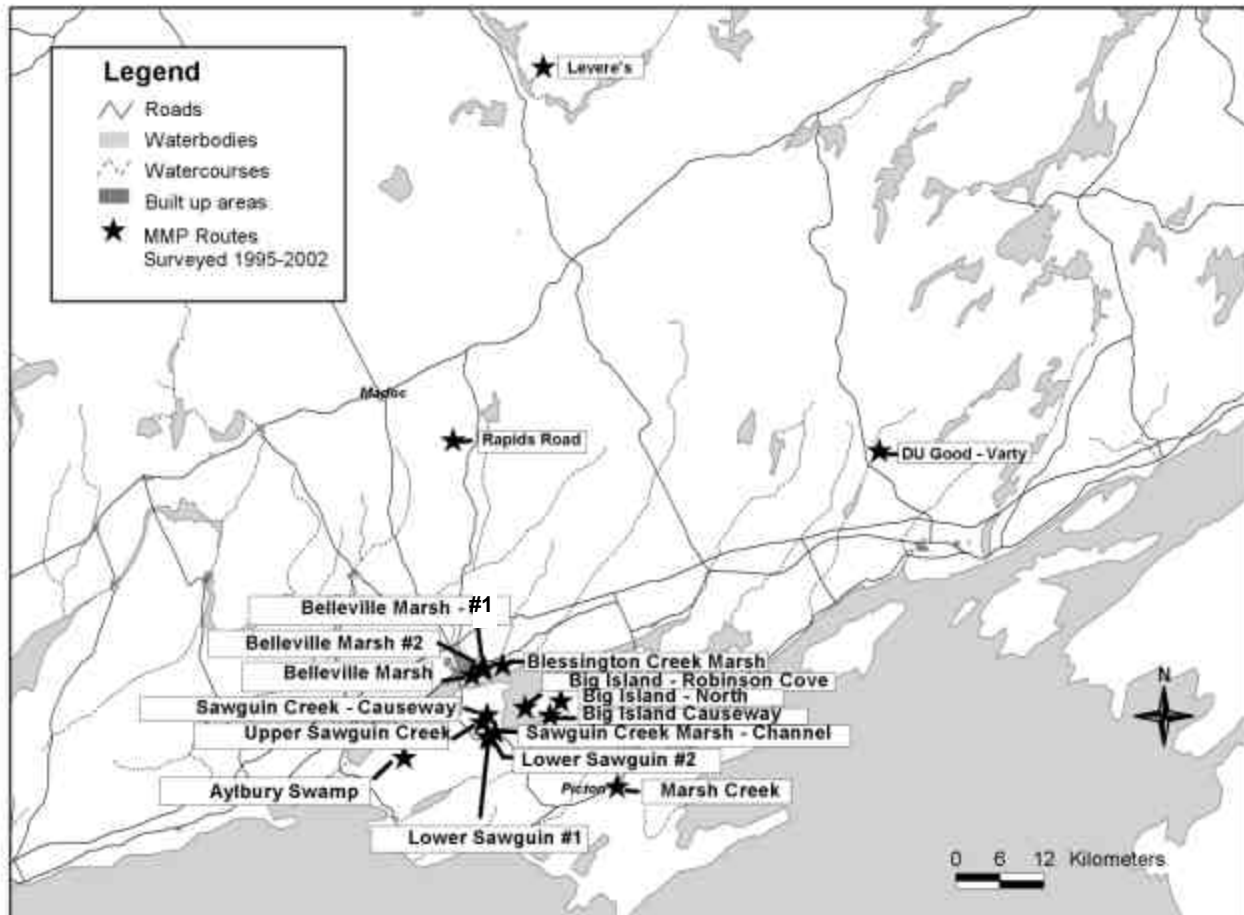
Efforts should be made to continue to rehabilitate marsh habitat and to monitor marsh bird and amphibian populations to properly address the effects of habitat loss. MMP routes should be established at all marsh rehabilitation projects. Efforts should be made to encourage all MMP volunteers surveying 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

Fourteen participants contributed over 328 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 Bay of Quinte surveys: Melanie Blamire, Dave Bostock, Donald Craighead, Peter Good, Karen Hartley, Natalie Helferty, Dan Korchuk, Faye O'Grady, Denise Patch, Michael Patrikeev, Glen Pearce, M. Richards, Margaret Simms and Chip Weseloh.

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MMP Routes in Bay of Quinte AOC.

Table 2. Marsh Monitoring Program Routes in the Bay of Quinte AOC.

Year	Route Type	# Routes	# Volunteers
1995	Amphibian	4	3
	Bird	5	4
	Both	0	0
1996	Amphibian	3	2
	Bird	1	1
	Both	4	3
1997	Amphibian	2	2
	Bird	0	0
	Both	4	4
1998	Amphibian	1	1
	Bird	0	0
	Both	3	3
1999	Amphibian	1	1
	Bird	2	2
	Both	0	0
2000	Amphibian	1	1
	Bird	0	0
	Both	2	2
2001	Amphibian	0	0
	Bird	0	0
	Both	2	2
2002	Amphibian	2	2
	Bird	0	0
	Both	3	3
Total	Amphibian	8	7
	Bird	6	4
	Both	5	5

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

Amphibian Species	Route Number ²												Bay of Quinte (maximum)
	1	2	3	4	5	6	7	8	9	10	11	12	
American Toad	-	-	3	3	2	1	1	1	-	-	-	1	3
Bullfrog	2	1	1	1	3	1	3	1	-	-	1	2	3
Chorus Frog	1	2	2	1	2	3	-	1	1	1	-	-	3
Gray Treefrog	3	1	2	-	3	1	3	3	-	1	1	3	3
Green Frog	3	1	1	-	2	1	3	2	-	1	1	3	3
Northern Leopard Frog	1	-	1	1	3	3	3	1	-	1	-	2	3
Pickerel Frog	-	-	1	-	-	-	-	1	-	-	-	-	1
Spring Peeper	3	-	-	-	3	2	3	3	-	2	-	1	3
Wood Frog	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.

²Route Name Route Number
 Aylbury Swamp 1
 Belleville 2
 Belleville Marsh #1 3
 Belleville Marsh #2 4
 Big Island – north 5
 Big Island – causeway 6
 Du Good – Varty 7
 Levere's 8
 Marsh Creek 9
 Rapids Road 10
 Sawguin Creek 11
 Sawguin Creek Marsh 12

Table 4. Marsh bird species composition and abundance (mean number per 10 stations) in the Bay of Quinte AOC from 1995 through 2002. Means for Bay of Quinte 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											Bay of Quinte AOC Mean	Great Lakes Basin non-AOC Mean	
	1	2	3	4	5	6	7	8	9	10	11			
<i>Marsh Nesters</i>														
Alder Flycatcher			0.5										0.09	0.34
American Bittern			1.8				0.4	p	p			p	0.33	0.64
American Coot			0.2										0.03	0.99
Black Tern			3.4			0.7							0.64	3.87
Blue-winged Teal						2.0							0.21	0.77
Canada Goose			p	5.0	p								p	4.56
Common Grackle	25.0	55.0	5.7		p	30.7	2.9	p	p			p	7.93	7.70
Common Moorhen	5.0	2.5	0.4			4.7						p	0.86	1.56
Common Snipe			p			1.3						p	0.14	0.38
Common Yellowthroat			6.1		7.5	4.7	2.5		2.5	15.0	3.3		4.21	6.41
Eastern Kingbird			0.2			2.0	2.5						0.45	1.51
Green-winged Teal						0.7							0.07	0.15
Least Bittern			0.2										0.03	0.43
Mallard	5.0	p	0.5		p	2.0	1.1	2.9	p			p	1.01	5.36
Marsh Wren		7.5	2.7		2.5	2.7	0.4	5.7		12.5	3.3		3.57	8.30
Moorhen/Coot			0.4				0.4						0.09	0.73
Northern Harrier			1.4		p			4.3	7.5	2.5	p		1.70	0.09
Pied-billed Grebe			2.1			1.3	1.1						0.59	1.69
Red-winged Blackbird	85.0	152.5	47.1	55.0	37.5	54.0	15.0	7.1	2.5	2.5	15.0		33.38	44.89
Sedge Wren							1.4						0.12	0.58
Song Sparrow		5.0	3.8		p	3.3	1.1						1.27	5.16
Sora			0.2			3.3							0.38	1.06
Swamp Sparrow			11.6	20.0	50.0	14.0	0.7	27.1	20.0	32.5	48.3		22.83	10.13
Virginia Rail			2.5		2.5	16.0	0.4	2.9				p	2.74	3.12
Willow Flycatcher		5.0	0.2										0.24	0.54
Yellow Warbler	30.0	15.0	5.9	15.0	p	7.3						p	4.25	6.31
<i>Water Foragers</i>														
Belted Kingfisher						1.3						p	0.14	0.53
Common Tern								1.4					0.21	0.84
Great Blue Heron		p	0.2		p	0.7	0.4	1.4	p			p	0.34	1.66
Green Heron						1.3		p					0.14	0.52
<i>Air Foragers</i>														
Bank Swallow			0.0			3.3							0.35	2.95
Barn Swallow		p	12.3	15.0	2.5	4.0		5.7	5.0	5.0			4.97	8.86
Common Nighthawk			p			p							p	0.27
Purple Martin			1.1										0.18	1.77
Tree Swallow	25.0	22.5	35.5	20.0	60.0	4.0		20.0		27.5	15.0		21.24	32.59

¹Route Name Route Number
 Belleville 1
 Belleville Marsh #1 2
 Big Island – North 3
 Big Island – Robinson's 4
 Blessington Creek 5
 Du Good - Varty 6
 Levere's 7
 Lower Sawguin #1 8
 Lower Sawguin #2 9
 Sawguin Creek 10
 Upper Sawguin Creek 11

Table 5. Status assessment of marsh bird and amphibian indicator species abundance in the Bay of Quinte 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
Aylbury Swamp													0	0		0	0
Belleville					0				0				0	0			
Belleville Marsh #1					0			0	0				+	+		0	
Belleville Marsh #2													0	0		-	
Big Island - north	+	0	0		-	p	0	0	-	0	-	0	+	+		+	+
Big Island - causeway													0	0		+	0
Big Island - Robinson's																	
Blessington Creek Marsh								0				0					
Du Good - Varty			0	0	+	0		0	0	0	+	+	0			+	+
Levere's	0							-	-	0		-	0	-		-	+
Lower Sawquin #1	p							0				0					
Lower Sawquin #2	p																
Marsh Creek														0			
Rapids Road														0		0	0
Sawquin Creek								0					0				
Sawquin Creek Marsh													+			0	-
Upper Sawquin Creek	p				p	p		0				p					
Bay of Quinte Overall Assessment	0	0	0	0	-	0	0	-	-	-	0	-	0	0		0	0

Table 6. Status of Bay of Quinte 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	
Aylbury Swamp <small>I, Tiny</small>	Amph	2002	2			+	+	4
Belleville <small>C, P, Medium</small>	Amph	1996 - 1998	3			0	-	1
Belleville Marsh #1 <small>C, P, Medium</small>	Amph Bird	1996	2 2	-	0	-	-	1
Belleville Marsh #2 <small>C, P, Large</small>	Amph Bird	1995 - 1997	6 2	-	-	-	-	0
Big Island - north <small>C, Huge</small>	Amph Bird	1996 - 2002	8 8	-	-	+	+	4
Big Island - causeway <small>C, Huge</small>	Amph	1995	4			0	0	2
Big Island - Robinson's <small>C, Medium</small>	Amph Bird	2002	1 2	-	-	-	-	0
Blessington Creek Marsh <small>C, Large</small>	Bird	1995	4	-	-			0
Du Good - Varty <small>I, Large</small>	Amph Bird	1996 - 1998	5 5	+	+	-	0	5
Levere's <small>I, Small</small>	Amph Bird	1996 - 2002	4 4	-	-	-	0	1
Lower Sawguin #1 <small>C, Large</small>	Bird	1995	7	-	-			0
Lower Sawguin #2 <small>C, Large</small>	Bird	1995	4	-	-			0
Marsh Creek <small>I, Small</small>	Amph	1997	2			-	-	0
Rapids Road <small>C, Small</small>	Amph	2002	2			0	+	3
Sawguin Creek <small>C, Huge</small>	Amph Bird	1996	4 4	-	-	0	-	1
Sawguin Creek Marsh <small>C, Huge</small>	Amph	1999 - 2002	4			0	0	2
Upper Sawguin Creek <small>C, Huge</small>	Bird	1995	6	-	-			0
Bay of Quinte Overall Assessment				-	-	0	-	1

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, P = provincially significant under the Ontario provincial wetlands evaluation system. 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.