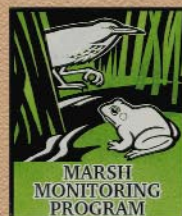


# The Marsh Monitoring Program

1995 - 1999: Monitoring Great Lakes Wetlands and Their Amphibian and Bird Inhabitants

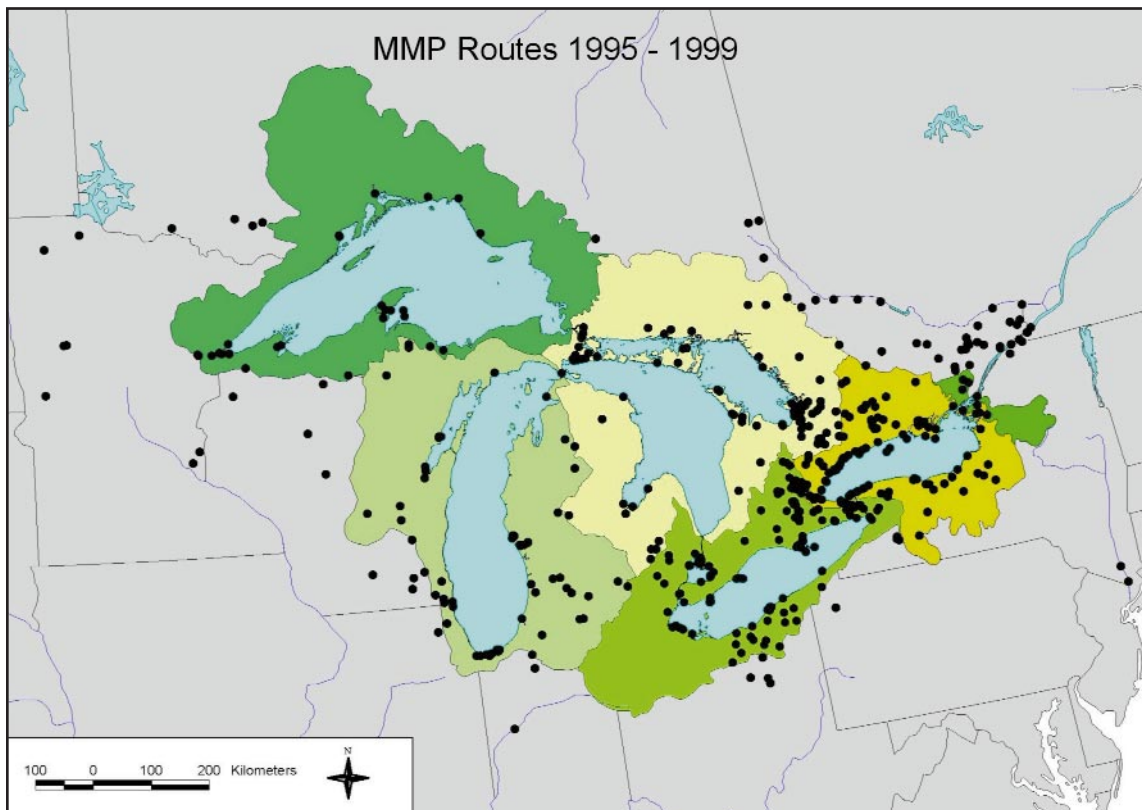
*Russ C. Weeber and Mary Vallianatos (editors)*





The **Marsh Monitoring Program (MMP)** is a binational, long-term monitoring program that coordinates the skills, interests and stewardship of hundreds of citizens across the Great Lakes basin to help understand, monitor and conserve the region's wetlands and their amphibian and bird inhabitants. The MMP was initiated in 1994 by Bird Studies Canada and Environment Canada and has been developed and expanded through the additional support of the U.S. Environmental Protection Agency and the Great Lakes Protection Fund. The MMP depends on the commitment of individuals, foundations, governments and non-governmental organizations that together form a strong partnership working towards effective conservation of wetlands and their inhabitants.

The MMP has an important role in addressing current and future conservation issues concerning Great Lakes wetlands and their amphibians and birds. This report provides an overview of many of these issues and, through a summary of MMP data collected from 1995 through 1999, demonstrates how the efforts of MMP volunteers have broad applications to a variety of conservation efforts across the basin.



**Copies of this report can be obtained by contacting:**



**Bird Studies Canada  
Marsh Monitoring Program**  
P.O. Box 160  
Port Rowan, Ontario N0E 1M0 Canada  
Toll free: 1-888-448-2473  
FAX: (519) 586-3532  
Email: aqsurvey@bsc-eoc.org



Environment Canada  
Environnement Canada  
Ontario Region Région de l'Ontario

**Environment Canada - Ontario Region  
Environmental Conservation Branch**  
4905 Dufferin St.  
Downsview, Ontario M3H 5T4 Canada  
Phone: (416) 739-5829  
FAX: (416) 739-5845  
Email: rose.iantorno@ec.gc.ca



**U.S. Environmental Protection Agency –  
Great Lakes National Program Office**  
Attention: Lawrence Brail (library contractor)  
77 W. Jackson, G-17J  
Chicago, IL 60604 U.S.A.  
Phone: (312) 886-7474  
FAX: (312) 353-2018  
Email: brail.lawrence@epa.gov

---

## Table of Contents

---

<b>Acknowledgements</b> .....	<b>2</b>
<b>Executive Summary / Résumé Exécutif</b> .....	<b>3</b>
<b>Introduction</b> .....	<b>6</b>
<b>Great Lakes Wetlands</b> .....	<b>6</b>
<b>The Marsh Monitoring Program</b> .....	<b>6</b>
<b>The Great Lakes Conservation Context</b> .....	<b>7</b>
<b>MMP Protocol</b> .....	<b>10</b>
<b>Route and Station Selection and Characteristics</b> .....	<b>10</b>
<b>Amphibian Survey Protocol</b> .....	<b>10</b>
<b>Bird Survey Protocol</b> .....	<b>11</b>
<b>Habitat Assessments</b> .....	<b>11</b>
<b>MMP Results</b> .....	<b>12</b>
<b>Routes</b> .....	<b>12</b>
<b>Habitat</b> .....	<b>15</b>
<b>Amphibians</b> .....	<b>16</b>
<b>Birds</b> .....	<b>19</b>
<b>Profiles</b> .....	<b>25</b>
<b>People Who Monitor</b> .....	<b>25</b>
<b>Site Conservation</b> .....	<b>27</b>
<b>Wetland Restoration</b> .....	<b>31</b>
<b>Conservation Connections</b> .....	<b>34</b>
<b>State of the Lakes Ecosystem Conference, Indicators, and the MMP</b> .....	<b>34</b>
<b>Bird Conservation</b> .....	<b>35</b>
<b>Amphibian Conservation</b> .....	<b>37</b>
<b>Opportunities and Challenges – The Future of the MMP</b> .....	<b>38</b>
<b>Volunteer Recruitment and Retention</b> .....	<b>38</b>
<b>Scientific Rigour</b> .....	<b>38</b>
<b>Data Management and Reporting</b> .....	<b>39</b>
<b>MMP Volunteers</b> .....	<b>40</b>
<b>References</b> .....	<b>44</b>
<b>Internet Resources</b> .....	<b>45</b>
<b>Glossary</b> .....	<b>46</b>
<b>List of Acronyms</b> .....	<b>47</b>

---

## Acknowledgements

---

The Marsh Monitoring Program (MMP)<sup>A</sup> is delivered by Bird Studies Canada (BSC), in partnership with Environment Canada's Canadian Wildlife Service – Ontario Region (CWS) and with significant support from the U.S. Environmental Protection Agency's (EPA) Great Lakes National Program Office and Lake Erie Team. Development and implementation of the MMP has been funded by Canada's Great Lakes Sustainability Fund (formerly Great Lakes 2000 Cleanup Fund), CWS, and the U.S. Great Lakes Protection Fund. The program has received important support from a variety of conservation partners, including Great Lakes United, the Federation of Ontario Naturalists, National Audubon Society and Brant Waterways Foundation. Expertise has also been contributed from a variety of Canadian and U.S. federal, state and provincial agencies and regional conservation groups. The following organizations were particularly instrumental during the early development of the MMP: Ashtabula River Public Advisory Committee, Citizens Advisory Committee for Rochester Remedial Action Plan, Hamilton Harbour Bay Area Restoration Council, International Joint Commission, Ontario Ministry of Natural Resources, Rochester Embayment Remedial Action Plan and the U.S. National Biological Service. We also appreciate the support and input of the MMP's Science and Technical Advisory Committee: Christine Bishop (CWS), Mike Cadman (CWS), Lesley Dunn (CWS), Charles Francis (BSC), Kathy Jones (BSC), Jon McCracken (BSC) and Russ Weeber (BSC). Amy Chabot, Natalie Helferty and Ron Ridout coordinated the MMP during the program's early development. Special thanks to Mike Cadman, Jon McCracken and Christine Bishop for their leadership in developing the bird and amphibian survey protocols.

Text and other contributions are gratefully acknowledged from the following authors (affiliation and sections to which they contributed): Christine Bishop (CWS; Amphibian Conservation), Lesley Dunn (CWS; Introduction, Canadian Wetland Restoration Profile, SOLEC), Ken Roblee (New York Department of Environmental Conservation; U.S. Wetland Restoration Profile), Mary Vallianatos (BSC; MMP Protocol, People Who Monitor, Site Conservation, Bird Conservation), Russ Weeber (BSC; Introduction, MMP Results, Opportunities and Challenges). The following people are thanked for their helpful comments and other assistance: Michael Bradstreet (BSC; project management), Andrew Couturier (BSC; maps), Lesley Dunn (CWS; technical and other assistance), Charles Francis (data analysis), Kathy Jones (data and volunteer coordination and general assistance), Jon McCracken (project management), Robert Wenting (CWS; Species at Risk), Jeff Robinson (CWS; Long Point profile), Len Simser (Royal Botanical Gardens; Canadian Wetland Restoration).

**Thank you to all MMP participants for your invaluable contributions and dedication to the program!**

**All participants from 1994 through 1999 are listed at the back of this report.**

*Editorial assistance:*

Jon McCracken (BSC)  
Lesley Dunn (CWS)  
John Schneider (EPA)

*Design and Layout :*

Morris Printing, Simcoe, Ontario

*Suggested Citation:*

Weeber, R.C. and M. Vallianatos (editors) 2000. The Marsh Monitoring Program 1995 – 1999: Monitoring Great Lakes Wetlands and Their Amphibian and Bird Inhabitants. Published by Bird Studies Canada in cooperation with Environment Canada and the U.S. Environmental Protection Agency. 47 pp.



S. Petrie



Printed on recycled paper. Aussi disponible en français.

---

<sup>A</sup> Acronyms defined at end of report

---

## Executive Summary

---

Great Lakes wetlands, particularly those dominated by non-woody emergent plants (marshes), are important reservoirs of plant and animal life and serve a wide array of functions ranging from improving water quality to providing outdoor recreation opportunities. Despite these benefits, Great Lakes marshes have been drained, filled and otherwise impacted for more than a century. This report summarizes the first five years of the Marsh Monitoring Program (MMP) and shows how the efforts of hundreds of Great Lakes citizens are contributing to the conservation, restoration and monitoring of marsh amphibians, birds and habitats.

Launched binationally in 1995, the MMP coordinates volunteers from the Great Lakes states and Ontario in monitoring the birds and calling amphibians of coastal and inland marshes. Bird Studies Canada delivers the program in partnership with Environment Canada and with substantial support from the U.S. Environmental Protection Agency. By coordinating and standardizing the survey efforts of volunteers throughout the basin, the MMP: monitors populations of marsh birds and amphibians over time on a variety of spatial scales; investigates habitat associations of marsh birds and amphibians; contributes to the assessment of Great Lakes Areas of Concern and other wetland conservation initiatives; and helps increase the awareness of conservation issues among the region's citizens, policy makers, scientists and others. Local citizen groups are using MMP data to help understand and maintain wetlands in their neighbourhoods, regional governments make use of MMP data for planning, and federal governments and others are making use of MMP data to help assess the health of Great Lakes wetlands and their amphibian and bird communities at the scale of individual lake basins and for the region as a whole.

MMP surveyors follow a standardized protocol and are guided by detailed written and auditory training materials. Surveys are conducted at semi-circle shaped stations positioned along routes. A nocturnal survey is conducted for frogs and toads three times in spring and early summer. An evening survey is conducted for birds twice during the height of the breeding season, and is augmented by the use of taped broadcasts to illicit response from several secretive species. MMP participants also provide assessments of wetland habitat at each surveyed station.

The data summaries presented in this report provide an overview of the types of information contributed by MMP surveyors from 1995 through 1999. Most summaries focus on the Great Lakes basin but selected data are presented in terms of individual lake basins. In total, 493 different MMP participants submitted data from 575 different routes. Most routes (489 routes, 85% of total) were within the Great Lakes basin but a small proportion (86, 15%) was outside the basin. The Lake Erie, Ontario and Huron basins contained the most routes (156, 139 and 102 respectively) with fewer routes in the Michigan and Superior basins (68 and 24 respectively). On average, most MMP surveys were conducted in permanent wetlands, with the highest percentage of survey stations in large wetlands, a somewhat lower proportion in very small wetlands and a few in intermediate size classes. On average, about 55% of the MMP station area was covered with non-woody, emergent vegetation, and about 27% was open water. Cattail and grasses/sedges were the dominant emergent plants at the majority of the stations but their respective dominance varied among lake basins.

MMP surveyors recorded 13 species of calling amphibians within the Great Lakes basin during the 1995 through 1999 period.



*Common Moorhen © A. & E. Morris/VIREO*

Spring Peeper was the most frequently detected species followed by Green Frog. Grey Treefrog, American Toad and Northern Leopard Frog were also commonly recorded while Bullfrog, Chorus Frog and Wood Frog were somewhat less common. The 8 common species detected by MMP surveyors varied somewhat in their distribution among lake basins. Because the range of each species extends the breadth of the Great Lakes basin, these patterns are not likely due to range limitations; differences in habitats, regional population densities, timing of survey visits or other factors are more likely explanations. Spring Peeper was encountered frequently in the Huron, Michigan and Superior basins but less often in the Ontario and Erie basins. Green Frog was equally distributed across the Ontario, Erie, Huron and Michigan basins while the Bullfrog was recorded most frequently in the Lake Ontario and Erie basins. Northern Leopard Frog was detected most frequently in the Ontario and Erie basins. Although the MMP is still very young as a population-monitoring program, some temporal trends were suggested for populations of American Toad (decreasing) and Bullfrog (increasing); only the declining trend for Chorus Frog could be resolved with sufficient statistical confidence. The extent to which additional years of data might be expected to provide good resolution on amphibian occupancy trends was assessed. The expected annual trend (i.e. percent change in population index based on station occupancy) was calculated assuming either 100 or 200 routes were monitored over 11 years (a 10-year interval). With 100 routes measured for 11 years, the estimated annual trend was about 1% or less for all of the eight amphibians commonly recorded on MMP routes. As expected, resolution improved with 200 routes measured for 11 years. Expected trend resolution was best for American Toad and Green Frog, followed by Grey Treefrog and Northern Leopard Frog. Resolution was expected to be lower for species that were less common (Bullfrog, Chorus Frog and Wood Frog) or which fluctuated widely in station occupancy (Spring Peeper). These results suggest that additional years of data are likely to improve the ability of MMP data to provide trend estimates for several amphibian species, including species of conservation and management concern such as the Northern Leopard Frog and Bullfrog.

Fifty-three species of birds that use marshes for feeding, nesting or both were recorded by MMP observers on Great Lakes routes. Among birds that typically feed in the air above marshes, Tree and Barn Swallow were the most common. Red-winged Blackbird was the most commonly recorded marsh nesting species, followed by Swamp Sparrow, Common Yellowthroat and Marsh Wren. Several species closely associated with marshes were also observed at substantial numbers of stations. Many of these species (e.g. Virginia Rail, Black Tern and Sora) are not well surveyed by other monitoring programs.

---

## Executive Summary

---

Individual bird species varied considerably in their distribution among lake basins, probably due to factors including differences in species geographic range and variation in wetland habitat characteristics among basins. In general, station occupancy by aerial foraging and marsh nesting birds tended to be highest in the Lake Ontario basin, intermediate in the Erie and Huron basins, and lowest in the Lake Superior basin. This suggests that, in general, analysis of MMP bird species information will provide the greatest resolution for trends in the lower Great Lakes but may be more limited for the Lake Superior basin. Although additional years of data are required to estimate population trends with strong precision, the results of preliminary analyses are presented for those species for which sufficient data were available. Declining trends were observed for Pied-billed Grebe, Blue-winged Teal, American Coot, Black Tern, Tree Swallow, and Red-winged Blackbird. Statistically significant increases were observed for Canada Goose, Mallard, Chimney Swift, Northern Rough-winged Swallow, Common Yellowthroat and Common Grackle. For many species, changes in numbers tended to differ somewhat among lake basins. The expected detectable annual trend (i.e. percent change in population index based on counts) was calculated for aerial foraging and marsh nesting birds assuming that either 100 or 200 routes were monitored over 11 years (a 10-year interval). With at least 100 routes surveyed for 11

years, good trend resolution is expected for 14 of the 28 species commonly recorded on MMP routes. Included in this group are several species associated with deeper water wetland habitats (e.g. Pied-billed Grebe, Common Moorhen) and many others associated with dense wetland vegetation (e.g. Virginia Rail, Marsh Wren, Common Yellowthroat, Swamp Sparrow, Red-winged Blackbird). Monitoring on about 200 routes will be required to adequately assess trends for two species of some conservation concern, Sora and Black Tern. On average, about 150 routes were surveyed annually between 1995 and 1999, suggesting that the current scale of MMP monitoring is appropriate for most of the 28 species commonly recorded by MMP surveyors.

This report summarizes the first five years of the MMP's implementation across the Great Lakes basin. It provides an overview of data collected from 1995 through 1999 and shows how the MMP is playing a role in many of today's (and tomorrow's) conservation issues and actions at different scales. In addition, this report is a statement of appreciation to the agencies and foundations supporting the program through the years. Last but not least, this report is intended to convey to the hundreds of Great Lakes citizens who have volunteered with the program that their contributions are both highly valued and extremely

---

## Résumé Exécutif

---

Les terres humides des Grands Lacs, en particulier celles que dominent des plantes émergentes non ligneuses (marais), sont d'importants réservoirs de vie végétale et animale et remplissent une grande diversité de fonctions allant de l'amélioration de la qualité de l'eau aux possibilités de loisirs en plein air. En dépit de ces avantages, on draine les marais des Grands Lacs, on les remblaie et les modifie d'une façon ou d'une autre depuis plus d'un siècle. Ce rapport résume les cinq premières années du Programme de surveillance des marais (PSM) et montre comment les efforts de centaines de citoyens des Grands Lacs contribuent à la conservation, à la restauration et à la surveillance des amphibiens, des oiseaux et des habitats des marais.

Lancé à l'échelon binational en 1995, le PSM coordonne l'activité des bénévoles des États des Grands Lacs et de l'Ontario pour la surveillance des oiseaux et l'appel des amphibiens des marais côtiers et de l'intérieur des terres. Études d'oiseaux Canada exécute le programme en partenariat avec Environnement Canada et avec une aide importante de l'U.S. Environmental Protection Agency. En coordonnant et en uniformisant les relevés qu'établissent les bénévoles dans tout le bassin, le PSM surveille les populations d'oiseaux et d'amphibiens des marais dans le temps et à diverses échelles spatiales; étudie les associations d'habitats pour les oiseaux et les amphibiens de marais; contribue à l'évaluation des secteurs préoccupants des Grands Lacs et d'autres initiatives de conservation des terres humides; aide à mieux sensibiliser aux questions de conservation les citoyens, les décisionnaires, les scientifiques et d'autres personnes de la région. Les groupes locaux de citoyens utilisent les données du PSM pour mieux comprendre et entretenir les terres humides de leur voisinage, les gouvernements régionaux utilisent les données du PSM pour la planification, les gouvernements fédéraux et autres exploitent les données du PSM pour aider à évaluer la

santé des terres humides des Grands Lacs et de leur population d'amphibiens et d'oiseaux à l'échelle des bassins lacustres individuels et de la région globale.

Les préposés aux relevés du PSM suivent un protocole standardisé et se guident sur des documents de formation détaillés, sous forme écrite et auditive. Les relevés sont établis à des stations en demi-cercles placées le long des itinéraires. On dresse un relevé nocturne de grenouilles et de crapauds trois fois au printemps et au début de l'été. On établit un relevé du soir d'oiseaux deux fois au cœur de la saison de reproduction; à cet égard, on utilise des émissions enregistrées pour susciter une réaction chez plusieurs espèces de nature réservée. Les participants au PSM fournissent aussi des évaluations de l'habitat des terres humides à chaque station étudiée.

Les résumés de données présentés dans le rapport offrent un aperçu des types de renseignements apportés par les agents du PSM de 1995 à 1999 y compris. La plupart des résumés se concentrent sur le bassin des Grands Lacs, mais les données sélectionnées sont présentées pour des bassins lacustres individuels. Au total, 493 participants du PSM ont soumis des données de 575 itinéraires. La plupart de ceux-ci (489, soit 85 % du total) se trouvaient dans le bassin des Grands Lacs, une petite proportion (86, soit 15 %) étant à l'extérieur. Les bassins du lac Érié, du lac Ontario et du lac Huron renfermaient la plupart des itinéraires (respectivement 156, 139 et 102), les bassins du lac Michigan et du lac Supérieur comprenant moins d'itinéraires (respectivement 68 et 24). En moyenne, on a dressé la plupart des relevés du PSM dans des terres humides permanentes, le plus fort pourcentage des stations d'établissement des relevés se trouvant dans de grandes terres humides, une proportion un peu

moins grande se situant dans les très petites terres humides et quelques stations se classant dans des classes intermédiaires de grandeurs. En moyenne, environ 55 % de la zone de la station du PSM étaient couverts d'une végétation émergente non ligneuse et environ 27 % étaient constituées d'eau libre. Les quenouilles et les herbes/carex étaient les plantes émergentes dominantes à la plupart des stations, mais leur dominance respective variait suivant les bassins lacustres.

Les préposés aux relevés du PSM ont enregistré 13 espèces d'amphibiens qui lancent des appels dans le bassin des Grands Lacs en 1995 pendant toute la période de 1999. La rainette crucifère a été l'espèce la plus souvent détectée, devant la grenouille verte. La rainette grise, le crapaud d'Amérique et la grenouille léopard ont aussi été souvent enregistrés, alors que le ouaouaron, le faux-criquet et la grenouille des bois ont été moins courants. La répartition des huit espèces communes détectées par les préposés a un peu varié parmi les bassins fluviaux. Comme la zone de fréquentation de chaque espèce correspond à l'étendue du bassin des Grands Lacs, cette distribution est due non pas, sans doute, aux limites de zone de fréquentation, mais plutôt aux différences d'habitats, aux densités des populations régionales, à la date des visites d'établissement des relevés ou à d'autres facteurs. On a souvent rencontré la rainette crucifère dans les bassins des lacs Huron, Michigan et Supérieur, mais moins souvent dans les bassins des lacs Ontario et Érié. La grenouille verte était répartie de façon uniforme dans l'ensemble des bassins des lacs Ontario, Érié, Huron et Michigan, alors qu'on a rencontré le ouaouaron le plus souvent dans les bassins des lacs Ontario et Érié. La grenouille léopard a été détectée le plus souvent dans les bassins des lacs Ontario et Érié. Le PSM est encore très nouveau comme programme de surveillance de la population, mais on a avancé quelques tendances temporelles pour les populations de crapauds d'Amérique (en baisse) et de ouaouarons (en hausse). Seule la tendance à la baisse du faux-criquet a pu être déterminée avec un degré suffisant de fiabilité statistique. On a évalué dans quelle mesure d'autres années de données pourraient en principe offrir une bonne résolution à l'égard des tendances d'occupation des amphibiens. On a calculé la tendance annuelle probable (changement en pourcentage dans l'indice de population d'après l'occupation de stations), en supposant que 100 ou 200 itinéraires aient été surveillés au cours de 11 ans (intervalle de 10 ans). Compte tenu de 100 itinéraires mesurés pendant 11 ans, la tendance annuelle estimée était d'au plus 1 % pour tous les huit amphibiens communément enregistrés sur les itinéraires du PSM. Comme on s'y attendait, la résolution s'est améliorée du fait de la mesure à 200 itinéraires pendant 11 ans. La résolution des tendances probables a été la meilleure pour le crapaud américain et la grenouille verte, devant la rainette grise et la grenouille léopard. On s'attendait que la résolution soit inférieure pour les espèces moins courantes (ouaouaron, faux-criquet et grenouille des bois) ou ayant beaucoup fluctué dans l'occupation des stations (rainette crucifère). Ces résultats donnent à penser que d'autres années de données devraient en principe améliorer l'aptitude des données du PSM à fournir des estimations de tendances pour plusieurs espèces d'amphibiens, notamment les espèces dont la préservation et la gestion préoccupent, comme la grenouille léopard et le ouaouaron.

Dans les itinéraires des Grands Lacs, les observateurs du PSM ont enregistré 53 espèces d'oiseaux qui utilisent les marais pour se nourrir ou se reproduire. Parmi les oiseaux qui se nourrissent typiquement dans l'air qui surmonte les marais, les hirondelles bicolores et les hirondelles rustiques étaient les plus courantes. La carouge à épaulettes était l'espèce de nidification des marais

la plus souvent enregistrée, devant le bruant des marais, la paruline masquée et le troglodyte des marais. À un bon nombre de stations, on a aussi observé plusieurs espèces liées de près aux marais. Nombre de ces espèces (râle de Virginie, guifette noire, marouette de Caroline) sont mal dénombrées dans d'autres programmes de surveillance. Les espèces individuelles d'oiseaux variaient beaucoup dans leur distribution parmi les bassins fluviaux, sans doute du fait de facteurs comprenant par exemple des différences dans la zone de fréquentation des espèces et la variation des habitats des terres humides parmi les bassins. En général, l'occupation des stations par les oiseaux qui nichent dans les marais et qui se nourrissent d'insectes qu'ils attrapent en plein vol a tendance à être la plus élevée dans le bassin du lac Ontario, intermédiaire dans les bassins des lacs Érié et Huron et la plus basse dans le bassin du lac Supérieur. Cela donne à penser, en principe, que l'analyse de l'information sur les espèces d'oiseaux du PSM offrira la plus forte résolution pour les tendances de la partie inférieure des Grands Lacs, mais sera peut-être plus limitée pour le bassin du lac Supérieur. Il faut d'autres années de données pour estimer les tendances des populations avec une grande précision, mais les résultats des analyses préliminaires sont présentés pour les espèces pour lesquelles on dispose d'assez de données. On a observé des tendances à la baisse pour le grèbe à bec bigarré, la sarcelle à ailes bleues, la foulque d'Amérique, la guifette noire, l'hirondelle bicolore et la carouge à épaulettes. On a constaté des hausses, importantes sur le plan statistique, pour la bernache du Canada, le canard colvert, le martinet ramoneur, l'hirondelle à ailes hérissées, la paruline masquée et le quiscale bronzé. Pour nombre d'espèces, les changements quantitatifs avaient tendance à différer un peu suivant le bassin fluvial. On a calculé la tendance annuelle détectable probable (changement en pourcentage dans l'indice de population d'après les chiffres de recensement) pour les oiseaux qui se nourrissent en vol ou nichent dans les marais, en supposant que 100 ou 200 itinéraires aient été surveillés au cours de 11 ans (intervalle de 10 ans). Du fait d'au moins 100 itinéraires recensés pendant 11 ans, on s'attend à une bonne résolution de tendance pour 14 des 28 espèces communément enregistrées sur les itinéraires du PSM. Figurent dans ce groupe plusieurs espèces liées aux habitats en terres humides à eau plus profonde (grèbe à bec bigarré, gallinule poule-d'eau) et bien d'autres liées à une végétation de terres humides (râle de Virginie, troglodyte des marais, paruline masquée, bruant des marais, carouge à épaulettes). Il faudra procéder à une surveillance d'environ 200 itinéraires pour bien évaluer les tendances de deux espèces dont la préservation préoccupe, la marouette de Caroline et la guifette noire. En moyenne, on a opéré des recensements à environ 150 itinéraires par an entre 1995 et 1999, ce qui donne à penser que l'échelle actuelle de surveillance du PSM est appropriée pour la plupart des 28 espèces couramment enregistrées par les recenseurs du PSM.

Ce rapport résume les cinq premières années de mise en application du PSM dans tout le bassin des Grands Lacs. Il offre un aperçu des données recueillies de 1995 à 1999 y compris et montre comment le PSM joue un rôle dans bien des mesures et des questions de conservation (et de demain) d'aujourd'hui à diverses échelles. En outre, ce rapport est l'expression de remerciements aux organismes et aux fondations qui appuient le programme au cours des ans. Enfin et surtout, ce rapport vise à signaler aux centaines de citoyens des Grands Lacs qui ont participé à titre bénévole au programme que leur contribution est à la fois très appréciée et très importante.

## Great Lakes Wetlands

The Great Lakes basin covers more than 760,000 square kilometres (290,000 square miles) in area and its lakes hold about 23,000 cubic kilometres (5,500 cubic miles) of water (Government of Canada & U.S. Environmental Protection Agency, 1995)<sup>R</sup>. It is the largest fresh water system on earth and contains approximately 18% of the global supply. Wetlands are one of the most productive systems in the basin and are very important buffers between open water and upland habitats. Marshes – a type of wetland dominated by emergent plants – serve a variety of important ecological, economic and social roles.

Due in large part to the natural resources available in the region, the Great Lakes basin holds some of the continent's largest concentrations of industrial and urban activity, along with a significant percentage of U.S. and Canadian agricultural production. More than 10% of the U.S. and 25% of the Canadian population live in the basin (Government of Canada & U.S. Environmental Protection Agency, 1995).



J. McCracken

Many coastal and inland Great Lakes wetlands are at the lowest elevations in watersheds that support very intensive industrial, agricultural and urban development. Great Lakes wetlands have suffered under a variety of stressors in addition to damaging inputs from upland areas. Since European settlement, draining and filling have resulted in a loss of more than 50% of the wetlands in several states in the Great Lakes basin (Dahl, 1990) and more than 80% of the wetlands have been lost from several Ontario counties (Snell, 1987). More subtle impacts such as water level stabilization, sedimentation, contaminant and nutrient inputs, and the invasion of exotic plants and animals continue to degrade wetlands across the region. These impacts have combined to dramatically reduce the area and function of Great Lakes wetlands compared to pre-industrial times. Despite these widespread impacts, some marshes remain in relatively good health, provide high quality habitat for a wide variety of species, and continue to function well.

### State of the Lakes Ecosystem Conference

The State of the Lakes Ecosystem Conference (SOLEC) is a biennial Great Lakes conference established by the federal governments of Canada and the United States. It began in 1992 as an independent science-based method for reporting on the state of the health of the Great Lakes basin ecosystem. In 1996, SOLEC began to evolve from a means of reporting on a few indicators to a way of developing a comprehensive, basin-wide set of indicators that would facilitate reporting more fully on progress under the Great Lakes Water Quality Agreement. After thorough reviews of a large suite of potential indicators by teams of experts and the public, a recommended list of indicators was presented at SOLEC 1998. Proposed indicators were those deemed sufficient and necessary to provide information on the state of the Great Lakes. Indicators were recommended that pertained to all major aquatic and terrestrial elements of the Great Lakes basin and to human health and society. A suite of 13 indicators was proposed for coastal wetlands and, together, these indicators are intended to reflect the state of coastal wetland health. Indicators related to plants, invertebrates, fish, and other biota were complemented by measures of wetland area, adjacent land uses, contaminant inputs and water level fluctuations. Two of these recommended indicators – wetland bird diversity/abundance and amphibian diversity/abundance – depend upon data provided by the MMP.

Efforts are underway on a number of fronts in both Canada and the U.S. to conserve the remaining high quality wetlands and to restore to the Great Lakes landscape the presence and functions of those wetlands that have been damaged or lost. Many of these efforts are led by provincial, state and federal agencies and several conservation organizations are also playing a vital part in conserving and restoring wetlands. Although agency leadership is critical, the importance of the support and participation of the region's citizens to these conservation initiatives cannot be overstated. Through their contributions on an individual basis or through citizen committees and programs such as the Marsh Monitoring Program (MMP), concerned people from across the basin are providing the necessary motivation, imagination and information to keep high quality wetlands healthy, identify and respond to signs of trouble, and aid in the restoration of degraded wetland habitats.

### The Marsh Monitoring Program

The MMP is a binational, long-term program that coordinates volunteers from the Great Lakes states and Ontario in monitoring the birds and calling amphibians of coastal and inland marshes. The program employs standardized methods for surveying over a broad time scale and across a large area. Bird Studies Canada (BSC)<sup>1</sup> delivers the program in partnership with Environment Canada (EC)<sup>1</sup>, with substantial additional support from the U.S. Environmental Protection Agency (EPA)<sup>1</sup>. After initial development and testing, the MMP was launched across the Great Lakes basin in 1995.

Through building on the enthusiasm and skills of volunteers throughout the basin, the MMP serves the following objectives:

- monitor populations of marsh birds and amphibians over time on a variety of spatial scales;
- investigate habitat associations of marsh birds and amphibians;
- contribute to the assessment of Great Lakes Areas of Concern (AOCs) and other wetland conservation initiatives with respect to marsh bird and amphibian communities; and
- increase awareness of marsh bird, amphibian and wetland conservation issues through volunteer participation and communication to the public, scientists and regulators.

<sup>R</sup> References listed at end of report

<sup>1</sup> Please see 'Internet Resources' section for a list of selected websites.

## The Great Lakes Conservation Context

Canada and the United States have a long history of jointly managing the Great Lakes basin. Official agreements between the two countries have had broad implications for the region's natural resources, helping to stimulate a variety of restoration, conservation and monitoring activities. The Boundary Waters Treaty, signed in 1909, led to the creation of the International Joint Commission (IJC). This treaty gave the IJC authority to study boundary water issues, to make binding decisions, and laid the groundwork for many subsequent studies and formal agreements, including the first Great Lakes Water Quality Agreement (GLWQA) in 1972. The 1987 Protocol to the GLWQA is the most recent formal agreement between Canada and the United States regarding the Great Lakes basin. The purpose of this agreement is to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes basin. The values of wetlands are recognized throughout the agreement, and wetland conservation and restoration efforts have important roles in meeting the 1987 Protocol objectives.

As part of their response to the 1987 Protocol, the two federal governments developed research, management and funding programs. Among these, Canada's Great Lakes Sustainability Fund (formerly Great Lakes 2000 Cleanup Fund), the U.S. Great Lakes Protection Fund, and U.S. EPA's Great Lakes National Program Office and Lake Erie Team have contributed essential financial support to the MMP.

Under the auspices of the 1987 Protocol, 43 coastal Great Lakes sites were identified as having impaired beneficial uses and being in urgent need of rehabilitation. Each of these Areas of Concern (AOCs) (Figure 1) was evaluated and a Remedial Action Plan (RAP) prepared for each. The goal of each RAP is to restore to the AOC the full range of social, economic and ecological benefits historically supplied by the site. In an effort to gauge the response of wildlife-related benefits to restoration activities, special emphasis is made in the MMP to ensure appropriate survey coverage of marshes located within AOCs.

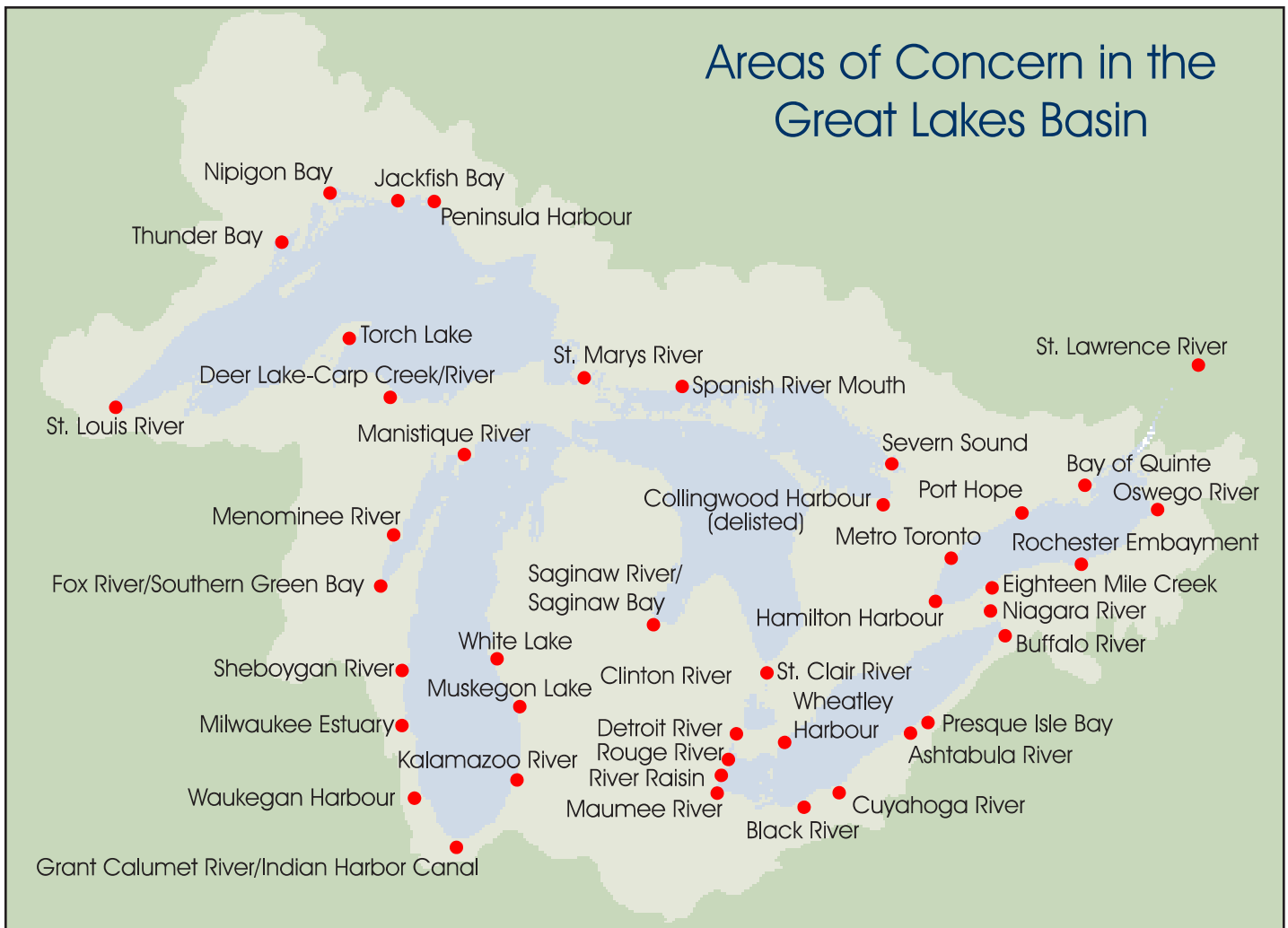


Figure 1: Areas of Concern in the Great Lakes basin. Thus far, one AOC, Collingwood Harbour, has been delisted.

---

## Introduction

---

MMP data are being used, and may be used in the future, to assist a wide range of wetland and wetland-wildlife conservation and rehabilitation issues. Local citizen groups are using MMP data to help understand and maintain wetlands in their neighbourhoods. Regional governments make use of MMP data for planning and MMP data contribute to management plans on the scale of individual lake basins (e.g. Lake Erie) and to the assessment of wetland health at the scale of the Great Lakes basin (e.g. State of the Lakes Ecosystem Conference).

This report summarizes the first five years of the MMP's implementation across the Great Lakes basin. It provides an overview of data collected from 1995 through 1999 and shows how the MMP is playing a role in many of today's (and tomorrow's) conservation issues and actions. In addition, this report is a statement of appreciation to the agencies and foundations supporting the program through the years. Most importantly, this report conveys to the hundreds of Great Lakes citizens who have volunteered with the program that their contributions are both highly valued and extremely important.



*Bullfrog: BSC Files*

### **Great Lakes Wetland Conservation Action Plan**

In Canada, the Great Lakes Wetlands Conservation Action Plan (GLWCAP) brings together federal and provincial governments and non-government organizations towards the implementation of a comprehensive wetlands conservation program for Great Lakes wetlands. GLWCAP was announced in 1994 through the signing of the Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA). The COA is an agreement between the governments of Canada and Ontario and sets specific targets and time frames for restoring, protecting and sustaining the basin's ecosystems. GLWCAP brings together a variety of partners in an effort to conserve the remaining wetlands in the Great Lakes basin. Partners take on responsibilities for individual projects, milestones and strategies that best complement their strengths and interests. The MMP is a key component of GLWCAP's monitoring and science strategy as well as its communication and coordination efforts.

### Why Wetlands? Why Birds and Amphibians?

Wetlands are critical in ensuring the ecological, economic and social health of the Great Lakes basin. Wetlands help protect shoreline areas from storm damage, reduce flood damage, refresh groundwater supplies, improve water quality by retaining sediments and excess nutrients, act as nursery areas for fish and wildlife, and provide opportunities for recreation ranging from fishing to birding. Marshes are particularly important reservoirs of biodiversity that provide critical habitat for a wide variety of plant and animal species. Despite all their valuable functions, Great Lakes wetlands have been heavily impacted over the last century. Anecdotal evidence and limited monitoring information indicates that many wetland-dependent wildlife species appear to be declining in response to these impacts.

A high proportion of the Great Lakes basin's wildlife species inhabit wetlands during part of their life cycle, and many of the species at risk in the basin are associated with wetlands. As a group, marsh birds are believed to have experienced population declines due to historical habitat loss and degradation, but it is unknown whether, and to what geographic extent, these declines are still occurring (Gibbs et al., 1992; Conway, 1995; Melvin & Gibbs, 1996). Similarly, there is growing international concern about declines of amphibian populations and an apparent increase in deformity rates (Heyer et al., 1994; Stebbins & Cohen, 1995).

About two-thirds of the birds and three-fourths of the amphibians federally listed as threatened or endangered in the U.S. are associated with wetlands (Mitsch & Gosselink, 1993). In Ontario, at least 10 bird species of conservation concern are closely associated with Great Lakes coastal wetlands (Austen et al., 1994). Although much is known about many species of Great Lakes landbirds, the ecology of most marsh-dependent species has received much less attention and very little is known about rails and many other secretive species (Gibbs et al., 1992; Conway, 1995; Melvin & Gibbs, 1996). Marsh birds are believed to be sensitive to habitat disturbances, and many scientists and conservationists consider their populations to be at risk due to the continuing loss and degradation of their habitats.

Many amphibian species, including two species of conservation concern (Blanchard's Cricket Frog and Fowler's Toad), are closely associated with Great Lakes coastal wetlands (Green, 1992; Oldham, 1992). Because frogs and toads are relatively sedentary, have semi-permeable skins, and breed in and adjacent to aquatic systems, they are likely to be more sensitive to, and indicative of, local sources of contamination to wetlands than most other vertebrates (Stebbins & Cohen, 1995).

Both marsh birds and calling amphibians are relatively easy to detect and identify, characteristics that allow geographically extensive surveys to be conducted by volunteer naturalists. Information on the abundance, distribution and diversity of marsh birds and amphibians provides needed measures of their population trends, their habitat associations, and can contribute to more effective, long-term conservation strategies. The MMP was designed to



*Blue-winged Teal nest: R. Weeber*



*BSC Files*