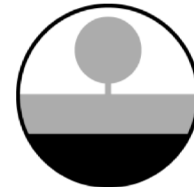
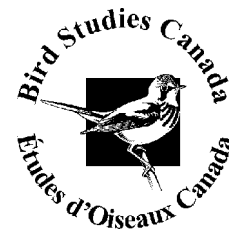


Conservation rankings for birds of the Grand River basin: a tool for conservation and management



A joint project of:



Grand River
Conservation
Authority

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EXECUTIVE SUMMARY

Municipalities and planning authorities in Ontario are faced with the formidable task of coordinating development activities without impairing the values and functions of natural heritage features, including those associated with significant wildlife habitat and significant woodlands. The approach described in this report aims to help planning authorities set priorities for conservation efforts by targeting bird species (and their associated habitats) that are significant within their region. Specifically, this report advocates the use of prioritised lists of birds as tools that planning authorities might use when developing Official Plans (e.g., identifying significant wildlife habitat, Environmentally Sensitive Areas, etc.) and when evaluating development proposals.

This report concerns significant bird species breeding within the Grand River basin. Additional lists of priority species for upper tier municipalities containing lands within the Grand River basin are also included (Grey, Dufferin, Wellington, Perth, Halton, Waterloo, Hamilton-Wentworth, Oxford, Brant, and Haldimand-Norfolk). Three distinct approaches have been used in establishing conservation priorities at the municipal level: *Jurisdictional Responsibility* is based on breeding distribution information and reflects the importance of a particular region to each bird species relative to its breeding distribution; *Preservation Responsibility* uses information on each species' abundance, population trend and sensitivity to identify the most vulnerable species at the provincial level; *Area Sensitivity* relates to the habitat-area requirements of a species. Each species breeding within the Grand River basin is assigned a score for each of the three components. A species is added to the basin priority list if it scores highly on at least one of the three individual components. A composite score is derived by summing the three individual scores and is used to rank species by conservation priority for planning purposes at the local level. The report describes how such lists might be used by resource managers and planners to fulfill obligations under the *Planning Act*, to inform decision making and, ultimately, to enhance conservation efforts.

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How to use this report

This report serves as a planning tool for the conservation of biodiversity in the Grand River basin. The report is divided into two primary sections:

Part I will be of immediate use to anyone making decisions concerning land management and conservation planning. Here, the conceptual basis and logic of the prioritisation approach are described, and a list of priority species is provided for the basin. This is all you need to get started.

To start using the list of priority species right away, first review the section entitled “How to interpret the list of priority species,” then go directly to the list.

Part II is more technical in nature and provides a thorough description of the methodology, along with detailed tables and maps. This complementary information may be of interest to those who wish to understand the “nuts and bolts” of the approach.

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PART I:

**A GUIDE FOR SETTING
CONSERVATION PRIORITIES**

INTRODUCTION

Background and Rationale

The landscapes of southern Ontario¹ consist of a varied mixture of land uses and cover types, including agriculture, urban, resource extraction, and wildlife habitat (forest, wetland, grassland). Southern Ontario is the most heavily populated and industrialized region in Canada. Forest cover in many counties in the region currently comprises a fraction of its extent prior to European settlement (Riley and Mohr, 1994). Other studies have shown that grasslands (Bakowsky, 1996) and wetlands (Snell, 1986) have also been extensively converted to other uses throughout the region. Animal and plant communities that rely on the availability of these habitat types for their survival have certainly been affected by these broad scale changes, some for the better, but most for the worse.

The Grand River basin, located in southwestern Ontario, is the largest Great Lakes sub-basin in the region (Figure 1). The basin is exceptionally rich in terms of its diversity of landscapes, vegetation characteristics, climatic regimes, flora and fauna, and so on (GRCA, 1996). Much of its unique character owes to the fact that it straddles an ecologically significant boundary – the northern limit of the Carolinian floristic zone. Because the basin encompasses both the largely deciduous forests of the Carolinian zone at its southernmost limits and the mixed forests of Great Lakes-St. Lawrence region at its northernmost reaches, ecosystems vary greatly within the basin (the availability of broad habitat types within the basin is shown in Table 1). Much of the eastern portion of the basin is influenced by the Niagara Escarpment, a geologically and ecologically significant landscape feature of southern Ontario, and a World Biosphere under the United Nations Environment Programme. Demands on the natural resources of the Grand River region continue to rise along with the rural and urban population. Clearly, land use planning and management needs to be conducted in the best possible manner and with the best tools and information available.

In southern Ontario, land use planning is a local level activity, carried out by upper and lower tier municipalities, and other bodies such as the Niagara Escarpment Commission. Responsibility for land use planning is conferred upon these planning authorities by the Government of Ontario via the *Planning Act*. Essentially, the province sets out planning policy, regulations and guidelines that are implemented by local planning authorities. While not a “planning authority” in the strictest sense of the term, Conservation Authorities, including the Grand River Conservation Authority (GRCA), also participate in the land use planning process by providing scientific and technical expertise to geographically overlapping municipalities². The GRCA watershed extends into ten upper tier municipalities (counties or regional municipalities, not including urban centres): Grey, Dufferin, Wellington, Perth, Halton, Waterloo, Hamilton-

¹In this report, southern Ontario is defined by the Mixedwood Plains ecozone (Ecological Stratification Working Group, 1995; Figure 1), which approximates the area of Ontario south and east of the Canadian Shield. While this ecozone is part of a national scale land classification system, its boundaries represent a close match to site regions 6E/7E in the OMNR ecological land classification system, a system with which some readers may be more familiar.

²In this report, the terms “municipalities” and “planning authorities” are used in a general sense in reference to bodies such as Conservation Authorities, the Niagara Escarpment Commission, and actual municipalities that conduct land use planning under various Acts of Parliament.

Wentworth, Oxford, Brant, and Haldimand-Norfolk. The GRCA is currently devising a Watershed Forest Management Plan to guide its operations in a coordinated, conservation-oriented manner.

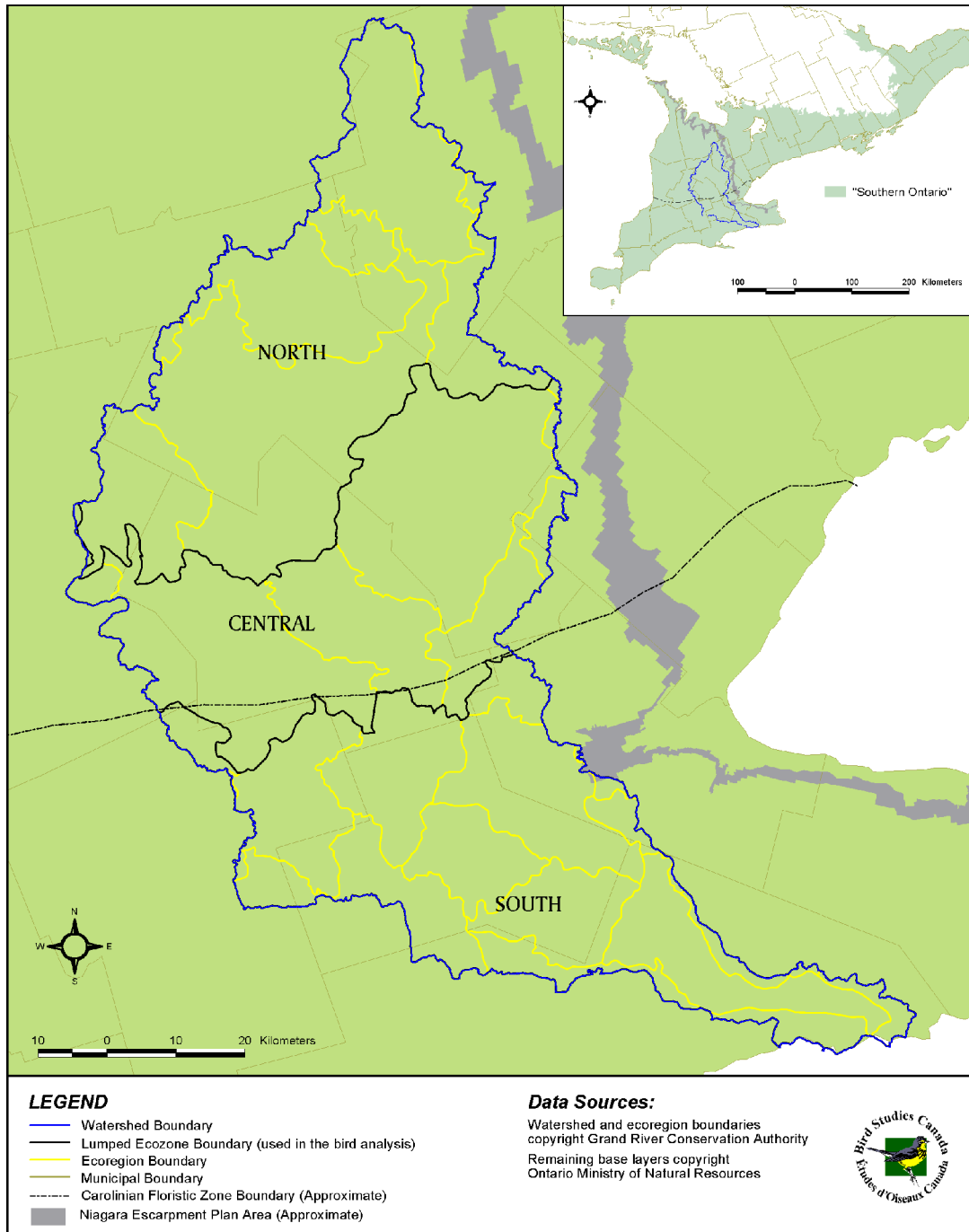


Figure 1. The Grand River basin in its regional context.

Table 1. Broad habitat types within the Grand River basin and its constituent ecoregions.

Ecoregion Name and Zone Designation	Total Area		Upland Forest (A)		Lowland Forest (B)		Total Forest (A+B)		Marsh (C)		Total Wetland (B+C)		Grassland & Pasture (D)		Total for all Habitat Types (A+B+C+D)	
	(km ²)	(km ²)	% of region	(km ²)	% of region	(km ²)	% of region	(km ²)	% of region	(km ²)	% of region	(km ²)	% of region	(km ²)	% of region	
NORTHERN ZONE																
HEADWATERS	454.4	85.7	18.9	12.8	2.8	98.5	21.7	0.0	0.0	12.9	2.8	60.5	13.3	159.0	35.0	
REDICKVILLE	4.4	1.1	25.8	0.4	8.2	1.5	34.0	0.0	0.0	0.4	8.2	0.4	8.5	1.9	42.5	
SHELBURNE	1.6	0.2	9.7	0.0	0.0	0.2	9.7	0.0	0.0	0.0	0.0	0.3	22.1	0.5	31.8	
ORANGEVILLE	186.1	43.0	23.1	4.3	2.3	47.3	25.4	0.1	0.1	4.4	2.4	25.5	13.7	72.9	39.2	
LUTHER	86.5	14.8	17.0	14.1	16.3	28.9	33.4	3.3	3.9	17.5	20.2	8.0	9.3	40.3	46.5	
ARTHUR	377.4	34.6	9.2	2.8	0.7	37.4	9.9	0.1	0.0	2.9	0.8	39.6	10.5	77.0	20.4	
CONESTOGO	984.7	95.3	9.7	3.3	0.3	98.6	10.0	0.0	0.0	3.4	0.3	25.9	2.6	124.6	12.7	
LISTOWEL	313.8	21.1	6.7	0.6	0.2	21.8	6.9	0.0	0.0	0.6	0.2	5.4	1.7	27.1	8.6	
TOTALS FOR ZONE:	2408.8	295.7	12.3	38.4	1.6	334.1	13.9	3.6	0.2	42.0	1.7	165.5	6.9	503.2	20.9	
CENTRAL ZONE																
GUELPH	777.4	128.1	16.5	14.5	1.9	142.6	18.3	0.1	0.0	14.5	1.9	67.7	8.7	210.3	27.1	
CAMPBELLVILLE	61.3	23.7	38.7	2.6	4.2	26.3	42.9	0.1	0.2	2.7	4.4	10.3	16.9	36.7	59.9	
ELLICE	35.5	2.6	7.2	1.4	3.8	3.9	11.0	0.1	0.2	1.4	4.0	0.3	0.7	4.2	11.9	
WILMOT	656.4	79.9	12.2	3.7	0.6	83.6	12.7	0.0	0.0	3.7	0.6	14.7	2.2	98.3	15.0	
PUSLINCH	171.7	41.5	24.1	5.8	3.4	47.2	27.5	0.0	0.0	5.8	3.4	27.2	15.8	74.4	43.3	
CENTRAL GRAND RIVER	313.8	24.6	7.8	3.2	1.0	27.8	8.9	0.4	0.1	3.6	1.2	9.3	3.0	37.5	11.9	
TOTALS FOR ZONE:	2016.0	300.3	14.9	31.1	1.5	331.4	16.4	0.6	0.0	31.7	1.6	129.5	6.4	461.5	22.9	
SOUTHERN ZONE																
BEVERLY	75.4	20.7	27.5	5.2	6.8	25.9	34.3	0.0	0.0	5.2	6.8	11.4	15.1	37.2	49.4	
DUMFRIES	289.1	48.8	16.9	3.8	1.3	52.6	18.2	0.0	0.0	3.8	1.3	8.8	3.0	61.4	21.3	
BLenheim	285.2	50.6	17.7	9.6	3.4	60.2	21.1	0.0	0.0	9.6	3.4	5.2	1.8	65.4	22.9	
WOODSTOCK	63.1	4.3	6.7	0.1	0.1	4.3	6.9	0.0	0.0	0.1	0.1	0.1	0.1	4.4	7.0	
ST. GEORGE	373.3	35.5	9.5	0.8	0.2	36.3	9.7	0.0	0.0	0.8	0.2	23.9	6.4	60.2	16.1	
HAMILTON	12.4	1.7	13.8	0.0	0.3	1.7	14.1	0.0	0.0	0.0	0.3	0.9	7.1	2.6	21.2	
MOUNT HOPE	45.8	2.9	6.2	0.0	0.0	2.9	6.2	0.0	0.0	0.0	0.0	2.9	6.2	5.7	12.5	
BRANTFORD	192.1	9.7	5.0	0.6	0.3	10.3	5.4	0.0	0.0	0.6	0.3	9.8	5.1	20.0	10.4	
WATERFORD	199.9	29.6	14.8	2.9	1.4	32.5	16.2	0.0	0.0	2.9	1.4	4.9	2.5	37.4	18.7	
NORWICH	67.6	6.0	8.8	0.4	0.7	6.4	9.5	0.0	0.0	0.4	0.7	0.8	1.2	7.2	10.6	
TUSCARORA	220.9	85.3	38.6	2.0	0.9	87.3	39.5	0.0	0.0	2.0	0.9	39.7	18.0	127.0	57.5	
CAYUGA	296.9	36.2	12.2	4.2	1.4	40.4	13.6	4.6	1.5	8.8	3.0	21.1	7.1	66.1	22.3	
GAINSBOROUGH	36.8	11.8	32.1	0.3	0.9	12.2	33.0	0.0	0.0	0.3	0.9	2.9	7.8	15.0	40.7	
JARVIS	160.6	18.7	11.7	0.2	0.1	18.9	11.8	0.0	0.0	0.2	0.1	14.7	9.2	33.7	21.0	
WAINFLEET	38.9	9.2	23.8	0.5	1.3	9.7	25.0	0.0	0.0	0.5	1.3	4.5	11.6	14.3	36.6	
TOTALS FOR ZONE:	2358.2	370.9	15.7	30.6	1.3	401.5	17.0	4.6	0.2	35.2	1.5	151.5	6.4	557.5	23.6	
TOTALS FOR GRAND RIVER BASIN	6783.0	966.9	14.3	100.1	1.5	1067.0	15.7	8.8	0.1	108.8	1.6	446.5	6.6	1522.2	22.4	

Note: Habitat coverage is derived from provincial LANDSAT TM imagery (circa 1986-1992), courtesy of the Ontario Ministry of Natural Resources. Figures do not sum to 100% as other land cover types (e.g., water, urban, intensive agriculture) were not included. As well, coastal wetlands are under-represented by the GIS methodology. These figures are approximations only; the GRCA will undoubtedly have more accurate information concerning land cover within the basin.

Section 3 of the *Planning Act* allows the province to “provide policy direction on matters of provincial interest related to land use planning and development” and stipulates that all planning authorities (municipal governments, Conservation Authorities, etc.) “shall have regard to” policy statements issued under the Act. The Provincial Policy Statement (Government of Ontario, 1996) represents the latest evolution of provincial policy and is guided by the notion that Ontario’s economic, environmental and social well-being are governed by the following principles:

1. managing change and promoting efficient, cost-effective development and land use patterns which stimulate economic growth and protect the environment and public health;
2. protecting resources for their economic use and/or environmental benefits; and
3. reducing the potential for public cost or risk to Ontario’s residents by directing development away from areas where there is a risk to public health or safety or of property damage.

-Provincial Policy Statement (Government of Ontario, 1996:1)

Specific rules regarding the protection of Natural Heritage are provided in section 2.3 of the Provincial Policy Statement (PPS). For example, the policy broadly states that “natural heritage features and areas will be protected from incompatible development.” Specifically, the policy states that “development and site alteration will neither be permitted in significant wetlands south and east of the Canadian Shield nor in significant portions of the habitat of endangered and threatened species.” The policy indicates that development and site alteration may be permitted in the following areas, provided that there will be no negative impacts on the natural features or the ecological functions for which the area is identified:

- fish habitat;
- significant wetlands in the Canadian Shield;
- significant woodlands south and east of the Canadian Shield;
- significant valleylands south and east of the Canadian Shield;
- significant wildlife habitat; and
- significant areas of natural and scientific interest

Development and site alteration may be permitted on lands adjacent to any of the features mentioned above, provided that there will be no negative impacts on the natural features or the ecological functions for which the area is identified. There is also a provision to maintain or enhance the diversity of natural features in an area.

One of the difficulties that land use planners and resource managers face is interpreting the new provincial policies and developing practical methods for implementing them. For example, the identification of significant wetlands and ANSIs is accomplished through established evaluation procedures put forth by the province. However, for other features mentioned above (e.g., significant woodlands, significant wildlife habitat), there is presently no standardised evaluation system in place, although the Ontario Ministry of Natural Resources (OMNR) is currently working on guidelines. OMNR has also produced a comprehensive advisory manual to assist planning authorities with interpreting policy 2.3 of the PPS (OMNR, 1999). The PPS

(Government of Ontario, 1996:18) advises that the “significance” of natural heritage features could be evaluated on the basis of “ecological importance in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic or natural heritage system,” or in terms of “amount, content, representation, or effect.”

Given the bewildering array of plants and animals inhabiting the landscapes of southern Ontario, accommodating the specific needs of each individual species in local planning and development activities is not practical. Conservation objectives will be most attainable if planning actions are targeted to critical habitats and to sites containing regionally important assemblages of species. The approach described in this report aims to help planning authorities prioritise conservation efforts by targeting bird species (and their associated habitats) that are “significant” within their region, and not necessarily just rare. Specifically, this report advocates the use of prioritised lists of birds as tools that planning authorities might use when developing or amending Official Plans—including the identification of significant natural heritage features—and when evaluating development proposals.

Lists of birds of conservation priority thus represent another tool within a municipality’s toolbox that can be used to fulfill its obligations under the *Planning Act* with regard to the protection of natural heritage features. These lists can be combined with information on significant plants, mammals, etc., in a multifaceted approach to identifying and protecting significant natural heritage features. The approach has the advantage of being standardised throughout southern Ontario, thus facilitating collaborative work among municipalities that may not have equal resources at their disposal to carry out detailed ecological studies on their own. While this approach focuses on birds, the same principles can be applied to other groups of wildlife.

Thus, this report aims to provide resource managers working in the Grand River basin with a list of bird species of conservation concern applicable to their region. The list is meant to assist – in the context of other tools, approaches and good science – with the identification of significant natural heritage features and to maintain or enhance biodiversity in the region.

The remaining pages in Part I describe, in general terms, the way in which lists of priority species are developed at the regional level (counties, regional municipalities, Conservation Authorities, the Niagara Escarpment, etc.). First, the logic and the components of the approach are reviewed. Then, a list of priority species for the Grand River basin is provided, along with explanatory notes to aid in interpretation of the list. Finally, Part II provides technical appendices for those interested in taking a closer look at the methodology.

LOGIC OF THE PRIORITISATION SCHEME

Components of the Conservation Priorities Approach

Determining conservation priorities for breeding birds at the local level involves the assessment of three criteria: *Jurisdictional Responsibility* (JR, a scale-dependent measure related to breeding distribution within a given spatial unit); *Preservation Responsibility* (PR, a scale-independent measure based on the biological characteristics of the species); and, *Area Sensitivity* (AS, a scale-independent measure related to the habitat-area requirements of the species). Each species breeding within a region is objectively assigned a score for each component (refer to the appendices for more detail on scoring methods) and these scores are then summed to provide a total score. **The list of priority species for a region comprises species that achieve a high score on at least one of these components and which have a total score greater than 8.5 (of a total 15 possible points).**

Component 1: Jurisdictional Responsibility

The Concept

Jurisdictional Responsibility is based on the concept that some species have distributions that are concentrated in some jurisdictions more than others, regardless of the species' abundance or status. In such cases, because some jurisdictions have a proportionally greater share of a species' population, these jurisdictions also carry a proportionally greater responsibility for the conservation of the species in question. The breeding habitat of these species will need special consideration in land-use decisions, which are invariably made at the local jurisdictional level.

At the provincial level, Ontario has a higher responsibility for conserving those species whose Canadian distributions are restricted to Ontario than for species which are widely distributed throughout the nation. For example, because the Canadian breeding range of Prothonotary Warblers is restricted to Ontario, this province has a very high responsibility for the conservation of this species. Likewise, if we consider other units such as upper tier municipalities or watersheds in southern Ontario, each has some responsibility for helping to maintain Ontario's biodiversity. Since most conservation action and planning occurs at the local level, JR scores are particularly important at this scale.

The Application

Jurisdictional Responsibility scores are derived from maps of breeding distribution. Broad scale range maps are used to calculate JR scores at the national, provincial, and eco-regional levels of analysis. At finer scales, breeding distribution information from the Ontario Breeding Bird Atlas (Cadman et al., 1987) is used. This data source indicates a species' breeding presence or absence within 10 x 10 km squares. For a given region, the JR component identifies species that are more widespread and abundant within the region relative to other regions. Species that have a large proportion of their breeding range falling within the boundaries of the region receive a high Jurisdictional Responsibility score for that region. The local level score is then averaged with JR scores from the eco-regional, provincial, and national level to derive a composite JR score for the region. In this manner, the conservation priorities for a local level region are linked

to priorities at broader geographic scales. Species scoring high on the composite JR score are flagged as species of conservation priority.

Component 2: Preservation Responsibility

The Concept

In this report, Preservation Responsibility focuses on species that are at risk at the provincial level. These species—whether because of rarity, very limited distribution, low reproductive output or declining numbers—may warrant priority conservation throughout their range, regardless of jurisdictional boundaries. Essentially, this component serves as a warning that the species may be in trouble and that extra care may be necessary in local-level planning and development activities.

The Application

Species are assigned scores based on the following criteria:

- abundance: rare species score highest
- breadth of breeding/winter range: restricted ranges score highest
- reproductive output: smallest clutches, or most infrequent breeding, score highest
- population trend over time: greatest declines score highest

These individual scores are averaged together to form a composite Preservation Responsibility score. Species scoring highly on this component are identified as species of conservation priority wherever they occur within the province, regardless of their Jurisdictional Responsibility score within any particular region.

Component 3: Area Sensitivity

The Concept

The Area Sensitivity criterion identifies species whose presence or absence is closely related to the amount of breeding habitat area within a given spatial unit. For example, some species may not be sensitive to habitat amount at all (i.e., they are present almost everywhere -- whether there is 5% suitable habitat cover in a region or 90% suitable habitat cover), while others may be very sensitive (i.e., they only regularly breed in areas containing larger amounts of habitat). Because of their sensitivity to changes in habitat amounts, area-sensitive species may require special consideration in planning and development activities.

The Application

We used breeding range information from the Ontario Breeding Bird Atlas (Cadman et al., 1987) and land cover information from OMNR's LANDSAT TM imagery to determine relationships between breeding presence/absence and habitat area. Since this project focusses on southern Ontario, the analysis of area sensitivity was restricted to breeding distribution and land cover data within this region. Species scoring highly on the Area Sensitivity component are flagged as species of conservation priority.

PRIORITY SPECIES AT THE LOCAL LEVEL

How to Interpret the List of Priority Species

The list of priority species³ (Table 3 at end of Part I) for the Grand River basin contains species that score highly *on at least one of the three criteria* used in the priority setting exercise: Jurisdictional Responsibility, Preservation Responsibility, and/or Area Sensitivity and which retain a total score of greater than 8.5. The list, therefore, is not a complete inventory of all the species occurring within the basin; the Ontario Breeding Bird Atlas (Cadman et al., 1987) should be consulted for additional detail. Local naturalist groups can also provide more up-to-date information.

The list contains species that are a conservation priority within the basin. It is important to recognize that every species on the list is important for one reason or another. Because species are evaluated on the basis of three different components, they will be placed on the list for very different reasons. By giving these three components equal weighting in the priority designation, the list captures species that are especially characteristic of the watershed (JR component); species that are uncommon and/or possess biological characteristics that render them less resilient to disturbances (PR component); and species that are sensitive to the amount of suitable breeding habitat available within a region (AS component).

The list is designed to identify a broad group of species that represent a priority for conservation, based on the three components that make up the approach. Thus, the list is not intended to identify only rare species or species under immediate threat or in need of population restoration. Further, the approach is not designed to identify species that are indicators of ecosystem health or integrity. While many such species will undoubtedly be on the list, resource managers and others will be left with the job of deciding how to apply this information (although some suggestions are provided on the following pages).

The list is sorted in descending order by level of conservation priority: level one (highest) through level four (lowest). The list is intended to complement and not replace the official list of species at risk in the province (see Table 2 for more detail) or lists that have already been developed by municipalities and other groups. In fact, Table 3 highlights species that carry official designations of “vulnerable”, “threatened” and “endangered” (VTE) within the province of Ontario (based on provincial or federal designation). As mentioned earlier, the Provincial Policy Statement states that development is not permitted within significant portions of the habitat of endangered and threatened species. Planning authorities must also adhere to the *Endangered Species Act*, which sets out specific rules regarding development in and around the habitat of endangered species. Within each priority category, species are listed in alphabetical order, and should be judged as being equal in their conservation importance. As well, to make interpretation of the list easier, the list is subdivided into broad habitat types (i.e., priority forest birds are listed separately from marsh and open country birds).

³Lists for municipalities overlapping GRCA lands may also need to be consulted; they are included in Appendix E.

Table 2. Southern Ontario species at risk. Under the *Planning Act*, Planning authorities must have regard to species with official “endangered” and “threatened” status (Government of Ontario, 1996:8). The policy does not, however, stipulate whether the OMNR or COSEWIC designations – or both – should be used. Under Ontario’s *Endangered Species Act*, Planning authorities must protect the habitat of those species with official OMNR “endangered” status. We recommend equal weighting for both designations: if a species is endangered or threatened, provincially or federally, its habitat should be protected. Further, “vulnerable” species should also be paid special attention with regard to proposed development activities in and around their breeding habitat.

SPECIES NAME	STATUS	
	OMNR	COSEWIC
Acadian Flycatcher		Endangered
Bald Eagle	Endangered	
Barn Owl	Threatened	Endangered
Henslow’s Sparrow	Endangered	Endangered
King Rail		Endangered
Kirtland’s Warbler	Endangered	Endangered
Loggerhead Shrike	Endangered	Endangered
Northern Bobwhite		Endangered
Peregrine Falcon	Endangered	Threatened
Piping Plover	Endangered	Endangered
Prothonotary Warbler		Endangered
Hooded Warbler		Threatened
Black Tern	Vulnerable	
Cerulean Warbler	Vulnerable	Vulnerable
Great Gray Owl	Vulnerable	
Least Bittern		Vulnerable
Louisiana Waterthrush	Vulnerable	Vulnerable
Red-headed Woodpecker	Vulnerable	Vulnerable
Red-shouldered Hawk	Vulnerable	Vulnerable
Short-eared Owl		Vulnerable
Yellow-breasted Chat	Vulnerable	Vulnerable
Yellow Rail		Vulnerable

Source: Royal Ontario Museum and Ontario Ministry of Natural Resources (www.rom.on.ca/ontario/risk.html) or (www.mnr.gov.on.ca/MNR/fwmenu.html). These web pages should be consulted for updates and additions to the list of species at risk in Ontario. Due to time lags between changes to the list and posting on the web site, OMNR staff may also need to be contacted directly to obtain the most up-to-date list of species at risk. The information in Table 2 is accurate to 21 June 1999.

Potential Applications and Suggested Uses of the List

Implementation of the Provincial Policy Statement

The list of priority species can be used for a variety of purposes. One such use is the fulfilment of a municipality's obligations under the *Planning Act* and, specifically, directives within the PPS pertaining to the protection of natural heritage values. Because Conservation Authorities often play a major role in the review of development proposals and since they also devise their own plans for conserving natural heritage, the list of species can provide similar evaluative and analytical functions in this context.

At the landscape level, the list could be used for pro-active planning and policy development, and cumulative effects assessment. In this case, the list could be used to create species richness maps. These maps depict patterns of concentration of priority species and are used to identify zones of conservation value within a region (Figures 2-4 at end of Part I). The maps could serve as a broad brush tool for evaluating current configurations of natural heritage features. For example, overlap between patterns of high species richness and existing protected areas could be interpreted as confirmation that existing protected areas are appropriately located. Conversely, if patterns of species richness do not coincide with existing protected areas, then these gaps could be targeted for further study. This type of gap analysis, when coupled with field studies, could prove useful for protecting important habitat within a region. In addition, zones of high conservation value might be flagged as requiring special consideration in land use planning.

At the site level⁴, the list of priority species could act as a tool for identifying "significant wildlife habitat," "significant woodlands," and other features within a region, as mandated by the PPS. In this case, the list would act as a flagging tool to identify areas containing significant numbers of regionally important species. Where available, this information could be combined with data on other groups of plants, fish and wildlife. There is presently no procedure for determining how many regionally important species must occur on a site for that site to be classified as "significant wildlife habitat." It is important to recognize that "significance" is a relative term. Because habitats and species assemblages vary tremendously across the landscapes of southern Ontario, we would expect patterns of species richness to vary substantially as well. In some regions, only one or two priority species might be expected to occur within a given habitat block (out of a total of 10 priority species breeding within the region) to warrant a designation of "significant." In other regions, four priority species (out of a total of 20 priority species breeding within the region) would be required to warrant a designation of "significant." Please note that these numbers have not been tested in any manner; they are only presented for illustrative purposes.

Once a significance rating has been assigned to a given feature or group of features, the results could be used to evaluate development proposals. Proposed development activities within or adjacent to significant features would then require special mitigation procedures to ensure that impacts to the functions and values of the subject natural area are minimized or eliminated altogether. Other tools such as the Significant Wildlife Habitat Decision Support System,

⁴Check OMNR's Natural Heritage Reference Manual for assistance in defining a "site."

developed by the OMNR, can also be used by municipal planners in reviewing development proposals that may impact significant wildlife habitat. This technical guide (Coleman et al., In prep.) is currently in production and is expected to be released in the fourth quarter of 1999.

While the list could be used to manage conservation lands for individual species, this is not a practical alternative for the majority of planning authorities. In some cases, however, species-specific management will be warranted (e.g., the management and restoration of nesting sites for critically endangered species). A more practical approach would be to use the list to identify priority groups of species with similar habitat requirements and then develop appropriate land use plans to capture these habitats.

One tool that planning authorities are encouraged to use for classifying habitat types at the landscape level is the Ecological Land Classification (ELC; Lee et al., 1998) system developed by the OMNR. This approach allows classification and mapping of habitat types down to a size of approximately 0.5 hectares and allows much more detailed classification of vegetation communities than the broad scale LANDSAT TM imagery. It has the additional advantage of being standardised throughout southern Ontario, so that mapping is consistent across municipal boundaries. ELC mapping, combined with municipal-scale priority bird lists, represents a powerful tool for focussing conservation efforts on appropriate habitats.

Ecological Restoration and Private Land Management

Another potential use of the priority list is to better focus future restoration efforts. For example, the rehabilitation of quarries and other disturbed sites, or the re-planting of abandoned agricultural land to native prairie or forest. The list of regionally important bird species, along with information concerning the relative abundance of different habitat types within the region could help in deciding what kinds of habitat to create on a given site. The same applies to private landowners interested in conserving biodiversity: such landowners could use the list of priority species (and associated habitat information) to make more informed land management decisions. Ideally, large sites are best, especially for forest interior birds. For other birds, a mosaic of habitat types, at different stages of maturity, and configured in an appropriate manner, would optimize conservation efforts. With careful planning, the need for large, relatively homogeneous blocks of habitat and for a mixture of different habitats can be accommodated within a landscape. Additional information on the design of natural area networks can be found in the Natural Heritage Reference Manual (OMNR, 1999) and the scientific literature cited therein.

We advise you to determine which habitats are threatened within your region and strive not lose any additional coverage of these habitats. In addition, future efforts might focus on expanding larger sites containing regionally abundant habitat (making what's already there bigger and better), filling gaps between important sites, and maintaining suitable habitat for area-sensitive species. Wherever possible, habitat for priority species should be conserved and/or created.

Limitations of the List

The approach described in this report is one of many tools a planning authority can use in efforts to conserve biodiversity. Other approaches could be used in conjunction with the list of priority species to make informed decisions. The resulting list of priority species was developed with broad scale, static data (breeding presence/absence within 10 X 10 km squares). Since species ranges will likely have changed slightly since the Atlas data were gathered (approximately 15 years ago), the list for the Grand River basin will not contain species that have recently colonised the region. While the list cannot possibly account for the dynamic nature of bird communities, it represents the best information on species ranges currently available. The new Breeding Bird Atlas, scheduled to commence in 2001, will be used to create revised lists that reflect these changes in breeding distribution, but this information will not be available until 2005 at the earliest. This information will be vital to updating and fine tuning the findings of this report. In fact, municipalities and resource management agencies are encouraged to update their priority lists and maps via their own monitoring programs.

Another limitation stemming from the broad scale nature of the data sources used is that the area sensitivity analysis was generalised to an analysis of presence/absence versus the availability of very broad habitat types (forest, marsh and open country). While this approach represents the best available data and approach for the southern Ontario scale of analysis, it does not paint the truest picture of area sensitivity. Ideally, information on species' abundance (rather than simple presence/absence measures) would be compared to the availability of specific habitat types (rather than generalised categories of habitat types) to analyse the area sensitivity relationship.

Because of these inherent deficiencies, the application of the list should be carried out in consultation with other information (e.g., updated species occurrence data from naturalist groups and other experts).

Additional Sources of Information

There is a multitude of resources available on the Internet to complement the information presented in this report. With respect to Ontario birds, the WILDSPACE web site (www.cciw.ca/green-lane/wildlife/wildspace/intro-e.html), developed by the Canadian Wildlife Service (www.cciw.ca/green-lane/wildlife/intro.html) contains an array of information about all species breeding within Ontario, including photographs, bird song examples, as well as detailed biological data for each species. Ontario Breeding Bird Atlas maps can also be viewed at this site. The Nature Conservancy (www.tnc.org/wings) web site also has detailed information concerning a wide variety of birds, including species management abstracts for a smaller group of species. This site, however, is not specifically geared toward Ontario birds and, therefore, will not be as useful as the WILDSPACE web site.

For information on VTE species in Ontario, the following two web sites are essential:

- 1) The Ontario Species at Risk web page (www.rom.on.ca/ontario/risk.html), a joint project between the Ontario Ministry of Natural Resources and the Royal Ontario Museum contains helpful information and up-to-date lists of species at risk in the province of Ontario. In addition to birds, listings are provided for amphibians, fish, insects, mammals, plants and reptiles. Range maps and photographs are also provided at this web site. The municipal list of priority species (Table 3) is based on information from the Breeding Bird Atlas that is now approximately 12-15 years old. It is possible that since the Atlas was completed, VTE species may have been found at additional breeding sites within the province, and thus would not be captured in the current list of priority species for the basin. Therefore, we recommend that **if new breeding sites for any of the VTE bird species (Table 2) are found within the Grand River basin, appropriate conservation efforts should be undertaken.** Users will thus need to cross-reference their basin priority species list (Table 3) with the Ontario species at risk list (Table 2 and updates from OMNR) to ensure that all species requiring special consideration do in fact receive it.

- 2) The Natural Heritage Information Centre web page (www.mnr.gov.on.ca/MNR/nhic/nhic.html) provides a variety of information concerning all taxa in the province. Complete lists of all bird species (as well as reptiles, mammals, etc.) occurring in the province are found here, along with abundance estimates for each species. Information on Ecological Land Classification can also be found at the NHIC site. The NHIC also maintains a database of the precise locations of VTE species. These data are not available to the general public, however, and must be obtained by contacting NHIC staff.

The home page of the Ontario Ministry of Natural Resources (www.mnr.gov.on.ca) also has ample resources concerning environmental land-use planning, along with many useful links to other sites offering complementary information. OMNR's Natural Heritage Reference Manual (OMNR, 1999) contains a wealth of information related to natural heritage conservation under the PPS. In addition to the ROM web site, the official list of VTE species can also be downloaded from (www.mnr.gov.on.ca/MNR/fwmenu.html). When published, OMNR's technical guide concerning the evaluation of significant wildlife habitat will represent another conservation tool for planning authorities.

SUMMARY AND CONCLUSION

The aim of this report is to provide resource managers working in the Grand River basin with a tool for prioritising conservation actions. The approach put forth in this report advocates the use of a prioritised list of bird species to accomplish this objective. The list of priority species, specifically tailored to the basin, can be used for a variety of purposes by resource managers and planners. Specifically, it can be used as an analytical tool to evaluate current configurations of significant wildlife habitat, significant woodlands, and the like; to broadly identify areas of concern within a region where development activities might have to be approached with caution; to act as a tool in wildlife habitat restoration efforts; and numerous other applications. Ultimately, it is hoped that the list of priority species, coupled with other approaches and information, will contribute to the conservation of the Grand River basin's impressive natural heritage.

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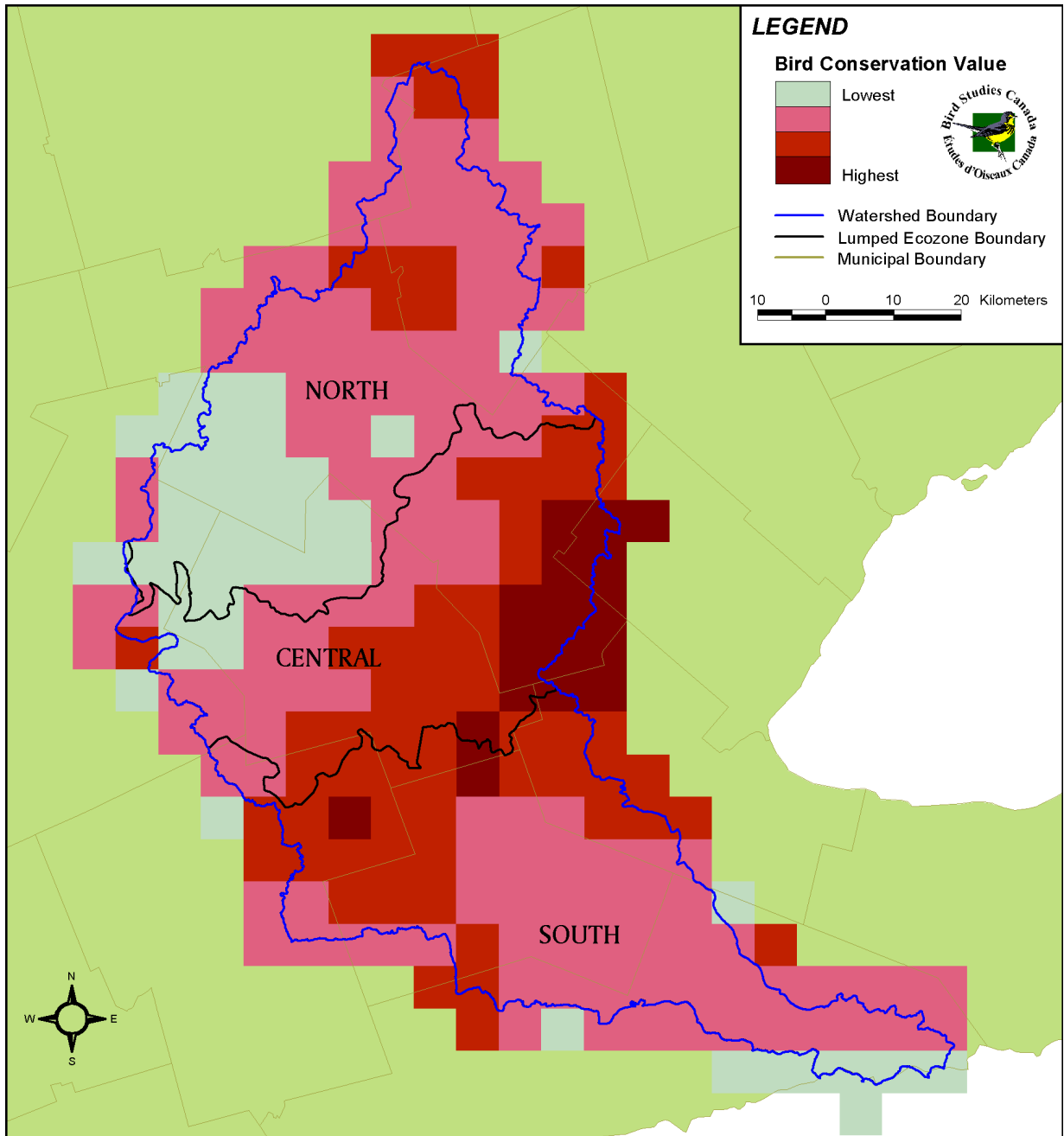


Figure 2. Forest species richness in the Grand River basin.

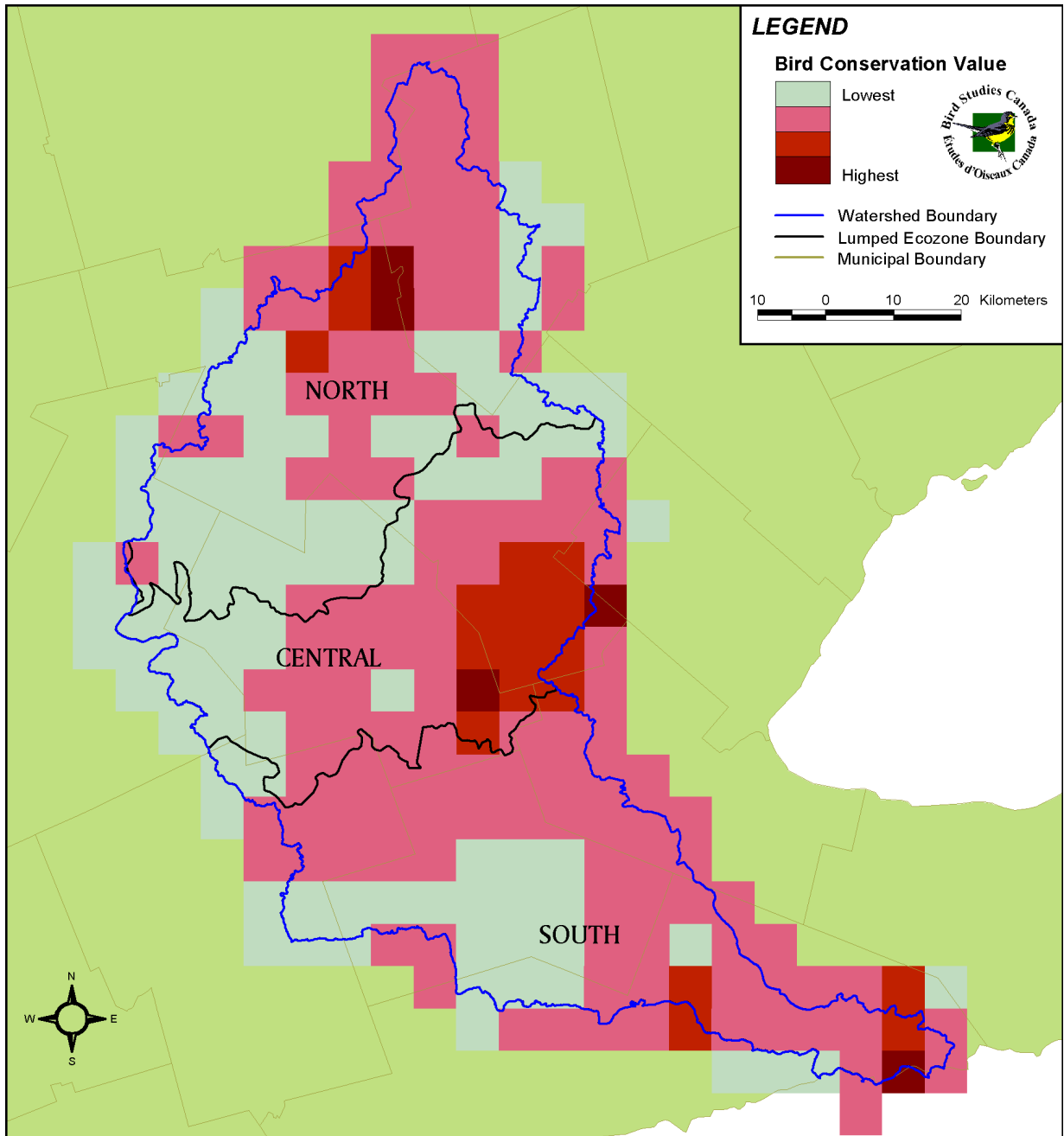


Figure 3. Marsh species richness in the Grand River basin.

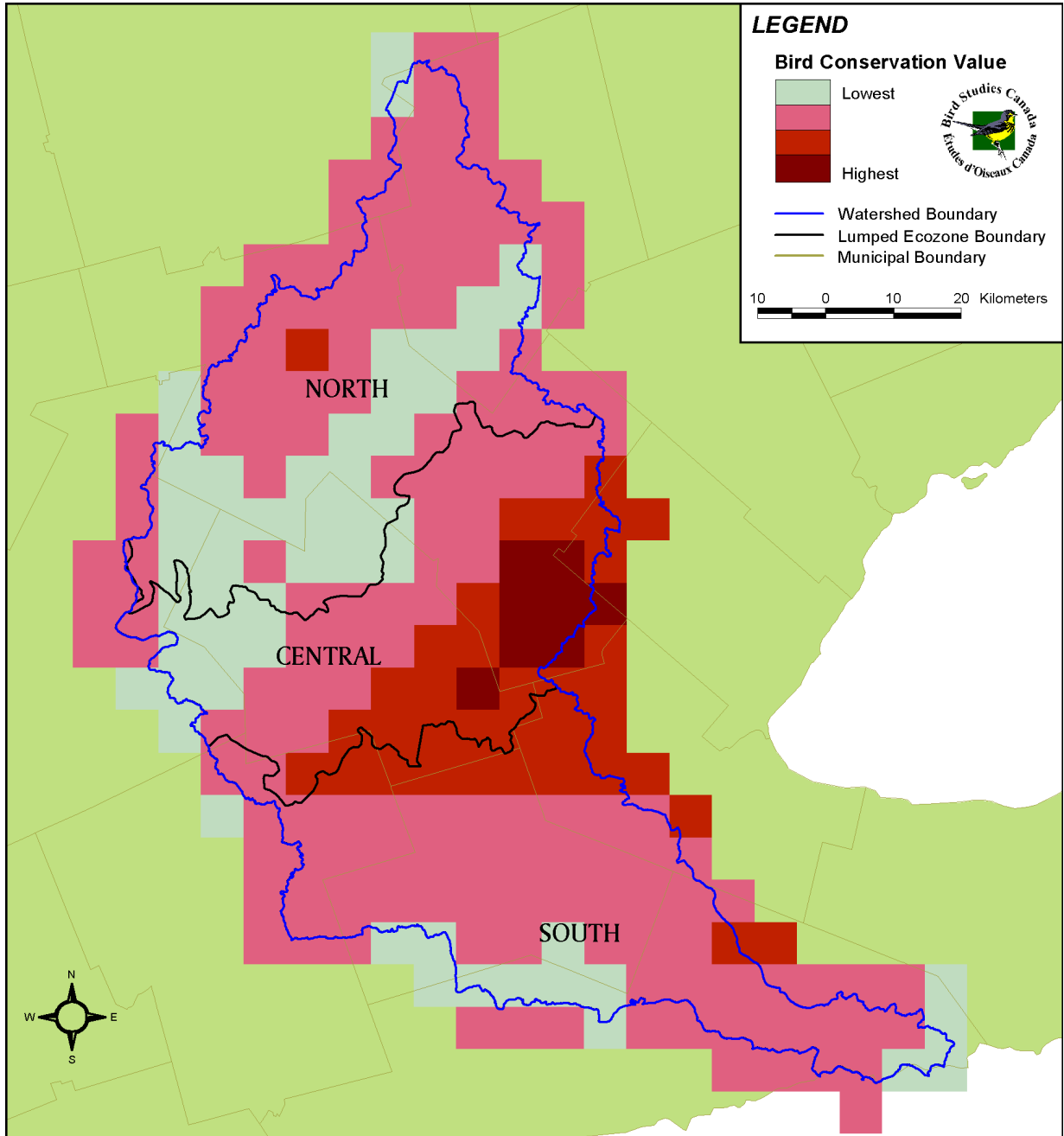


Figure 4. Grassland / Open Country species richness in the Grand River basin.