HABITAT MANAGEMENT GUIDELINES FOR BIRDS OF ONTARIO WETLANDS

including marshes, swamps and fens or bogs of various types

ONTARIO MINISTRY OF NATURAL RESOURCES

Prepared by Ross D. James
Associate Curator of Ornithology
Royal Ontario Museum

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Preface

As the century nears its end and demand for food and competition for land escalate, a most important issue facing conservationalists will be the preservation of a mosaic of habitats in which can be preserved a representative cross-section of native species. The Global 2000 Report to the President of the United States predicts worldwide that 500,000 to two (2) million species will become extinct by the year 2000, and that the rate will increase from one (1) per day in 1980 to one (1) per hour by century's end. Over 500 species and subspecies of flora and fauna have become extinct in North America since the Puritans arrived in 1620.

The most critical need, to preserve habitat so that floral and faunal diversity can be maintained, rests not only on the loss of genetic diversity and scientific or medical properties that will be lost, but on the long term consumptive, nonconsumptive and social values of plants and wildlife to mankind. (Samson and Knopf 1982).

Introduction

The Importance of Wetlands

Originally there were in excess of two point three (2.3) million hectares of wetlands in southern Ontario. Today there is a mere twelve percent (12%) remaining (Rowntree 1979). Yet, these same areas are vital to the continued existence of a whole host of wildlife species. Grebes, herons, bitterns, rails, shorebirds, gulls, terns, and numerous smaller birds, plus the waterfowl, nest in or use wetlands for feeding and resting. About ninety-five percent (95%) of all furbearers are taken in water (Rowntree 1979). Reptiles and amphibians must return there to breed. Several species of game fish live or spawn in wetlands. Hundreds, if not thousands, of invertebrates that form the food of birds also rely on water for most, if not all, phases of their existence. In fact, most all species of animals we have must spend at least part of the year in wetlands. To lose any more of these vital areas is almost unthinkable.

Wetlands enhance and protect water quality in lakes and streams where additional species spend their time and from which we draw our water. Water from drainage may have five (5) times more phosphates or as much as fifty (50) times more nitrates than water from marshes. These nutrient loads act as fertilizers to aquatic plants whose growth may clog rivers, foul shorelines and deplete oxygen in the water making it unsuitable for fish. Wetlands handle as much as fifty percent (50%) of terrestrial denitrification whereby nitrogen is returned to the atmosphere. Wetlands act as settling and filtration basins collecting silt that might build up behind dams or clog navigation channels. Vegetation in wetlands protects shorelines from damage by tides and storms. Wetlands soak up tremendous amounts of rainwater, slowing runoff and decreasing flooding that will help to decrease erosion of streambanks and prevent property damage. Water maintained in wetlands also helps to maintain ground water levels.

Wetlands provide valuable renewable resources of fur, wild rice, fish, bait, cranberries, game, etc.

They are rich in plant and animal life and are, therefore, ideal for scientific studies and educational field trips. The recreational potential for wetlands is immense. About eighty percent (80%) of Canadians value wildlife conservation and spend some three (3) billion dollars annually on nonconsumptive wildlife related activities as well as another one (1) billion on consumptive pursuits. Photography, bird-watching, canoeing, nature study, hiking, fishing and hunting are all pursued in wetlands.

The economic value of wetlands may far exceed the returns gained from converting them to other uses. In addition to recreational potential, the farming of wildlife for economic return has proven to be viable for many species (Smith et al. 1983). Wetlands may prove valuable to more than fur, rice or cranberries in future.

The greatest threats to our remaining wetlands are from agricultural drainage and industrial or housing developments (Brynaert 1983). Vast sums are expended annually by federal and provincial government agencies to implement drainage programs with little or no consideration given to wildlife values. The extensive so-called stream improvements, channeling and ditching, are very much questionable. It is essential **now** to introduce measures that clearly place the onus on agricultural agencies to prove that drainage projects are economically viable and that they do not jeopardize our wetland habitats (Brynaert 1983).

Wetlands are important to the productivity of the entire biosphere (Sanderson 1977). They are vital to effective management of many wildlife species that depend upon these habitats. Whether a hunter or a naturalist, the preservation of wetlands is an objective that should appeal to everyone (Brynaert 1983). The entire province, country and continent have suffered a great loss in natural resources because of wetland losses. If we cannot succeed in saving wetlands, we shall not be able to meet the greater challenge of safeguarding an environment that man can continue to inhabit (Rowntree 1979).

The Types of Wetlands

In order to avoid confusion about the names of various types of wetland referred to in the following pages, the following definitions are presented. They are adapted from Jeglum et al. (1979).

1) Marsh - Areas of relatively shallow standing or slowly flowing water, usually with open water present, and with vegetation consisting of a variety of nonwoody emergent rushes, reeds, sedges or grasses growing over mineral soils.

   Water levels may fluctuate seasonally exposing matted vegetation or mudflats. Usually bordered by shrubs or trees that may form an integral part of the wetland. Can be conveniently and logically divided into two different types: Reed Marsh and Meadow Marsh.

   (a) Reed Marsh - Found at the edges of water bodies, characterized by **tall,**

rank growths of reeds in standing water. Commonly dominated by cattails, but also various types of reeds and grass, particularly along lake edges.

(b) Meadow or Graminoid Marsh - Form zones between open water and fields, or at the edges of reed marshes where water is shallow or present only part of the year, characterized by dense but **short** sedges or grasses (sometimes a few shrubs).

2) Swamp - Wooded wetlands where standing or gently flowing waters occur seasonally or persist for long periods over mineral soils. Readily divisible into three types as follows:

(a) Thicket Swamp - Characterized by tall shrubs covering more than twenty-five percent (25%) of the ground; trees few or absent.

(b) Hardwood Swamp - Trees present and dominated by broadleaf species.

(c) Conifer Swamp - Trees present and dominated by coniferous species.

3) Fens - Peatlands that are poorly drained, but slow internal drainage does occur. Dominant vegetation is sedges, but shrubs and sparse, short tree growth may be present. Waters are circumneutral or only slightly acid. Three basic types are found.

(a) Graminoid Fen - Open, sedge covered fen, with less than ten percent (10%) cover of shrubs or trees.

(b) Low Shrub Fen - Open fen dominated by shrubs such as leatherleaf and dwarf birch less than 135 cm high.

(c) Treed Fen - Canopy cover more than ten percent (10%), usually tamarack, and usually not of merchantable size.

4) Bogs - Peatlands that are poorly drained and where water movement is restricted. Ground cover is usually dominated by sphagnum moss. Waters are acidic. Shrubs and sparse tree growth, usually black spruce, may be present.

Graminoid, low shrub and treed bogs look superficially like the corresponding fens, but are generally a small percentage of the wetlands of Ontario.

Factors Affecting Management Considerations

Information Needs

Perhaps one reason wetlands have been so mistreated is our lack of understanding of many of the creatures that dwell there. Many of the birds are secretive and difficult to observe in dense vegetation and, therefore, are difficult to gather information about. Despite the present urgent need to protect wetlands, we have far less information available than would be desirable in order to formulate specific management guidelines. Forest species are far more studied than wetland species, with the exception of waterfowl that have consumed the major interest in wetland studies.

Also, as a result of the paucity of information, a number of points about the biology of species and the factors that appear to be limiting them, are from personal experience with most of these birds.

Channelization

Stream channelization is claimed to improve watershed protection, yet in the short term at least may increase erosion, and in the long term has damaging effects on wetlands. Channelization can increase drainage rates by five (5) times, permitting wetland drainage deleterious to wildlife (Erickson et al. 1979). With the decided lowering of water levels, as brought about by channelization, the survival of all plant and animal associates may be impossible. Brackish marshes may become too acidic through oxidation and leeching to support indigenous plant growth and too acidic for mollusks (Bourn and Cottam 1939). Permanent lowering of water levels by even a few inches can lower invertebrate populations fifty to ninety percent (50-90%), resulting in a great loss of food for fish and bird life (Bourn and Cottam 1939).

Drainage of peaty marshes or fens and bogs completely changes the flora and fauna, but also may subject them to fire damage if they dry out.

Peaty marshes, if drained for agriculture may subside as much as a metre as the water leaves. This results in poor drainage and their eventual abandonment for agricultural purposes, after they have been rendered useless to wetland inhabiting wildlife (Bourn and Cottam 1939).

Channelization is said to improve flood control, yet it is usually undertaken solely for economic gain with little consideration given to public values such as wildlife. It will destroy the environment for birds (Taylor 1984) as well as for fish and many other species.

Water Level Control

Just as with forest environments, where managing for a diversity of vegetation types provides optimum habitat for many species (MacArthur 1964, Crawford and Titterington 1979, Bury et al. 1980, Luman and Neitro 1980, Anderson and Robbins 1982, Franzreb 1983), so also diversity in wetlands produces the greatest abundance of all species concurrently (Weller and Fredrickson 1973). Monocultures are impractical and undesirable.

Water levels in natural marshes are cyclic with cycles of five to twenty (5-20) years. Such fluctuations stimulate plant regeneration and diversity of plant growth. They also encourage the release of nutrient material from organic debris through oxidation. This recycling of nutrients and germination of diverse plants is essential to the rejuvenation of a marsh (Weller and Fredrickson 1973).

Prolonged flooding gradually eliminates all plants but cattails. Few marshes inundated for more than seven (7) years (or even five [5] years) remain productive of aquatic vertebrates. The product of stability is a centrally open marsh with a perimeter of dense cattail that is generally low in productivity of invertebrate or vertebrate life. They are onithologically dead. They lack the lushness associated with temperature semi-permanent glacial marshes. Marshes with water control structures often are the most poorly managed; stability is confused with productivity (Weller and Fredrickson 1973, Whitman 1976). Static marshes cannot be considered either logical or desirable when managing for productivity or diversity.

Although water level fluctuations in marshes are natural, some species prefer wetter or drier conditions than may be found in any one marsh in any particular year. It is important, therefore, to have other marshes in close proximity such that a species may move to a different area for a year or two (2). This emphasizes the need to maintain as many marshes as possible so that species looking for alternate sites will be able to find another marsh conveniently, and thus continue to breed successfully.

If dams are in use, flooding during the nesting season must be avoided, or those nesting on the ground or even over water may be flooded out. On the other hand, stability of water levels until late in the breeding season would be of benefit in contributing to reduced predation of nests placed over water.

Pesticides

There are numerous chemical pesticides being dumped on land water in even greater profusion. The effects of one or of more together are often difficult to predict in the long term (Cope 1966). But what is certain is that pesticides applied anywhere on land are eventually going to be washed into wetlands, rivers, ponds and lakes. Pesticides in wetlands have been known to be lethal (Keith 1966, Grue 1983). Organochlorine pesticides in particular, if not lethal, are known to reduce productivity in birds including waterfowl, terns, gulls, herons and likely in many species not yet studied, through chick and/or egg loss (Keith 1966, Anderson et al. 1969, Vermeer and Reynolds 1970, Cooke 1973, Gilbertson 1974, Gilbertson et al. 1976, Peakall 1976, Longcore and Stendell 1977, Ohlendorf et al. 1979, Fleming et al. 1983, Weseloh et al. 1983) or indirectly by affecting the behaviour of adults which are less than able to be successful parents (Nelson 1976, Fyfe et al. 1976). Pesticides may also cause pathological conditions in wildlife (Gilbertson et al. 1976).

But perhaps more serious are the secondary effects on predatory animals and humans that further concentrate poisons from the animals they eat. Several studies have indicated that migratory shorebirds possess the highest organochloride residues of any prey items taken by Peregrine

Falcons (Cade et al. 1968, Enderson and Burger 1968, White et al. 1973). Fish could become toxic to Bald Eagles (Hickey et al. 1966) or even to man. Game birds such as snipe or woodcock will accumulate pesticides taken up by invertebrates (Gish and Hughes 1982) and could then be a health hazard to people.

The application of chemical pesticides for insect control, in the long term only speeds up the development of insect strains resistant to chemicals. Biological control of insect pests is feasible, and in the long term would be much cheaper (Takekawa et al. 1982). Chemicals kill the birds that are natural insect controls as well as killing the insects themselves, reducing the control factor and hastening an outbreak of insects that multiply much faster than the controls. Biological control through bacterial pathogens leaves birds alive to help in control, and the pathogens themselves will multiply and spread, continuing to exert control much longer than chemicals.

Human Disturbance

As recreational activities increase, human disturbance, although often unintentional, can still exert a tremendous influence on some wetland species. Yellow Rails, Northern Harriers and Short-eared Owls seem to require undisturbed habitat for nesting. They may abandon perfectly suitable habitat if disturbance is too frequent. Single disturbances well spaced may have minor effects, but species such as grebes, if repeatedly disturbed, even by canoeists passing by at considerable distances, might simply be unable to successfully hatch eggs. Power boats create waves that could easily destroy tern, grebe or possibly rail nests. A person entering a tern colony would subject their eggs to predation by gulls. Gulls may even rob each other's eggs if their colonies are disturbed. Predators such as racoons or mink may follow human trails through dense marsh vegetation and destroy all nests encountered. There is a growing need for general restrictions on activities, particularly in southern marshes during the breeding season (May and June at least), but impact is likely to be minimal at other times of the year.

Livestock allowed to roam freely in wetlands could trample nests. At times other than the breeding season, disturbance by livestock might even be beneficial in breaking up dense mats of cattail (DeSmet 1982, Tuck 1972).

Spring burning of grasslands, marshes or brush can destroy valuable cover and kill birds or the eggs of early nesting species such as Woodcock (Mendall and Aldous 1943), Short-eared Owls or Northern Harriers.

Overall, there is a need for more study of the effects of recreational activity on wildlife populations (Boyle and Samson 1983).

Isolation

As wetland areas continue to be drained or filled, particularly in southern Ontario, the remaining areas are becoming more and more isolated. Wetland species may be relatively well adapted to searching for more suitable habitats as natural fluctuations in water levels affect the attractiveness

of any wetland in any one breeding season. But as the isolation between areas increases, the chances of finding another suitable area diminish and hence reproductive success is going to decline. The numbers of species that islands of vegetation can continue to attract is influenced by the distances between them (Diamond 1975, Samson 1980). We cannot afford to further isolate the remaining wetlands in southern Ontario at least.

Habitat Size

As well as isolation, the size of any patch of vegetation is important to the diversity it can contain (Diamond 1975, Samson 1980). Although we do not have figures for wetland dwelling species, as with forest dwelling species, some are undoubtedly area sensitive and require relatively large areas in order to breed successfully. In forest management, there has been an emphasis on taking into consideration the retention of large units for such species (Galli et al. 1976, Robbins 1979, Luman and Neitro 1980, Lynch and Wigham 1984). The size of habitat should be emphasized in conservation strategies, but this does not exclude the preservation of small unique or diverse habitats. We can scarcely afford to lose any more wetlands anywhere in southern Ontario, regardless of size.

Migrants

Most of the wetland species occurring in Ontario are migrants, and it is essential to consider the needs of these birds while on migration as well as in breeding areas (Rappole and Warner 1978). One particular example is the many shorebirds that may fly nonstop from James Bay to South America for the winter. Shorebird species breeding in the arctic and subarctic of other provinces and territories as well as those breeding in Ontario, use the mudflats of James Bay as a staging area to put on sufficient fat to fly to wintering areas. Any development affecting those shores could be disastrous to many species (Morrison and Harrington 1979). There are only a limited number of such areas in North America of such great importance to thousands of shorebirds, and all should receive special consideration.

For many other wetland species, if habitat is not readily found between summering and wintering areas, they could effectively be barred from making the trip, or could do so only with difficulty and high mortality.

Unfortunately, many birds, especially wetland species, are killed for food in tropical wintering areas, and more importantly all are experiencing the loss of habitat in those areas as well. Although we cannot directly affect their survival in wintering areas, we must contribute as best we can to their continued reproductive potential in summering areas to offset winter losses.

Present vs Future Needs

Many of our wetland species occupy the more remote parts of northern Ontario where there is relatively little or virtually no human activity apart from logging in the southern boreal forests. We have an opportunity then to consider the importance of these areas to wetland species before

we make some drastic mistakes. Coastal oil drilling could foul beaches and adjacent wetlands causing the destruction of countless thousands of shorebirds that depend on those areas for survival. Peat removal would destroy wetland habitats, and if practiced on a large scale might severely affect bird populations, as these areas would be slow to return to usable areas. The logging of smaller trees or trees in riparian areas as the demand for wood increases, would destroy some of the most used and valuable areas for wetland species. Detailed studies are needed prior to any major developments in northern wetlands.

Legislation

Most of our wetland species are migratory birds and are protected by provisions of the *Migratory Birds Conservation Act of 1917*. Hawks, owls and the gray jay are protected by the *Fish and Game Act of Ontario, RSO 1980, C182*. The blackbirds considered in this report are apparently unprotected, although none of these species has ever been thought of as a serious agricultural pest, and in fact, they may be beneficial in reducing insect populations and consuming weed seeds.

However, the abundance of birds is determined by the habitat conditions that alter the carrying capacity of the wetlands. If habitat declines, the number of birds decline. No amount of protective legislation will maintain a population if its essential needs are not met (Sandfort 1977).

What is needed now is not more protective legislation for species, but legislation to protect habitats, or to revoke or alter those laws, such as drainage acts, which now form a detriment to wetlands.

The Species and their Requirements

A great deal of the information on distribution and nesting biology for virtually every species considered here has come from Godfrey 1966, Peck and James 1983, or Peck and James in prep. I mention them here, rather than cite them for each species.

In general, I consider that "northern Ontario" or "the north" refers to all the area north of Lake Nipissing and Lake Huron while "the south" or "southern Ontario" refers to the area south of Lake Nipissing. The "agricultural southern part of Ontario" refers to the area south and west of a line drawn roughly from the south end of Georgian Bay to Kingston, and the area east of a line from Brockville to Ottawa. The intervening region is underlain by the Canadian Shield.

Pied-billed Grebe, *Podilymbus podiceps*

The Pied-billed Grebe breeds throughout southern Ontario, but very sparsely on the Canadian Shield. A few range as far north as Sandy Lake and Fort Albany, but they are probably absent from most of the Boreal Forest Area.

For nesting they require marshes with relatively deep water or the marshy edges of small to large freshwater lakes, rivers and ponds, surrounded or edged by extensive growths of emergent vegetation (reed marshes). Nests are placed near open water in the emergent vegetation where permanent water depth is usually point three to one (0.3-1) m deep. Each pair requires an area of one to three (1-3) ha as a breeding territory. As nests are floating mats of vegetation, minor fluctuations in water level are not serious. During migration they also prefer sheltered streams and ponds with emergent vegetation.

Populations have declined noticeably in recent years. Disturbance by people is a serious problem as they are very wary, leaving nests long before they are closely approached, and returning only a considerable time after the disturbance. Habitat loss is also a serious threat.
(Bent 1919, Boyer and Devitt 1961, Faaborg 1976, Glover 1953, Nudds 1982, Palmer 1962, Provost 1947).

Horned Grebe, *Podiceps auritus*

The Horned Grebe is primarily a species of the prairies. Although nesting records are scattered over much of Ontario, it has virtually disappeared from this province during this century. The only breeding record since 1938 is at Fort Severn, although some may breed elsewhere on the western borders of the province. They are still found as migrants in considerable numbers in the Great Lakes area.

For breeding they prefer reed marshes in small permanent ponds and sloughs, or protected shallow bays of larger lakes. They will use areas with less emergent vegetation than Pied-billed Grebes, or areas with a greater interspersion of vegetation and water. Territories may be quite small (are about one [1] ha) but birds are very territorial. Their nests are also floating platforms, placed in emergent vegetation near open water. On migration, large open lakes are used as well as smaller ponds and rivers.

Human disturbance and loss of habitat have probably contributed to their disappearance in Ontario.
(Faaborg 1976, Nudds 1982, Palmer 1962, Sugden 1977).

Red-necked Grebe, *Podiceps grisegena*

The Red-necked Grebe breeds mainly in western Ontario and at scattered locations elsewhere. The species does not seem to be numerous in the province any more except as a migrant.

During the breeding period they choose quiet inland waters of lakes, marshes or large rivers in open areas or among woodlands, where water levels are unlikely to fluctuate much. They use areas with much open water (rarely less than four [4] ha), where stands of emergent vegetation (medium density) are present in water at least a half to one (0.5-1) m deep. Floating nests are placed in relatively exposed positions at the outer edges of the emergent vegetation. During migration they frequent inland waters of many types, especially open lakes.

Nests are very subject to disturbance by boat wakes since they are placed in relatively exposed positions. Human disturbance would also be a critical factor since they are easily scared from nests.
(Bent 1919, Cringon 1957, DeSmet 1982, Palmer 1962).

American Bittern, *Hotaurus lentiginosus*

The American Bittern breeds throughout the province, although it is sparse in the Boreal Forest region.

They nest in fresh and saltwater marshes, swamps, fens, and less often in grassy fields adjacent to wetlands. Nests are not floating, but placed typically in dense emergent vegetation over shallow water, but may also be in dry areas on the ground. Nests may be relatively close together or in small marshes if adequate foraging space is available nearby, but typically they probably require at least four (4) ha of wetlands to nest successfully. During migration, large marshes are preferred.

Nests are particularly susceptible to disturbance by livestock or dogs, and birds are unlikely to occupy wetlands where people frequently disturb them. The species has apparently declined noticeably in recent years, particularly in southern wetlands.
(Bent 1926, Boyer and Devitt 1961, Provost 1947).

Least Bittern, *Ixobrychus exilis*

The Least Bittern nests almost exclusively in southern Ontario and is largely found in places other than the Canadian Shield where marshes are few.

They nest primarily in dense cattail marshes, but also may be found in the marshy vegetation of ponds, lakes and sluggish streams. Nests are placed above water in emergent plants, preferably cattails, where water is shallow to about one (1) m deep. No information is available on the site of marshes necessary to accommodate them. On migration, larger marshes are apparently preferred.

Loss of habitat and human disturbance appear to be the major factors contributing to a noticeable decline in numbers in recent years.
(Boyer and Devitt 1961, McCracken et al. 1981, Provost 1947).

Green-backed Heron, *Butorides striatus*

The Green-backed Heron is also restricted to southern Ontario mainly south and west of the Canadian Shield.

Nests are placed in trees or shrubs of many types, either close to or over water, but also at considerable distances from water. Nests may be single isolated nests or in small colonies usually not with other herons. Nest sites may be close to the ground or as high as fifteen (15) m. Nest sites then are often not directly associated with foraging habitat and are unlikely to be a limiting factor. The birds forage along the edges of streams, ponds, marshes, etc., where shrubs or trees provide shelter, and in swamps. No information is available on the size of area required. Similar habitat is used during migration.

The species has apparently been expanding very slowly northward in this century. The greatest threat apart from pesticides in the environment would be loss of habitat in and about wetland areas.
(McCracken et al. 1981).

Northern Harrier, *Circus cyaneus*

The Northern Harrier is found most commonly in summer in the agricultural southern part of Ontario and along the northern coasts, although they probably occur at least sparsely throughout the province where suitable habitat is available.

Nesting and foraging habitat is open country, either marshes (fresh or brackish), marshy edges of lakes and rivers, fens and wet meadows, or drier agricultural fields, also tundra either dry or wet. Nests are often placed in marshes, where they may be floating, but more likely subject to destruction by rising water levels; also on dry ground. There is some evidence to suggest in wetlands than on dry sites. Wetland sites seem to be preferred if available. Nests are placed among cattails or in sedges, reeds or bushes and shrubs. Each pair is likely to require at least 640 ha to forage over.

The species has been declining noticeably in southern agricultural areas. Human disturbance, wetland drainage and pesticides in the environment appear to be the main limiting factors. (Erskine 1977, Hammerstrom 1969, Provost 1947, Sealy 1967).

Merlin, *Falco columbarius*

The Merlin breeds throughout the forested portions of northern Ontario, with a few widely scattered records in more remote parts of southern Ontario.

They nest in sparse woods that are broken by expanses of open country where they forage, either along marshes (fresh and brackish), beaches, mudflats or open fens.

Since they occupy a large area in more remove parts of the prairies, populations are probably stable. Pesticides in the environment and unwarranted shooting would appear to be the worst potential threats.
(DeSmet 1984).

Yellow Rail, *Coturnicops noveboracensis*

The Yellow Rail is most numerous along the James Bay coast, but also occurs along the Hudson Bay coast at scattered large marshes in southern Ontario, and potentially in any large marsh in the provinces.

They prefer dense monotypic stands of sedges or grasses with shallow standing water. These may be fresh or brackish water areas where dead grasses of the previous growing season form a matlike canopy above the water. Nests are clumps of dead sedges over water or sometimes on dry ground. They appear to be somewhat gregarious and thus need areas sufficiently large for a number of pairs, but the size of area for each and the minimum number per area are undetermined.

The species has apparently never been numerous in southern Ontario, but drainage of marshes and wetlands for agriculture has undoubtedly almost extirpated them from that part of the province. Populations on the north coast are likely stable unless pesticide contamination or loss of winter habitat are limiting.
(Anderson 1977, Bart et al. 1984, Lane 1962, Terrill 1943).

King Rail, *Rallus elegans*

The King Rail is found regularly only in a few large marshes near lakes Erie and St. Clair, but they occur sporadically in other marshes in the most southerly parts of the province.

They nest and feed in freshwater reed marshes, graminoid marshes and marshy borders of lakes, ponds and rivers. They seem to like relatively shallow water of five to ten (5-10) cm, and areas with shrubs on drier islands or about marshes, thus using the drier borders of wetlands. Graminoid marshes are preferred over cattail marshes. Territory sizes appear to be point three to a half (0.3-0.5) ha, but as they seem to occur regularly only in large marshes, they seem to require the presence of a small population for successful breeding. The species is not abundant and faces extirpation without protection of existing large marshes in southern Ontario.
(Bateman 1977, Cosens 1984, Meanley 1969, Provost 1947, Wormington 1982).

Virginia Rail, *Rallus limicola*

The Virginia Rail is found throughout Ontario as far north as Kenora and Lake Abitibi, but is numerous only south of the Canadian Shield.

They prefer marshes dominated by cattails, but also graminoid marshes and bushy borders of wetlands along lakes, ponds, or rivers; heath bogs, cedar and deciduous swamps and wet meadows may also be frequented and such areas need not be large. Nests are typically over water in clumps of vegetation. Water depth in breeding habitats is always less than fifteen (15) cm. Territory sizes are from a quarter to one (0.25-1) ha depending upon habitat quality. Nests do not float to escape rising water, but falling water levels may be just as harmful.

The species is declining only as its habitat is destroyed.
(Bent 1926, Greise et al. 1980, Holliman 1977, Lindmeier 1960, Provost 1947, Sayre and Rundle 1984).

Sora, *Forzana carolina*

The Sora breeds throughout the province, but is numerous only south of the Canadian Shield.

They prefer to nest in tall, dense sedges adjacent to cattails which offer escape cover. They will choose freshwater or brackish marshes of many types, swamps, beaver meadows, willow swales and bogs. The critical factor seems to be water depth. They require somewhat wetter conditions than Virginia Rails, needing water fifteen to thirty (15-30) cm deep. In ideal habitat densities may be ten (10) or more pairs per hectare. Nests are in clumps of dead vegetation over water and thus may be destroyed by rising water levels. But lowering water and allowing easier predator success is probably more harmful.

The greatest threat to this species is continued drainage and destruction of wetland habitat.
(Bent 1926, Griese et al. 1980, Lowther 1977, McCracken et al. 1981, Odom 1977, Sayre and Rundle 1984, Walkinshaw 1940).

Common Moorhen, *Gallinula chloropus*

The Common Moorhen is confined largely to southern nonforested areas.

Breeding habitat consists of freshwater reed marshes where tall emergent vegetation is interspersed with areas of open water. Water depth is usually between a half and one 0.5-1) m deep, and populations decline noticeably in areas of low water. Nests are floating platforms near open water in cattails, bulrushes, sedges, horsetails, burreeds and reed grasses. They prefer somewhat deeper water than rails, but lower water and denser vegetation than coots. The size of territories is undetermined.

The species is doing well in Ontario, limited only by a lack of habitat.
(Fredrickson 1971, McCracken et al. 1981, Provost 1947, Taylor 1984, Strohmeyer 1977, Weller and Fredrickson 1973).

American Coot, *Fulica americana*

The American Coot breeds primarily in the agricultural portions of southern Ontario where reed marshes are most numerous. A few range as far north as Kenora and Cochrane.

They nest in freshwater marshes with permanent water, where small patches to extensive areas of tall emergent vegetation are present. Production is highest in cattail marshes with about fifty percent (50%) open water. Water depth at nests average about point seven (0.7) m. Territories may be quite small at under point three (0.3) ha in productive marshes. Nests are floating platforms that accommodate well to water level changes, but low water will discourage nesting.

On migration they occur in shallow but more open water areas of lakes, rivers and ponds. They are numerous in the province, limited mainly by a shortage of habitat.
(Boyer and Devitt 1961, Fredrickson 1977, McCracken et al. 1981, Nudds 1982, Provost 1947, Sugden 1979).

Sandhill Crane, *Grus canadensis*

The Sandhill Crane occurs most frequently in the Hudson Bay Lowland and south to Cochrane and Kapuskasing, and in the area between Sault Ste. Marie and Sudbury; also in western Rainy River District.

Nesting habitat is primarily large fens or bogs where tall emergent vegetation or shrubs and trees provides concealing cover. They will also nest in cattail marshes of lakes and large rivers and on tundra. There is usually some open water in the breeding territory, and nests are placed over water of one to twenty-five (1-25) cm deep or are just above water on small hummocks.

Territories may be as small as ten (10) ha, but most are considerably larger. In more populated areas they seem to use wetlands of forty (40) ha or larger. Nests are almost invariably placed at least one (1) km from any human activity, even from agricultural fields, although such fields may be used for foraging by nesting adults or migrants.

This species has been increasing in numbers in recent years and reoccupying areas they formerly used before populations were decimated in the 1800's. Most nest in remote areas and those in more populated areas are very wary. Disturbance during the breeding season is probably the most significant limiting factor for breeding birds.
(Lumsden 1971, Riley 1982, Tebbel 1981, Walkinshaw 1949, Walkinshaw 1965).

Greater Yellowlegs, *Tringa melanoleuca*

The Greater Yellowlegs breeds throughout most of the Boreal Forest and Hudson Bay Lowland of Ontario.

They occur typically in fens with short scattered clumps of trees interspersed among patches of open fen and small ponds. No information is available on territory sizes. Nests are on the ground near or among taller vegetation in moist situations.

They are abundant and not in need of management except for the continued protection of northern coastal and southern wetland for use by migrants.
(Erskine 1977, James et al. 1982a, Palmer 1967).

Lesser Yellowlegs, *Tringa flavipes*

The Lesser Yellowlegs is slightly more northern in distribution than the Greater Yellowlegs, occupying the northern third of the province and being more numerous farther north within this range.

They also occupy fens, but usually drier areas with graminoid meadows and stunted trees amid open woodlands. No information is available on territory sites. Nests are close to or within areas of open bushes and stunted trees. Migratory habitat includes beaches and mudflats, but often the more sheltered portions of such areas.

They are numerous, and if northern coasts and southern marshes are retained for migrants, no management is urgent.
(Erskine 1977, James et al. 1982a, Palmer 1967).

Solitary Sandpiper, *Tringa solitaria*

The Solitary Sandpiper breeds throughout the forested portions of northern Ontario south to about Wawa and Timmins.

In summer they favour ponds and open fens or quiet woodland pools or other wetlands with surrounding trees. Eggs are laid in trees in old nests of species such as American Robin or Rusty Blackbird. No information is available as territory sizes. On migration they prefer sheltered ponds, marshes and ditches where mudflats are exposed, but are not an open beach bird or to be found on salt water.

They are numerous and their remote breeding habitat does not seem threatened. Protection of southern wetlands for migrants is their most urgent need.
(James et al. 1982a, Palmer 1967).

Whimbrel, *Numenius phaeopus*

The Whimbrel breeds only along the Hudson Bay and northern James Bay coasts.

They breed in tundra areas, mainly in wet graminoid tundra but also on drier heath-lichen tundra, even where a few scattered trees are found in otherwise open areas. Nests are placed on dry hummock among sedges or grasses. No information is available on territory sizes required. In migration they are found mainly on the margins of salt and fresh waters, especially tidal estuaries and rivers. We have a relatively small but stable breeding population in Ontario, but numerous birds use the northern coasts for migration. The preservation of those coasts is necessary for their continued success. (Palmer 1967).

Hudsonian Godwit, *Limosa haemastica*

The Hudsonian Godwit breeds only along the Hudson Bay coast in areas where treeline habitat is within about fifteen (15) km or less of the coast, where woods and tundra intermix. Their habitat has a great many small ponds and an intricate mixture of wet marshes and dry heath-lichen hummocks with shrubs and stunted trees. Nests are placed among the shrubs on dry ground.

We have a rather small breeding population, probably relatively stable and possible increasing in numbers, but during migration thousands amass on the tidal flats of James Bay. The preservation of these flats is vital to their continued well being
(Hagar 1966).

Marbled Godwit, *Limosa fedoa*

The Marbled Godwit breeds only along the James Bay coast, apparently more commonly in the southern half.

They use the open coastal graminoid marshes for breeding and more open mudflats and beaches on migration. No information is available on territory sizes. Nests are probably among sedges or grasses, on dry hummocks or ridges in the marshes.

They are relatively few in number, but the population seems to be increasing slowly. Preservation of the important coastal marshes should assure their survival.
(Morrison et al. 1976, Palmer 1967).

Semipalmated Sandpiper, *Calidris pusilla*

The Semipalmated Sandpiper breeds all along the Hudson Bay coast, most abundantly in the Cape Henrietta Maria area.

They breed on either wet graminoid tundra or drier heath-lichen tundra either coastally or somewhat inland. Nests are among sedges or grasses and possibly under dwarf trees. No information is available on territory sizes. On migration they use mudflats and beaches of salt or freshwater.

They are one of the most numerous of migrants. Breeding populations are more restricted (by habitat availability) but appear stable. They should not be threatened in Ontario as long as tundra areas and northern tidal flats remain intact.
(Derksen et al. 1981, Palmer 1967).

Least Sandpiper, *Calidris minutilla*

The Least Sandpiper is also largely restricted to the tundra areas of the Hudson Bay coast.

They nest mainly in wet graminoid tundra, but also probably in somewhat drier heath-lichen tundra and in areas closer to the tree line where stunted spruces occur about areas of fen. Nests are among sedges or grasses in dry hummocks. No information is available on territory sizes. On migration they visit both fresh and salt water mudflats and beaches, usually closer to grassy situations.

They are an abundant migrant and common breeder with apparently stable numbers in need only of preservation of breeding and migratory habitats in Ontario.
(Palmer 1967).

Pectoral Sandpiper, *Calidris melanotos*

The Pectoral Sandpiper breeds in the Cape Henrietta Maria area (and possibly at scattered locations along the Hudson Bay coast).

They breed in low wet tundra or graminoid marshes in coastal lowlands, but no nests have been reported from Ontario. Territories are about three (3) ha minimum, to six (6) ha in less dense populations. On migration they prefer wet meadows and the margins of salt or freshwater bodies where there is sedge or grass growth.

There are very few breeding in Ontario, although they are a common migrant. Populations appear to be stable and in need of no immediate management. Preservation of breeding and migration habitat is essential.
(Connors et al. 1979, Derksen et al. 1981, Palmer 1967, Pitelka 1959).

Dunlin, *Calidris alpina*

The Dunlin breeds in the Cape Henrietta Maria area primarily, but also along the Hudson Bay coast.

Breeding habitat consists of wet tundra or possibly coastal marshes. Nests are in grass tufts on dry hummocks. They are territorial until young hatch, each pair occupying about five to seven (5-7) ha. Drier upland tundra is used for flocking later in the season. On migration salt and freshwater mudflats and beaches are used.

The breeding population in Ontario is relatively small but stable in numbers, however, they are abundant migrants. They should require only the continued existence of their nesting and migrating habitats for survival. (Derksen et al. 1981, Holmes 1966, Palmer 1967).

Stilt Sandpiper, *Calidris himantopus*

The Stilt Sandpiper nests mainly in the Cape Henrietta Maria area, and a few apparently also occupy parts of the whole Hudson Bay coast.

Breeding habitat is wet graminoid meadows or tussock tundra in the vicinity of ponds and pools. Nests are likely to be in clumps of sedge although none have been reported from Ontario. No information is available on territory sizes. Migratory habitat is shallow, quiet inland or coastal pools, marshes, estuaries, etc.

Ontario hosts only a relatively small but apparently stable breeding population, but they are common migrants. The continued existence of tundra and migratory habitat should assure them of a place in this province. (Jehl 1973, Palmer 1967).

Short-billed Dowitcher, *Limnodromus griseus*

Breeding by this species has never been satisfactorily documented in Ontario, but apparently breeding birds are known to summer at least in the Winisk area.

They occupy coastal graminoid marshes and tussock tundra in Ontario, but fens with low vegetation about them are used in other parts of the country and possibly in Ontario. Territories are not vigorously defended and are probably held only briefly as with Snipe (R. E. Harris, pers. comm.). Nests are on the ground in clumps of sedge or grass in relatively open situations.

Summering populations are small, but substantial numbers migrate through Ontario. No limiting factors are evident in Ontario.
(Palmer 1967).

Common Snipe, *Gllinago gallinago*

The Common Snipe breeds throughout Ontario. They breed in open bogs, open or lightly treed fens, open willow and alder swales in the north; also in graminoid marshes, and wet meadows or pastures in the south. Nests are on the ground in clumps of grasses or sedges. They are territorial and may initially claim ten to fifteen (10-15) ha per pair. But the behaviour breaks down rapidly once incubation is under way, so that other birds may move in and overlap extensively. On migration they frequent marshes and wet meadows of many types.

They are common breeding and migratory birds in Ontario and are unlikely to experience declines, except as habitat disappears.
(Tuck 1972).

American Woodcock, *Scolopax minor*

The American Woodcock breeds throughout southern Ontario, and as far north as northern Lake Superior and Cochrane, but numbers are relatively small on the Canadian Shield areas.

Two types of territories are required: dry open upland singing grounds, and moist wooded areas for nesting and feeding. Although the dry uplands are not the subject of these guidelines, they are inextricably tied to the swampy sites. Nest sites are almost always within hearing distance of the singing grounds (ave. 130 m away - Gregg 1984) and feeding sites of adults and chicks are always present within a short distance of the nest. Thus, the presence of swampy areas adjacent to farm fields or to forest areas cut to provide singing areas must be preserved to provide for woodcock feeding and nesting.

Nesting and feeding areas are low areas with moist soils that may be flooded briefly in spring or after rains. The early stages of forest succession where birch and aspen are dominant, or alder and willow swales often in riparian areas are preferred, but open somewhat older stands with relatively dense understory may also be used. Nests, begun very early, are on the ground, usually placed very near the edges of the woodland, predominantly within the woods, but also out in the long grass of fields. Singing territories are usually more than 200 m apart, but nesting territories of females may be much smaller (as small as twenty-five by fifty [25x50] m) so that several females may nest adjacent to one male.

On migration, alder and willow swales or moist aspen and birch woods are used.

Woodcock are most numerous in southern agricultural areas and have no doubt declined greatly as wetlands have been drained for agricultural purposes. They appear to be relatively stable at present, being threatened mainly by the loss of additional habitat. Intensive management specifically for this species could, no doubt, increase their numbers.
(Dwyer and Storm 1982, Gregg 1984, Gutzwiller 1983, Mendall and Aldous 1943, Petingill 1936, Rabe et al. 1983, Wishart and Bider 1976).

Wilson's Phalarope, *Phalaropus tricolor*

The Wilson's Phalarope breeds mainly in the agricultural southern part of the province, and in the southern James Bay area. They probably also breed in extreme western and northwestern Ontario in a few places.

Breeding habitat is the borders of quiet shallow waters of lakes, ponds, sloughs and rivers where low grasses and sedges cover the banks and surrounding areas; also extensive graminoid marshes bordered by low shrubs. Birds are not aggressively territorial and, on islands which they prefer to use, nests may be only nine to twelve (9-12) m apart in semi-colonial situations. Nests are placed on the ground either close to water or at some distance back in grassy or sedge covered areas. On migration they frequent quiet shallow waters of various types.

They are not numerous in Ontario at present, but seem to have been slowly increasing in numbers during the last two or three decades. They will be limited by available habitat and disturbances within those areas.
(Hahn 1967, Kagorise 1979, Morrison and Manning 1976, Sinclair 1978).

Red-necked Phalarope, *Phalaropus lobatus*

The Red-necked Phalarope breeds most commonly in the Cape Henrietta Maria area, but some are scattered all along the Hudson Bay coast.

They nest in sedges or grasses adjacent to shallow pools in tundra. No information is available on territory sizes but they appear to be semi-colonial as is Wilson's Phalarope. On migration they also occupy areas of shallow quiet waters of various types, both salt and freshwater. They seem to have a relatively small but stable population in Ontario, likely to persist as long as tundra environments are maintained.
(James and Peck 1985, Palmer 1967).

Parasitic Jaeger, *Stercorarius parasiticus*

The Parasitic Jaeger breeds mainly in the Cape Henrietta Maria area, but a few probably also nest elsewhere along the Hudson Bay coast.

They nest on wet graminoid tundra, but forage over all types of tundra. Territories are larger, covering at least as much as a square kilometre, probably much more in lean years. Few, if any, come very far inland, but move to open seacoasts to winter. Few breed in Ontario, but numbers are apparently stable. They are scavengers and predators that will not suffer unless their tundra habitat is destroyed.
(Pitelka et al. 1955).

Little Gull, *Larus minutus*

The Little Gull is a recent colonizer of North America. They breed at scattered locations in southern Ontario marshes and have recently been found at a couple of locations in Northern Ontario.

They nest in large, open reed marshes, and in open fens or graminoid marshes. Nests are floating or semifloating in shallow water in relatively open areas. They are colonial, defending only a small territory about the nest. Open marshes, fens and beaches of salt or freshwater are used by nonbreeding birds.

The preservation of large marshes in southern Ontario will be essential to their continued presence in the south. As they have expanded recently into northern fens, habitat should not limit their continued expansion there.

Common Tern, *Sterna hirundo*

The Common Tern breeds throughout Ontario with the exception of a wide strip along the coast of Hudson Bay.

They prefer to nest on islands in larger lakes where nests are placed on rocky or sandy shores, often near low vegetation. Nests are also placed in cattail marshes on floating vegetation or logs or muskrat houses, etc. They forage along lakeshore and large rivers. They are colonial nesters with only very small individual territories. Open marshes and shorelines with boggy areas are also used by migrants. The species has declined as marsh habitat has been destroyed. They may still be experiencing declines because of predation pressure from Ring-billed Gulls. Pesticides in the environment likely also had an effect in the past.

Forester's Tern, *Sterna forsteri*

Forester's Tern breeds in only a few areas of extreme southern Ontario.

They seem to use only very large cattail marshes where there is considerable open water. Nests are placed mainly on muskrat houses or pushups where they are not subject to wave action. Several nests may be placed on a single lodge, as the species is highly colonial. Marshy pools and marshy borders of lakes and rivers are used for foraging at all times.

They were apparently common in Ontario waters in the previous century, but disappeared and have only recently (since 1976) recolonized several large marshes. Disturbance in the nesting season, pesticides in the environment and the loss of large marshes would all be detrimental to them. (Bergman et al. 1970, Provost 1947, Weller and Fredrickson 1973).

Black Tern, *Chlidonias niger*

The Black Tern breeds throughout Ontario north to Big Trout Lake and Fort Albany, but north of the agricultural areas of southern Ontario they become increasingly scarce or absent from large areas.

They breed most commonly in larger reed marshes or marshy borders of lakes, river and ponds, also in wet open fens. Nests are usually floating platforms among emergent vegetation in water about a half to one (0.5-1) m deep. They must have shallow water and areas of open water near nests. Nests are often grouped, but may be isolated, and when in groups, they are only loosely associated in the same general area. Nests may be in relatively dense vegetation if an open pool of water is immediately surrounding the nest, but more often they are in areas of sparse vegetation that offers some protection from wave action. Low vegetation near open water is a definite preference. Quiet waters of bays, ponds, rivers and marshes are used by migrant birds.

This species has, no doubt, declined greatly in the past century as marsh habitat has been eliminated. They are apparently still declining slowly, probably as a result of human disturbance in the remaining marsh habitats and possibly from pesticide contamination.
(Bergman et al. 1979, Cuthbert 1954, McCracken et al. 1981, Provost 1947).

Great Gray Owl, *Strix nebulosa*

The Great Gray Owl is believed to breed throughout most of the forested portions of northern Ontario south to at least northern Lake Superior, but records are too few to be certain of their real range. They may be scarce in all but the southern parts of the Hudson Bay Lowland. There is good evidence that tamarack fens occurring in extensive areas or along the edges of wet areas or in spruce forests is especially important as breeding habitats. Stands of mature aspens adjacent to wetlands with tamarack are important as nesting sites, since they use the old nests of ravens, crows and hawks that are in such sites. They usually remain in such areas year round.

We have no information on territory size but it is probably rather large (perhaps one [1] sq. km minimum). Populations are likely relatively stable given the remoteness of their activities and habitats but we have little real information on population sizes or limiting factors.
(Nero 1980, Nero et al. 1984).

Short-eared Owl, *Asio flammeus*

The Short-eared Owl breeds in southern Ontario and along the Hudson and James Bay coasts and probably is thinly scattered throughout the rest of Ontario where suitable habitat is available. For nesting, they require large undisturbed grassy fields, or extensive open fens or graminoid marshes on fresh or salt water, also tundra. Similar habitat is used by migrants. Territory sizes range from about twenty-five (25) to 125 ha depending upon vole populations. Nests are on the ground in dense grasses or sedges perhaps under shrubs.

With intensive agriculture in southern Ontario, this species has all but disappeared from this region. Northern fen and coastal marsh habitats appear secure at present and populations there still appear healthy, but migratory birds are likely having difficulty in southern Ontario. They will also hunt in freshwater marshes in the south, but these too have disappeared from many areas.
(Clark 1975, Erskine 1977).

Alder Flycatcher, *Empidonax alnorum*

The Alder Flycatcher breeds throughout Ontario, except tundra areas, and is scarce in extreme southern Ontario.

They prefer thicket swamps in areas such as lake and stream edges, bogs and fens, damp fields, or cutover areas growing up to alders. There is generally no tree growth in their habitat. Territories are about a quarter to a half (0.25-0.5) ha in size. Similar thicket swamps are used in migration.

The species is an abundant breeder, limited mainly by loss of habitat in the south of the province.
(Barlow and McGillivray 1983, Erskine1977, James et al. 1982b, Snyder 1953, Stein 1963, Zink and Fall 1981).

Eastern Kingbird, *Tyrannus tyrannus*

The Eastern Kingbird breeds across Ontario, north to about Kenora and Cochrane in relative abundance, and occur sporadically in summer north to Hudson Bay.

They breed in both dry upland areas and in wetlands. In wetlands they occur wherever scattered trees, either alive or dead, are found around or in sloughs, beaver meadows, lake or river edges and fens or bogs. Birds defend an area of up to about one (1) ha in size. Similar habitat is occupied on migration, or anywhere they can forage in open areas, particularly over water.

They are a numerous species with no apparent limiting factors but habitat availability, and they can occupy a tremendous variety of habitats.
(Brewer 1967, MacKenzie and Sealey 1981, McCracken et al. 1981).

Gray Jay, *Perisoreus canadensis*

The Gray Jay breeds throughout the forested portions of northern Ontario, south to above northern Haliburton District.

They are non-migratory and highly territorial, spending their life in open coniferous and mixed woods, particularly spruce swamps, where trees are often short and spaced slightly apart or clumped irregularly.

They are a common bird, confined largely to more remote areas, and as much of their habitat is not commercially valuable for timber, they are unlikely to be threatened by human activity. But they rely on stored food toward winter's end, and cutting in their territories might prevent a year's production or even survival.
(Bent 1946).

Sedge Wren, *Cistothorus platensis*

The Sedge Wren breeds primarily south of the Canadian Shield in southern Ontario, with a few ranging north to about Kenora and Timmins.

They nest in graminoid marshes, often around the edges of water bodies, and sometimes in cattail marshes; also dry grassy fields and graminoid fens. Nests are placed just above the water or ground among the sedges or grasses, but seldom over water of any depth, and most areas would be dry later in the year. Territories average about point two (0.2) ha or about five (5) times as large as those of the Marsh Wren. This species has a low site tenacity and a high mobility between seasons, searching out suitable habitat that may not be stable from year to year. Similar habitat is used on migration.

This species seems to have been declining in recent years, probably as a result of habitat loss or disturbance.
(Burns 1982, Provost 1947).

Marsh Wren, *Cistothorus palustris*

The Marsh Wren breeds mainly in the marshes of the southern part of Ontario. They become scarce or absent from large areas on the Canadian Shield north to about Kenora and northern Lake Superior, and there is an isolated occurrence on southern James Bay.

They nest almost exclusively in cattail marshes, usually large ones, where open water is interspersed among the emergent vegetation, providing a somewhat open stand of vegetation. Thus, habitat requirements are relatively narrow. Territory sizes are quite small, averaging about point zero four (0.04) ha in these rich marshes. Nests are placed in cattails usually about a half to one (0.5-1) m above water. Similar habitat is used on migration.

The species is numerous where cattail marshes remain, but has declined as marshes have disappeared.
(Erskine 1977, Kantrud and Stewart 1984, McCracken et al. 1981, Verner 1965).

Swainson's Thrush, *Catharus ustulatus*

The Swainson's Thrush breeds throughout the forested portions of northern Ontario, extending into southern Ontario only on the Canadian Shield and only to about Haliburton District.

They are associated with undisturbed coniferous forests, although mixed forests are also acceptable, also areas of dense alder/willow swamps with scattered coniferous trees. Very often the woods selected are wet for at least part of the year, often in the vicinity of streams. Nests are well above ground in coniferous trees. Territory sizes are unknown but unlikely to exceed a few hectares. On migration they may be found in most any forested situation.

They are a numerous species, unlikely to be in need of management strategies for their continued abundance.
(Bent 1949, Dilger 1956, James et al. 1982b).

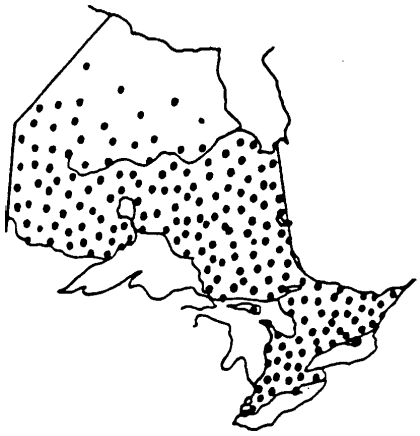
Gray Catbird, *Dumetella carolinensis*

The Gray Catbird is found most commonly in the agricultural areas of southern Ontario, but they do occur in the Kenora and Thunder Bay areas and north to about Kirkland Lake.

They breed in thickets and shrubbery of most any type in both wet and dry places. But the edges of streams, ponds and marshes are favourite spots. Nests are placed in shrubs well above ground. Territory sizes average about a third (0.33) ha. Similar habitat is used on migration.

They are an abundant species and as they also use dry shrubbery they have not been drastically affected by wetland losses.
(Bent 1948, Darley et al. 1971, Harcus 1973, McCracken 1981, Nickell 1965).

Cedar Waxwing, *Bombycilla cedrorum*



The Cedar Waxwing breeds throughout Ontario at least as far north as Favourable Lake and Moosonee, probably at least as far as Big Trout Lake and Fort Albany.

They are characteristic of the edges of ponds, lakes, rivers, marshes, fens or open swamps of various types, wherever there are bushes and trees producing fruit or providing perches over open areas (water or marsh vegetation) for flycatching. Both coniferous and deciduous woodland edges are used, and nests are placed in bushes or trees of both types, usually within two or three (2-3) metres of the ground. Birds are scarcely territorial and may be very loosely colonial with nests as close as eight to ten (8-10) m apart. They are non-migratory, but wander widely outside the breeding season that is somewhat later than most birds (July and August).

They are a widespread and numerous species that may have benefited from man's activities. (Crouch 1936, Erskine 1977, Putnam 1949).

Northern Shrike, *Lanius excubitor*

The Northern Shrike is primarily a resident of subarctic areas outside of Ontario, but a few records indicate a sparse population exists, at least near the Hudson and James Bay coasts, if not through much of the Hudson Bay Lowland.

They prefer lightly treed fens or open sparse woods and low growth near the tree line. No information is available on territory sizes. A few wander south in winter, but they are not migratory to any extent. No nests have been reported in Ontario. They have not likely ever been numerous in Ontario and are relatively unaffected by man's activities. (James 1981).

White-eyed Vireo, *Vireo griseus*

The White-eyed Vireo nests only in the extreme southern part of the province, principally in Point Pelee National Park.

They occupy scrubby second growth or forest edge often at the edges of marshes, lakes, rivers or swamps (although also in drier upland areas). Nests are low in bushes. Territories are about one to two (1-2) hectares in size. It is a relatively recent breeder in Ontario (since 1971), likely to be affected by habitat loss, but currently increasing slowly.
(Bent 1950, Bradley 1980).

Solitary Vireo, *Vireo solitarius*

The Solitary Vireo breeds across Ontario, north to at least Big Trout Lake and Fort Albany, south regularly to Haliburton District and Ottawa-Carlton RM, rarely farther.

They breed in coniferous and mixed woods, usually where there are some mature trees, either in closed canopy forest or where trees are more scattered. There must also be young coniferous trees or deciduous shrubs as understory where they place their nests. They are often associated with swampy areas where such conditions are found, although they are not restricted to wet areas. Territories would seldom exceed one (1) ha in size. On migration they may be found in many woodland types.

The species has probably disappeared from much of southern Ontario in historic times as swamps have been cleared for agriculture. They are a relatively common bird and existing populations are stable and unlikely to be unduly stressed by human activities in this province, except by logging in riparian areas.
(James 1979, James 1973).

Philadelphia Vireo, *Vireo philadelphicus*

The Philadelphia Vireo breeds across northern Ontario as far north as Big Trout Lake and Fort Albany. They seldom nest in southern Ontario as far south as Bruce and Leeds counties.

They occupy alder swamps along streams and wetlands, usually at the edge of or within open, mixed or deciduous woods where they also nest and forage (areas that may be quite dry). Territories are small, probably about a half (0.5) ha each. On migration, open deciduous woods and shrubbery of many types are used.

They are common species, whose habitat is unlikely to be threatened by human activity.

(Barlow and Rice 1977, James et al. 1982b).

Blue-winged Warbler, *Vermivora pinus*

The Blue-winged Warbler breeds only in the very southern portions of the province north to about Toronto and Kingston.

They often nest in thicket swamps and at the edges of streams where thickets are scattered in moist habitat. But they also occupy woodland edges, overgrown fields and even open woodland. Nests are on the ground usually among grasses, weeds and shrub stems in moist or dry situations. Territories may be quite small (less than a half (0.5) ha) but they seem to be area sensitive, requiring at least nineteen (19) ha of habitat before they occupy the area.

Although they are a relatively rare species in Ontario, they seem to have been increasing slowly in numbers since they began nesting here about thirty (30) years ago. They seem to be limited as much by northern latitude as by a lack of habitat.

(Confer and Knapp 1981, Graber et al. 1983, Harrison 1984).

Golden-winged Warbler, *Vermivora chrysoptera*

The Golden-winged Warbler breeds throughout southern Ontario.

They nest at the edges of wet areas of many types where scattered shrubbery is found, as well as in overgrown fields or woodland edges in drier areas. They tend to choose drier areas more than Blue-winged Warblers, but their habitat preferences are narrower. They occur only where forest edge or succession is ten to thirty (10-30) years old or in areas maintained shrubby by wet conditions.

Territories are small (ca half (0.5) ha or less), but they also prefer areas with ten (10) or more hectares of habitat.

They are a relatively common species now in Ontario, and have been expanding northward slowly through this century, taking advantage of man's forest clearing activities.
(Confer and Knapp 1981, Graber et al. 1983, Harrison 1984).

Yellow Warbler, *Dendroica petechia*

The Yellow Warbler breeds throughout Ontario.

It is a bird of thickets and shrubs, sometimes in dry areas, but preferably thicket swamps at the edges of marshes, ponds, rivers, lakes and fens. Birds are territorial, but defended areas may be small (point eight [0.08] ha) where densities are high, and they probably forage beyond their defended territory. They may occupy very small patches as single pairs or many may be in larger patches with other pairs. Similar habitat is used on migration.

They are a common and widespread species, little affected by man's activities except the destruction of southern wetlands.
(Beer et al. 1956, Ficken and Ficken 1966, Graber et al. 1983, Harrison 1984).

Palm Warbler*, Dendroica palmarum*

The Palm Warbler breeds throughout northern Ontario, but in the south only a few remain in scattered bog habitats as far south as the Bruce Peninsula and Ottawa.

Although it occurs in some dry areas, wet ones seem much preferred. They like lightly treed or shrubby bogs, or even open spruce swamp. Nests are on the ground on sphagnum hummocks. Territories are about one to two (1-2) ha in size. On migration, wetlands with shrubs or open woodland edges are used.

They are a common and widespread species of more remote areas unlikely to be affected much by human activity, except for migrants and scattered breeders that will suffer if existing southern wetlands are eliminated.
(Erskine 1977, Harrison 1984, Walkinshaw and Wolf 1957, Welsh 1971).

Black-and-white Warbler*, Mniotilta varia*

The Black-and-white Warbler breeds throughout Ontario as far north as Big Trout Lake and Fort Albany, but becomes increasingly scarce in the extreme south of the province.

They breed at the edges of deciduous, mixed or coniferous woodlands, especially in moist situations, where alder or willow shrubbery is plentiful, or in very open wet swamps where shrubbery is dense. Some trees and numerous deciduous shrubs are essential. They also appear to be area sensitive requiring as much as 300 ha for successful continued occupation of an area (Robbins 1979), even though territory sizes are likely rather small (probably up to one [1] ha). On migration they like bottomland forests and forest edges.

They are an abundant and widespread species, being more limited only in the south where most forest growth has been eliminated.
(Graber et al. 1983, Harrison 1984, James et al. 1982b, Robbins 1979).

Connecticut Warbler, *Oporornis agilis*

The Connecticut Warbler breeds across Ontario, north to about Sachigo Lake and Fort Albany and south to Wawa and Cochrane.

They occur in some dry upland areas, but in Ontario are found largely in well spaced black spruce swamps where trees are not tall and where there is usually a good ground cover of Laborador tea. Nests are placed on the ground among shrubbery or the lower limbs of evergreens. Territory sizes are not determined but are unlikely to be large. On migration a variety of shrubby wooded habitats are used.

They are a reasonably common species, but suitable habitat is often widely spaced. Trees are seldom of commercial size and so their habitats are not likely to be disturbed to any extent. (Harrison 1984, Huff 1929, Walkinshaw and Dyer 1961).

Common Yellowthroat, *Geothlypis trichas*

The Common Yellowthroat breeds across Ontario north to about Big Trout Lake and Fort Albany, but they are scarce in most of their range that lies in the Boreal Forest and Hudson Bay Lowland.

They occur mainly in moist to wet areas where dense sedges or grasses are mixed with scattered but lush shrub growth, but trees are few or absent. The edges of marshes, streams, ponds, lakes, fens and wooded swamps are the usual habitat. Nests are placed in dense vegetation close to the ground or water. Territories seem to be about a half (0.5) ha at least. Similar habitat is used on migration.

They are a common species, limited mainly by the disappearance of wetlands or even temporarily flooded lowlands.
(Graber et al. 1983, Harrison 1984, McCracken et al. 1981, Stewart 1953).

Wilson's Warbler, *Wilsonia pusilla*

Wilson's Warbler breeds throughout northern Ontario, although scarce in the far north. They are not believed to breed in southern Ontario.

It occurs in alder and willow swamps sometimes with scattered coniferous trees, but the dense scrub is the essential element, and the habitat is almost always wet. Nests are on the ground in sedges and grasses, often on hummocks near shallow water. The banks of streams, ponds and lakes are typical nesting areas. Territory sizes are unknown, but probably between a half and one (0.5-1) ha. On migration, similar wet shrubby habitats are frequented.

They are a common species and largely removed from extensive human activities. (Bent 1953, Harrison 1954, James et al. 1982b).

Savannah Sparrow, *Passerculus sandwichensis*

The Savannah Sparrow nests throughout Ontario. They breed in open areas either dry or wet, including fresh or saltwater graminoid marshes, fens, wet tussock tundra, floodplains and fields. Nests are on the ground in clumps of vegetation, often on hummocks surrounded by water. Similar habitat is used during migration. Territory sizes are about one and a half to two (1.5-2) ha in size.

They are among the most abundant of Ontario birds and have undoubtedly benefited from forest clearing in the south. (Kantrud and Stewart 1984, Weins 1969).

Le Conte's Sparrow, *Ammodramus leconteii*

Very little is known of the distribution of this sparrow in Ontario as it has scarcely ever been found. It is probably absent from large areas, although potentially it might be found almost anyplace. At one time they nested in the Holland Marsh area, but are now gone. They definitely occur in western Rainy River District and along the coasts of James and Hudson Bays, but elsewhere are unlikely to be seen.

They seem to prefer large undisturbed areas of dense graminoid marsh, with or without low scattered shrubs. These may be wet areas such as marsh edges, brackish or freshwater marshes or drier sites such as fallow fields (often near water). Territories seem to be two to three (2-3) ha in size, but birds probably seldom occur as isolated pairs on small grasslands. Nests are close to the ground in tufts of grass or sedge. On migration similar habitat would be used.

They are very secretive birds, difficult to get information about, but are undoubtedly rare except possibly along the north coasts. Undoubtedly, they have disappeared from southern Ontario with the disappearance of most of the wetlands there, or because of disturbance in the fields that were created. Northern populations have likely been little affected by human activity. (Cooper 1984, Murray 1969, Robbins 1969, Walkinshaw 1937).

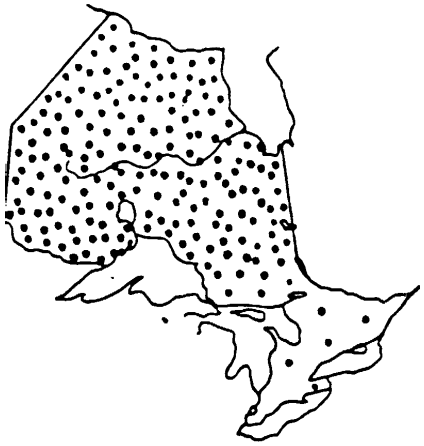
Sharp-tailed Sparrow, *Ammodramus caudacutus*

The Sharp-tailed Sparrow appears to breed only in Maritime areas, along the shores of James Bay and at least as far west as Winisk on the Hudson Bay coast.

They breed in open brackish graminoid marshes where vegetation is dense, and always in wetter areas. Nests are in tufts of sedge near or surrounded by water. The extent of territorial activity is unknown for this subspecies, but the prairie race is essentially non-territorial. Similar grassy areas are likely used by migrant birds.

They would seem to be relatively limited in distribution, possibly patchily distributed and not overly common, but poorly documented. They have likely been little disturbed by man's activities in this province, although wetland disappearance in the south may have affected migrants. (Bent 1968).

Lincoln's Sparrow, *Melospiza lincolnii*



The Lincoln's Sparrow breeds throughout northern Ontario, but only a few scattered birds remain to nest in southern Ontario.

They breed mainly in wet areas where sedges and grasses are interspersed with shrubs and short trees. Fens and bogs, the edges of lakes and streams and open alder or willow swamps are preferred. Nests are on the ground in hummocks of sphagnum or in clumps of sedges. Territory sizes are unknown, but are probably not larger than about one (1) ha. Shrubby wetlands similar to nesting areas are also used on migration. They are a common bird in northern wetlands, but southern populations were undoubtedly much more widespread, disappearing as wetlands were drained.
(Bent 1968, Erskine 1977).

Swamp Sparrow, *Melospiza georgiana*

The Swamp Sparrow breeds throughout Ontario.

They occupy marshes and the marshy edges of water bodies where rank emergent vegetation and shrubs occur, in fens and bogs with small conifers and shrubs, in swamps with shrub growth, about sedge meadows and shorelines with willow thickets and wet pastures or beaver meadows. Shrub growth is usually denser and territorial areas apparently smaller (even narrow riparian strips) than for the Lincoln's Sparrow that prefers more open and larger fens and meadows. Nests are on the ground on hummocks or in clumps of grasses and bushes. They use similar habitat on migration.

They are an abundant species, limited in southern Ontario only by the available habitat.
(Bent 1968, Erskine 1977).

Yellow-headed Blackbird, *Xanthocephalus xanthocephalus*

The Yellow-headed Blackbird nests in only a very few places in Rainy River District and the Lake St. Clair area.

They nest in a relatively narrow range of conditions, in the outer edges of marshes over standing water (usually twenty to ninety (20-90) cm deep) where vegetation is scattered in clumps. Vegetation used is cattail, bulrush, reed grass, wild rice or occasionally willows. Territories may be rather small (as small as point zero three [0.03] ha) in semicolonial situations. Nests are placed in clumps of dead vegetation over the water. Shallower water discourages yellow-headed and encourages Red-winged Blackbirds.

The Yellow-headed Blackbird is a relatively rare bird in Ontario, but one that has relatively recently moved into the province. They do not seem to be limited by habitat.
(Miller 1968, Minock 1980, Minock and Watson 1983, Orians 1980, Provost 1947, Willson 1966).

Rusty Blackbird, *Euphagus carolinus*

The Rusty Blackbird breeds throughout northern Ontario, south only to about Muskoka and Haliburton Districts.

They nest in edges or openings of woods, or where shrubs and small trees are scattered (always near water) of lakes, rivers, ponds, fens, bogs or swamps, in more remote or undisturbed areas. Nests are in trees (often low) and several may be relatively close together as small nesting territories are served by common feeding areas. Swampy areas as well as agricultural fields may be visited on migration.

It is a common and stable species, now living largely apart from man. They have, no doubt, decreased in southern Ontario with the loss of woodlands and wetlands in historic times.
(Bent 1958, Erskine 1977, James et al. 1982, James et al. 1982b).

Brewer's Blackbird, *Euphagus cyanocephalus*

The Brewer's Blackbird breeds in the Kenora to Thunder Bay region, from Sault Ste. Marie to Sudbury area, and at a few scattered locations in southern Ontario, also recently in Timiskaming District.

They usually nest in open areas, most of which are dry, such as railway and road right of ways, fields and pastures where bushy tangles are present. But they also nest in low shrub bogs, where adjacent grassy areas are available for foraging. Nests are typically on the ground in clumps of grass, or in low bushes in bogs. They are a colonial species with small defended territories about nests and common feeding areas. The larger the feeding areas, the larger a colony may be. Open grassy areas are also used on migration.

This species is increasing in numbers, moving into agricultural areas primarily.
(Bent 1958, Stepney 1975, Stepney 1979).

Management Guidelines

General Comments

Although some wetland species have already been largely extirpated from Ontario and some others are rare, most of the species considered are not in danger of extirpation in the near future if the remaining habitat can be maintained. But a number of species have virtually disappeared or are vanishing from the southern part of Ontario as human population continues to grow and impinge upon their habitat. The most urgent needs are in the south of the province.

Wetlands should seldom be managed for a single group (eg., waterfowl) with little consideration for other wildlife (Sanderson 1977). Some species require open water, some just damp areas or even adjacent dry areas for part of their breeding cycles. But we should consider both parts of the wetland as important. There is a spectrum of species, from those of very wet to dry areas. Those that require open water are undoubtedly in greater need of management. But management to provide optimum habitat for the most critical species will likely provide conditions that will be suitable for most other species using the same habitat (Connor 1979, Webb et al. 1977).
For almost all species on the list of wetland inhabitants, particularly those largely or entirely breeding in northern Ontario, I would not recommend for any specific management. They will take care of themselves if we do not destroy their habitat. This does not mean that they might not benefit from species specific management, but they are not in need of it to maintain present numbers. The following general guidelines will be adequate for most.

General Considerations

1.1) The most urgent need of wetland species is for the preservation of remaining wetlands. This applies particularly to large reed marshes, and particularly in southern Ontario where several rarer species (King Rail, Forster's Tern) rely exclusively on these marshes. The large marshes are essential to those species that may be area sensitive or those that require relatively undisturbed conditions (Pied-billed Grebe, American Bittern, Northern Harrier, Yellow Rail, Black Tern, Short-eared Owl). But even smaller marshes are important, mainly because we have already lost the bulk of our southern wetlands on which all species depend, but also all sizes are important to migrant birds.

1.2) Conserve the drier surrounding edges as well as the wetlands themselves.

1.3) Avoid channeling rivers that results in wetland drainage. Channeling will also destroy marshy edges and riparian vegetation valuable to many species.

1.4) Do not artificially control natural water fluctuations in such marshes. Allow natural regulation to provide a diversity of plant life.

1.5) Discourage the logging or disruption of swampy areas where trees are small, such as in northern spruce swamps and fens. Southern hardwood swamps and riparian areas should be disturbed as little as possible (for guidelines to logging in riparian areas, see Appendix I from James 1983c).

1.6) In northern meadow marshes and wet tundra areas: confine exploration to relatively small areas; coastal areas with barrier islands and river deltas should be preserved; beaded streams should not be diverted, channeled or impeded; roads should have adequate cross drainage; all facilities should be put on dry upland tundra. Particular attention should be given to preservation of southern James Bay tidal flats and marshes.
(Bourn and Cottam 1939, Brynaert 1983, Derksen et al. 1981, DeSmet 1982, Erickson 1979, Fogarty and Arnold 1977, James 1983a, Morrison and Harrington 1979, Owen 1977, Rowntree 1979, Samson 1980, Samson and Knopf 1982, Sanderson 1977, Sandfort 1977, Taylor 1984, Tuck 1972).

2) Avoid the use of chemical pesticides, especially long lived organchlorine compounds. Encourage research into the development and use of biological control measures against insect pests. If pesticides must be used ensure proper testing prior to use. There should be an effort made to monitor pesticide levels in the environment to avoid the type of disaster inflicted upon Peregrine Falcons and to a lesser extent, other wetland and raptorial species.

(Anderson et al. 1969, Cade et al. 1968, Cooke 1973, Cope 1966, Enderson and

Burger 1968, Fleming et al. 1983, Gilbertson 1974, Gilbertson et al. 1976, Gish and Hughes 1982, Grue 1983, Hickey 1966, James 1983c, Keith 1966, Longcore and Stendell 1977, Nelson 1976, Ohlendorf et al. 1979, Peakall 1976, Takekawa et al. 1982, Vermeer and Reynolds 1970, Weseloh 1983, White et al. 1973).

3) Encourage public education programs: to inform people of the importance of wetlands and thereby generate support for preservation; to encourage the wise use of wetlands during the nesting season; to discourage the shooting of wetland species such as raptors, and to encourage private landowners to protect wetlands. The best woodcock management program, for example, is one involving private landowners (Owen 1977). Waterfowl and other wetland species will all benefit from wetlands on private lands. (Cosens 1984, DeSmet 1982, Owen 1977, Rowntree 1979, Sanderson 1977).

4.1) Encourage research on wetland species. Habitat requirements of most species are known only in general. We need further searches for the presence of rarer species so that critical habitat can be preserved (for Yellow Rail in the south, King Rail, Wilson's Phalarope, Little Gull, Le Conte's Sparrow).

4.2) Information from the Ontario Breeding Bird Atlas program (see Appendix II) could be used to provide a basis for additional work.

4.3) The Ontario Nest Records Scheme (see Appendix III) is an ongoing program designed to gather basic nesting information about Ontario birds. Contributions to it should be encouraged, and information already accumulated is available to assist in future research.

4.4) There is a need to find areas, such as southern James Bay, where there is a high use by resident and/or migrant birds so that such critical areas can be identified and preserved.

4.5) Prior to the development of any wetland area, studies should be undertaken to determine the importance of those wetlands to wildlife. (Boyle and Samson 1983, Cosens 1984, DeSmet 1982).

5) Consider limiting the recreational use of some critical wetland areas during the

6) breeding season. This would apply particularly to large areas where wide ranging species like Northern Harriers and Short-eared Owls occur or to areas where rarer species such as Yellow Rails (in southern Ontario) or King Rails occur, to tern colonies, and to open reed marshes where grebes are nesting. (Clark 1975, Lindmeier 1960).

6) In any wetlands where water control structures exist, encourage procedures that will maintain a diversity of plant life and animal life, and open up dense stands of cattail

growth. Encourage water level fluctuations from year to year (but not during the breeding season), light grazing by cattle in the autumn will break up cattails; encourage muskrats which also break up cattails and create pools and channels of use to wildlife; blasting and dredging could also be used to create pools in dense vegetation; draw down of water in autumn encourages use by migrant shorebirds and may improve productivity through oxidation of organic matter and release of nutrients and will help thin cattails. In areas of standing water, an interspersion of water and vegetation of about fifty to fifty (50:50) is ideal.
(Beaule 1979, DeSmet 1982, Ellarson 1950, Rowntree 1979, Tuck 1972, Weller and Fredrickson 1973).

7) Encourage the creation of additional wetlands. This could be accomplished through reflooding of once drained areas, or impeding the flow of water from low areas that could readily be flooded. (Rowntree 1979, Breva 1985). This applies primarily to southern Ontario.

8) Restrict development of lakeshores where wetlands will be affected either directly through development or indirectly through increased disturbance to the area. This also applies primarily in southern Ontario.

Specific Considerations

Sandhill Crane

Although they are an expanding species in Ontario at present, they are very sensitive to disturbance, not nesting anywhere near human activity (Tebbel 1981). In wetlands where they are known to be nesting, consider establishing a buffer zone of about one (1) km around the wetland in which all activity is restricted during the breeding season. It will also be important that vegetation immediately surrounding the wetland area not be disturbed at any season. They are known to forage in forest edges about nesting areas. Within perhaps 100 m of the woodland edge, little or no logging should occur even outside of the nesting season.

Great Gray Owl

Much of the habitat they use is tamarack fens or bogs. Most such areas are unlikely to be disturbed. However, if the demand for tamarack or peat extraction increases, their habitats may be destroyed. They must have forested areas of considerable extent although the exact extent is unknown. If they are to be retained as a part of the avifauna then harvest of trees from boreal areas must involve a sustained yield rotation. The exclusion of fens and immediately adjacent forests from any sort of cutting may be essential to this species.

The opening up of forested areas, even through logging roads, will also attract people. This could be harmful to this species through shooting of birds or disturbance that will force them to move. They appear to require isolation (Nero 1980).

American Woodcock

The preservation of wetland edges, riparian growth and swampy woods and thickets will take care of woodcock as far as wetland areas are concerned. Much of the management for Woodcock also involves forest management in adjacent uplands. Information on upland management is available in Gregg (1984), Owen (1977), Sepik (1980) and Sepik et al. (1981) (see also Appendix IV).

Other Species

A number of other species make use of wetlands, but their management was considered in other reports. The Red-shouldered Hawk was considered in Management Guidelines for Forest Nesting Raptors (James 1983a), and the Saw-whet Owl and Prothonotary Warbler in Guidelines for Cavity Nesters (James 1983b).

Species List

The following table is provided as a quick reference to those species likely to be found breeding in the various wetland types of Ontario. Those found in southern wetlands are indicated by an “s”, and those in northern wetlands by an “n”. Where “s” or “n” are bolded, the species is relatively rare or declining in those regions.

	Marsh		Swamp				Fen or Bog	
Species	Reed	Meadow	Thicket	Conifer	Deciduous	Open	Low	Treed
Pied-billed Grebe	**s n**							
Horned Grebe	**n**							
Red-necked Grebe	**n**							
American Bittern	**s** n	**s** n				**s** n		
Least Bittern	**s**							
Green-backed Heron	s		s	s	s			
Northern Harrier	**s** n	**s** n				s n		
Red-shouldered Hawk					**s**			
Merlin				n		n		
Yellow Rail		**s n**						
King Rail	**s**	**s**						
Virginia Rail	s	s	s					
Sora	s n	n	s n			n		
Common Moorhen	s							
American Coot	s							
Sandhill Crane						**n**	**n**	
Greater Yellowlegs						n		
Lesser Yellowlegs						n		
Solitary Sandpiper						n		
Whimbrel		n						
Hudsonian Godwit		n						
Marbled Godwit		**n**						

	Marsh		Swamp				Fen or Bog	
Species	Reed	Meadow	Thicket	Conifer	Deciduous	Open	Low	Treed
Semipalmated Sandpiper		n						
Least Sandpiper		n						
Pectoral Sandpiper		n						
Dunlin		n						
Stilt Sandpiper		n						
Short-billed Dowitcher		**n**						
Common Snipe		n				s n		
American Woodcock			s n	s	s n			
Wilson's Phalarope	**s n**							
Red-necked Phalarope	n							
Parasitic Jaeger		**n**						
Little Gull	**s n**					**n**		
Common Tern	**s n**							
Forster's Tern	**s**							
Black Tern	**s n**	**s n**				n		
Great Gray Owl					**n**			n
Short-eared Owl	**s**	**s n**				n		
Alder Flycatcher			s n					
Eastern Kingbird	s n			s n				n
Gray Jay								
Sedge Wren		**s n**	**s**					
Marsh Wren	s							
Swainson's Thrush			n	n				
Gray Catbird			s n					
Cedar Waxwing			s n					
Northern Shrike								n
White-eyed Vireo			s					

	Marsh		Swamp				Fen or Bog	
Species	Reed	Meadow	Thicket	Conifer	Deciduous	Open	Low Shrub	Treed
Solitary Vireo				s n				
Philadelphia Vireo			n		n			
Blue-winged Warbler			**s**					
Golden-winged Warbler			s					
Yellow Warbler			s n					
Palm Warbler								
Black-and-white Warbler					s n			
Prothonotary Warbler					**s**			
Connecticut Warbler				n				n
Common Yellowthroat		s n	s n				s n	
Wilson's Warbler			n					
Savannah Sparrow		s n				s n		
Le Conte's Sparrow		**n**						
Sharp-tailed Sparrow		n						
Lincoln's Sparrow		**s** n					n	
Swamp Sparrow		s n	s n					
Yellow-headed Blackbird	**s n**							
Rusty Blackbird				n			n	n
Brewer's Blackbird		n					n	

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APPENDIX I: Riparian Forest and Logging

(Extracted from James 1983c)

Avoid cutting riparian forests. Plan to leave them as part of the nesting requirements for specific species, as well as for the needs of numerous other animals. The closer the cutting is to a stream or lake, the greater the impact on wildlife. Leave forest on all steep banks. Limit cutting to selective removal if it is to be done. Try to maintain a minimum of fifty (50) m uncut on either side of a river or lake (Allan and Bohart 1979, Evans and Connor 1979, Thomas et al. 1979).

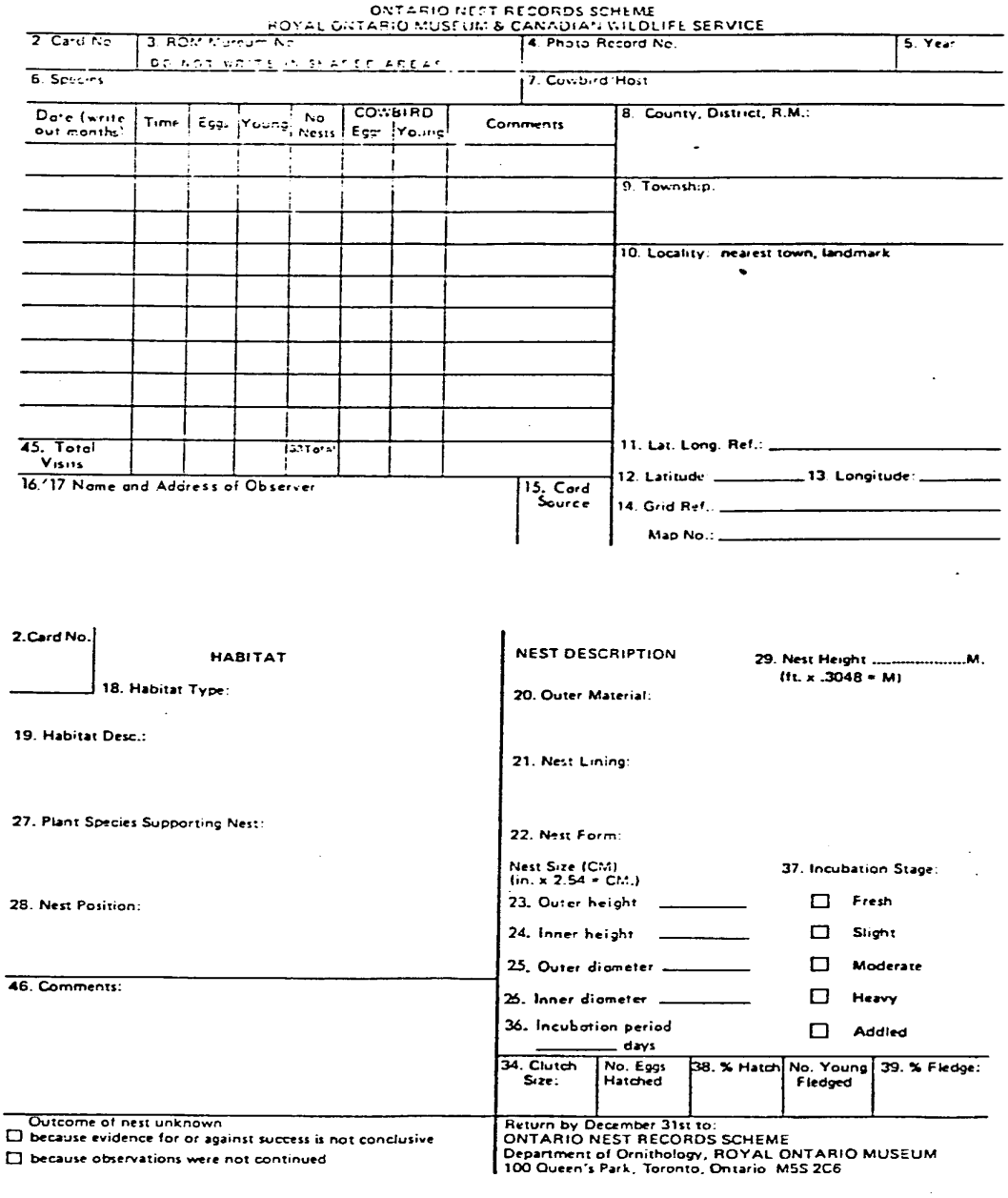
APPENDIX II: Ontario Breeding Bird Atlas

The atlas program is designed to gather information about the distribution of all the breeding birds of Ontario during a relatively short period from 1981 to 1985. Data is being collected on ten (10) kilometre squares (about 1800) in the southern part of the province and near centres of population in the north, and on 100 km squares (about 100) in the northern portions of Ontario. Data are computerized so that information about the occurrence of any species is readily available in map or table form. Results of the program are expected to be published sometime in 1986 or 1987.

For further information contact the Federation of Ontario Naturalists, 355 Lessmill Road, Don Mills, Ontario, M3B 2W8. (416) 444-8419.

APPENDIX III: Ontario Nest Records Scheme

The Canadian Wildlife Service and the Royal Ontario Museum provide a central registry for all nesting birds in the province. ONRS cards should be completed for all nests located. These cards will be kept in confidence if so requested, but otherwise they are available to all researchers. A sample card is included, and is available from the Royal Ontario Museum.



ONTARIO NEST RECORDS SCHEME
ROYAL ONTARIO MUSEUM & CANADIAN WILDLIFE SERVICE

2. Card No. | 3. ROM Museum No. DO NOT WRITE IN SHADED AREAS | 4. Photo Record No. | 5. Year

6. Species | 7. Cowbird Host

Date (write out months)	Time	Eggs	Young	No. Nests	COWBIRD Eggs	COWBIRD Young	Comments
45. Total Visits				(33)Total			

8. County, District, R.M.:

9. Township:

10. Locality: nearest town, landmark

11. Lat. Long. Ref.: _____

12. Latitude _____ 13. Longitude: _____

14. Grid Ref.: _____

Map No.: _____

16./17 Name and Address of Observer

15. Card Source

2. Card No. _____

HABITAT

18. Habitat Type:

19. Habitat Desc.:

27. Plant Species Supporting Nest:

28. Nest Position:

46. Comments:

NEST DESCRIPTION

29. Nest Height _____M. (ft. x .3048 = M)

20. Outer Material:

21. Nest Lining:

22. Nest Form:

Nest Size (CM) (in. x 2.54 = CM.)

23. Outer height _____

24. Inner height _____

25. Outer diameter _____

26. Inner diameter _____

36. Incubation period _____ days

37. Incubation Stage:

☐ Fresh
☐ Slight
☐ Moderate
☐ Heavy
☐ Addled

34. Clutch Size:	No. Eggs Hatched	38. % Hatch	No. Young Fledged	39. % Fledge:

Outcome of nest unknown
☐ because evidence for or against success is not conclusive
☐ because observations were not continued

Return by December 31st to:
ONTARIO NEST RECORDS SCHEME
Department of Ornithology, ROYAL ONTARIO MUSEUM
100 Queen's Park, Toronto, Ontario M5S 2C6

APPENDIX IV: Woodcock management in uplands.

For management of relatively small areas, and on private lands where woodcock management is the primary objective, the following are recommended:

For feeding and nesting cover, choose areas with or near moist soils that birds require for feeding. Encourage the growth of aspen and alder that provide choice food for earthworms, and are characteristic of early successional stages favoured by woodcock. Selective removal of conifers (for pulp or Christmas trees) is recommended. Then clear cut strips through the area on a rotation that ensures early successional stages (twenty to twenty-five [20-25] year maximum age) are always present. The more area maintained as young growth, the greater the number of woodcock accommodated.

For singing and roosting areas, clear cut small patches or strips of about one (1) ha in size and maintain them by burning (or pasturing). Deer will also use such areas and help to maintain them. Alternatively clear cut narrow strips through aspen and alder stands every four to five (4-)5 years so that some cleared areas are always available.

On large areas, in conjunction with logging operations, short rotation clear cutting of aspen or mixed woods on moist soils is recommended. But woodcock populations in northern Ontario where this might apply are relatively sparse and may not respond strongly in any event.

Greater detail is available in Gregg (1984), Owen (1977), Sepik (1980), or Sepik et al. (1981).