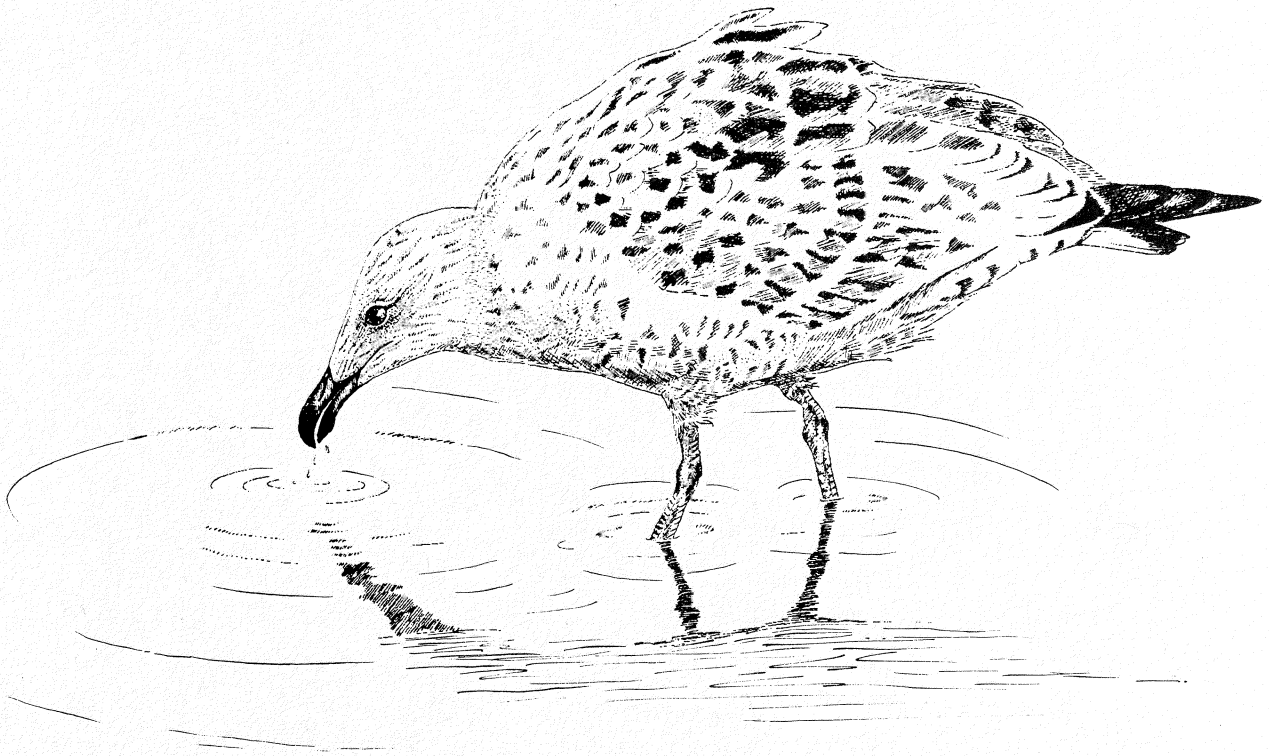

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Région de l'Atlantique

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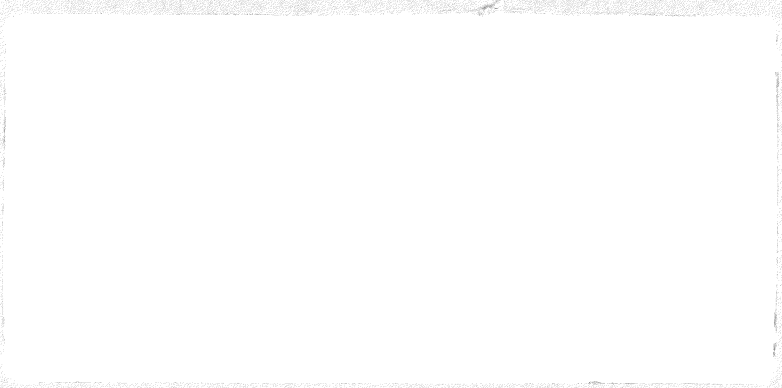


Atlantic Region
Gull Management Plan
Canadian Wildlife Service

TABLE OF CONTENTS

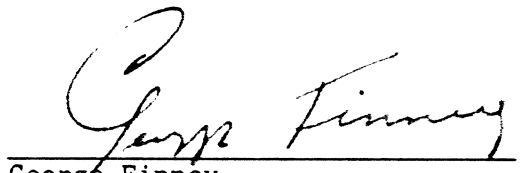
PREFACE

The protection of migratory birds in Canada is guaranteed by the Migratory Birds Convention Act of 1917. This was enacted to give legal force to the Migratory Birds Convention between Canada and the United States. It was designed to protect to those species of birds which, at the time, were considered useful to man or harmless.

Because their behavioral flexibility allowed them to thrive in association with man, gulls increased greatly under the protection of the Act. Recently, as abundant, opportunistic scavengers, they have come into conflict with man: as urban nuisances, fouling buildings and dock facilities; as aviation hazards because of the seriousness and increasing frequency of gull-aircraft collisions; and as competitors with, and predators on, other bird species whose populations we are trying to preserve or enhance.

Sections 24 to 28 of the Migratory Bird Regulations, promulgated under the Migratory Birds Convention Act, make provision for the control of migratory birds which conflict with man's interests. The Canadian Wildlife Service administers these regulations and consequently has the central role in avian problem management.

Recent increases in the number of gull nuisance complaints and in reports of gull predation at eider and tern colonies, prompted the Canadian Wildlife Service to undertake a detailed assessment of the effects of gulls. Results were reported in: An Examination of the Status and Impacts of Gull Populations in Atlantic Canada, by A.R. Lock (1987). This management plan has been advanced to deal with the problems identified in that report.



George Finney
Regional Director
Canadian Wildlife Service
Atlantic Region

EXECUTIVE SUMMARY

In this century there have been large increases in gull populations in both Europe and North America. Legislation protecting gulls and the ready availability of anthropogenic wastes as food, facilitated the observed increases. Urban dumps and wastes from the inshore fishery are the most important sources of supplementary food.

The number of gulls breeding in Atlantic Canada at present is not accurately known but is estimated to be over 200,000 pairs. The number of immature gulls in this population is about 350,000, bringing the total to more than 750,000 birds.

The annual rate of increase of Ring-billed Gulls is estimated to be 21%; the rate of increase of large gulls is unknown but thought to be considerably less than that.

Gulls are involved in 20% of aircraft-bird strikes and bird strike rates at major Atlantic Region airports are among the highest in Canada. This is the most serious gull problem in the region. Relatively few other gull problems of economic importance are reported. Fisheries-related complaints are received most frequently from Newfoundland. Most agricultural problems center on blueberry culture and it is expected that, as blueberry production expands, reports of gull problems will become more frequent.

At the root of gull population increases is the fact that gulls have been able to gain an advantage from recent socio-economic changes in human society. The best strategy to reduce gull numbers, and therefore gull problems, is to reverse the changes which have been advantageous to gulls. The Canadian Wildlife Service will initiate discussions with responsible agencies to modify waste management practices in fisheries, at food processing facilities, and at dumps. Reductions of gull populations over a wide range by culling or reducing breeding success will not be attempted.

Local solutions will be sought to gull problems, and environmental modifications and scaring techniques are recommended. Migratory Bird Permits allowing the killing of birds will be issued only if problems are sufficiently serious and if alternatives are ineffective.

The Canadian Wildlife Service will continue its present series of gull censuses to determine gull population status and changes in the Atlantic Region and studies of gull trophic and reproductive biology will be encouraged.

Management plans for those species most affected by gulls in the Atlantic Region will be prepared and implemented. Public information and consultation will be integral components of these processes.

In implementing the plan, top priority will be given to cooperation with Transport Canada to reduce aircraft-bird strikes; gull control considerations where they are known to adversely affect other bird populations; public information and surveys of gull colonies in insular Newfoundland.

1. INTRODUCTION

In this century there have been large increases in gull populations in both Europe and North America. These have been of such magnitude and had such an influence on other species that they have been well documented. It is notable that the largest increases have occurred in relatively affluent, industrialized areas and that some of the heaviest concentrations of breeding colonies are close to towns with fish docks or with large human populations and open dumps. This has suggested that the observed gull population growth, and present high population levels, are a consequence of the ready availability of human refuse.

This hypothesis has received further support from studies which have shown that gulls breeding close to sources of garbage or fishery wastes produce more fledgelings than gulls which breed under more natural circumstances.

Gull populations began to increase in North America in the early decades of this century, after they were given protection by the Migratory Birds Convention. Prior to that time they had been legally hunted for food and plumage, and populations had been reduced to low levels. Gulls also benefitted from changing socio-economic conditions such as changes in fisheries practices brought on by use of gasoline engines in fishing boats. This innovation allowed fishermen to range farther for fish and to live in fewer, larger settlements. As fishermen abandoned coastal islands, gulls gained access to safe, undisturbed breeding places. They responded to protection and changing circumstances by increasing so rapidly that by the late 1930s research was begun in the United States on methods of controlling their numbers. This initiative was prompted by their supposed effects on the fishing industry and the fact that gulls were already perceived as urban and rural nuisances.

Recent investigations have shown that gull populations in the Atlantic Provinces are increasing and that these increases are having detrimental effects on other coastal bird populations and are leading to conflicts with human economic interests.

This management plan has been constructed with objectives of reviewing gull population history in the Atlantic Region and identifying problems resulting from gull population increases. It will summarize data on public perceptions of gull problems and of gull problem management, and evaluate gull control techniques and management options. A gull management strategy for the Atlantic Region and priorized actions required for its implementation will be identified.

2. GULL POPULATION HISTORY

Seabird population changes have been best documented in the populous and industrialized regions of the world. In eastern Canada we lack historical population data of sufficient accuracy and completeness to allow a precise assessment of changes, but such data do exist for New England. In the absence

of detailed local data we must attempt to understand the growth of Canadian gull populations by comparison with the New England experience.

After the introduction of legal protection, Herring Gulls (Larus argentatus) increased in New England at a fairly even rate up to the late 1940s, and since then at lesser rates. In this same period Great Black-backed Gulls (Larus marinus) extended their breeding range south from the Atlantic Provinces to New Jersey. By 1972 an estimated 90,000 pairs of Herring Gulls and 12,400 pairs of Great Black-backs bred in New England. Since that time populations have stabilized or decreased.

Although data sufficient to assess population changes of Herring and Great black-backed Gulls throughout the Atlantic Provinces as a whole are incomplete, it is possible to describe the growth rate of these large gulls in Prince Edward Island. Their rate of increase in that province is estimated to have been around 10% per year in the last two decades.

Ring-billed Gulls (Larus delawarensis) are smaller than, but similar in appearance to, Herring Gulls. They have increased greatly in Ontario and Quebec in recent decades and they began breeding in the Maritime Provinces in New Brunswick in 1965. By 1975 they had spread to Prince Edward Island. This population has been increasing at a mean rate of approximately 21% per year. They also breed in Newfoundland and southern Labrador and there are indications that they are increasing there also.

Laughing Gulls (Larus atricilla) are small black-capped gulls. This species, which was at the northern extreme of its breeding range in Nova Scotia, ceased to breed in that Province around 1960. In the eastern United States their numbers also decreased and it was shown that they were excluded from many of their traditional breeding places by increasing numbers of large gulls: Herring Gulls and Great Black-backed Gulls.

Within the last two decades the Black-headed Gull (Larus ridibundus), a small, black-capped European species, began breeding in western Newfoundland. It has increased in numbers very slowly and it is not expected that this species will proliferate sufficiently to be considered a nuisance.

Existing census data suggest that present breeding gull populations total over 200,000 pairs (Table 1). Large gulls do not breed until their fourth year and there are, consequently, numerous sub-adult, non-breeding birds in populations of these species. If we assume that the age structure of gulls in this region is similar to that of the expanding New England population, it may be estimated that the total number of gulls in the Atlantic Provinces populations exceeds 750,000.

Table 1. Numbers of pairs of Great Black-backed Gulls, Glaucous Gulls, Herring Gulls, and Ring-billed Gulls estimated to breed in the Atlantic Provinces in 1988.

	GBBG	GG	HG	RBG	TOTAL
Labrador	4,000	7,000	4,500	800	16,300
Insular Nfld.	30,000		70,000	10,000	110,000
New Brunswick	1,100		17,000	1,400	19,500
P.E.I.	2,600		6,200	200	9,000
Nova Scotia	30,000		28,000		58,000
TOTALS	67,700	7,000	125,700	12,400	212,800

All available evidence suggests that the expansion of Maritime Provinces populations began later than in New England, and numbers may still not have levelled off. In Newfoundland the most rapid expansion has been still more recent and populations there may be even further from achieving stable levels.

3. PUBLIC PERCEPTIONS AND ATTITUDES

3.1 Gull Problems

Gulls are large, conspicuous birds and this, coupled with their close association with man's activities, gives the impression of super-abundance. Neither gull nor human populations are particularly dense in the Atlantic Provinces and, with the exception of air strikes, gull-human conflicts are relatively rare. In the Maritime Provinces gulls are usually viewed as useful scavengers or as a picturesque and traditional part of a seascape. There are periodic complaints of building, car or boat soilings but few complaints of serious economic damage. Consequently, the impacts of gulls are generally viewed as a tolerable inconvenience.

This view contrasts strongly with attitudes reported to prevail in Newfoundland. The Canadian Wildlife Service receives more complaints about gulls from that province than from the three Maritime Provinces combined. In Newfoundland the perceived gull problem may not arise simply from an increase in numbers, but also from a recent change in gull behaviour. It is only very recently that protection of gulls and many other birds has become a fact in that province and an increase in the boldness of gulls probably contributes to problems there.

In an attempt to determine the seriousness of gull problems in this region, enquiries were sent to federal and provincial government agencies in whose areas of concern gull problems might be experienced, and to naturalist

and wildlife groups. The respondents identified few gull problems from their own experience. The most serious biological impact perceived was their negative effect on other bird species.

3.2 Gull Controls

Gull population reductions have been carried out in many parts of the world but they have not been without their critics. Some have objected, on principle, to killing while others have objected to killing birds simply to re-arrange the natural world to man's liking. But recently there has been a general recognition that gull increases are the result of changes in the natural environment wrought by human society. The damage done by gulls to other species has become of sufficient concern that many naturalist organizations have accepted the fact that a further intervention in the natural scheme of things may be necessary to redress the balance.

Constructive policies on gull control have been adopted by the Canadian Nature Federation and the International Council for Bird Preservation in Canada and the National Audubon Society in the United States. The C.N.F. - I.C.B.P. policy recognizes the need for the option of killing gulls to protect other species, but additionally, it recognizes a variety of human-centered nuisance problems which may have to be addressed by killing gulls. While the support for gull control is unequivocal it is a reasoned support for local controls of problem birds if all other options have been considered and shown to be impractical. The C.N.F. - I.C.B.P. policy does not support range-wide culls to reduce gull numbers.

Among members of regional naturalist and birding organizations there is a similar acceptance of the need to consider local dispersal or culling of gulls as a means of preserving populations of such species as terns, which are declining. There is also a general acceptance of the occasional necessity of local killing of gulls where they have economic impacts and there are no other practical solutions. However, there would be little support for large scale culling to reduce gull numbers throughout the region.

Major colonies of some bird species, whose management may require gull controls, have been given protected status by other federal or provincial government agencies or by non-government organisations. Where other organisations manage the habitat on which gulls need to be controlled, control programs will be carried out in co-operation with those organisations.

4. PRINCIPLES OF BIRD POPULATION MANAGEMENT

The principles which have guided the design of the Atlantic Region Gull Management Plan are summarized below.

(i) Environmental management practices should aim to preserve the stability and diversity of ecosystems and to ensure secure populations of all native bird species.

(ii) Where, as a result of human activities, increases of some

species act to the detriment of others, efforts should be made to redress the balance.

(iii) In the long term, management of super-abundant species is best achieved by management of the causes of their increase.

(iv) The guiding principle of avian problem management should be that of a graduated response, of doing the least that will effectively achieve desired results.

(v) Where it is necessary to manage the impacts of a species that has become a nuisance as a result of an increase in numbers, local solutions will be sought to local problems rather than attempting direct reductions of populations over wide geographic areas.

(vi) Regional reductions in populations by killing birds will not be attempted, but the necessity of reducing populations may require efforts to limit reproductive success.

(vii) In designing solutions to local bird problems, first efforts should be directed to making local environmental modifications: to making problem areas unattractive to birds.

(viii) If environmental modifications fail, non-lethal bird scaring and dispersal techniques should be employed.

(ix) Only when non-lethal methods are impractical should killing of nuisance birds be considered a solution.

(x) If birds must be killed in a management operation, the most humane, practical means should be employed.

5. THE ROLE OF THE CANADIAN WILDLIFE SERVICE

In the management of gull problems the role of the Canadian Wildlife Service is to:

(i) monitor migratory bird populations

(ii) identify ecosystem imbalances that lead to bird population changes

(iii) prevent extinction or serious decline of bird species

(iv) develop population management strategies through a process of active public consultation, and to coordinate their implementation

(v) maintain an expertise in methods of bird population management and control

(vi) coordinate, and carry out, investigations of the biological impacts of enhanced gull populations

(vii) advise on methods of addressing gull nuisance problems

(viii) oversee or undertake control of gulls where this is necessary for the protection of other bird species

(ix) issue permits to allow the dispersal or killing of problem birds subject to specific conditions

(x) ensure adherence to the conditions of permits issued

(xi) monitor the effectiveness of gull control operations

(xii) undertake or oversee control of gulls where it is necessary for the survival of other bird species

(xiii) become aware of areas where gull problems are developing or are perceived and give direction and advice

6. MANAGEMENT OPTIONS

6.1 Strategies

At the root of gull population increases is the fact that they have been able to gain an advantage from the great socio-economic changes which have occurred in human society in this century. The best strategy to reduce gull numbers, and associated problems, is to bring about changes in those human activities that are most beneficial to gulls.

However, it is unlikely that, in the near future, the islands that provide safe breeding places for gulls will be repopulated by fishermen or that recreational use will limit gull breeding success. The reduction of available food is potentially the best strategy for gull population control. Its effects would be felt only slowly but they would be enduring. This would require large changes in waste handling procedures, particularly by municipalities and by the fishing industry. Such changes will not easily be achieved but they must be pursued. Improved waste management will also benefit society both in terms of aesthetics and environmental quality.

Controlling gull numbers is favoured by some as an obvious, direct, and practical alternative. Such reductions may be regional or local. The theoretical advantage of regional control is that gull numbers are reduced over a wide geographic area and all problems caused by gulls would be, to a degree, ameliorated. However, experience elsewhere has shown that it is both difficult and expensive to reduce gull numbers over a wide geographic area.

Gull populations may be controlled by reducing reproductive success or by reducing the number of breeding adults. Life tables have been constructed for many species of large gulls and, while they differ in detail, they

identify species which mature in their third or fourth year, which have adult mortality rates of 10% or less per year, and which usually produce one fledged young per pair per year. A model of a Herring Gull population increasing at a rate of 4.7% per year suggests that every thousand breeding pairs will produce, annually, 317 young which will survive to breeding age. Fewer than one eighth of the eggs laid produce a bird which survives to breeding age so most effort destroying eggs as a method of gull population control is wasted. It is clear that even complete suppression of breeding for several years in such a population would have a minor impact and it has been calculated that a programme of reproductive control by egg destruction carried on for 10 years with an efficiency of 80-90% would merely prevent a population increase.

One such project was carried out by the U.S. Fish and Wildlife Service which began research on gull control techniques in the mid-1930s. They funded a Herring Gull and cormorant control project in New England between 1938 and 1952. This project did not attempt to reduce numbers of adults, but gull breeding success was reduced by spraying eggs with an oil and formalin mixture. Numbers of gulls breeding in the project area gradually declined but numbers breeding in neighboring areas increased, and when the control project was terminated gulls returned to breed in large numbers.

Reduction of a population over a wide geographic range could only be done effectively by reducing numbers of adults. Because of the associated expense and potential to arouse public opposition, there are few examples of such wide-ranging gull control projects.

The alternative is the reduction of gull numbers at sites where they are troublesome. This strategy has the advantage of obtaining a maximum effect at the problem site and it requires the removal of only those birds which are causing the problem. Local controls are also much less expensive than wide-ranging reductions. In recent years all gull control projects in Europe and the United State have been site-specific and almost all have been motivated by the desire to protect other breeding seabirds.

In summary, given the difficulty in changing waste management practices and the impracticality of broad-scale gull culls, in the short term, one must resort to local measures to solve pressing local problems. It is best if this can be done by environmental modifications that make the site unattractive to gulls. Such modifications, reinforced by a variety of scaring techniques which have a short-term effect, may be sufficient to solve the problem. If neither of these strategies is effective, and if the problem is sufficiently serious, it may be necessary to allow the killing of problem birds.

6.2 Techniques

6.2.1 Environmental modifications

Gulls may be attracted to an area if it is a source of food or if it is a safe breeding or loafing site. They may also be attracted to areas that provide a hard surface for breaking shells, or warmth and shelter in bad weather. If the reason for gull presence is determined it is usually possible to modify the local environment to reduce its attractiveness. At fish docks, cattle feed lots, food processing or sales areas and recreational sites, gulls

are usually attracted by edible wastes. Gull presence and associated problems at such sites can often be prevented simply by making the wastes inaccessible.

Sites can also be made unattractive to gulls by using mechanical or chemical irritants to make perching places uncomfortable, or by increasing the complexity of the environment so that they cannot fly into it. This is usually accomplished by stringing lines or grids of wires over and around areas from which gulls are to be excluded.

6.2.2 Scaring Techniques

Bird scaring, as a method of solving nuisance problems, has severe limitations. These techniques are only temporary expedients since birds soon habituate to even the most violent stimuli and may return to the problem site if it remains otherwise attractive. However, in situations where environmental modifications cannot be undertaken or where they are too limited to deter gulls, a variety of bird scaring techniques may be employed. Apart from the temporary nature of the effects of bird scaring, there are other disadvantages. It is often highly labour intensive, and may require a substantial capital outlay.

The most advanced bird dispersal techniques have been developed to combat bird problems at airfields where they are used in conjunction with appropriate environmental modifications. The use of gas exploders or electronic sirens has been found to be effective in some situations in the short term and recordings of avian alarm calls are often even more effective. The presence of predators is usually sufficient to disperse birds and even crude models of predators or recordings of predator vocalizations can be effective.

6.2.3 Control of Gull Numbers

Several techniques have been developed to reduce gull breeding success, These usually involve removing eggs, or oiling or pricking them to prevent their hatching. These techniques are labour intensive and, at best, may reduce breeding success at target colonies for the duration of the project. They are not an effective means of reducing gull populations over a wide range or of solving gull problems in the long term. The release of dogs or other predatory mammals onto insular colonies deters gulls from breeding. This technique is cheaper than rendering eggs infertile, and more effective in breaking breeding gulls' attachment to colony sites.

Chemo-sterilants have been developed to reduce the productivity of mammalian populations and it is possible that compounds will be developed that will be useful in avian population control.

Gulls have increased in numbers because they have an ability to adapt to and exploit a changing environment. However, within a population, individual birds become more effective foragers by specializing in exploiting a single or a few food sources. So whether the nuisance is at a trout pond or an airport, if the few specialist gulls are removed, the problem may be significantly reduced.

Projects attempting the local removal of gulls have progressed from

the use of strychnine to narcotics such as alpha chloralose, and more recently to safer, specific avicides such as DRC-1339 which is marketed by the Ralston-Purina Company in the United States as Starlicide. This substance has not been submitted to the Department of Agriculture for approval for use in Canada but is available to the Canadian Wildlife Service for experimental use. When properly applied, modern methods of local gull control are efficient, humane and cost-effective.

In a majority of cases the Canadian Wildlife Service delegates the removal of nuisance birds to the complainant by issue of a Migratory Bird Permit. This allows the recipient to disperse birds by scaring or, if specified, to kill a limited number of birds of named species. These permits are effective in that they allow the elimination of only the birds causing a problem, and efficient in that the solution is delegated to the complaining party. There are problems in ensuring compliance with the restrictions of these permits but, despite this difficulty, they remain the prime instrument of bird nuisance control available to the Canadian Wildlife Service.

7. SPECIFIC MANAGEMENT INITIATIVES

It is suggested that, unless remedial action is taken, gull numbers will continue to increase in the Atlantic Provinces, and that gulls will probably become more, rather than less, of a problem. Consequently, it is necessary to frame a policy for the management of gull problems.

7.1 Reduction of Gull Numbers - General

Solutions to gull-related issues almost invariably require a reduction in their numbers. Such reductions can conveniently be placed into two categories: long term initiatives aimed at overall regional population reductions and short term actions to deal with immediate local problems.

While pressing gull problems will be dealt with as outlined below, the Canadian Wildlife Service will seek a long term and enduring solution by attempting to bring about a reversal of some of the processes which have led to gull population increases. Breeding success and adult and juvenile survival may be decreased if access to food is reduced by better control of wastes. Gulls obtain food from wastes at dumps, at food processing facilities, and, most importantly, from inshore fisheries and at fish processing plants.

The Canadian Wildlife Service will influence managing agencies to effect long term environmental changes which will be to the disadvantage of gulls. This will be done by initiating discussions with responsible agencies to bring about modifications of waste management practices in fisheries, at dumps and at food processing facilities, with the aim of reducing the food available to gulls.

7.1.1 Short Term Initiatives

The overall reduction of regional gull populations will be a long and slow process. In the interim, there are pressing gull management issues that must be addressed. The approach will be to reduce gull numbers locally as required.

The Canadian Wildlife Service will assess the necessity to reduce gull numbers to solve related biological or socio-economic problems. Where necessary, populations will be reduced on a local basis.

7.2 Research and Monitoring

Monitoring of populations will be sponsored by CWS with the possible assistance of other government agencies. Research initiatives will be broadly based and will include work within universities.

Effective management of animal populations requires a knowledge of their population dynamics, movements and food. Below are listed data gathering programs required to properly manage gull populations in the Atlantic Provinces. The work schedule indicated below is subject to the annual availability of funds for gull related projects.

7.2.1 Gull Population Monitoring

Recent surveys of the breeding gull populations of Labrador and the Maritime provinces have provided base-line data on numbers in these areas.

An air and ground survey of the breeding seabirds of insular Newfoundland is scheduled to be carried out in 1991 and 1992.

The rate of change of gull populations can be determined by repeating the gull censuses on the following schedule:

Maritimes Ring-billed Gulls	1993
Northern New Brunswick and P.E.I.	1996
Nova Scotia	1997
Southwestern N.B.	1998
Labrador	2000
Insular Newfoundland	2001

In monitoring colony populations and making comparisons to baseline data full use will be made of the Seabird Colony Registry.

7.2.2 Biological Studies

A basic knowledge of breeding success, population dynamics, feeding biology, local movements and migration is required in order that the most effective interventions can be made to achieve population management aims. The Canadian Wildlife Service will encourage and support research in the following areas:

7.2.2.3 Population Dynamics

No reliable modern estimates are available of reproductive success for gulls breeding in differing areas and circumstances in the Atlantic Region.

The Canadian Wildlife Service will encourage or support studies of reproductive success and survival which are required for effective management of gull species.

7.2.2.4 Feeding

It is believed that anthropogenic wastes contribute greatly to the diets of gulls, but it has not been determined in the Atlantic Region to what extent they contribute to maintaining gull populations or concentrating gulls in certain areas.

The Canadian Wildlife Service will encourage or support studies of gull diets.

7.2.2.5 Dispersion

Limited data are available on the wintering areas of birds breeding in the Atlantic Provinces and on the origin of the many thousands of immature gulls which summer here. Nor are there data on local movements of birds concentrated in urban areas outside the breeding season.

The Canadian Wildlife Service will, where necessary, undertake or support studies involving the banding, dye-marking and radio-tagging of gulls.

7.3 Management of Biological Impacts

A pressing problem associated with gull increases in many parts of the world has been their impact on other avian species. The species most affected are those which nest in association with gulls including seaducks and other seabirds. As early as 1924, in the eastern United States, worries were expressed about the effects of an expanding gull population on terns.

It is the responsibility of the Canadian Wildlife Service to manage native migratory bird populations and to protect and preserve those species that are declining. Gulls have been shown to be affecting populations of several species of birds including eiders, petrels, terns, Piping Plovers and, possibly, puffins.

The Canadian Wildlife Service will monitor populations of these species and, where significant declines are detected, will prepare management plans to ensure the preservation of threatened populations.

Experimental local reductions or culls may be undertaken in situations where gulls are known to be having an adverse effect on other bird species. Such reductions will be approved only in situations where the impacts of gulls have been quantified, and the effects of a control program can be monitored.

Further local controls, which do not involve a detailed monitoring of the effects, may be permitted only when the impacts of gulls on specific bird populations have been demonstrated.

7.3.1 Terns

The earliest, most consistent and best supported complaints about the effects of increasing gull populations on other species have concerned their impacts on terns. So obvious has been gull competition with, and predation upon, terns and so rapidly have terns declined as gulls increased, that the most frequent reason given for gull control programs has been the protection of tern populations. Gulls compete with terns for safe breeding places, and because they occupy breeding sites earlier than terns, gulls are able to exclude them. Gulls also prey on tern eggs and chicks and, to a lesser extent, on adults.

Atlantic Provinces' tern populations have not been well documented and for an understanding of tern population changes in eastern North America we must refer to the better described populations in New England. There, terns responded well to protection in the early years of this century, increasing to peak numbers in the 1940s. But between 1940 and 1972, in the period of maximum gull population growth, Common Terns in Maine decreased by some 60%. The data we have for a few colonies in the Atlantic Provinces indicate serious declines in tern numbers. It is prudent to assume that terns will continue to decline in areas where gulls are abundant unless man intervenes.

Because the great decrease in terns appears to be attributable to gull competition and predation, any effective rehabilitation program must include the reduction of the effects of gulls at significant colonies.

In some situations gulls can be excluded by early season disturbance of the colony to prevent breeding, or by erection of an overhead grid of wires or lines under which terns, but not gulls, will nest. However, the most certain and economical method of eliminating breeding gulls at protected tern colonies is the use of the avicide: DRC-1339. This is the method used by the National Audubon Society in New England to rehabilitate tern colonies. The preservation of terns in the Atlantic Region can be assured if a relatively small number of the most significant colonies are managed to control gull predation and human disturbance.

The Canadian Wildlife Service will produce a management plan for terns in 1990. This will outline a strategy for the preservation of tern populations in the face of heavy gull predation by the protection and management of a few, critically important tern colonies.

7.3.2 Common Eiders

Common Eiders are the most abundant ducks nesting on coastal islands, often those on which gulls breed. The impacts of gulls on breeding eiders have become apparent at several colonies and fears have been expressed about the future of some eider populations.

Gull predation on eiders is common, and investigations in Scandinavia,

Scotland and Maine have shown that gulls may reduce reproductive success and limit the rates of growth of eider populations. However, in none of these situations has gull predation been shown to be sufficient to cause a decrease in population size. Gulls seem not to have an important impact on large, established eider colonies. Their greatest impact is on small colonies that have suffered decimation due to a combination of factors, and this impact is greatly increased by human disturbance.

At the turn of the century eider populations throughout Maine and the Maritime Provinces were reduced almost to the vanishing point, but in this century they have increased remarkably. In the Maritime Provinces and in the St. Lawrence estuary all eider populations that have been examined are known to be stable or to have increased over the last several decades. However, in Newfoundland eider populations have remained at a low level, primarily because of human persecution.

Recently, Canadian Wildlife Service investigators have reported gull problems among eiders breeding in northern Newfoundland and in southwestern New Brunswick. However, data on eider breeding in this region are not sufficient to quantify the over-all effects of gull predation. In Insular Newfoundland, the Canadian Wildlife Service, the provincial Wildlife Division and Ducks Unlimited are working to expand a remnant breeding population of eiders and gull predation is thought to be retarding their increase. Reduction of gull predation on eider eggs may be accomplished by the installation of nest boxes on eider colonies. Control of gull predation on hatchlings is more difficult and for this purpose it may be necessary to reduce gull numbers and predation to allow a more rapid eider expansion. Such culling of gulls will only be undertaken in situations where the detrimental effects of gulls have been well documented, and where the effects of gull reductions can be demonstrated by monitoring eider reproductive success.

The Canadian Wildlife Service will produce an eider management plan for Newfoundland and Labrador in 1990 which will consider the need for gull control measures.

7.3.3 Piping Plovers

Piping Plovers are declining throughout their range, and gull predation pressure is one of many factors contributing to this decline. Many beaches on which Piping Plovers breed are heavily used by humans for recreation and the effects of mammalian, gull and corvid predation are exacerbated by human presence. Unfortunately, the exclusion of predators is a labour-intensive task and it is not possible to protect a significant amount of the breeding habitat of a non-colonial species.

A reduction in the size of the total gull population would reduce one of a number of factors affecting Piping Plover breeding success. Increased gull abundance is not the main cause of the Piping Plover decline, but in order to increase breeding success at crucial sites, it may be necessary to reduce gull numbers.

The Canadian Wildlife Service will, in cooperation with provincial and non-government agencies, complete a Piping Plover Recovery Plan in 1990. This plan will address the effects of gulls on Piping Plovers.

7.3.4 Atlantic Puffins

Puffins are specialized diving birds which breed only in the northern hemisphere, the majority at high temperate latitudes. They breed synchronously in large colonies and the gulls associated with some colonies may reduce breeding success through chick predation, kleptoparasitism, and occasional predation on adult puffins. It is likely that puffin populations have been greatly reduced in historic times by human persecution, but the recent trajectory of puffin populations in the Atlantic Provinces cannot be plotted with certainty. Puffins die in oil-spills, from hunting and from drowning in fishing nets and the effects of gulls on the population as a whole have not been defined accurately.

Gull predation pressure, if it were shown to be critical, could be lessened on a significant portion of the western North Atlantic puffin population by reducing gull numbers on the large puffin colonies in Witless Bay in eastern Newfoundland. These colonies, and access to them, are controlled by the provincial Parks Division. Any required gull management at such sites would be carried out in co-operation with the provincial agency.

If assessments of puffins in this region show a downward trend the Canadian Wildlife Service will develop a puffin management plan which will ensure their preservation in the face of a variety of human-related mortality factors. Such a plan will consider the necessity of gull control at key sites.

7.3.5 Leach's Storm-Petrels

The breeding range of this species in the western Atlantic extends from southern Labrador to Maine. Their burrow-nesting habit has made it difficult to assess their numbers accurately but the majority of the population is known to breed on islands off the east coast of insular Newfoundland. There are no obvious indications that the populations at these colonies have declined significantly.

By contrast, the impact of gulls on petrels is apparent in colonies near the southern edge of their breeding range. In the Maritime Provinces, many of their breeding places are now abandoned. The decline of these colonies has been contemporaneous with a large increase in numbers of nesting gulls.

If assessments of Leach's Storm Petrels show an overall downward trend, a management plan will be developed for this species which will consider the need for gull control at major colonies.

7.4 Management of Socio-Economic Impacts

Many nuisance problems can be solved by relatively straightforward environmental modifications. Fish docks, cattle feed lots and garbage disposal areas can be kept clean. Hatchery ponds may be covered by an excluding grid of wires and safe roosting places can be eliminated. Such

techniques, alone or combined with visual and auditory scaring devices, may be sufficient to reduce problems to acceptable levels.

The Canadian Wildlife Service will be knowledgeable of such techniques, prepared to assess problem situations and will offer effective advice.

Where environmental modifications or repellent devices are ineffective or impractical, the issue of a Migratory Bird Permit authorizing the scaring or killing of gulls may be warranted.

Migratory Bird Permits to solve gull problems will be issued by the Canadian Wildlife Service only where, after a thorough investigation of the problem, alternative measures have been shown to be impractical. Adherence to the limitations of these permits will be enforced by follow-ups and spot checks.

7.4.1 Aviation

Gull strikes by aircraft are a serious concern. About 20% of the bird strikes in Canada involve gulls, and because gulls are large birds these strikes are more serious than small-bird strikes.

International Civil Aviation Organization statistical summaries show that between 1977 and 1985, in Canada west of the Atlantic Provinces, numbers of bird strikes have varied from year to year, but have not noticeably increased. In Atlantic Canada numbers of strikes have tripled in the same period. In 1985 Sydney recorded more bird strikes than any other civil aerodrome in Canada, a strike rate of 12.37 per 10,000 aircraft movements. In the same year Halifax International Airport recorded a strike rate of 11.15 and Charlottetown 6.22. In contrast, Pearson Airport in Toronto and Vancouver International Airport reported strike rates of 1.77 and 2.04 respectively.

We expect that gull numbers will continue to increase in this region and the number of gull-aircraft conflicts will probably also increase.

Bird dispersal techniques applicable to airfields are already well developed, and advice on airfield management is given by Transport Canada.

Dumps, airports and reservoirs are usually located on the peripheries of cities, and occasionally poor municipal planning results in the placement of a dump, which attracts gulls, close to an airport. In the Atlantic Region this situation occurred at Yarmouth, Charlottetown and Summerside.

The Canadian Wildlife Service will cooperate with Transport Canada to influence municipal planning processes to ensure that dumps and other facilities are made as unattractive to gulls as possible and are not located close to airfields.

7.4.2 Public Health

In this region public health fears have been caused by presence of large numbers of gulls on some water-supply reservoirs. Their presence is

invariably the result of the reservoir's proximity to a food source for gulls. This problem has been reported in Saint John, Port aux Basques and Halifax, and in each case a near-by dump was at the root of the problem. Migratory Bird Permits have been issued for gull control in Saint John and they provide some amelioration of the problem, but not a solution. In Port aux Basques the dump was cleaned up and an incinerator was built. This solved the problem.

Gulls on reservoirs and recreational lakes are a cosmetic and perceived problem rather than a real public health problem. In this region no infectious disease has been shown to result from gull presence at reservoirs and raised fecal coliform counts in recreational lakes are usually a result of sewage leaks.

In recent decades the proportions of "edible" waste in garbage has increased greatly. This is a result of a greater proportion of the population living in cities and discarding food waste in garbage rather than recycling it. Garbage is, therefore, highly attractive to gulls and, if the numbers of gulls attracted to a dump are to be reduced, garbage must be incinerated or buried immediately and kept covered.

The Canadian Wildlife Service will influence municipal and provincial authorities to raise the standards of dump operation and reduce the amount of edible garbage available to gulls.

7.4.3 Fisheries

7.4.3.1 Aquaculture

Gulls are occasionally problems at fish hatcheries and rearing ponds. In the past, such problems have usually been dealt with by issue of Migratory Bird Permits allowing the scaring or killing of nuisance birds. Gulls are often attracted to such facilities by fish food rather than by the fish itself. They may best be discouraged by cleaning up scattered fish food, or by rendering the environment unattractive by placing a grid-work of wires or nylon lines over the area.

The Canadian Wildlife Service will recommend environmental modifications and scaring techniques to solve such problems and permits to kill offending birds will only be issued when other methods are shown to be ineffective.

Most depredation on cultivated mussels is by Common Eiders and scoters, but gulls are occasionally involved. Since gulls are surface feeders, such problems are best solved by sinking the mussel crop a meter or so below the surface.

The Canadian Wildlife Service will recommend alterations to gear placement or other steps to discourage gulls from feeding on cultivated mussels. Migratory Bird Permits for gull control will be issued only if the problem cannot be solved by other means.

7.4.3.2 Conventional Fishery

In the Atlantic Region wild salmon are fished commercially only in Newfoundland. There they are taken in surface gill nets, and if these nets are loosely set, gulls may gain access to fish in them. The Department of Fisheries and Oceans in St. John's estimates that about 2% of salmon caught are pecked by gulls, but that not all that are pecked are unmarketable. Fish plants reject heavily damaged fish but these are then sold in the community or are consumed by the fishermen. Because salmon nets are set and left unattended at sea, neither environmental modifications nor bird scaring techniques are feasible. Issue of a Migratory Bird Permit would not solve the problem either. More careful setting of nets would have the greatest effect, but in areas with a large tidal amplitude, problems are difficult to avoid. Further investigations are required to determine the seriousness of the problem and the best methods of combating it.

Complaints have been received from trawl or long-line fishermen in Newfoundland that gulls steal baits from hooks as the lines are paid out. Fishermen in the Maritimes also report that gulls steal baits but they are tolerant of this inconvenience. No formal complaints have been received by the Department of Fisheries and Oceans but Canadian Wildlife Service biologists have received such complaints from Newfoundland fishermen. No practical method of combating this problem has been developed.

The Canadian Wildlife Service will react to complaints that may be received from fishing interests by cooperating in the determination of remedial actions.

7.4.3.3 Shellfish Contamination

On the coast of northern New Brunswick two shellfish harvesting areas near gull colonies have been closed because of high fecal coliform counts in the waters around the colonies. In both these cases there were no alternative sources of contamination and it was concluded that run-off from the colonies was responsible for the elevated coliform counts. To date no complaints or referrals have been made to the Canadian Wildlife Service about these closures, but as shellfish resources become increasingly exploited we expect that there will be pressure to remove gulls from colonies near valuable shellfish beds.

The Canadian Wildlife Service will, on request from the Department of Fisheries and Oceans, investigate such complaints and, if the situation merits, issue a Migratory Bird Permit to allow dispersal of gull colonies.

7.4.4 Agriculture

In Nova Scotia commercial blueberry production increased from 51 tones in 1958 to 7,400 tones in 1986, and the target production for 1992 is 22,400 tones. Production is increasing comparably in all the Maritime Provinces. Several species of migratory birds are causing problems in blueberry fields and gulls are among the less important species involved. Studies have shown that mammals and other species of birds are more important problems. Although

it has not been definitely determined that gulls are a significant problem, they are perceived to be a significant cause of crop damage. The rapid rate of increase of the blueberry harvest and the parallel growth of gull populations suggest that complaints will become more frequent.

Practical environmental modifications have not been developed for this situation and a combination of acoustic and visual scare techniques combined with occasional shooting and hanging of corpses may be the most effective course.

The Canadian Wildlife Service will issue Migratory Bird Permits to deal with blueberry losses only where the need has been demonstrated and all other methods have been shown to be impractical.

7.4.5 Urban and Rural Nuisance Problems

By dropping shells on roads and by defecating on private property, gulls have become urban nuisances. In this region such problems are not widespread and none have developed which have not been solvable by environmental modifications or by scaring. Most complaints concern the fouling of buildings, usually ones that provide a safe loafing or roosting site close to a source of food, such as a fish dock or a dump.

The problem may be solved by removing the attraction in the area, by cleaning up a fish dock for example, or by making the surroundings less comfortable for gulls. This may be achieved by covering perching areas with spikes or irritating gels or by adding obstructions which make it difficult for large birds to land or take off.

The Canadian Wildlife Service will recommend environmental modifications or the use of bird-scaring devices to solve building fouling problems, but will not issue Migratory Bird Permits to allow the killing of nuisance birds

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7.5 Public Information

There are indications that there are great differences in the public's attitudes to gulls throughout the region. In Newfoundland there appears to be less tolerance of gulls and possibly a more severe gull nuisance problem than in the Maritime Provinces.

The Canadian Wildlife Service, in designing its programs, will assess and respond to public opinion and will explain its gull management policies to all concerned groups.

The assistance of an informed public will be sought to bring about changes which will reduce garbage and wastes available as food for gulls.

The Canadian Wildlife Service will mount a program of public information on the gull problem. The primary

message will be that a long-term solution can only come from changes in waste handling procedures which will disadvantage gulls.

The Canadian Wildlife Service will provide information to municipal administrations, and to provincial and federal agencies that administer activities which contribute to gull proliferation in an attempt to reverse this effect.

8. IMPLEMENTATION PRIORITIES

The management initiatives to be pursued under this plan form a closely linked package of actions required to address the full range of gull related issues in the region. Consequently, it is difficult to recongnize any one initiative as being more important than others. This is particularly true in view of the fact that some actions are aimed at short term solutions while others address the long term dimensions of gull proliferation. However, in order to ensure achievement of the objectives of the plan, it is necessary to establish priorities to guide its implementation. The following hierarchy of priorities will be recognized.

8.1 Highest Priority

Top priority will be given to the following actions:

(i) cooperation with Transport Canada to reduce aircraft-bird strikes

(ii) the Piping Plover Recovery Plan

(iii) the regional Tern Management Plan

(iv) the Newfoundland and Labrador Eider Management Plan

(v) public information

(vi) air and ground surveys of gull colonies in insular Newfoundland

8.2 Second Priority

Second priority will be given to the following actions:

(i) repeat gull censuses

(ii) studies of gull diets

(iii) banding, dye-marking and radio-tagging of gulls

(iv) issuing of gull control permits and offering associated advice

(v) information exchange with managers of activities causing gull proliferation

(vi) influencing dump and fish processing facility operation standards

8.3 Third Priority

Third priority will be given to the following actions:

(i) studies of gull reproductive success and survival

(ii) monitoring populations and preparing management plans for species that, in the future, may be affected by gulls

(iii) developing additional expertise and preparedness to offer advice

9. CONCLUSION

Management of either exploited or super-abundant species requires both extensive public consultation, information distribution and education. This management plan is a part of that process.

The recommendations of any management plan are constrained by the likelihood of securing funds to finance them. The actions proposed by this plan are realistic in that they are achievable within expected regional funding over the next decade. If the gull problems become more serious, greater efforts and resources than are specified here may be required.

This plan provides a blueprint for gull management in the Atlantic Region. There is a need for a national consensus on management of problem species, and where problems are sufficiently serious to require the consideration of population control measures a consistent and uniform national policy should be sought. It is hoped that this management plan may serve as a basis for the design of a national gull management policy.