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Changes in reported waterfowl hunting activity and kill in Canada and the United States, 1985–1998

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Abstract

Sales of federal Migratory Game Bird Hunting Permits (hereafter referred to as “Permits”) in Canada fell from 375 000 in 1985 to 204 000 in 1998 (–46%). The rate of decline slowed after 1993. The number of ducks reported shot fell from 2.50 million in 1985 to 1.54 million in 1998 (–38%), while the kill of geese increased from 699 000 to 883 000 (+26%). An increase in the number of non-Canadian hunters, from 18 000 in 1985 to 25 700 in 1998 (+43%), partially offset the effects of the decrease in the number of active Canadian hunters, from 296 000 in 1985 to 160 000 in 1998 (–46%). In 1985, non-Canadians (4.8% of Permit buyers) took 9% of the ducks and 12% of the geese reported shot. In 1998, nonresidents (13% of Permit buyers) took 22% of the ducks and 30% of the geese.

Much of the drop in Permit sales is due to fewer young Canadians buying Permits. In 1986, over 78 000 Canadian men aged 15–24 (3.6%) bought Permits; in 1996, only 35 700 (1.6%) did so. The increase in the number of visiting non-Canadian hunters has been greatest, and has had most effect on the kill, in Manitoba and Saskatchewan. In 1996, an estimated 101 000 Canadian women hunted (10% of all hunters). Only 17 700 said they pursued waterfowl. Less than two-fifths of them claimed to have shot a duck or goose, while two-thirds of male waterfowl hunters claimed to have done so.

American waterfowl hunting declined in parallel with hunting in Canada from 1985 to 1993, but then revived, especially in the Mississippi Flyway, after the adoption of an “adaptive harvest management strategy” that allowed longer seasons and higher bag limits for most species. In 1996, 15% of U.S. hunters were women, 7% of the female population; the proportion hunting waterfowl was not reported. There were substantial differences in hunting success between the four American flyways. The mean seasonal kills of both ducks and geese were higher in most southern states, where waterfowl winter, than in northern ones, where many ducks breed and through which greater numbers of northern-breeding ducks and geese pass in autumn. Hunters in southern states have gained most from the recent easing of regulations. Mean seasonal kills of ducks per active hunter were far higher in southern wintering areas than in Canada or the northern states.

In 1985–1987, about 20% of the total reported kill of ducks and 30% of the geese were shot in Canada. In 1996–

1998, only about 9% of the ducks and 21% of the geese reported shot were taken in Canada. These reductions in the impact of hunting by Canadians seem likely to continue. In both countries, the numbers of people hunting birds and mammals have been falling. In Canada, waterfowl hunting has decreased at much the same rate as the pursuit of other quarry. In the United States, it has decreased less than other kinds of hunting.

Acknowledgements

Our greatest indebtedness is to those Migratory Game Bird Hunting Permit buyers who, after being selected in one of the annual samples of hunters for the National Harvest Survey, took the trouble to answer the questions asked or to send in the wings of the ducks or the tails of the geese that they had shot. Without their continuing cooperation, it would be impossible to monitor changes over time and differences between regions in waterfowl hunting, such as those reported here. Collaboration by members of the staff of the U.S. Fish and Wildlife Service has also been important, although they are not responsible for any errors in our interpretation of U.S. data.

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1. Introduction

This report uses information from surveys of waterfowl hunting activity, based on sampling frames provided by sales of Migratory Game Bird Hunting Permits (hereafter referred to as "Permits") in Canada and of Duck Stamps in the United States, to track recent changes in hunter activity and success. Demographic data collected by Statistics Canada and the U.S. Bureau of the Census are then used to relate waterfowl hunting to the composition of the human populations of the two countries and to other forms of recreation based on interest in wildlife.

2. Methods

Most hunters of waterfowl in Canada are legally obliged to buy federal Permits, in addition to provincial hunting licences, although Aboriginal peoples are not required to do so. Visitors from outside the country must buy Permits. The Permit was introduced in 1966 in order to provide a means of estimating the numbers of hunters of migratory game birds and their annual kill of waterfowl and other quarry species.

The Canadian Wildlife Service (CWS) of Environment Canada distributes questionnaire surveys to two samples of people who have bought Permits in the current hunting season. In the Hunter Questionnaire Survey (HQS), members of the first group are asked to record when and how often they hunted and the numbers of waterfowl and other migratory game birds that they shot and retrieved. In the Species Composition Survey (SCS), people in a second group are supplied with batches of envelopes and asked to send to the CWS a wing from each duck they shoot or the tail feathers from each goose. The proportions of different species in the kill and how many of them were birds of the year can be estimated from these "parts." The methods used in these surveys were described in detail by Cooch et al. (1978) in a report that also included results from the early years of the surveys (Boyd and Finney 1978).

Until 1992, survey results were published annually in a series of CWS Progress Notes. In recent years, detailed results have been distributed electronically to provincial and regional agencies and other interest groups and summarized in annual Waterfowl Status Reports. Several previous CWS publications have dealt with changes in Canadian waterfowl hunting over time, including comparisons with the much greater amount of waterfowl hunting in the United States. The most recent (Boyd 1990) dealt with the period up to 1988.

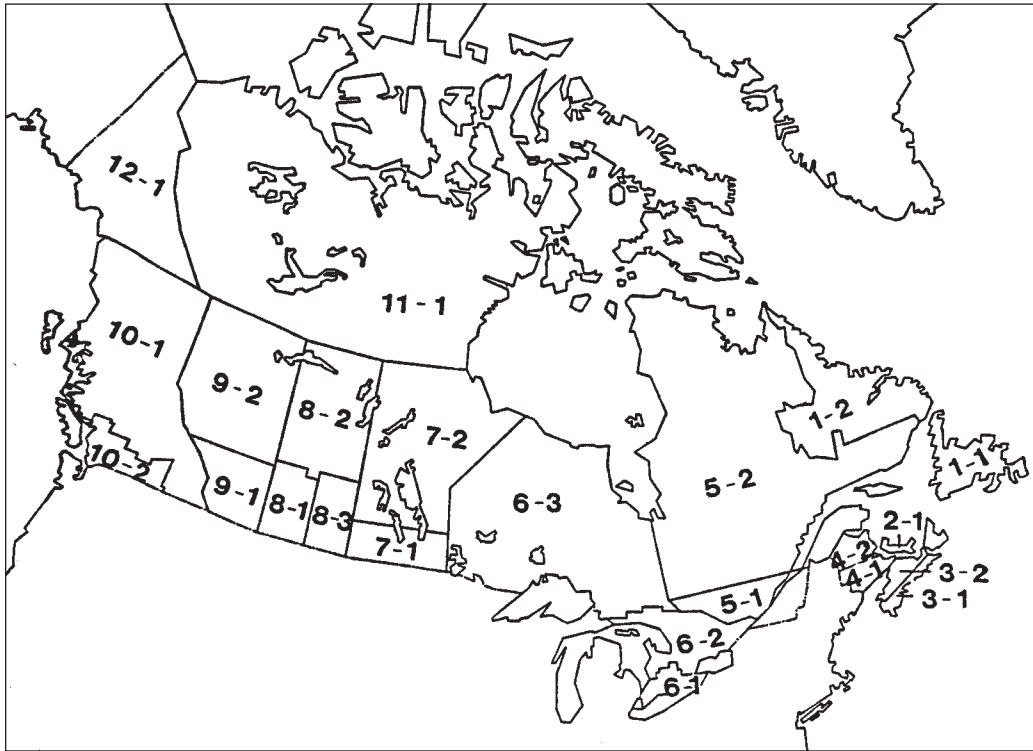
For the HQS, Canada is divided into zones within most provinces (Fig. 1). Because few Permits are sold in the Yukon, Northwest Territories, and Nunavut,¹ where most hunters are not required to buy Permits, the HQS waterfowl hunting data from those territories are of limited value and are not used here.

The sections in this report summarizing the age composition of Canadian waterfowl hunters in the recent past

¹ Nunavut, formerly the eastern part of the Northwest Territories, became separate in 1999, after the period dealt with here.

Figure 1

Location of National Harvest Survey hunting zones used in reporting harvest data for each province and territory in 1985–1998. The first number refers to the province or territory, and the second refers to the zone (e.g., 3-2 is Nova Scotia, zone 2).



include projections of likely future Permit sales, obtained by combining data from the HQS with census data and population projections made by Statistics Canada. Methods are discussed in the original publications. The Median Population Projection model of Statistics Canada (George et al. 1994) has been used here.

The summary of recent waterfowl hunting in the United States uses records published by the U.S. Fish and Wildlife Service at the national and flyway levels. (For administrative purposes, the 48 conterminous states are grouped into four flyways — Atlantic, Mississippi, Central, and Pacific.) In Alaska, as in northern Canada, there are many Aboriginal hunters who operate under different rules. The Alaskan data, which are listed separately and which form only a small part of the U.S. totals, have not been used here.

The section of this report comparing waterfowl hunting with other forms of wildlife-centred recreation uses information from special surveys conducted by Environment Canada and by the U.S. Bureau of the Census. The methods used in those surveys are described in the original publications.

3. Results

3.1 Hunting and reported kill in Canada, 1985–1998

3.1.1 Permit sales and hunter activity

When introduced in 1966, a Permit cost \$2.00. In 1974, the fee was increased to \$3.50. Since 1985, Permit buyers have also been required to buy a Wildlife Habitat Conservation Stamp, which cost \$4.00 when introduced and has gradually risen to \$8.50. In 1998, the price of a Permit was increased to \$8.50, for a total cost of \$17.00.

Permit sales nationally and in seven provinces peaked in 1978, when 524 946 Permits were sold. In 1998, only 204 164 were sold (–61%). Figure 2 shows the national and regional trends in Permit sales since 1985. Numbers of Permits sold were greatest, and fell furthest, in Ontario. In proportion to the size of the adult male population, sales are much higher in the Prairie provinces. From 1985 to 1998, Permit sales decreased by 48% in British Columbia, 50% in Alberta, 40% in Saskatchewan, 41% in Manitoba, 46% in Ontario, 50% in Quebec, 32% in New Brunswick, 28% in Nova Scotia, 43% in Prince Edward Island, and 49% in Newfoundland and Labrador.

About 24% of Permit buyers sampled in the HQS reported that they did not hunt in the year of purchase. This proportion changed very little over the years, despite the large decrease in Permit sales. The proportion of buyers not hunting varied between regions, from 14% in the Prairie provinces to 36% in British Columbia. Regional trends in the estimated numbers of active hunters (Fig. 3) are very similar to those in Permit sales. The number of active Canadian hunters decreased from 296 000 in 1985 to 160 000 in 1998 (–46%).

3.1.2 Retrieved kill

3.1.2.1 Ducks

The estimated numbers of ducks shot and retrieved by Permit holders in Canada (Fig. 4, upper) fell from 2.50 million in 1985 to 1.54 million in 1998 (–38%). Yet in all regions, the mean seasonal kill per successful hunter (Fig. 4, lower) was greater in 1993–1998 than it had been in 1985–1988. Mean seasonal bags were highest in British Columbia, where hunters are few and decreasing more rapidly than elsewhere, but which has many overwintering waterfowl. The second highest seasonal bags were in Quebec, where they did not vary much between 1985–1988 and 1993–1998.

In the maritime parts of Quebec, as in much of Atlantic Canada, many ducks stay late into, or throughout, most winters, so that the effective hunting season is far longer than in the Prairie provinces. The steep drop in the Prairie kill from 1987 to 1988, the slower decline to 1993, and the subsequent rapid increase were far greater than the changes in other regions.

3.1.2.2 Geese

Contrary trends in the reported kills of ducks and geese have persisted for many years. The national seasonal bag of geese (Fig. 5, upper) rose from 699 000 in 1985 to 883 000 in 1998 (+26%). Of these totals, 501 000 (72%) and 579 000 (66%), respectively, were taken in the Prairie provinces, where the mean seasonal bags per successful goose hunter (Fig. 5, lower) were much higher than in other regions. Nearly all groups of geese became much more numerous during the period.

Increasing proportions of active waterfowl hunters have been taking geese, although there has been little change in the Atlantic provinces. Throughout the period, about 77% of active hunters claimed to have shot ducks. In 1985, less than 36% reported taking geese; in 1998, 54% did so. The relatively small kills in 1988 and (especially) 1992 reflect the scarcity of young geese in those years, due to unfavourable summer weather in the Canadian Arctic (Ganter and Boyd 2000). Young geese are easier to shoot than older, more experienced ones (Hanson and Smith 1950).

These estimates of kill refer only to geese taken during the standard hunting seasons. Since 1998, an amendment to the Migratory Bird Regulations has permitted exceptional measures to be taken to increase the mortality rate of snow geese by two to three times. These measures include the use of electronic calls and baiting to attract geese to within range of hunters and ending the ban that had been in place since 1917, permitting spring shooting in parts of Quebec and Manitoba. (In spring 2001, special measures were also authorized in parts of Saskatchewan and Nunavut.) It will be some time before the effects of these measures can be assessed.

3.1.2.3 Total kill of waterfowl in Canada

The estimates reported above refer only to the activities of Permit buyers and the waterfowl they reported having shot and retrieved. The total numbers of ducks and geese

Figure 2
Migratory Game Bird Hunting Permit sales in Canada, 1985–1998

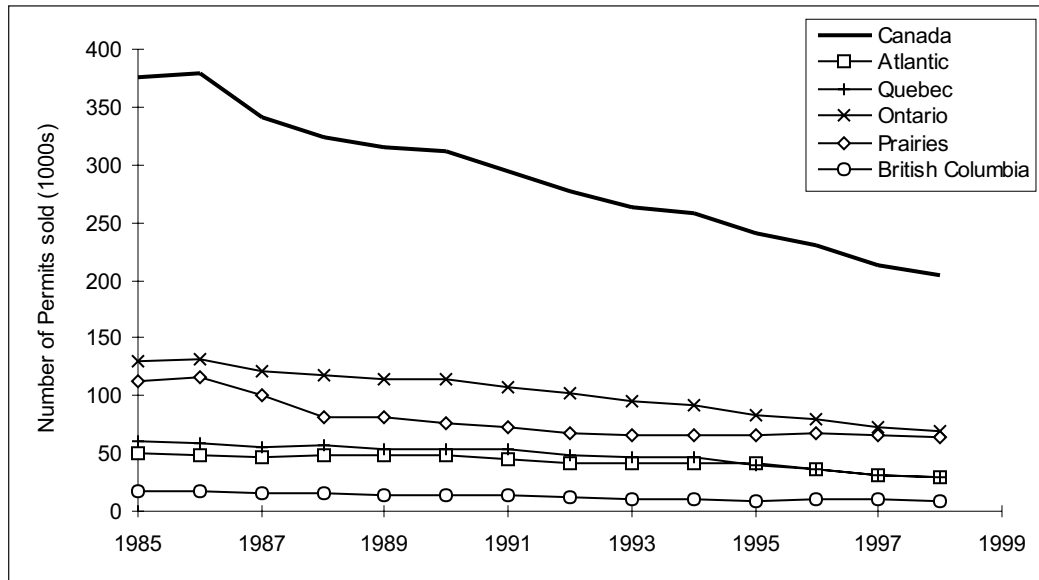
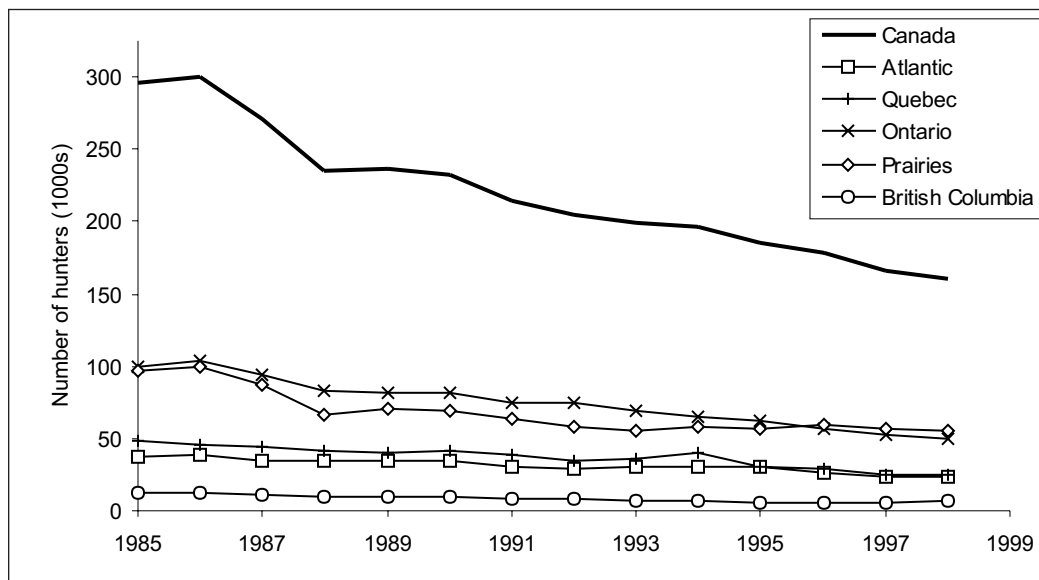


Figure 3
Estimated number of active waterfowl hunters in Canada, 1985–1998



shot in Canada in any year must be much higher than those presented here, for at least three reasons.

First, Aboriginal peoples are exempt from the legal requirement to be in possession of a Permit while hunting migratory game birds. The best estimates of their annual kill in the early 1990s were 730 000 ducks and 470 000 geese, about 27% and 44% of the total Canadian harvests (Wendt and Dickson 1994). Their estimated kill of ducks in the 1990s was much the same as reported for the 1980s by Finney (1990), while the kill of geese had risen by 34% from 350 000, in line with the kill of geese by other Canadians. The greatest numbers are taken in northern Quebec and Ontario, where waterfowl are important in the local diet, especially in spring.

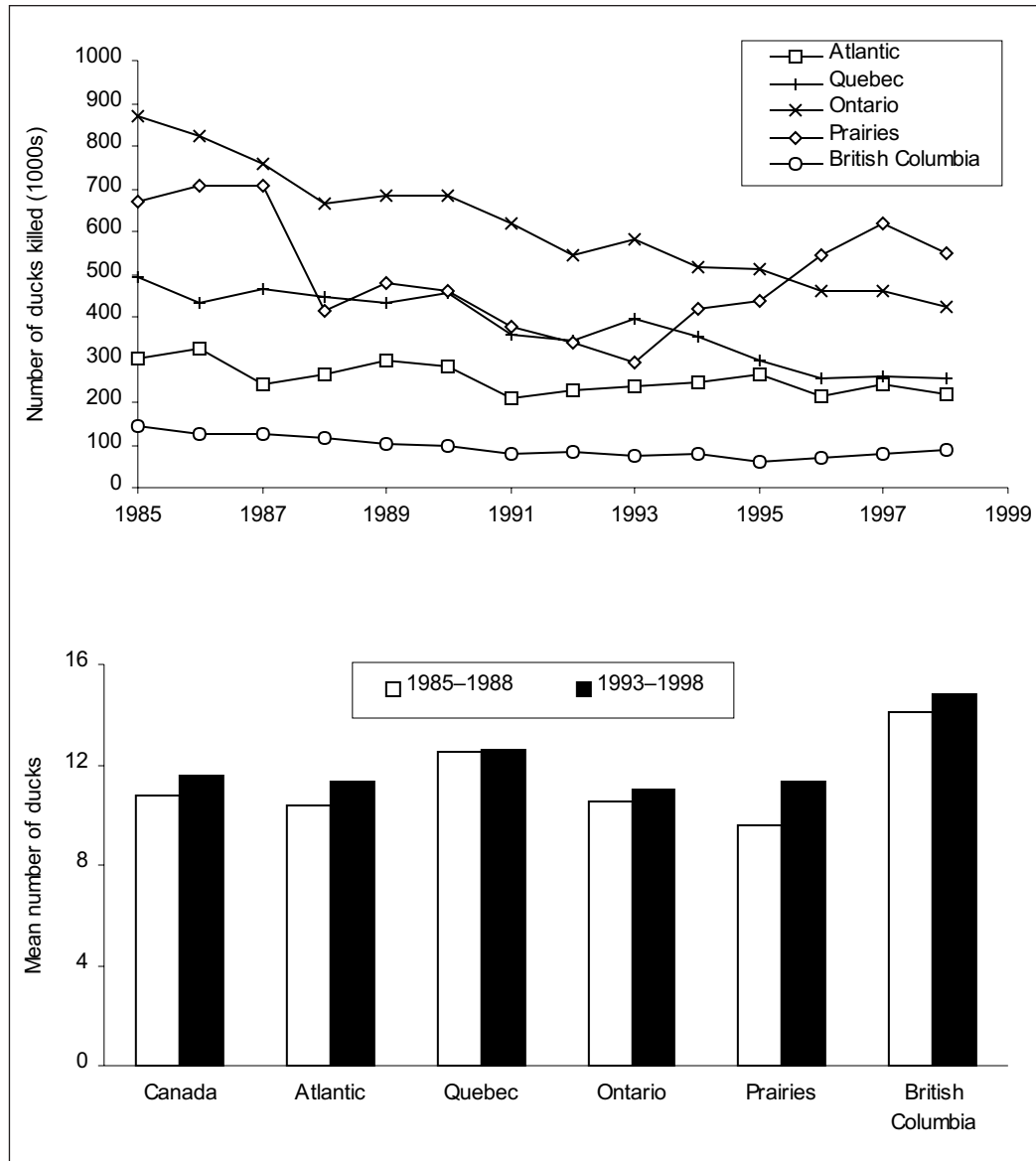
Secondly, not all the hunters who should buy a Permit each year do so. In a national survey on the importance of

nature to Canadians (DuWors et al. 1998), extrapolations from the replies of the sample interviewed suggested that 235 000 Canadians would have claimed to have hunted waterfowl in 1996. The HQS showed that 178 000 Permit holders were active in 1996, 22 000 being non-Canadians, who would not have been included in the survey by DuWors et al. (1998). These discrepancies suggest that only two-thirds of the active waterfowl hunters may have bought Permits. Field studies in 1974–1976 (Cooch et al. 1978) had shown that there were differences in compliance between regions; the proportion of active hunters found without a Permit when checked by enforcement officers was highest in the Atlantic provinces (34%) and lowest in Saskatchewan (18%).

Finally, no allowance is made in the Canadian harvest surveys for birds killed but not retrieved. The proportion may

Figure 4

Estimated number of retrieved ducks killed by Permit holders in Canada, 1985–1998 (upper), and mean seasonal bag of ducks by successful hunters, by region, 1985–1988 and 1993–1998 (lower)



be substantial, particularly when the hunters are inexperienced and/or hunting after sunset. Studies performed many years ago in the United States (Bellrose 1953) and eastern Canada (Boyd 1971) suggested that about 25% of ducks hit were not retrieved. Whether that proportion has changed significantly is not known. Nor is it clear whether many of the hunters who complete HQS questionnaires claim birds hit but not retrieved.

For the comparisons in this report, those omissions and uncertainties are ignored, on the untested assumption that their relative importance may not have changed much between 1985 and 1998.

3.1.3 Non-Canadians hunting in Canada

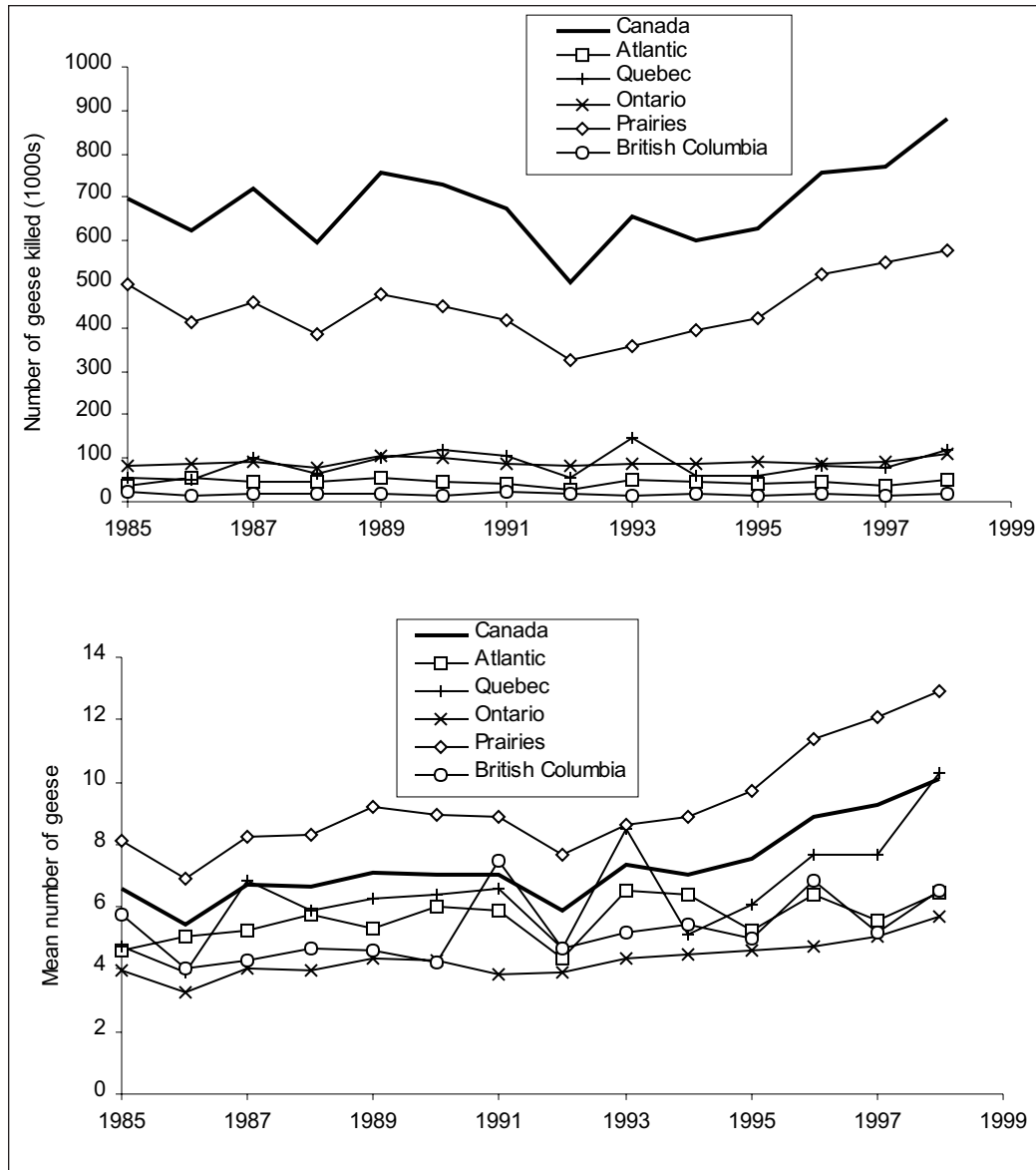
Hunters visiting Canada from other countries are required to buy Permits and provincial hunting licences before being allowed to hunt waterfowl. Most of them probably do, as they are more likely than residents to be

found out if they do not. In many cases, the operators of hunting camps obtain the federal and provincial permits that their visitors require. A great majority of visitors are American, although appreciable numbers of European hunters have been arriving in recent years, especially in Quebec, where many of them are more interested in shooting snipe and woodcock than in shooting waterfowl.

Between 1985 and 1998, the number of non-Canadian Permit holders increased from 18 000 to 25 700 (+43%), although decreasing in Ontario and British Columbia. Coupled with the decrease in the number of resident hunters, this has led to considerable increases in the proportion of nonresidents among Permit holders in all regions except British Columbia, where their numbers have always been small (Fig. 6). In 1985, only 5% of Permit holders were not Canadians. By 1998, this percentage had increased to nearly 13%. The increase has been greatest in Manitoba and Saskatchewan, from 11% of buyers in 1985 to nearly 34% in 1998.

Figure 5

Estimated number of retrieved geese killed by Permit holders in Canada (upper), and mean seasonal goose kill per successful hunter (lower), 1985–1998



Although the kill of ducks by non-Canadians was only a small proportion of the total reported kill, their mean seasonal kill was more than twice that of Canadian residents (Fig. 7, upper). In the 1990s, the kill of geese by nonresidents increased rapidly; in 1998, nonresidents took more than one-third of the reported kill, while their mean seasonal bags were four times greater than those of Canadians (Fig. 7, lower). This does not necessarily mean that visiting hunters were much more efficient than resident hunters. The visitors presumably gave undivided attention to hunting during their stay. Most residents hunt intermittently, many only on the opening day or on Saturdays, when competition is greatest. In parts of Manitoba and Saskatchewan, where visitors now form about a third of all hunters, the season opening dates for nonresidents were until recently later than those for residents. The removal of this restriction in 1996, except for White-fronted Geese *Anser albifrons* and Canada Geese *Branta canadensis* in Saskatchewan, may help to account for the recent surge in success. In 1985, non-Canadians in Manitoba

and Saskatchewan took 17% of the geese shot (mean seasonal bags 8.6 for nonresidents, 5.7 for residents). In 1998, the average seasonal kill by non-Canadians had risen to 15.4 (residents 9.25), accounting for almost half the reported kill. The kill by residents fell by about 3.5% a year over the period from 1985 to 1998, while that by nonresidents rose annually by more than 10%.

3.2 Possible future changes in waterfowl hunting by Canadians

3.2.1 The ages of Canadian Permit buyers

Nearly all purchasers of Permits respond to a question about their age. Since 1971, they have not been asked their sex. At that time, less than 5% were female. In the 1996 survey by DuWors et al. (1998), 7.5% of self-identified hunters were women. The age distributions of women and men differ, and that of women who hunt waterfowl has not

Figure 6
Non-Canadian Permit buyers as a percentage of regional sales in Canada, 1985–1998

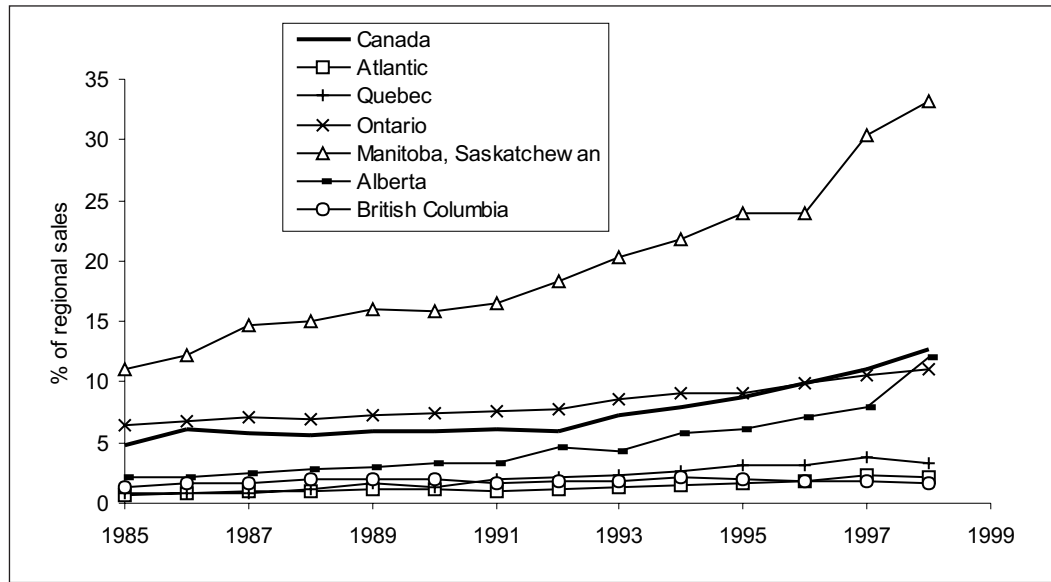
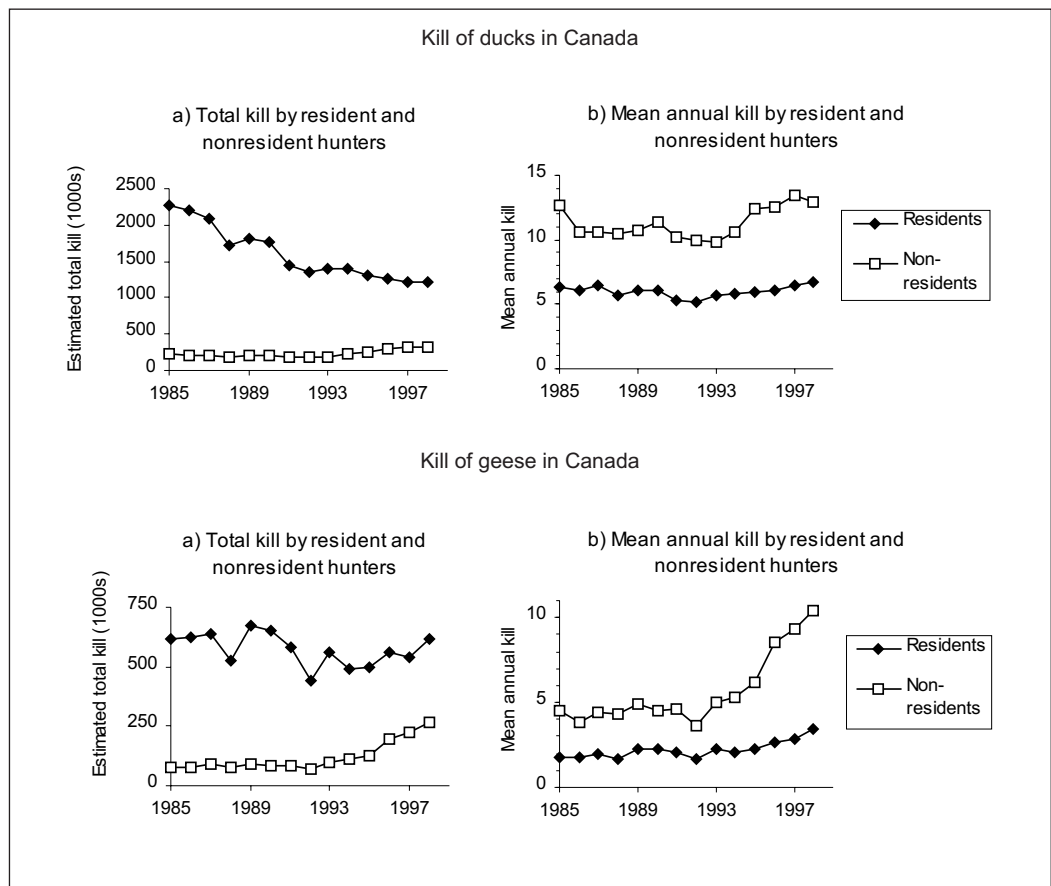


Figure 7
Kill of ducks (upper) and geese (lower) by resident and nonresident hunters in Canada, 1985–1998



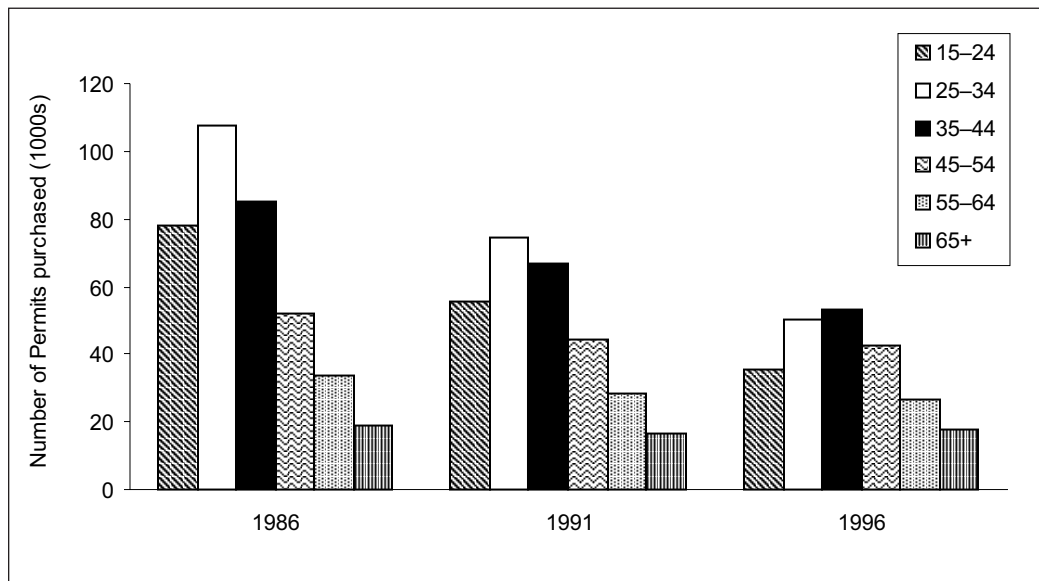
been studied. In 1996, the age distributions of game hunters were very similar for men and women.

Figure 8 shows the age distribution of Permit buyers. Although the age at which young people are legally entitled to hunt varies a little between provinces, here it is taken to be

15. Only numbers in 1986, 1991, and 1996 are shown, as those are years with full national census data. In 1986, 78 000 (21%) of Permit buyers were under 25. In 1996, there were only 35 700 of these young hunters (16% of the reduced number of Permit buyers). The numbers of Permit

Figure 8

Age distribution of Canadians buying Permits, by census year



buyers 25–34 years old also fell by more than 50% over the 10 years, while those aged 35–44 decreased by 38%. The numbers of Permit buyers 45 and over decreased by 17.5% from 1986 to 1996, while those 65 and over increased from 1991 to 1996.

The upper part of Figure 9 shows the numbers of men aged 15–79 in Canadian regions in recent census years. Nationally, the proportion of those aged 15–24 fell from about 3.9% of adult males in 1986 to 2.8% in 1991 and just below 2% in 1996. The most striking drop in Canadian Permit buyers as a percentage of the male population aged 15–79 was in Manitoba and Saskatchewan from 1986 to 1991 (Fig. 9, middle).

The bottom part of Figure 9 shows the numbers of Canadian Permit buyers in different age groups as percentages of the total numbers of males in those groups. The proportions of Permit buyers less than 45 years old fell by more than half between 1986 and 1996, although the decrease was only 30% among those 55 and over.

In 1986, the proportions of men purchasing Permits were highest in the age classes 25–34 and 35–44, at about 4.6%. By 1996, there had been a levelling off at around 2%, except in the youngest and oldest classes.

3.2.2 Projected sales of Permits

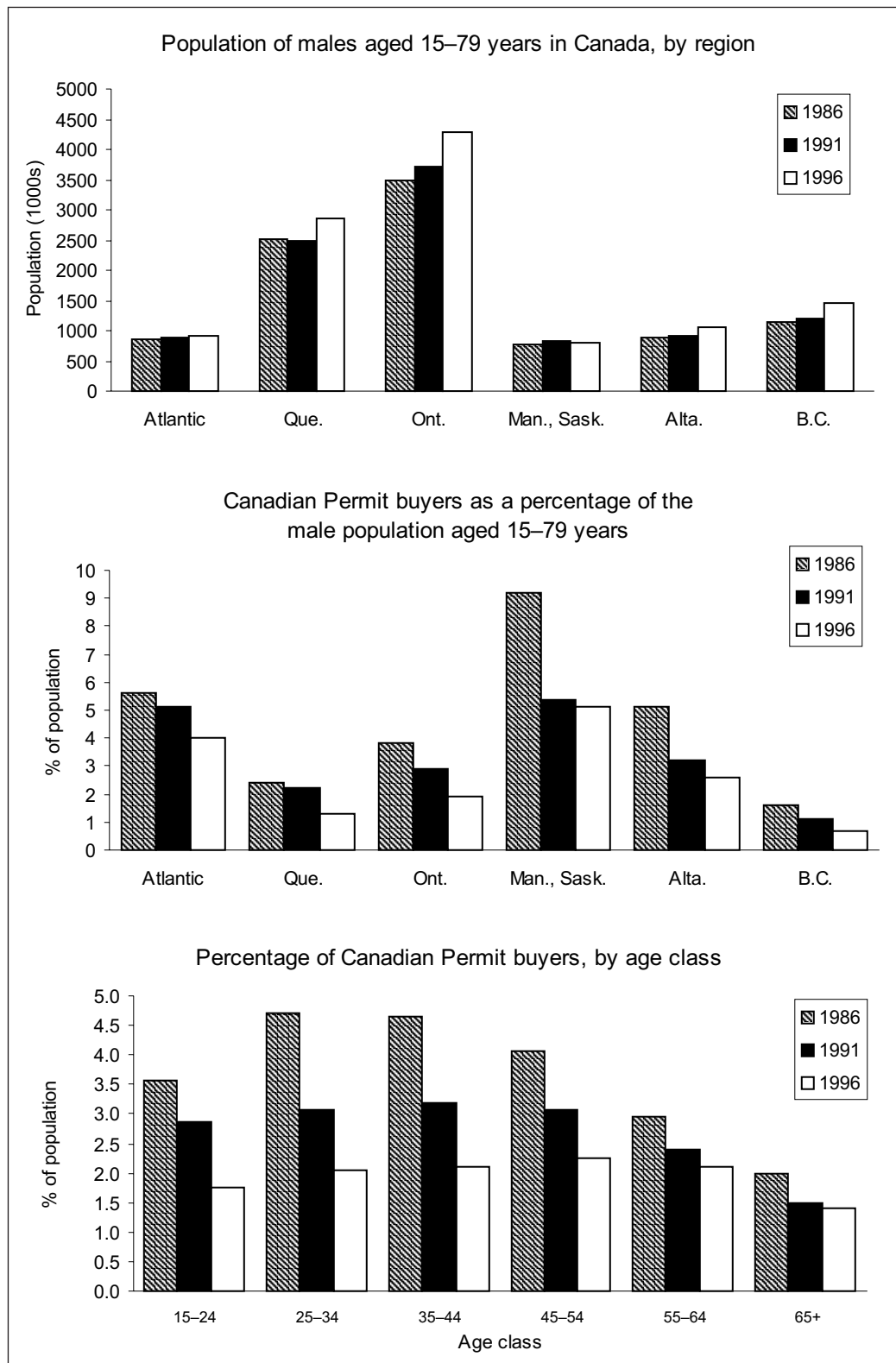
The numbers of males expected to be found in different age groups and provinces in 2001–2016 (Fig. 10) can be estimated in several ways, depending on assumptions about immigration to and emigration from Canada and the scale of movements within the country. We have adopted the Median Population Projection model preferred by Statistics Canada (George et al. 1994). While the numbers of young men (15–24 years of age) may have continued to fall until 2001, they are expected to increase again in later years. The greatest increases in the numbers of men aged 15–79 are expected to be in Ontario, where most of them will live in cities and so be rather unlikely to become hunters.

The simplest form of projection of future Permit sales is to use the linear regression of sales on years in the recent past (Fig. 11, upper). One alternative is to extrapolate the recent estimates of male age structure (Fig. 11, lower) and the proportions of members in each age group that have bought Permits. Both methods suggest that sales will fall much further than they have already done. Note that, were Permit buying to continue to decline at the rates prevailing between 1986 and 1996, by 2006 only men 35 and over would be buying Permits. While that is an exaggeration, most unlikely to be borne out, it seems probable that unless a considerable resurgence of interest in hunting among young people takes place, few young hunters will be buying a Permit for the first time during the next decade.

The decreases in Canadian Permit sales and in the recruitment of young hunters reported here are accelerations of trends that have been apparent since the late 1970s (Boyd 1985, 1988, 1990; Boyd and Cooch 1986). If the numbers of Canadian waterfowl hunters continue to fall, the effects of their kill on duck populations will become very small at the national level, although not necessarily at the local level.

Recent efforts to increase the kill of snow geese by increasing bag limits, changing opening dates, and permitting spring hunting in parts of the Mississippi and Central flyways have shown that in the United States, hunters can respond rapidly and massively to increased hunting opportunities. There is, as yet, little indication that Canadians will do the same. The high numbers of ducks produced in the Canadian and American prairies in the mid-1990s (Wilkins and Cooch 1999) led quickly to increased hunting in the United States (Martin and Padding 2000) but did not reverse the decline in the numbers of Canadian duck hunters. It may be too soon to conclude that the long decline in waterfowl hunting by Canadians is irreversible, even though the numbers of active hunters seem likely to remain far less than they were 30 years ago.

Figure 9
Percentage of Permit buyers in the Canadian population



3.3 Waterfowl hunting in the United States

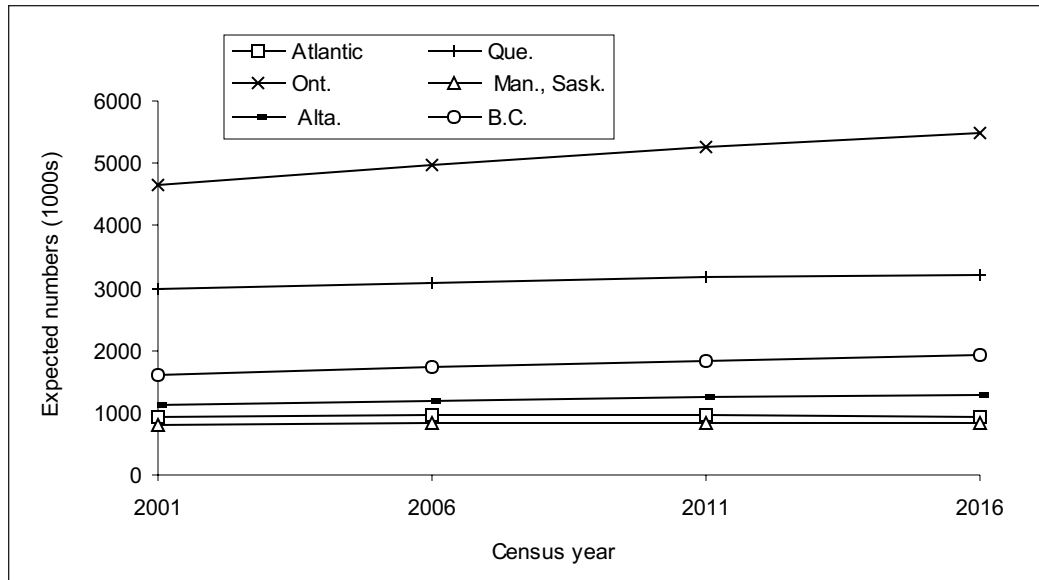
3.3.1 Hunting activity

Sales of Duck Stamps (Fig. 12) and the numbers of active (Fig. 13, upper) and successful (Fig. 13, lower)

waterfowl hunters in the United States fell from a peak in the late 1970s until 1993, then began to increase again. In 1997 and 1998, although fewer Duck Stamps were sold than in 1985 and 1986, the numbers of active hunters had increased. The number of American hunters claiming to have shot ducks or geese, just over 1 million in 1985–1987, fell to

Figure 10

Expected number of males aged 15–79 years in 2001, 2006, 2011, and 2016



815 000 in 1989, then rose slowly, returning to over a million by 1995 and reaching 1.18 million in 1997 (Fig. 13, lower). About 45% of successful waterfowl hunters were in the Mississippi Flyway, where activity increased more than in the Central Flyway and much more than in the Pacific or Atlantic Flyway.

3.3.2 Ducks and geese shot in the United States

The estimated retrieved kill of ducks in the United States (Fig. 14, upper) fell from 9.5 million in 1985 and 1986 to only 5.0 million in 1988, increased slowly from 1989 to 1993, then accelerated rapidly, reaching 15.9 million in 1997 and 16.6 million in 1998. The pattern of change was common to all four flyways, although the rates of increase were greater in the Mississippi and Central than in the Atlantic and Pacific flyways.

The total retrieved kill of geese (Fig. 14, lower) dropped from 1.8 million in 1985 to 1.5 million in 1986 and 1987, before a sustained increase to 3.1 million in 1998. The sole recent check occurred in 1992, when the kill dropped by 400 000, due to widespread breeding failures of geese and other birds in the exceptionally cold Arctic summer of 1992 (Ganter and Boyd 2000). As with duck hunting, the increased activity was greater in the Mississippi and Central flyways than in the Pacific Flyway.

The Atlantic Flyway did not share in the increases in retrieved goose kill elsewhere. The relatively low level of goose hunting in the Atlantic Flyway in recent years, especially in 1995, was due in part to a temporary prohibition on the taking of Canada Geese in those states where most of the geese breeding in northern Quebec spend the winter, as that stock was decreasing rapidly.

3.4 Comparisons between Canada and the United States

3.4.1 Numbers of active hunters

From 1985 to 1990, Canadians represented about 18% of the mean total of active waterfowl hunters in the two countries (Fig. 15). In 1998, less than 11% of active waterfowl hunters were in Canada, and one-sixth of those were Americans (see Section 3.1.3 above).

3.4.2 Numbers of ducks and geese shot

As the numbers of ducks shot in the United States grew after 1993, so did their combined kill (Fig. 16, upper), at a mean annual rate of 4.6%. The proportion taken in Canada fell from about 20% in 1985–1987 to below 10% in 1998.

The kill of geese (Fig. 16, lower) also grew more rapidly in the United States than in Canada, so that the Canadian share of the reported kill fell from 27–33% in 1985–1990 to about 21% in 1994–1998.

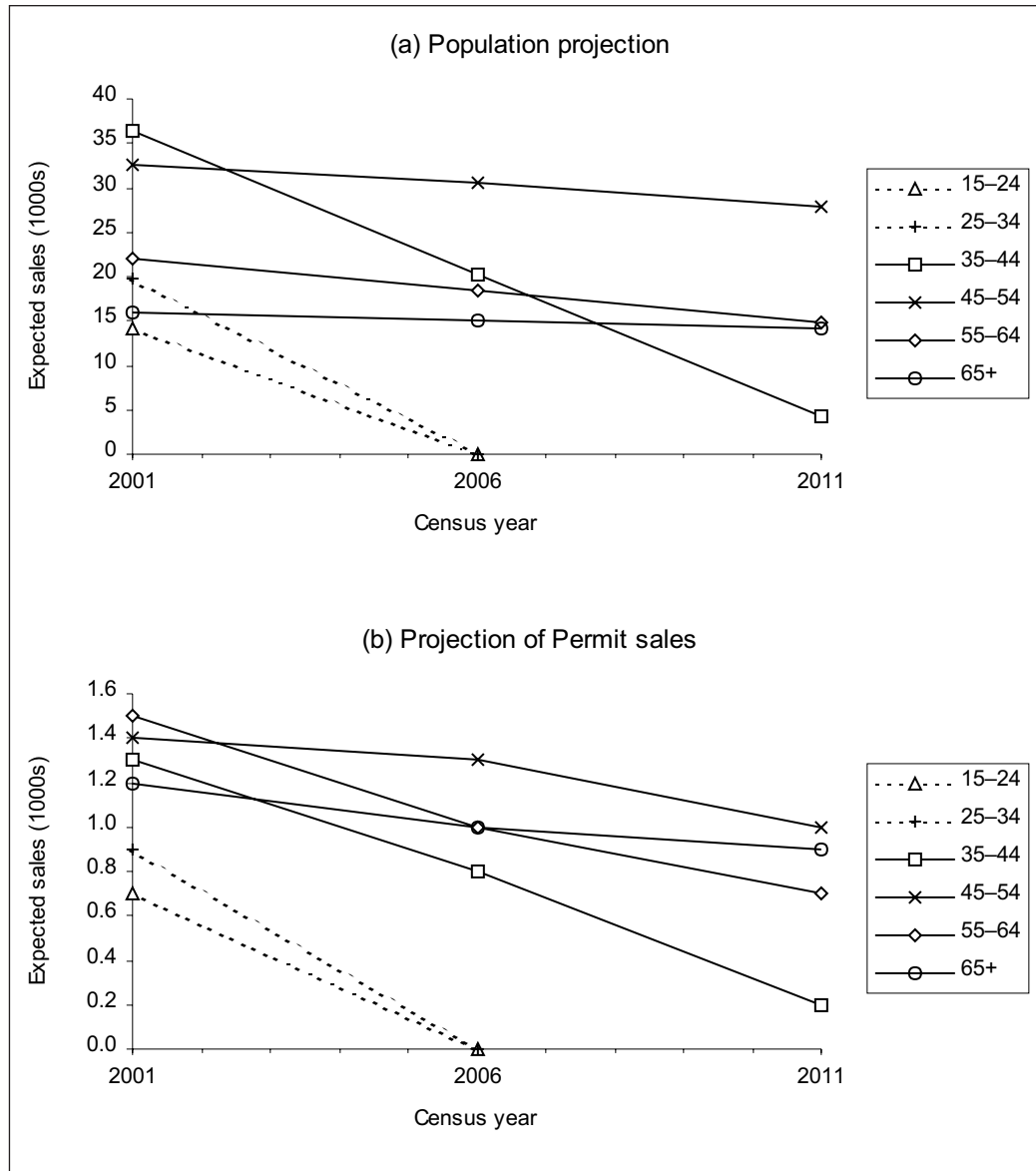
The combined kill of ducks and geese, which fell from 14.5 million in 1985 to 9.1 million in 1988, has since increased to 22.1 million in 1998, i.e., by more than half the 1985 total. The proportion of geese in the American kill (19%; mean 2.7 million, range 2.0–4.0 million) has shown no sustained trend. In Canada, hunting of geese has grown increasingly important as the kill of ducks has fallen. Geese formed well over 30% of the total kill of waterfowl in Canada in 1996–1998, compared with 21% in 1985–1986.

3.4.3 Relative success of Canadian and American hunters

In 1985–1993, as in 1972–1984 (Boyd 1988), the mean seasonal bag of ducks per active hunter was higher in Canada than in the United States (Fig. 17, upper). The surge in American hunting after 1993, especially in the Mississippi Flyway, reversed that difference. From 1985–1993 to

Figure 11

Expected sales of Permits to Canadians by age group, from population projection (upper) and from projection of Permit sales (lower)



1994–1998, the mean seasonal bag increased by 55% in the United States, but by only 7% in Canada. Even in the Atlantic Flyway, where the mean seasonal kill per hunter remained less than in Canada, the duck kill increased by 43%.

The mean seasonal bags of ducks in both Canada and the United States were higher along the Pacific coast than farther east, although waterfowl hunting is less popular in British Columbia than in most parts of North America.

The mean annual bags of geese (Fig. 17, lower) remained higher in Canada than in the United States after 1993, although the increases from 1985–1993 to 1994–1998 were as great in the Mississippi and Central flyways as in Canada (all between 45 and 46%).

The flyways divide the United States longitudinally. There are also substantial latitudinal differences in the kill between southern states, where most waterfowl spend the winter, and the central and northern states, which are used more as staging than as wintering areas. The mean seasonal

kills in the northern states resemble those in Canada. Those in wintering areas are much higher. The extensive shifts in the human population, chiefly from the northeast to the southwest, that have occurred in the last quarter century may have increased the north–south disparity, even though most of the human immigrants and internal migrants to the south have moved to cities and include many Hispanics and Afro-Americans, only 2% of whom hunted in 1996 (U.S. Fish and Wildlife Service 1997).

3.5 Waterfowl hunting and other wildlife-related recreation

Public interests in wildlife are changing, both in Canada, as shown by the national nature surveys (Filion et al. 1983, 1993; DuWors et al. 1998), and in the United States (U.S. Bureau of the Census 1987, 1998; U.S. Fish and Wildlife Service 1997). Sixty years ago, hunters led the

Figure 12
Number of Duck Stamp sales in the U.S. flyways, 1985–1998

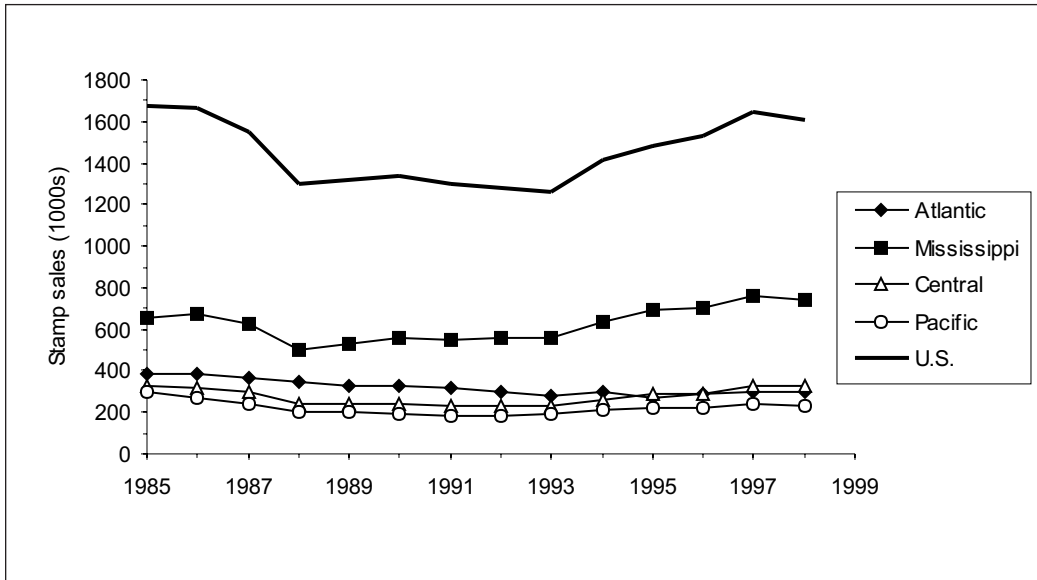


Figure 13
Number of active (upper) and successful (lower) waterfowl hunters in the U.S. flyways, 1985–1998

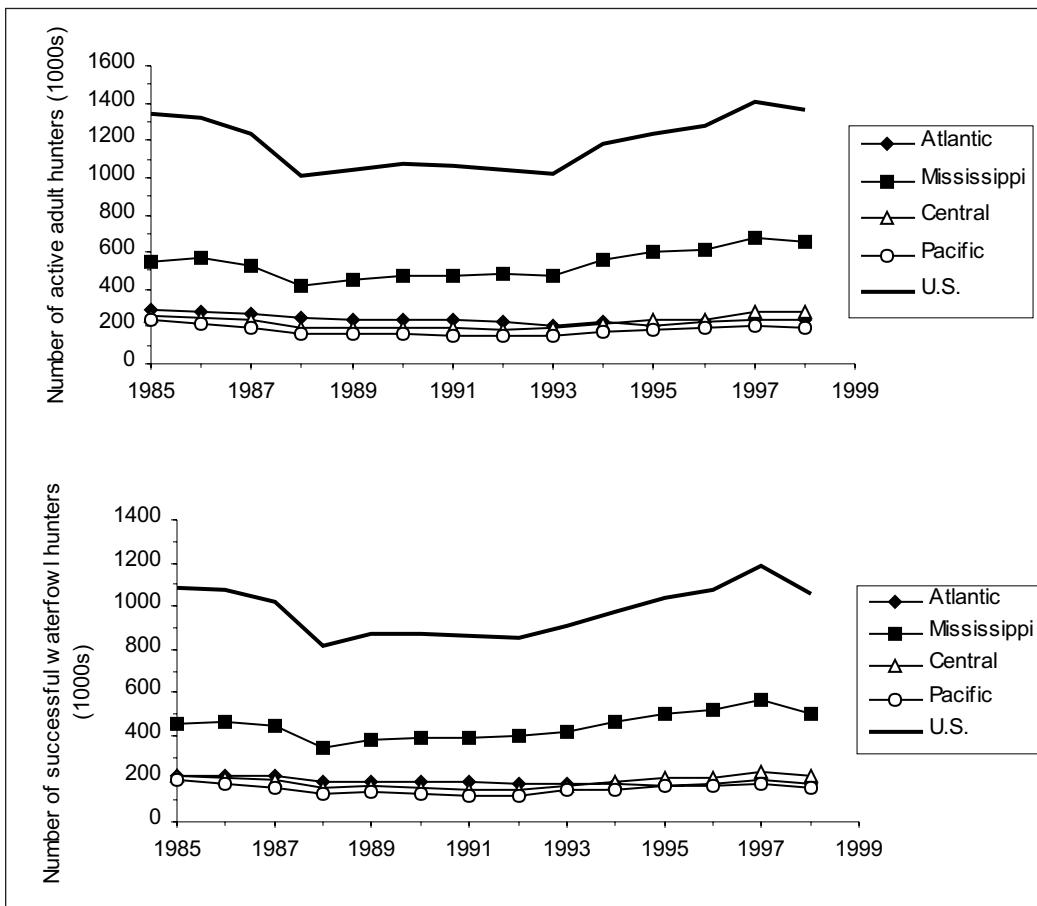


Figure 14
 Estimated retrieved kill of ducks (upper) and geese (lower) in the U.S. flyways, 1985–1998

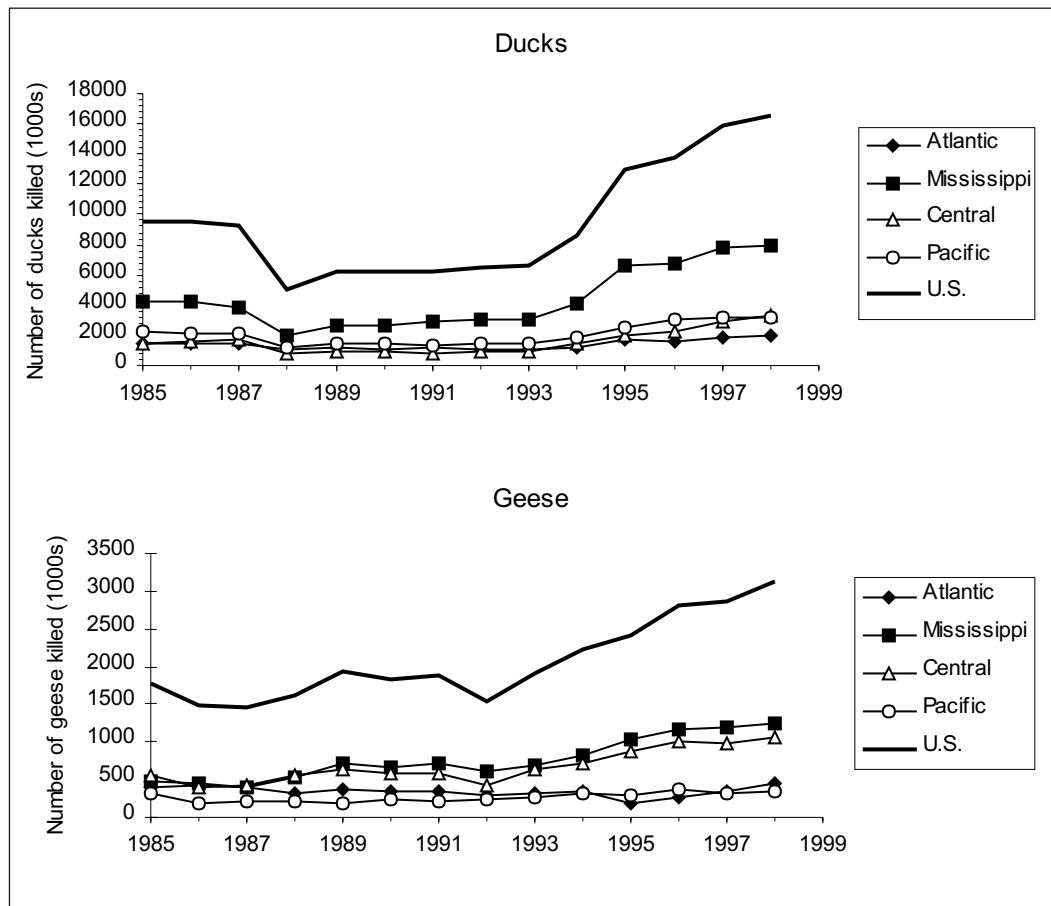
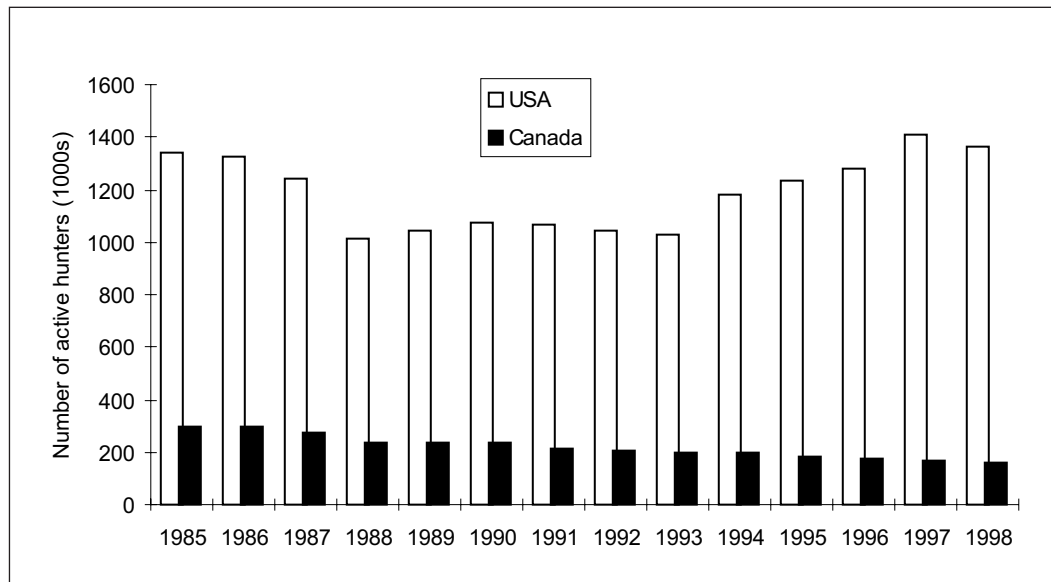


Figure 15
 Number of active waterfowl hunters in Canada and the United States, 1985–1998

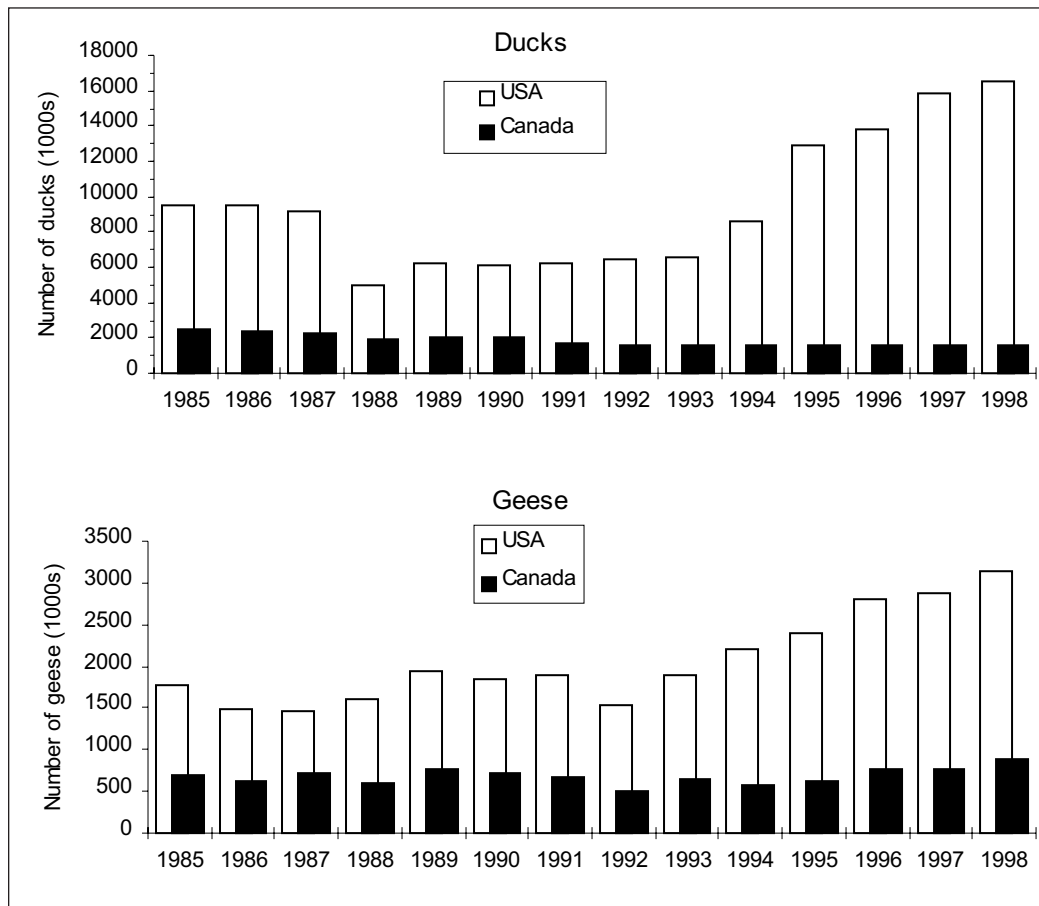


demand for the creation and management of wildlife refuges in the United States and had great influence on the setting of hunting regulations in both countries. Now, although hunters remain well-organized and politically powerful, the voices of other groups interested in wildlife, some of them opposed to

hunting, are also influential. Table 1 is an assembly of some published statistics that show the relative importance of waterfowl hunting, hunting of other birds and mammals, and “nonconsumptive” interests in wildlife (watching, feeding, photographing, etc.).

Figure 16

Reported retrieved kills of ducks (upper) and geese (lower) in Canada and the United States, 1985–1998



Although the reliability of these data doubtless varies, they serve to set waterfowl hunting into the larger contexts of all hunting and of other outdoor activities involving wildlife. Despite gaps in information from the 1980s, there are four main messages, applying to both countries:

- The numbers of hunters of most groups of birds and mammals have been falling.
- Although waterfowl hunting has decreased at much the same rate as hunting of other birds in Canada, the declines in the United States have been much smaller.
- In 1996, waterfowl hunters formed about 20% of hunters in Canada and 22% in the United States.
- Hunters — the great majority of whom are also “nonconsumptive users” of wildlife — are greatly outnumbered by “wildlife watchers” (U.S. Bureau of the Census 1998).

A major reason for the disparity between the numbers of people hunting and watching wildlife is that relatively few women hunt, while many enjoy watching wildlife. In Canada, about 180 000 women hunted in 1981, forming 10% of all hunters; the numbers hunting waterfowl were not identified separately. In 1996, 101 000 women were estimated to have hunted game, nearly 17 700 pursuing waterfowl (DuWors et al. 1998). They represented 7.5% of waterfowl hunters at that time.

In the United States, nearly 31% of those who hunted or fished in 1985 were women (up from 29% in 1980). In 1996, 15% of American hunters were women (U.S. Bureau of the Census 1998).

While 66% of sampled male waterfowl hunters in Canada claimed to have killed some ducks or geese, only 39% of female hunters said that they had done so (DuWors et al. 1998). This disparity was greater than for other kinds of hunting; for example, when hunting large mammals, 38% of women and 42% of men reported success. Claimed success was higher among those pursuing other birds (women 57%, men 70%) and small mammals (women 50%, men 63%).

Figure 17

Mean seasonal bags of ducks (upper) and geese (lower) per active hunter in Canada, the United States, and the four U.S. flyways, 1972–1998

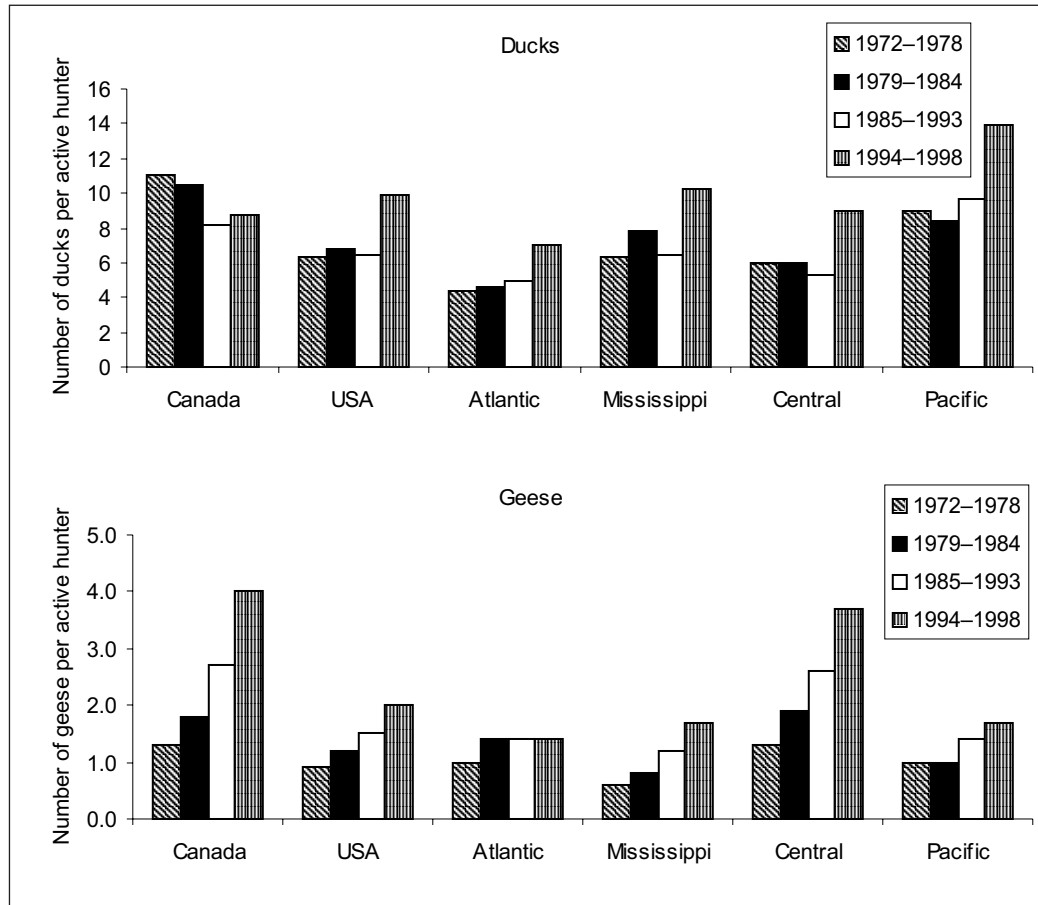


Table 1

Relative importance of waterfowl hunting and other wildlife-related recreation in Canada, 1981 and 1996, and the United States, 1985 and 1996^a

	1981				1996				% change in P from 1981 to 1996
	P	% of population	RD	\$	P	% of population	RD	\$	
Canada									
All hunting	1.8	9.8	32.2	1200	1.2	5.1	15.1	670	-33
Waterfowl	0.7	3.6	7.5	230	0.24	1.0	1.95	80	-66
Other game birds	1.0	5.3	10.9	290	0.37	1.6	3.15	100	-63
Small mammals	0.9	5.0	12.6	200	0.23	1.0	2.46	60	-74
Large mammals	0.9	5.1	10.2	470	0.72	3.1	7.24	420	-20
Nonconsumptive	15.5	83.8			12.2	51.9			-21
At home	9.9	53.5	754.4	200	9.0	38.3	13.0	300	-9
Elsewhere	3.6	19.4	56.8	2100	1.5	6.2	16.4	500	-58
United States									
All hunting	16.7	9.0	33.5		14.0	6.7	257		-16
Waterfowl	1.56	0.8	11.2		1.43	0.7	13.2		-8
Other migratory birds	3.48	1.9	30.8		1.64	0.8	13.3		-53
Small mammals	10.83	5.8	132		6.94	3.3	75.1		-36
Large mammals	12.52	6.8	131		11.29	5.4	153.8		-10
Nonconsumptive	NA								
At home					60.75	30.3	NA		
Elsewhere					23.65	11.4	314		

^a Numbers of adult participants (P) and recreation days (RD) in millions; Canadian expenditures (\$) in millions of dollars, not adjusted for inflation.

4. Final comments

The recent resurgence of waterfowl hunting in the United States, where the numbers of waterfowl shot have always been much larger than in Canada, means that the impact of hunting on North American waterfowl remains considerable, although probably not, at present levels, of crucial importance in the dynamics of waterfowl populations. Despite their minor contribution to the continental kill, Canadian hunters can still have important effects on some stocks of ducks, especially in eastern Canada, where most of the ducks killed on opening day may well have been reared locally (Reed and Boyd 1974).

Because it is comparatively easy to count waterfowl and to estimate their annual breeding success (by field observations and from the SCS), the history of waterfowl populations during the second half of the 20th century has been documented at the continental level better than that of any other group of birds. This makes them especially valuable as indicators of ecological change, especially in Canadian wetlands. North American federal government agencies and their provincial and state collaborators must continue to monitor changes in continental waterfowl populations. Their efforts should be intensified in some cases. There is a special need to determine the effects of the attempts now being made to greatly reduce the numbers of Lesser Snow Geese *Anser caerulescens caerulescens* and Greater Snow Geese *Anser caerulescens atlanticus*. Such regulatory experiments should increase fundamental understanding of population dynamics, as well as providing test cases for “adaptive harvest management” (Johnson et al. 1993) and for studying the possibly harmful effects of disturbance by hunters, not only on the target species but on other birds (Madsen 1995). These drastic experiments may also have wider effects on public attitudes towards hunting.

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