History and current status of the Loggerhead Shrike in Quebec
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Introduction
In the past 20 years, concern has been raised about the status of the Loggerhead Shrike Lanius ludovicianus in certain parts of the United States and Canada (Graber et al. 1973; Campbell 1975; Cadman 1985; Luukkonen 1987; Novak 1989; Brooks and Temple 1990). Moreover, data from the Breeding Bird Survey and the Christmas Bird Count (Geissler and Noon 1981; Morrison 1981; Robbins et al. 1986) in addition to the National Audubon Society’s Blue List, published in American Birds (David 1985), have shown that the shrike is in a precarious situation in a number of regions in its range. The Loggerhead Shrike is one of the species that has suffered the severest decline in several parts of North America, particularly in areas east of the Great Plains (Morrison 1981; Luukkonen 1987; Cadman 1990), and it is currently considered threatened or endangered in several midwestern and eastern states as well as in Canada.

In Canada, the Loggerhead Shrike was designated a threatened species by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in the mid-1980s (Cadman 1985). Following a reassessment of the situation, however, the subspecies L. l. migrans, which occurs in southeastern Manitoba, southern Ontario, and southern Quebec, was recently classified as endangered (Cadman 1990). This reassessment was justified by the fact that the status of the species in Canada varies substantially from one region to another and that in the short term, the eastern population is clearly more likely to disappear than the western population.

In Quebec, the Loggerhead Shrike was designated an endangered species in the late 1980s (Robert 1989). As a result, the Quebec regional office of the Canadian Wildlife Service (CWS) developed a provincial recovery plan and conducted a survey of breeding shrikes in southern Quebec (Robert and Laporte 1991). The purpose of this report is to summarize the data collected by CWS in recent years. It contains (1) information compiled to date on the history of the Loggerhead Shrike in Quebec, (2) results of surveys conducted in Quebec in 1989 and 1990, and (3) data on changes to Quebec’s agricultural landscape since establishment of the Loggerhead Shrike in southern Quebec and on the possible causes of these changes on the status of the species in the province.

Methods

History and population trends
The data on the history of the species were taken from a variety of sources. Many sight records and breeding records were published in the latter half of the 1800s and the early 1900s in natural science or ornithology journals (e.g., Canadian Sportsman and Naturalist, Canadian Naturalist and Geologist, Canadian Field-Naturalist, Auk). In addition, a number of books published during that period provide information on the status of the Loggerhead Shrike in certain regions of southern Quebec. They include "The birds of Montreal", by E.D. Wintle (1896), and "Les oiseaux de la province de Quebec", by C.-E. Dionne (1906). In addition to published data, we had access to various manuscripts and personal notes by Quebec ornithologists who were very active at the turn of the century. The records were taken primarily from the personal notes of Lewis McIver Ternlit, but also from a manuscript by Henry Moulsey and notes compiled by Alfred Gareau and Victor Gabouriault. A number of historical breeding records were also compiled using data from the egg collections of the Canadian Museum of Nature (Ottawa) and the now defunct Institution des Sourds-Muets de Montreal.

The breeding records and information on the status of the species over the past 50 years were taken primarily from the following publications: the annual report and newsletter of the Province of Quebec Society for the Protection of Birds, the Bulletin ornithologique of the Club des ornithologues du Quebec, Les oiseaux des collines montréalaises et de la région de Montréal (Ouellet 1974), and État et distribution des oiseaux du Québec méridional (David 1980). We also obtained several records through the Quebec Nest Record Card Program (Canadian Museum of Nature) and from preliminary data for the Quebec breeding bird atlas (CWS).

Population trends in recent decades were determined using data from the ÉPOQ database (Étude des populations d’oiseaux du Québec). This database is managed by the Association québécoise des groupes d’ornithologues, which compiles records from the daily checklist records used by Quebec ornithologists since 1948. At present, the database contains roughly 2 million records, from some 150 000 checklists. By examining the annual frequency of occurrence, that is, the percentage of checklists in which the species is recorded in a given year, we can evaluate the population trends of the Loggerhead Shrike in Quebec (Larivée 1989). For each year, we analyzed only the checklists for May, June, July, and
August in order to avoid records resulting from erroneous identifications made in March and April, when both the Loggerhead Shrike and the Northern Shrike L. excubitor are present in southern Quebec (Robert 1991). The annual frequency of occurrence was calculated beginning in 1969.

Fieldwork

In 1989, the field investigations were restricted to visiting the main sites at which breeding of Loggerhead Shrikes had been reported since 1974 to 1986 and to verifying the records of Quebec ornithologists.

In 1990, we attempted to inform as many ornithologists as possible of the need to immediately report their records of Loggerhead Shrikes to us. The information was disseminated in a variety of forms, the most important being the publication of a notice in Québec Oiseaux, which has a circulation of 5500 across the province. Various ornithological groups not likely to have seen the notice were informed, and records were checked in the field. In 1990 we also surveyed several sectors in southern Quebec. Our objective was to prepare a list of as many breeding pairs as possible. The survey technique consisted of slowly driving along secondary roads in a 100-km² sector (10 × 10 km), stopping for a short time (5–20 min) in habitats suitable for the breeding of shrikes. In areas with little traffic, the observer drove at a speed of 30–50 km h⁻¹. On certain stretches of road, however, he had to drive more quickly. The location of the sites surveyed and the clusters of secondary roads were also determined on the basis of the UTM (Universal Transverse Mercator) projection on 1:50 000 and 1:250 000 topographical maps of Energy, Mines and Resources Canada. All secondary roads in an area of approximately 13 000 km² (from 159 plots measuring 10 × 10 km) were surveyed using this method between April 19 and July 6, 1990. The plots were selected so as to sample all regions in Quebec that were potentially suitable for the breeding of Loggerhead Shrikes. Pots surveyed in the Eastern Townships, the foothills of the Laurentians (as far as Cap Tourmente), the Ottawa valley, and St. Lawrence lowlands. Some of the plots were only partly surveyed because they contained almost no suitable breeding areas. We were thus able to devote more time to the more suitable sectors. All plots in which breeding of Loggerhead Shrikes had previously been reported were visited. In addition, all precisely identified breeding sites were checked.

Changes in Quebec's agricultural landscape

A number of statistics on agriculture in Quebec were compiled and analyzed in order to determine the possible importance of agricultural changes on the establishment and decline of the Loggerhead Shrike in Quebec. Data on the areas under pasture and under crops in the nineteenth and twentieth centuries were taken from the statistics published in the Statistical yearbook, Le Québec statistique, and Canada yearbook.
Changes in Quebec’s agricultural landscape

The establishment of the Loggerhead Shrike in southern Quebec, like elsewhere in the Northeast, is associated with the clearing of forests in the last century (Palmer 1898; Monisy 1918; Lewis 1920). The rapid development of agriculture during this period was a major factor in the clearing (Clawson 1979). In Quebec, the agricultural crisis in the first half of the 1800s, closely related to the decline in wheat production, was followed by a gradual shift in agriculture to dairy farming and—by a move away from subsistence farming to commercial farming (McCallum 1980; Monette 1980; Perron 1980). According to Monette (1980), farming in Quebec shifted toward new agriculture practices in which crops to feed livestock, particularly grass and pasture crops, accounted for a large percentage of farmland. In short, the forests of the St. Lawrence plain have increasingly been replaced by open agricultural fields.

The establishment of the Loggerhead Shrike in Quebec not only resulted in a decline in the area of pastureland but also brought about significant changes in the development of farmland. The current pattern of the agricultural landscape differs considerably from previous use patterns, and these changes may have contributed to the decline in the Loggerhead Shrike in Quebec. The shift away from subsistence farming to commercial production in the last 150 years has resulted in a gradual decline in the number of small family farms and in the farming population. Much marginal farmland has thus been abandoned or has been urbanized, while, on the other hand, the average area of farms has increased considerably (Bernier 1980; Monette 1980). Moreover, owing to the mechanization of farming, the areas cultivated are now much larger than they once were. These changes also, in most cases, denuded and lack shelterbelts. The mosaic of small fields which were previously divided almost equally between pasture and cropland has been replaced by large fields where the proportion of pasture is now no more than roughly 15%.

In short, we believe that southern Quebec is less suitable for the breeding of Loggerhead Shrike today than it previously was, not only because of the disappearance of pastureland, but also because of the larger area under cultivation, the predominance of corn fields, the gradual removal of the shelterbelts, and the return of poor agricultural lands to forest. Of course, these changes alone do not explain the decline in Loggerhead Shrike in Quebec, since many environments that appear suitable to the establishment of this species still exist. We believe, however, that these changes have contributed to the gradual disappearance of the Loggerhead Shrike from Quebec.

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