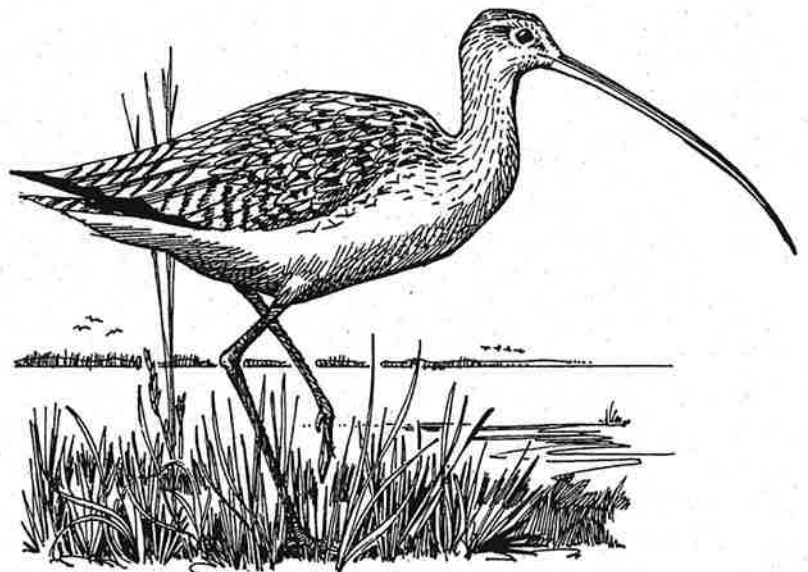


Fisheries &
Wildlife
Management
Division

RESOURCE STATUS AND
ASSESSMENT BRANCH

**Status of the
Long-billed Curlew
(Numenius americanus)
in Alberta**

Dorothy P. Hill



Alberta Wildlife Status Report No. 16



Alberta
ENVIRONMENTAL PROTECTION



Alberta Conservation
Association

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PREFACE

Every five years, the Fisheries and Wildlife Management Division of Alberta Natural Resources Service reviews the status of wildlife species in Alberta. These overviews, which have been conducted in 1991 and 1996, assign individual species to 'colour' lists that reflect the perceived level of risk to populations that occur in the province. Such designations are determined from extensive consultations with professional and amateur biologists, and from a variety of readily available sources of population data. A primary objective of these reviews is to identify species that may be considered for more detailed status determinations.

The Alberta Wildlife Status Report Series is an extension of the 1996 *Status of Alberta Wildlife* review process, and provides comprehensive current summaries of the biological status of selected wildlife species in Alberta. Priority is given to species that are potentially at risk in the province (Red or Blue listed), that are of uncertain status (Status Undetermined), or which are considered to be at risk at a national level by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

Reports in this series are published and distributed by the Alberta Conservation Association and the Fisheries and Wildlife Management Division of Alberta Environmental Protection, and are intended to provide detailed and up-to-date information which will be useful to resource professionals for managing populations of species and their habitats in the province. The reports are also designed to provide current information which will assist the Alberta Endangered Species Conservation Committee to identify species that may be formally designated as endangered or threatened under the Alberta Wildlife Act. To achieve these goals, the reports have been authored and/or reviewed by individuals with unique local expertise in the biology and management of each species.

EXECUTIVE SUMMARY

The Long-billed Curlew (Numenius americanus) once bred throughout most of the prairie regions of North America. Historically, over-hunting and habitat loss decimated curlew numbers. Today the species is extirpated from Kansas, Michigan, Iowa, Minnesota, Wisconsin, eastern Nebraska, Illinois, Manitoba, and southeastern Saskatchewan. A naturally slow-breeding species, Long-billed Curlews continue to be threatened by habitat loss as native prairie habitats are fragmented and converted to cropland and urban development. These trends have fueled concern for curlew numbers in Alberta and have led to their inclusion on the 'Blue List' of species that may be at risk in the province.

In Alberta, the Long-billed Curlew breeds primarily within the Grassland Natural Region. Preferred breeding habitat within the province occurs in native prairie grasslands and sandhills. Long-billed Curlews prefer to nest in areas with large expanses of relatively low vegetation and use areas of higher vegetation for brood-rearing activities. It is speculated that these habitat requirements are compatible with moderate livestock grazing.

Changes in population size and distribution in Alberta have not been well documented and currently, limited evidence suggests that population levels may be declining. Nevertheless, higher numbers of curlews are found in Alberta than in either Saskatchewan or British Columbia, where curlew populations continue to decline. Thus, conservation of the Alberta population is important on a national scale. Additional research is needed to determine the influence of various grazing regimes and agricultural activities, as well as other limiting factors, on curlew populations in Alberta.

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INTRODUCTION

The Long-billed Curlew (Numenius americanus) is the largest shorebird, and the most southerly breeding curlew, in North America (Pampush and Anthony 1993). Once abundant over most of the prairie regions of the United States and Canada, populations of the Long-billed Curlew have declined throughout most of the species' breeding range since the early 1900s as a result of both over-hunting and habitat loss (Timken 1969, Allen 1980, Pampush and Anthony 1993). Long-billed Curlews are currently on the 'Blue List*' of species that may be at risk of declining to non-viable population levels in Alberta in the event of further reductions in population, habitat, and/or provincial distribution (Alberta Wildlife Management Division 1996).

Some researchers consider that Long-billed Curlews breeding on the Canadian prairies, north-central Montana, and Washington are a distinct subspecies (the Lesser Long-billed Curlew, Numenius americanus parvus) from the population breeding further south (the Greater Long-billed Curlew, N. a. americanus; Allen 1980, Johnsgard 1981, Kantrud 1982). Differences between the two populations may represent adaptations to climate differences between the two areas, but most authorities do not consider these differences great enough to merit subspecies status.

This report summarizes recent information on the Long-billed Curlew in

order to facilitate an update of the species' status in Alberta.

HABITAT

The breeding habitat of Long-billed Curlews is typically described as short-grass or mixed-grass native prairie (Sadler and Maher 1976) but varies from moist meadows to very dry grasslands (DeGraaf and Rappole 1995). Within certain parameters, curlews appear to be somewhat flexible in their breeding habitat preferences (see review in De Smet 1992). In general, Long-billed Curlews prefer to nest in areas with large open expanses of relatively low vegetation (Pampush and Anthony 1993). Pampush and Anthony (1993) found that vegetation height at nest-sites in Oregon was lower and more uneven than that of the surrounding habitat. Similarly, preferred nesting areas in British Columbia had a vegetative cover of 20 cm or less (Campbell et al. 1992). Redmond (1986) found that curlew foraging efforts were hampered in a year in which weather conditions resulted in abundant thick, standing-dead vegetation.

Extensive cultivation eliminates Long-billed Curlews from an area (Renaud 1980). However, curlews will occasionally breed in agricultural land (e.g., in fallow or stubble fields) or in tame pastures planted with Crested Wheatgrass (Agropyron cristatum; Pampush and Anthony 1993, Prescott and Bilyk 1996). In Saskatchewan, Crested Wheatgrass pastures are an important habitat for curlews (S. Davis, pers. comm.). Within Alberta, Curlews also use tame pastures but at somewhat lower densities than in native habitats

* See Appendix 1 for definitions of selected status designations

(Prescott and Bilyk 1996, Prescott 1997). Renaud (1980) suggested that some of the breeding records in cultivated land may, in fact, represent adults tending broods that were hatched in native grasslands. Agricultural land used by breeding Curlews typically has a similar vertical profile to that of native prairie (De Smet 1992) and is usually adjacent to native grassland (Renaud 1980).

Moderate livestock grazing tends to maintain the low vegetation profile curlews require for breeding. In Idaho, Medin and Clary (1990) recorded a mean 1.8 breeding pairs/40 ha on grazed plots, while curlews occurred only infrequently on ungrazed plots. Prescott and Wagner (1996) detected a mean 3.2 and 0.7 curlews per 100 m radius census plot on early-season (April to mid-June) and continuously grazed plots, respectively. In contrast, no curlews were detected on plots where grazing was deferred until after mid-June when pairs had already established territories.

Grazing regimes that are compatible with maintaining preferred curlew habitat likely vary between regions depending on soil and moisture conditions (B. Dale, pers. comm.). Relative height of vegetation may be an important habitat feature that influences the ability of curlews to detect and avoid predators (Pampush and Anthony 1993). Although the effect of habitat fragmentation on curlew habitat selection and breeding success are unknown, the species' current distribution in southwestern Saskatchewan and southeastern Alberta suggests that it prefers large tracts of habitat (S. Davis, pers. comm.).

The availability of brood-rearing habitat is another important component of habitat selection by Long-billed Curlews. Shortly after the eggs hatch, adult curlews move their broods to areas where denser vegetative cover is available (Maher 1973). One brood was known to have moved more than 6 km in a six-day period (Maher 1973). These areas of denser vegetation may be important for reducing the chances of brood loss caused by predation.

In Alberta, the Long-billed Curlew breeds within the Grassland Natural Region. Specifically, curlews are most often detected in fescue grasslands, native mixed grasslands, and sandhills (Prescott and Bilyk 1996, Prescott 1997). From a limited number of surveys, maximum breeding densities of curlews occur in moderately grazed mixed grasslands with sandy loam soil (De Smet 1992, Prescott and Bilyk 1996). Presumably, land under moderate grazing regimes provides both areas of low, uneven vegetation required for nest-sites and areas of denser vegetation required for brood-rearing.

Within native habitats in Alberta, curlew abundance in one study varied from 0.25 to 0.40 birds detected per 15 ha site surveyed (Prescott and Bilyk 1996, Prescott 1997). In contrast, curlew abundance in agricultural land varied from 0.06 to 0.14 birds detected per 15 ha site (Prescott and Bilyk 1996, Prescott 1997). In roadside counts in the Handhills area, Owens and Myres (1973) found that curlews were 4.5 times more abundant in native grasslands compared to cultivated land. In the Southern Prairie Biome (south of the South Saskatchewan River), Prescott and Bilyk

(1996) detected Long-billed Curlews in 16.7% of sites surveyed in sandhills, 22.2% of sites in native mixed-grass prairie, 16.7% of sites in fescue grasslands and 6.3% of sites in tame pasture. Curlew numbers in fescue grasslands were twice as numerous as those in tame pastures (Prescott and Bilyk 1996). Similarly, in the Northern Prairie Biome (north of the South Saskatchewan River), Prescott (1997) detected curlews in 24.0% of sites surveyed in native mixed grasslands and in 40.0% of sites surveyed in sandhills. In this survey, curlew numbers in native mixed grasslands were 2.8 times higher than in planted cropland and 6.5 times higher than in hayfields (Prescott 1997).

Habitat requirements during migration within the province appear to be less critical than breeding habitat requirements. During spring migration, Long-billed Curlews are most often observed in upland prairie, stubble, and fallow fields and they also frequent sloughs and runoff ponds during this time (Renaud 1980). During fall migration and staging, the species is often sighted near bodies of water, such as lakeshores and river valleys (Renaud 1980). Wintering habitat in the southern United States, Mexico, Central and South America consists of tidal mudflats, sandbars, and estuaries in coastal regions (Stenzel et al. 1976), as well as in inland fresh water wetlands (DeGraaf and Rappole 1995).

Conservation and management of the Long-billed Curlew in Alberta relies upon the maintenance of the remaining native grasslands and sandhills which the species uses as breeding habitat. The effects of habitat fragmentation and

degradation on curlew populations are poorly understood. An understanding of the species' breeding biology is also key to successfully managing Long-billed Curlew populations so that the relative values of habitats used within the province can be determined.

CONSERVATION BIOLOGY

Long-billed Curlews arrive in southern Alberta between 13 and 24 April (Sadler and Myres 1976, Pinel et al. 1991). Territory size varies from 6 to 20 ha and pairs often return to the same territories in subsequent years (Johnsgard 1981, Redmond and Jenni 1982). Male curlews tend to return to their natal area for breeding (Redmond and Jenni 1982).

Long-billed Curlews are a late-maturing, long-lived species with low reproductive output. In Western Idaho, Redmond and Jenni (1986) found age at first breeding to be 2 to 3 years for females and 3 to 4 years for males, while average longevity was estimated to be 8 to 10 years. Females lay only one clutch each breeding season (Redmond and Jenni 1986) and only one case of a re-nesting attempt following nest failure has been recorded (Allen 1980).

Like other ground-nesting species, Long-billed Curlews may suffer heavy predation on eggs and young. At a site in western Idaho, 42.0% of all clutches failed, and most (84.0%) nest failures were attributed to predation (Redmond and Jenni 1986). Annual fledging success in Idaho varied from 17% to 40% (Redmond and Jenni 1986), whereas nesting success at a site in eastern Washington varied from 0% to 100% (Allen 1980).

Nests are built in May in a scrape excavated in the ground and are lined with grasses, straw, and plant stems. The rim of the nest may be slightly elevated above the surrounding vegetation and the bowl has an average inside diameter of 20.3 cm and a depth of 5.1 cm (Harrison 1979, Allen 1980). Clutch size is usually four eggs, although three- and five-egg clutches are possible (Sadler and Maher 1976, Cannings et al. 1987). The eggs are olive-buff and are evenly spotted with brown or olive and average 65.0 by 45.8 mm in size (Harrison 1979). Eggs are laid on alternate days resulting in a full clutch taking 4 to 7 days to complete (Allen 1980, Redmond and Jenni 1986). Incubation begins after the last egg is laid (Redmond and Jenni 1986) and is shared by both parents for 27 to 30 days (Maher 1973, Allen 1980, Redmond and Jenni 1986). Females incubate during the day and males incubate at night (Allen 1980). Mean incubation period at a site in western Idaho was 28.4 days (Redmond and Jenni 1986).

Young Long-billed Curlews are precocial (i.e. able to walk and feed themselves shortly after hatch) and hatch synchronously. Adults lead their chicks to areas of dense vegetative cover shortly after hatching (Maher 1973) where invertebrates, such as grasshoppers, constitute the majority of the diet for both adults and young (Cannings et al. 1987). Adult curlews may also feed upon passerine nestlings (e.g. Horned Lark, *Eremophila alpestris*; Sadler and Maher 1976, Goater and Bush 1986) and small amphibians (Timken 1969).

Major predators on curlew eggs include: coyotes (*Canis latrans*), Black-billed

Magpies (*Pica pica*), Bullsnares (*Pituophis melanoleucus*), Common Ravens (*Corvus corax*), and badgers (*Taxidea taxus*; Allen 1980). In addition to these predators, curlew chicks are also vulnerable to predation by Ferruginous Hawks (*Buteo regalis*), Swainson's Hawks (*Buteo swainsonii*), and Great Horned Owls (*Bubo virginianus*; Allen 1980).

Long-billed Curlews rely upon the cryptic colouration of their plumage and eggs to avoid predation (Redmond 1986) and will crouch low on the nest in the presence of potential avian predators (Allen 1980). The effectiveness of this crypsis may be enhanced when breeding territories are located within large tracts of unfragmented habitat. Adult curlews actively defend their eggs and young by feigning injury to lead predators away, and by calling and diving at predators (Allen 1980, Cannings et al. 1987). Non-incubating curlews often assist neighbours in attempts to drive predators away (De Smet 1992, pers. obs.). Curlew breeding territories are frequently clumped in loose aggregations and it has been suggested that this aids in predator defense (Fitzner 1978).

Like many species in which both parents incubate the eggs, the female Long-billed Curlew often abandons the brood 2 to 3 weeks after hatching (Allen 1980). Thereafter, the male cares for the young (Allen 1980) until they reach independence 41 to 45 days after hatching (Fitzner 1978). In July and August, adults and juveniles join post-breeding flocks prior to migration and, by the end of August, Long-billed Curlews leave Alberta (Pinel et al. 1991). From 1971 to 1980, the latest fall record

for Long-billed Curlews in the province was 2 September (Pinel et al. 1991).

DISTRIBUTION

1. Alberta. - Long-billed Curlews primarily breed in the Grassland Natural Region of southern Alberta, although some breeding records extend into the Parkland Natural Region (Figure 1). During the Alberta Bird Atlas project, Long-billed Curlews were recorded in 22% of the squares in the Grassland Region, but in less than 2% of the squares in either the Parkland or Foothills Regions (Semenchuk 1992; Figure 1).

Confirmed breeding records extend as far north as near Wainwright and west to the foothills (Salt and Salt 1976, Semenchuk 1992). Farley (1932) reported a pair observed at the Miquelon Lakes, southeast of Edmonton, in late May of 1931, but it was never confirmed whether these birds nested in the area. Actual breeding sites are habitat dependent: curlews prefer to breed in native prairie grasslands and sandhills, although they will occasionally use agricultural land (see 'Habitat' section, above). The Alberta Breeding Bird Atlas reports highest densities of Long-billed Curlews in the grasslands south of the Red Deer River between Gem and Empress (Semenchuk 1992; Figure 1). Another important site is Canadian Forces Base (CFB) Suffield where Long-billed Curlews were detected on 12.5% of 833 point counts in grasslands and sandhills (B. Dale, pers. comm.).

During migration, and occasionally during the summer, curlews may be observed beyond their breeding limits.

For example, curlews have been recorded at Waterton Lakes National Park, east and north of Edmonton at Beaverhill Lake and Belvedere, west of Calgary at Glenbow Lake, and in Banff (Henderson 1931, Sadler and Maher 1976, Salt and Salt 1976, Pinel et al. 1991).

2. Other Areas. - Long-billed Curlews formerly bred in southwestern Manitoba at Aweme and on the prairies of the Red and Souris Rivers (Godfrey 1966), but are now extirpated from that province (Salt and Salt 1976, Johnsgard 1981). Once found throughout southern Saskatchewan, the species has completely disappeared from the southeastern portion of the province (Renaud 1980, Smith 1996; Figure 2). The highest densities of curlews are found south of the South Saskatchewan and Qu'Appelle Rivers and west of 106° W longitude (Renaud 1980, Smith 1996). East of this area, curlews are recorded as spring transients, but rarely as breeders (Renaud 1980). In British Columbia, Long-billed Curlews breed in the dry grasslands of the southern interior and are most abundant in the Chicotin-Cariboo region (Campbell et al. 1992; Figure 2). Curlews also breed in the Okanagan Valley with higher populations occurring in the north Okanagan compared to the south (Cannings et al. 1987, Campbell et al. 1992). Curlews breed in scattered locations throughout the Thompson-Okanagan Plateau, especially at Lac du Bois, Douglas Lake, and the Upper Nicola areas (Campbell et al. 1992).

In the United States, Long-billed Curlews breed on the grasslands of Washington, Oregon, northeastern California, Idaho, Nevada, central Utah,

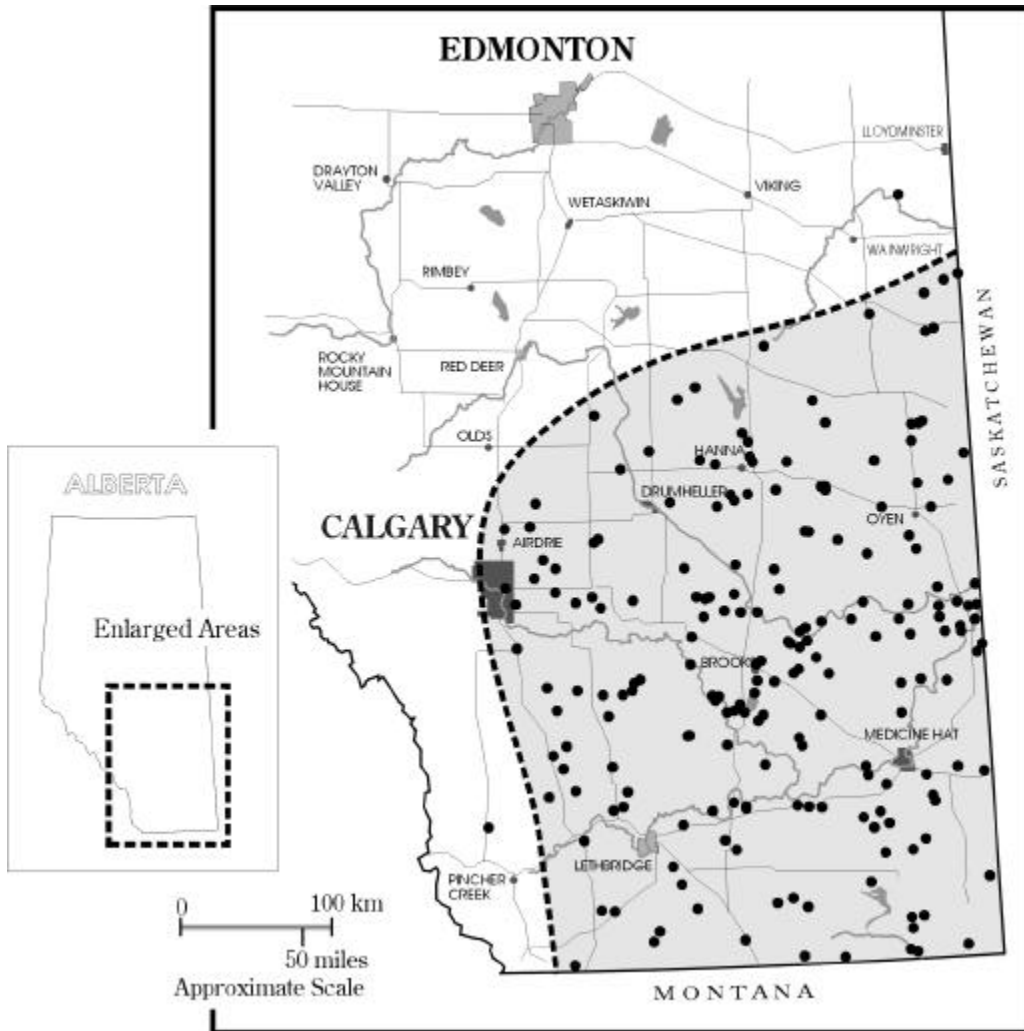


Figure 1. Distribution of records of Long-billed Curlews recorded during the breeding season in Alberta since 1966. Descriptions of site records are found within the Biodiversity/Species Observation Database (Alberta Conservation Association and Alberta Environmental Protection 1998).

northern New Mexico, northern Texas, northwestern Oklahoma, Wyoming, Montana, Colorado, North Dakota, South Dakota, Nebraska, and western Kansas (Farrand 1987, DeGraaf and Rappole 1995, Sauer et al. 1997; Figure 2). However, some authorities believe that summer records from California may represent late migrants or non-breeders, as opposed to a breeding population (Sauer et al. 1997). Since the early 1900s, the species has been extirpated from Michigan, Iowa, Minnesota, Wisconsin, Illinois, and eastern Nebraska (Allen 1980, Johnsgard 1981, Sauer et al. 1997; Figure 2). Formerly widespread throughout the Great Plains Region, there is some indication that the populations in western South Dakota and north-central Montana are now disjunct (Kantrud 1982). The largest remaining populations in the Great Plains occur in the foothill grasslands of Montana (Kantrud 1982). Oberholser (1974) noted that the breeding range in Texas has contracted substantially in the past half century.

Long-billed Curlews winter from central California, southern Arizona, southern New Mexico, northern Texas, and Louisiana, south to Mexico, Central and South America (Farrand 1987, DeGraaf and Rappole 1995). Wintering populations also occur along coastal South Carolina, Georgia, and Florida (Farrand 1987, DeGraaf and Rappole 1995; Figure 2).

POPULATION SIZE AND TRENDS

1. Alberta. - Changes in population size in Alberta have not been well documented. However, a possible decline in curlew numbers was detected

within the province during drought conditions in the 1980s (De Smet 1992). Currently, curlew numbers are believed to be low and possibly declining (Semenchuk 1992). Nonetheless, numbers of curlews in Alberta are generally greater than elsewhere in Canada (De Smet 1992). Breeding Bird Survey data indicate that the Alberta population of Long-billed Curlews declined 2.9% annually between 1980 and 1996, although this trend was not significant ($p = 0.35$) because of the small number of routes ($n = 18$) surveyed (Sauer et al. 1997).

2. Other Areas. - Breeding populations of Long-billed Curlews appear to be increasing in some parts of the western United States, but declining throughout the rest of the species' range in the central United States and throughout Canada (DeGraaf and Rappole 1995, Alberta Environmental Protection 1997). Breeding Bird Survey (BBS) data suggest that curlews are increasing in the Great Basin Region (Sauer et al. 1997). For the survey period 1966 to 1996, significant increases were recorded in Idaho (+6.5%/yr, $p = 0.00$), the Columbia Plateau (+4.3%/yr, $p = 0.01$), and the Dissected Rockies strata (+4.6%/yr, $p = 0.06$). Long-billed Curlew numbers also increased by 2.1%/yr in the Western BBS region, however this trend was not significant ($p = 0.11$). During the same period, significant declines in curlew numbers were recorded in the High Plains (-10.0%/yr, $p = 0.02$) and in the Central BBS Region (-4.4%/yr, $p = 0.01$). Declines also occurred in Great Plains (-3.8%/yr, $p = 0.13$), and Alberta (-0.5%/yr, $p = 0.79$), although these trends were not significant.



Figure 2. Current and historical breeding ranges and current wintering range of the Long-billed Curlew (adapted from De Smet 1992 and Sauer et. al 1997).

Most declines in Long-billed Curlew numbers have occurred since 1980. In the survey period 1966 to 1979, only two survey areas (Oregon and the High Plains) showed negative population trends (Sauer et al. 1997). In contrast, for the survey period 1980 to 1996, negative population trends were indicated in eight of 15 regions surveyed (Sauer et al. 1997). Overall, both the U.S. and Canadian populations of Long-billed Curlews showed declining trends between 1980 and 1996 (-1.9%/yr, $p = 0.16$ and -1.2%/yr, $p = 0.70$, respectively; Sauer et al. 1997). On a continental level, Long-billed Curlew populations declined 2.0% annually between 1980 and 1996 ($p = 0.10$; $n = 186$ routes; Sauer et al. 1997).

Documentation of a contraction in the curlew's breeding range since the early 1900s likely parallels a corresponding decline in curlew numbers. Since 1950, Long-billed Curlew numbers in south-central Saskatchewan are believed to have declined along the northern and eastern limits of the species' range within that province (Renaud 1980). Gollop (1987) noted that curlew numbers were much reduced in the area south of Highway 1 in western Saskatchewan. Apparently suitable breeding habitats (i.e. uncultivated native prairie grasslands) in southeastern Saskatchewan near Weyburn and Quill Lake have never been re-populated (Renaud 1980). Over a five-year study, densities of Long-billed Curlews at Matador in central Saskatchewan varied from 0.06 to 0.19 pairs/km² (Maher 1973). The current population in Saskatchewan is estimated at 3000 adults (Smith 1996). Declines in curlew breeding populations in British Columbia were first recorded in the early

1900s (Brooks 1918); in particular, the South Okanagan Valley population has declined considerably (Cannings et al. 1987, Campbell et al. 1992).

LIMITING FACTORS

1. Natural Limiting Factors. - Within Alberta, the Long-billed Curlew's breeding range is restricted to the Grassland Natural Region and availability of suitable nest-sites and brood-rearing habitat (see 'Habitat' section, above) likely limits the distribution and abundance of the species within the province.

Long-billed Curlew populations are naturally slow growing (see 'Conservation Biology' section, above) which may make them particularly vulnerable to reductions in habitat or population. There is some indication that drought conditions may reduce Long-billed Curlew breeding success by reducing the abundance of areas of dense vegetation needed for brood-rearing (Allen 1980). De Smet (1992) speculated that if such conditions persist, the result might be a decline in population. Management of Long-billed Curlews in Alberta should take into consideration the possibility of future periodic droughts and the effect this may have on the population levels.

Like other ground-nesting species, Long-billed Curlews also face high rates of nest and chick predation. Human-related influences, such as habitat use (e.g. grazing during drought), loss and fragmentation, may increase the effect natural limiting factors have on the Alberta curlew population.

2. Agricultural Activities. - Loss of habitat, as a result of the conversion of native prairie to cropland and urban development, has been identified as the single greatest cause of past declines in curlew populations. Since the 1900s, the distribution of curlews in North America has contracted along the eastern grasslands, likely resulting from habitat loss. Within Alberta, an estimated two-thirds of the original grasslands have been lost to cultivation (De Smet 1992, Samson and Knopf 1994). The remaining grasslands are under increasing pressure, especially with large-scale irrigation projects enabling cultivation in arid areas (Coupland 1987, pers. obs.). In general, crop farming is detrimental to curlew habitat, while ranching activities designed for long-term maintenance of the grasslands sustain curlew breeding habitat.

Land under moderate grazing regimes presumably provides the habitat heterogeneity curlews require for both successful nesting and brood rearing (See 'Habitat' section, above). Moderate livestock grazing appears to enhance curlew breeding habitat (see Medin and Clary 1990), but heavy grazing, particularly during droughts, may eliminate important brood-rearing areas. Furthermore, egg loss due to trampling by livestock may increase with increasing stocking rates.

The effects of grazing on curlew breeding habitat appear to vary across the species' range (De Smet 1992). This variation may reflect differences in moisture or vegetation (De Smet 1992, B. Dale, pers. comm.) and/or variation in the classification of grazing regimes between regions and observers. Whereas

some curlews have been reported to use cultivated land for breeding activities (Renaud 1980, De Smet 1992), it has not been documented whether these birds breed with the same success as those in native habitat.

Pesticide use may also influence curlew breeding success, either through direct ingestion of the chemicals or through a reduction in the invertebrate prey that constitute the curlew diet (De Smet 1992). Threats to the wetlands that serve as wintering habitat, such as the Pantanal Wetlands in South America, may also adversely affect Alberta's population of curlews (World Wildlife Fund Canada 1997).

3. Other Anthropogenic Influences. - Initial declines in Long-billed Curlew populations occurred as a result of over-hunting in the late 1800s and early 1900s (Allen 1980). While curlews are no longer a game or commercial species, their large size, conspicuous mobbing behaviour, and tenacious incubation behaviour (Cannings et al. 1987), may make them vulnerable to being shot illegally (see Redmond and Jenni 1986). Road and petroleum pipeline construction may result in both habitat loss and habitat degradation (Redmond and Jenni 1986) and human activity and disturbance can result in nest desertion. One study found that a minimum distance of 400 m between areas of human activity and curlew breeding territories was needed as a buffer zone (Jenni et al. 1982). Other human-related causes of nest failure include predation of adults, eggs, or young by domestic cats and dogs, and nest desertion following the trapping of incubating birds on the nest (Redmond and Jenni 1986). Human-

made structures can also be hazardous to curlews: Allen (1980) found a fledgling that had collided into a utility wire and another that had been hit by a car.

STATUS DESIGNATIONS

1. Alberta. - The Long-billed Curlew is currently on the 'Blue List' of species that may be at risk in the province (Alberta Wildlife Management Division 1996). This designation was made based on the low, possibly declining provincial populations, the species' reliance on native grasslands and the lack of specific data on Alberta population trends (Alberta Wildlife Management Division 1996). The down-listing in 1996 from the 1991 'Red List' was based on better information rather than on an increase in population (Alberta Fish and Wildlife 1991, G. Court, pers. comm.). The Long-billed Curlew is designated as a 'non-game species' in the Alberta Wildlife Act meaning that it is illegal to kill or capture curlews without the appropriate permits.

The Nature Conservancy (1998) currently ranks the Long-billed Curlew as 'G5' meaning it is 'demonstrably secure' within its global range. In Alberta, the Long-billed Curlew is ranked as 'S3' or 'rare' (Alberta Natural Heritage Information Centre 1998).

2. Other Areas. - Long-billed Curlews are designated as 'vulnerable' in Canada (De Smet 1992, COSEWIC 1998). This designation has been assigned because current data are insufficient to demonstrate continuing population declines in recent years, despite substantial historical declines and breeding range contraction (De Smet

1992). The species has been extirpated from Manitoba and southeastern Saskatchewan (Renaud 1980, Johnsgard 1981, De Smet 1992). Long-billed Curlews are currently ranked as 'S4' ('secure'; Saskatchewan Conservation Data Centre 1997) in Saskatchewan where they are also being considered for provincial listing (S. Davis, pers. comm.). Habitat loss and historic population declines in British Columbia have led to the Long-billed Curlew being assigned 'Special Concern' status in that province (Campbell et al. 1992). Currently, the curlew is on the 'Blue List' in British Columbia based on probable population declines (British Columbia Wildlife Branch 1991), and is ranked as 'S3' ('rare'; British Columbia Conservation Data Centre 1997).

In the United States, the Long-billed Curlew has been extirpated from several states (Allen 1980, Johnsgard 1981) and is listed as a candidate for federal threatened and endangered status (DeGraaf and Rappole 1995). For the most part, in the northern Great Plains, Long-billed Curlews are ranked as 'S3' ('rare'; e.g. Idaho Department of Fish and Game 1997, South Dakota Department of Game, Fish and Parks 1998). At the eastern periphery of their range, where range contractions have occurred, Long-billed Curlews are ranked as 'S1' ('critically imperiled'; e.g. Kansas Natural Heritage Program 1996).

Since 1917, the Long-billed Curlew has been protected in Alberta, as well as throughout the rest of Canada and United States, by the Migratory Birds Convention Act. This act prohibits the intentional killing or harassment of all

migratory bird species, including the destruction of their eggs or nests.

RECENT MANAGEMENT IN ALBERTA

No management projects currently exist specifically for Long-billed Curlews in Alberta. However, there are several management plans that aim to protect the native grasslands for the species that rely upon it. Among these is Operation Grassland Community, a public awareness program operated by the Alberta Fish and Game Association. North American Waterfowl Management Plan (NAWMP) projects within Alberta have identified native grasslands as one of the habitats supporting the highest avian diversity (Prescott et al. 1995, Prescott and Bilyk 1996, Prescott 1997). The Prairie Conservation Action Plan (World Wildlife Fund 1988) has proposed that at least one large tract of representative native grasslands within the province be granted full protection (De Smet 1992). In 1991, the Department of National Defense signed a memorandum of understanding with Environment Canada to set aside the northwestern portion of Canadian Forces Base Suffield as a National Wildlife Area (Dyson 1992). Negotiations are ongoing with respect to this designation. The Dinosaur Provincial Park Resource Management Plan identified the Long-billed Curlew as a representative species of native prairie habitat and suggested that the species could be used in public awareness and education programs within the park (Alberta Recreation and Parks 1991). In addition, the Canadian Wildlife Service has initiated a pilot Grassland Bird Monitoring (GBM) program to supplement the Breeding

Bird Survey data. The initial results indicate an increase in sample size which will allow increased coverage and enhance the ability of wildlife managers to track curlew population trends (Dale 1997). The pilot project will be completed in 1999 at which time its effectiveness in monitoring Long-billed Curlews and other grassland species will be evaluated (B. Dale, pers. comm.).

SYNTHESIS

Declines in Long-billed Curlew populations have been recorded throughout its range since the early 1900s. These declines were initially attributed to over-hunting and, later, to habitat loss caused by agricultural activities (DeGraaf and Rappole 1995). While curlews are no longer hunted, loss of breeding habitat continues to be a threat. Within Alberta, the preferred breeding habitat of Long-billed Curlews is native prairie grasslands and sandhills. Further threats to this habitat, such as irrigation projects enabling extensive cultivation in arid regions, construction of roadways and petroleum pipelines, and urban growth, have the potential to reduce Long-billed Curlew breeding habitat within the province.

Numbers of curlews in Alberta are generally greater than elsewhere in Canada, however, existing data show that the provincial population is declining. Given the continental population trends, it would be prudent to carefully monitor curlew populations in the province. The Grassland Bird Monitoring Program may be the means to do this and multi-agency participation in this survey is desirable. In addition, further study of Long-billed Curlews

breeding in Alberta is necessary to facilitate effective management of the species. In particular, the following should be examined: the effects of various grazing regimes, artificial (e.g. cropland) habitats, habitat fragmentation, and commonly used pesticides on Long-billed Curlew populations and breeding success.

Finally, effective management of Long-billed Curlews in Alberta relies upon the implementation of systematic population surveys and the protection and maintenance of the remaining native grassland and sandhill habitats in the province.

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APPENDIX 1. Definitions of selected legal and protective designations.

A. Status of Alberta Wildlife colour lists (after Alberta Wildlife Management Division 1996)

Red	Current knowledge suggests that these species <u>are</u> at risk. These species have declined, or are in immediate danger of declining, to nonviable population size
Blue	Current knowledge suggests that these species <u>may be</u> at risk. These species have undergone non-cyclical declines in population or habitat, or reductions in provincial distribution
Yellow	Species that are not currently at risk, but may require special management to address concerns related to naturally low populations, limited provincial distributions, or demographic/life history features that make them vulnerable to <u>human-related</u> changes in the environment
Green	Species not considered to be at risk. Populations are stable and key habitats are generally secure
Undetermined	Species not known to be at risk, but insufficient information is available to determine status

B. Alberta Wildlife Act

Species designated as ‘endangered’ under the Alberta Wildlife Act include those defined as ‘endangered’ or ‘threatened’ by *A Policy for the Management of Threatened Wildlife in Alberta* (Alberta Fish and Wildlife 1985):

Endangered	A species whose present existence in Alberta is in danger of extinction within the next decade
Threatened	A species that is likely to become endangered if the factors causing its vulnerability are not reversed

C. Committee on the Status of Endangered Wildlife in Canada (after COSEWIC 1998)

Extirpated	A species no longer existing in the wild in Canada, but occurring elsewhere
Endangered	A species facing imminent extirpation or extinction
Threatened	A species likely to become endangered if limiting factors are not reversed
Vulnerable	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events
Not at Risk	A species that has been evaluated and found to be not at risk
Indeterminate	A species for which there is insufficient scientific information to support status designation

D. United States Endangered Species Act (after National Research Council 1995)

Endangered	Any species which is in danger of extinction throughout all or a significant portion of its range
Threatened	Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range

E. Natural Heritage Element Rarity Ranks (after The Nature Conservancy 1998)

Global or G-rank: Based on the range-wide status of a species.

Sub-national or S-rank: Based on the status of a species in an individual state or province. S-ranks may differ between states or provinces based on the relative abundance of a species in each state or province.

Rank	Definition
G1 S1	Critically imperilled globally because of extreme rarity (5 or fewer occurrences, or very few remaining individuals), or because of some factor of its biology making it especially vulnerable to extinction.
G2 S2	Imperilled globally because of rarity (6 to 20 occurrences), or because of other factors demonstrably making it very vulnerable to extinction throughout its range.
G3 S3	Either very rare or local throughout its range, or found locally in a restricted range (21 to 100 occurrences).
G4 S4	Apparently secure globally, though it might be quite rare in parts of its range, especially at the periphery.
G5 S5	Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

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NOTES