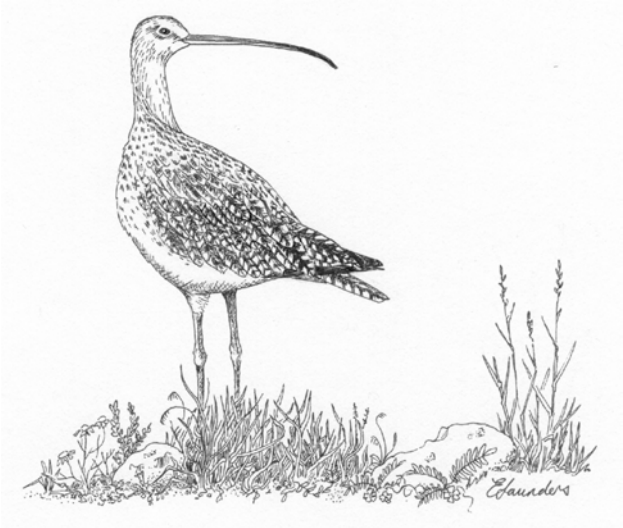
COSEWIC
Assessment and Update Status Report

on the

Long-billed Curlew
Numenius americanus

in Canada



SPECIAL CONCERN
2002

COSEWIC
COMMITTEE ON THE STATUS OF
ENDANGERED WILDLIFE
IN CANADA

COSEPAC
COMITÉ SUR LA SITUATION
DES ESPÈCES EN PÉRIL
AU CANADA

COSEWIC status reports are working documents used in assigning the status of wildlife species suspected of being at risk. This report may be cited as follows:

COSEWIC 2002. COSEWIC assessment and status report on the Long-billed Curlew *Numenius americanus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 31 pp.

Previous report:

De Smet, K.D. 1992. COSEWIC status report on the Long-billed Curlew *Numenius americanus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 33 pp.

Production note: COSEWIC would like to acknowledge Elizabeth J. Saunders for writing the status report on the Long-billed Curlew *Numenius americanus*, prepared under contract with Environment Canada.

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Également disponible en français sous le titre Rapport du COSEPAC sur la situation du courtis à long bec (*Numenius americanus*) au Canada

Cover illustration:
Long-billed Curlew — Illustration by Elizabeth J. Saunders, Monarch, Alberta.

Catalogue No. CW69-14/342-2003E-PDF
ISBN 0-662-35404-4
HTML: CW69-14/342-2003E-HTML
0-662-35405-2

Recycled paper

COSEWIC
Assessment Summary

Assessment Summary – November 2002

Common name
Long-billed Curlew

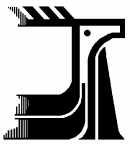
Scientific name
Numenius americanus

Status
Special Concern

Reason for designation
The species is associated with prairie habitat that has declined and is projected to decline further. The global population is in decline..

Occurrence
British Columbia, Alberta, Saskatchewn

Status history
Designated Special Concern in April 1992. Status re-examined and confirmed as Special Concern in November 2002. Last assessment based on an update status report.



COSEWIC
Executive Summary

Long-billed Curlew
Numenius americanus

Species information

The Long-billed Curlew (*Numenius americanus*) is a large brown sandpiper with a distinctive down-curved bill and cinnamon wing linings. Canadian birds are of the subspecies *N.a. parvus*.

Distribution

The Long-billed Curlew breeds in the grassland regions of North America from southern Canada to northern Texas. It winters from central California to southern Florida and irregularly in Central America. In Canada, the Long-billed Curlew breeds in Saskatchewan, Alberta and British Columbia. It has been extirpated in Manitoba since the mid-1980s.

Habitat

Preferred habitat during the breeding season includes extensive, flat areas of short native grassland. Although more numerous in native grassland, the Long-billed Curlew appears to be able to use some agricultural areas for feeding, nesting and raising young. Less than 5% of curlew habitat is considered protected.

Biology

The Long-billed Curlew is migratory and arrives in Canada in March (British Columbia) and April (Saskatchewan and Alberta). Pairs establish nesting territories and usually lay four eggs in a ground nest. Eggs are vulnerable to predation by coyotes, badgers and magpies, as well as trampling by livestock. Once the chicks have hatched, family groups disperse from the breeding territory. Chicks have a high mortality rate, succumbing to heat stress, starvation and predation by hawks, magpies and weasels. Curlews feed primarily on grasshoppers and beetles. By late June and through to August, large groups of curlews often feed together, usually in native grasslands. Most Long-billed Curlews have left Canada by the end of August.

Population sizes and trends

In Saskatchewan, a rough estimate of 4,000 birds has been made. In Alberta, a recent inventory estimated a minimum population of 19,000 birds. In British Columbia a minimum of 500 birds is estimated. Thus, the Canadian Long-billed Curlew population is estimated at a minimum of 23,500 birds. This is higher than previous population estimates, as a result of improved information. There is limited information on population trends for this species in Canada. North American Breeding Bird Survey (BBS) data show a significant continent-wide decline of –1.7% per year from 1980 to 2000. There is no significant empirical or anecdotal evidence of a change in the Saskatchewan or Alberta populations in the last ten years. In British Columbia, most populations appear to be stable, with declines in a few areas.

Limiting factors and threats

Habitat loss in Alberta and Saskatchewan contributed to past declines in the Long-billed Curlew population and native grasslands continue to be lost, primarily to agricultural conversion and urban encroachment. The rate of loss is unknown, but it is estimated that in Saskatchewan, 24% of existing grassland is at medium to high risk of being broken. In British Columbia, habitat loss to agriculture (vineyards, orchards and ginseng) and urban areas is significant and ongoing. Although the Long-billed Curlew uses agricultural habitats in some areas for feeding and nesting, there is no information on breeding success in agricultural areas.

Increasing predator populations, primarily coyotes, may play a role in limiting the Long-billed Curlew population. Other limiting factors include illegal shooting, agricultural activities (e.g. ploughing, haying, livestock trampling) and vehicle collisions. On their wintering grounds, climate change and subsequent rising sea levels may affect the carrying capacity of their feeding areas.

Special significance of the species

The Long-billed Curlew symbolizes Canada's grassland ecosystems and is easily recognized and admired.

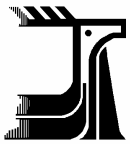
Existing protection or other status designations

The Long-billed Curlew has been recommended for "vulnerable" status in Saskatchewan, is considered "May be at Risk" in Alberta and "vulnerable" in British Columbia. In Canada, its current designation is "special concern".

Summary of status report

It is estimated that there are at least 23,500 Long-billed Curlews in Canada. Although there have been dramatic reductions in the species' breeding range and numbers since the early 1900s, current population trends in Canada are largely

unknown. Loss of the curlew's preferred habitat, native grassland, has been significant in the past, and continues at an unknown rate in all three provinces where curlews occur. There is some indication that the contraction in the eastern part of the curlew's range may be continuing. Although curlews appear to be breeding in some agricultural areas, particularly in Alberta and British Columbia, nesting success and the impact of agricultural activities in these areas is unknown.



COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) determines the national status of wild species, subspecies, varieties, and nationally significant populations that are considered to be at risk in Canada. Designations are made on all native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fish, lepidopterans, molluscs, vascular plants, lichens, and mosses.

COSEWIC MEMBERSHIP

COSEWIC comprises representatives from each provincial and territorial government wildlife agency, four federal agencies (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biosystematic Partnership), three nonjurisdictional members and the co-chairs of the species specialist groups. The committee meets to consider status reports on candidate species.

DEFINITIONS

Species	Any indigenous species, subspecies, variety, or geographically defined population of wild fauna and flora.
Extinct (X)	A species that no longer exists.
Extirpated (XT)	A species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A species facing imminent extirpation or extinction.
Threatened (T)	A species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
Not at Risk (NAR)**	A species that has been evaluated and found to be not at risk.
Data Deficient (DD)***	A species for which there is insufficient scientific information to support status designation.

* Formerly described as “Vulnerable” from 1990 to 1999, or “Rare” prior to 1990.
** Formerly described as “Not In Any Category”, or “No Designation Required.”
*** Formerly described as “Indeterminate” from 1994 to 1999 or “ISIBD” (insufficient scientific information on which to base a designation) prior to 1994.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list.

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Canada

The Canadian Wildlife Service, Environment Canada, provides full administrative and financial support to the COSEWIC Secretariat.

Update
COSEWIC Status Report

on the

Long-billed Curlew
Numenius americanus

in Canada

2002

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SPECIES INFORMATION

Name and Classification

The Long-billed Curlew (*Numenius americanus* Bechstein) comprises two subspecies: the larger *Numenius americanus americanus* in the southern part of the range and the smaller *Numenius americanus parvus* in the northern part (AOU 1983, Cannings 1998). The birds in Canada belong to *N. a. parvus*.

In French the curlew is called Courlis à long bec. Historically, the Long-billed Curlew has also been referred to as the Sicklebill and Sickle-billed Curlew (Taverner 1937, Johnsgard 1981).

Description

The Long-billed Curlew (Figure 1) is the largest of the North American shorebirds and the largest sandpiper in the world. Adults weigh between 445 and 951g (Johnsgard 1981). The length of adult birds ranges from 51 - 66 cm (Godfrey 1986). The species' most characteristic feature is its long down-curved bill, which can be up to 21cm long. Females are generally larger than males and have a noticeably longer bill (Allen 1980, Johnsgard 1981).

The plumage is brownish on the upper parts and a lighter buff colour on the under parts. Males and females have identical plumage. Cinnamon wing linings help distinguish the Long-billed Curlew from the shorter-billed and smaller Whimbrel (*Numenius phaeopus*). The down-curved bill distinguishes the Long-billed Curlew from the Marbled Godwit (*Limosa haemastica*), which has a straight or slightly up-turned bill.

The Long-billed Curlew has a variety of characteristic calls, including the loud "curlee curlee", long drawn out whistles and the soft "kerr kerr" notes that are repeated during the male's courtship flight.

Figure 1. The Long-billed Curlew.

DISTRIBUTION

Global Range

The Long-billed Curlew breeds in the grassland regions of North America, ranging from southern Canada to northern Texas and from eastern Washington to central Nebraska (Figure 2). The Long-billed Curlew's wintering range includes central California, southern Arizona (rarely), southern Texas, southern Louisiana and coastal South Carolina south to southern Mexico and southern Florida and irregularly to Guatemala, Honduras and Costa Rica. There are occasional winter records from New Brunswick, Missouri, British Columbia, Washington, Oregon, Panama, Venezuela, French Guyana and the Greater Antilles (American Ornithologists' Union 1983, De Smet 1992, Tostain et al. 1992, National Audubon Society 2001; Figure 2).

Both the breeding and wintering ranges of the Long-billed Curlew have decreased significantly since the beginning of the 1900's (De Smet 1992). Curlews have been extirpated from the eastern part of their breeding range including Manitoba, Michigan, Minnesota, Wisconsin, Illinois, Iowa, eastern Nebraska and eastern Kansas (De Smet 1992). Historically the Long-billed Curlew was a common to abundant winter resident along the Atlantic coast as far north as Newfoundland (De Smet 1992).

Canadian Range

Within Canada the Long-billed Curlew breeds in British Columbia, Alberta and Saskatchewan (Figure 3). Since the last century, its breeding range has contracted. Long-billed Curlews formerly bred in southern Manitoba, but have been considered extirpated from the province since the mid-1980s (see De Smet 1992 for details). In the last decade, there are four reports from Manitoba, although all were single observer sightings with no photographs: two near Pierson, 8 June 1991, one at Oak Hammock Marsh, 29 May 1992, one at Ile-des-Chênes on 14 June 1992, and one at Marquette on 4 June 1998 (P. Taylor, pers. comm. 2001).

In Saskatchewan, breeding curlews are found predominantly in the southwest part of the province, with concentrations in the Great Sandhills, Bitter Lake area, Maple Creek and around the South Saskatchewan River (A. Smith, pers. comm. 2001). The northern edge of the curlew's breeding range is just south of the border between the aspen parkland and grassland ecoregions, between 52°N and 53°N, north of Biggar (Renaud and Wapple in press, A. Smith, pers. comm. 2001). The only curlews breeding east of 106°W are in the vicinity of Moose Jaw, Buffalo Pound Lake and Big Muddy Lake (De Smet 1992; W. Harris, pers. comm. 2002). There have been occasional observations east of Moose Jaw (e.g., one observed in 1996 on a BBS route near Tyvan, southeast of Regina; Sauer et al. 2001). Relatively large expanses of suitable habitat exist in southeastern Saskatchewan that are not currently occupied by curlews, such as in the Weyburn area (A. Smith, pers. comm. 2001). Although there is no scientific evidence available, it appears that the Long-billed Curlew is continuing to undergo a range contraction in the eastern part of its range in Saskatchewan (W. Harris, pers. comm. 2002).

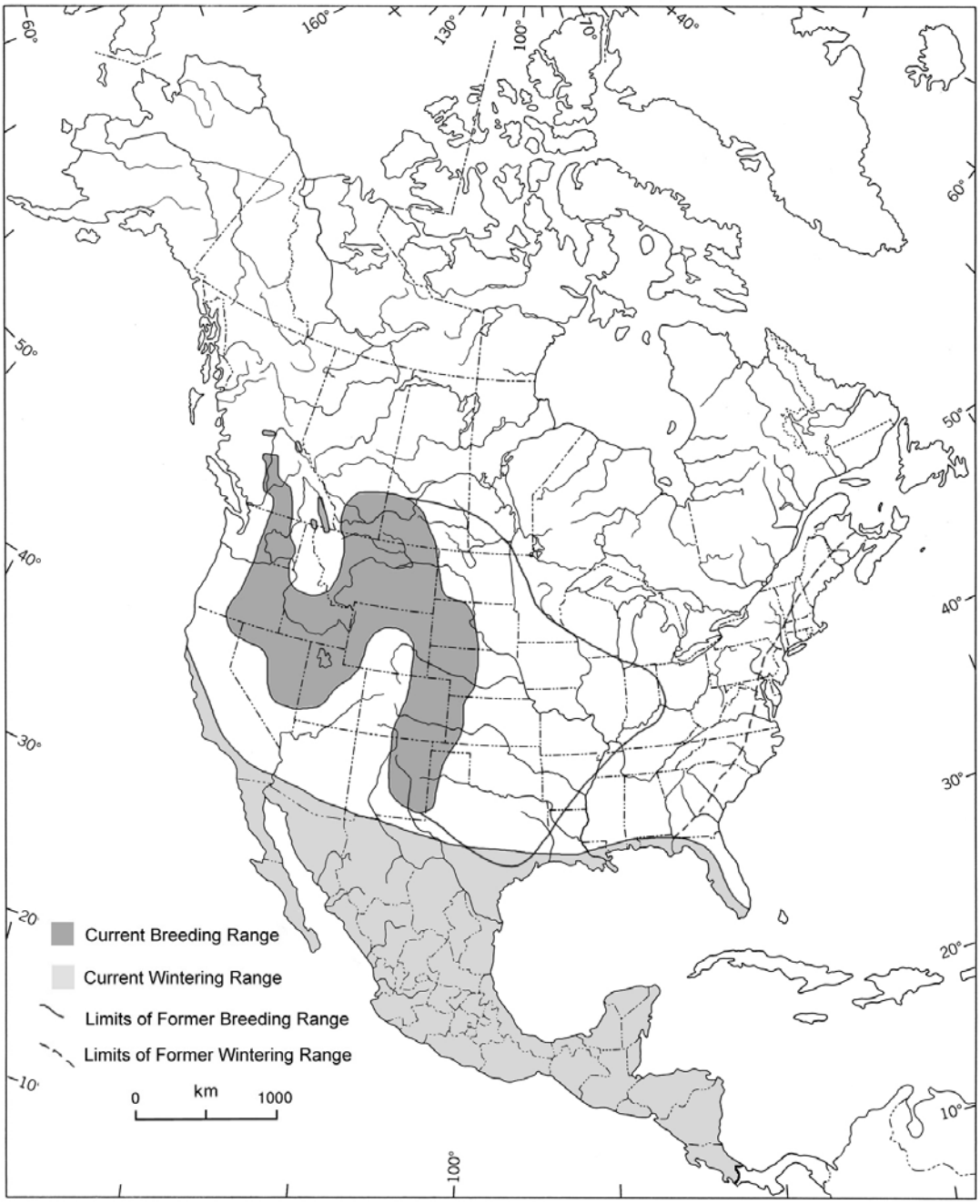

Figure 2. Breeding and wintering range of the Long-billed Curlew (based on AOU 1983, De Smet 1992, Cannings 1999, Hill 1998, Sauer et al. 2001, National Audubon Society 2001).

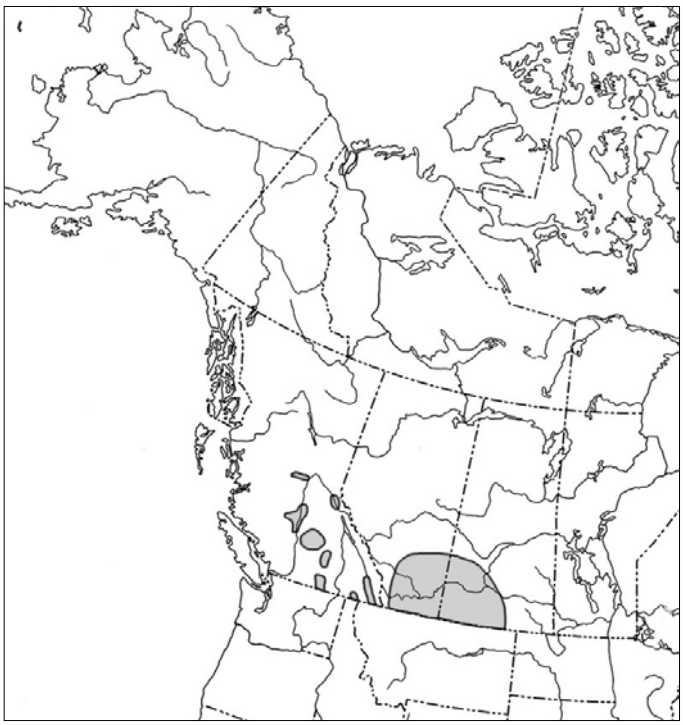

Figure 3. Breeding range of the Long-billed Curlew in Canada (primarily based on De Smet 1992, Cannings 1999, Hill 1998, Sauer et al. 2001).

In Alberta, Long-billed Curlews breed in the Grassland Natural Region with a few birds breeding in the southern portion of the Parkland Natural Region, and as far north as Wainwright (Hill 1998). In the west, curlews breed in the Calgary area (Hill 1998) and they are present during the breeding season west of Pincher Creek, in the Cowley area (W. Norstrom, pers. comm. 2001). There appear to be concentrations in the grasslands south of the Red Deer River between Gem and Empress, in the Suffield National Wildlife Area, along the U.S. border between Del Bonita and the Milk River Natural Area and in an agricultural area between Fort Macleod, Stavely and Vauxhall (Hill 1998, Dale et al. 1999, Saunders 2001b).

There is no indication of range expansion or contraction in Alberta since the last COSEWIC status report (i.e. De Smet 1992). Although curlews have been reported on more BBS routes in the last decade (40 routes compared to 16 routes in 1992; Appendix 1), this is primarily because a number of new routes have been run within the curlew's range since 1992. There appears to be unoccupied suitable breeding habitat (Saunders 2001b).

In British Columbia, since the mid-1970's, Long-billed Curlews have extended their range into the McBride and Creston areas (Cannings 1999; E. Stanley, pers. comm. 2001; M-A. Beaucher, pers. comm. 2001). Curlews have been breeding in the Vanderhoof area since the late 1990's and are present in low numbers through the breeding season in the Prince George area (J. Bowling, pers. comm. 2001). The highest breeding concentrations are

on the high rangelands of the Fraser-Chilcotin region (Cannings 1999). Suitable habitat exists in some places with no evidence of breeding curlews (Cannings 1999). Migrants are seen along the coast in very small numbers most years (Campbell et al. 1990).

Overall the range of the Long-billed Curlew in Canada does not appear to have changed significantly since the 1992 COSEWIC status report, except for a slight expansion in British Columbia and possibly a slight range reduction in eastern Saskatchewan.

HABITAT

Habitat Requirements

Long-billed Curlews nest in short-grass and mid-grass prairie (De Smet 1992, Pampush and Anthony 1993, Dechant et al. 2001). In general, vegetation structure appears to be important to curlews. Their preferred nesting habitat seems to vary throughout their range, but often includes large, relatively flat areas of short grassland (De Smet 1992, Saunders 2001a). Such areas facilitate predator detection and effective communication between nesting birds (Allen 1980, Ohanjanian 1987). Several studies have found that curlews are more abundant in heavily to moderately grazed grasslands (Bicak et al. 1982, Ohanjanian 1987, Medin and Clary 1990). Studies have found a preference for grass less than 20-30cm high that allows for good visibility and irregular spacing of grass clumps that compliment their cryptic colouring (Fitzner 1978, Allen 1980, Hooper and Pitt 1996). Once the young have hatched, curlews appear to prefer areas of taller vegetation. This may aid in camouflage of the young and reduction of heat stress (Sadler and Maher 1976, Allen 1980, Cannings et al. 1987).

In Saskatchewan, a study of curlew habitat preferences revealed a positive relationship between curlew abundance and native grassland (J. Foster-Wilfong, pers. comm. 2001). Curlews preferred nesting grounds containing: a higher percentage of grass than forbs, grass lower than 10 cm, low amounts of bare ground and low amounts of dead litter. During the brood period there was a significant positive relationship between curlew abundance and spring/summer crop, suggesting that adults were moving their chicks into cropland as the season progressed, likely because of the availability of grasshoppers (J. Foster-Wilfong, pers. comm. 2001).

In Alberta, native grassland was a strong predictor of curlew numbers during the courtship and incubation stages, but curlews were also found in high densities in some areas of intensive cultivation during the breeding season (Saunders 2001b). Overall within the Grassland Natural Region, curlews were half as numerous in areas with 0-50% native grassland than in areas containing 51-100% native grasslands. Saunders (2001b) also found that curlews were negatively correlated with riparian areas. Similarly, in a study of the relationships between shorebirds and managed wetlands, Gratto-Trevor (1999) reported that all curlew nests found were more than 1km from permanent water, including dugouts. In the Suffield National Wildlife Area, curlews were most abundant in upland grassland, disturbed grassland (described as formerly cultivated, mowed or heavily grazed

grassland) and moist grasslands (Dale et al. 1999).Concentrations of birds appeared to be in areas of unconsolidated glacial deposits (Dale et al. 1999).

In British Columbia, Long-billed Curlews breed in dry grasslands scattered through the interior. The 2000 and 2001 British Columbia curlew count observed 40% of curlews in pasture (non-native grasslands), 25% in agricultural land, 25% in native grass, and 10% in other habitats. Of all curlew observations, 55% were in vegetation less than 15 cm tall, 30% were in vegetation 15 - 30 cm tall and only 3% were observed in vegetation over 30 cm. (E. Palmer, unpublished preliminary data 2001). In the Cariboo-Chilcotin region, curlews were most common on north-facing, high elevation, gently sloping sites with a mean vegetation height of 5 – 8 cm and high insect larvae biomass (Hooper and Pitt 1996). Although curlews often use alfalfa fields for foraging, there are only isolated reports of curlews nesting in such habitat (Ohanjanian 1992). In East Kootenay, crested wheatgrass (*Agropyron cristatum*) plantings were used by curlews only as the plants were becoming established or if heavily grazed; otherwise, the high vertical profile created unfavourable habitat (Ohanjanian 1992). Size of grassland openings is important to curlews. In East Kootenay, curlews only nested in areas where grasslands openings were greater than 250 m at their narrowest point (Ohanjanian 1992). Long-billed Curlews have been observed breeding in agricultural habitats in biogeoclimatic zones that are otherwise unsuitable, such as at Creston and McBride (Cannings 1999; E. Stanley, pers. comm. 2001).

During migration and on their wintering grounds, curlews are found in both inland and coastal shallow waters (Bent 1929, Johnsgard 1981, AOU 1983).

Trends

In Alberta and Saskatchewan, the threats to native prairie are similar and include agricultural expansion and conversion to cropland, invasion of introduced plants, resource extraction and acreage and urban development.

In Saskatchewan, 10,853 km^2 or 16% of the native grassland remains in the Moist Mixed Grassland Ecoregion, and 26,791 km^2 or 31% of grassland remains in the Mixed Grassland Ecoregion (Hammermeister et al. 2001). The concentrations of remaining grassland are in the southwestern part of the province and the majority of this grassland (75%) occurs on land that is currently unsuitable for crop production (Hammermeister et al. 2001). Over 24% of the remaining native grassland in Saskatchewan is considered to be at a medium or high risk of being broken, and with advancements in crop development and varieties this figure may become higher (Hammermeister et al. 2001).

In Alberta, approximately 40,000 km^2 or 42% of native grassland remains in the Grasslands Natural Region (Prairie Conservation Forum 2001a). There is no information available on the current rate of native prairie loss, although a 10-year change assessment to the Alberta Native Prairie Inventory will be conducted in 2002 (I. Dyson, pers. comm. 2001).

Grassland Natural Region of Alberta approximates 9,694,650 ha of land, of which, 2,857,480 ha are under Crown ownership. Nearly 43% of the region (4,143,960 ha) remains native prairie. Within these native areas, 2,328,630 ha are under Crown ownership, while 1,815,060 ha are on private range.

In British Columbia, there are approximately 5,000 km^2 of grasslands remaining in the southern interior region (Grasslands Conservation Council of British Columbia 2002). In the Okanagan, less than 40% of the original grasslands remain and much of this is on steep slopes avoided by curlews (Cannings et al. 1998). Agricultural expansion, primarily vineyards and orchards, as well as urban encroachment, occurs at a fast pace (Cannings 1999). In the Thompson and Fraser valleys, several hundred hectares of potential curlew habitat have been converted to ginseng production (Cannings 1999). Forest encroachment is also impacting grasslands, especially in the Cariboo-Chilcotin grasslands where approximately 30% of the grasslands have been invaded by forest (Pitt and Hooper 1994). In Central British Columbia, curlews have taken advantage of agricultural activities (using primarily alfalfa, grain and other field crops; Cannings 1999). In the upper Fraser and North Thompson valleys curlews may have benefited from the clearing of lowland forests (Cannings 1999).

Protection/ownership

Of all of the remaining native grassland[1] in Saskatchewan, 2.7% falls in protected areas[2]. One of the largest protected areas of grassland in Saskatchewan is Grasslands National Park, which currently covers 478 km^2, but will eventually include 900 km^2. Long-billed Curlews are considered to be relatively common in the Park, but are locally distributed and limited to the south side of the Frenchman River Valley (R. Sissons, pers. comm. 2001). 32% of Saskatchewan's remaining native grassland is managed by government agencies or conservation organizations. Almost half of this is managed as provincial or Prairie Farm Rehabilitation Administration (PFRA) pasture (Hammermeister et al. 2001). PFRA and provincial pasture in native grassland areas likely provides suitable habitat for breeding curlews.

In Alberta, high density native grassland[3] in the Grasslands Natural Region covers 26,678 km^2 (M. Schmoll, pers. comm. 2001). Of this, 737 km^2 (2.8%) overlaps with

[1]Native Dominant Grassland (grassland dominated by native plants but possibly including some tame grasses and forbs) in all four ecoregions in the Prairie Ecozone: Mixed Grassland, Moist Mixed Grassland, Aspen Parkland and Cypress Upland (Hammermeister et al. 2001).
[2]Includes: Ramsar Sites, Migratory Bird Sanctuary, National and Provincial Parks, National Wildlife Area, Ecological Reserves, Protected Areas, Wildlife Refuges and Nature Conservancy Lands.
[3]High density native grassland prairie was defined from the habitat associations for grassland bird species that appear in the Prairie Partners In Flight's Draft Priority Species list. In high density native grassland the total native vegetation is greater than 95%, native prairie (grass and shrub) is greater than 80% and grassland (grass) is greater than 60% (M. Schmoll pers. comm. 2001). Alberta's Native Prairie Inventory, which defines percentages of land cover types at the quarter section level, was used to calculate areas of high density native grassland prairie.

protected areas[4] and 18,104 km^2 (68%) overlaps with federal and provincial crown land (M. Schmoll, pers. comm. 2001). Large protected areas of upland grassland in Alberta include: Twin River Heritage Rangeland Natural Area (includes 150 km^2 of upland grassland habitats), Onefour Heritage Rangeland Natural Area (includes 92 km^2 of upland grassland habitats), and the Suffield National Wildlife Area (on CFB Suffield; includes 326 km^2 of upland grassland habitats; A. Landals, pers. comm. 2001). The Suffield National Wildlife Area is considered important for both breeding and post-breeding activities (Dale et al. 1999).

In British Columbia, less than 1% of remaining grasslands have protected status (Pitt and Hooper 1994), although this has increased slightly with the addition of parks in the Kamloops and south Okanagan-Similkameen areas (R. Cannings, pers. comm. 2001). There are approximately 11 grassland areas included within ecological reserves, but several were established to protect features such as saline lakes and include only small amounts of grassland (Pitt and Hooper 1994). In the south Okanagan region, 47% of suitable curlew habitat is on private land, 31% is on Indian Reservations, 16% is on crown land and 6% is in conservation areas (MWLAP 2001). Cannings (1999) estimates that less than 10% of the curlew population nest in areas where there is some form of habitat protection, while the majority nests on private lands (Cannings 1999). Out of 42 pairs nesting in East Kootenay, only nine (21%) were nesting on crown land (Ohanjanian 1992). The Skookumchuk Prairie in East Kootenay supported 21 nesting pairs; it has recently been designated as an Important Bird Area (P. Ohanjanian, pers. comm. 2001).

Therefore, we can estimate that, in Canada, less than five percent of Long-billed Curlews breed on protected land (provincial and national parks, ecological reserves etc.). The majority breed on privately owned or privately managed lands, although in Alberta and Saskatchewan, a significant proportion of the population (probably 10-40%) may nest on crown lands. It is not anticipated that this ownership pattern will change significantly over the next 20 years, although the amounts of protected grassland may increase slightly as a result of conservation efforts such as Saskatchewan's Representative Areas Network and Nature Conservancy of Canada programs.

It should be noted that protected areas are not always managed in a way that benefits Long-billed Curlews. For example, cattle have been excluded from the Junction Wildlife Management Area in the Cariboo-Chilcotin in order to improve habitat for Bighorn Sheep (*Ovis canadensis*; Pitt and Hooper 1994). If grazed, the lower vegetation profile would make the area more favourable for Long-billed Curlews (Ohanjanian 1987).

[4]Includes: Ecological Reserves, National and Provincial Parks, Natural Areas, Wilderness Areas, Wilderness Parks, Wildland Parks, National Wildlife Areas

BIOLOGY

General

Despite its conspicuous nature, the Long-billed Curlew has been the subject of relatively few detailed studies. Allen (1980) provides extensive details on the ecology and behaviour of the species in Washington. In Idaho, a multi-year study looked at curlew breeding density, clutch size, reproductive success, reproductive tactics, adult survival and diet (Redmond and Jenni 1982, Redmond and Jenni 1986).

Reproduction

Females reach reproductive maturity at three to four years and the males at two to three years (Redmond and Jenni 1986). Average longevity is estimated as eight to ten years (Redmond and Jenni 1986), but it may be longer, as suggested by the record longevity of 23 years and 10 months of its congener, the Bristle-thighed Curlew (*Numenius tahitiensis*; Marks 1992 in Ohanjanian 1992).

Only one clutch is laid per breeding season and there is only one record of re-nesting after nest failure (Allen 1980). Four eggs are usually laid, although occasionally nests containing two, three or five eggs have been reported (Sadler and Maher 1976, Redmond and Jenni 1986, Pampush and Anthony 1993, Cannings 1999). Out of four nests in southern Alberta, all contained four eggs (Gratto-Trevor 2001). Records from the British Columbia Nest Records Scheme (n=31) show an average clutch size of 3.5 eggs (Cannings 1999). Incubation is performed by the female during the day and the male at night (Allen 1980). The incubation period ranges from 27 to 30 days (Graul 1971). The precocial chicks hatch synchronously and begin to leave the nest within three hours of hatching (Allen 1980).

Survival

In a three-year study in Idaho, 42% of nests were lost before hatching (Redmond and Jenni 1986). The main predators on curlew nests are Coyote (*Canis latrans*), American Badger (*Taxidea taxus*), Black-billed Magpie (Pica pica), American Crow (*Corvus brachyrhynchos*) and Common Raven (*Corvus corax*; Allen 1980, Redmond and Jenni 1986). Livestock trampling has also been found to destroy curlew nests (Redmond and Jenni 1986, Cochrane and Anderson 1987), as have agricultural activities such as plowing (Shackford 1994) and dragging hayfields to break up cow manure (Cochrane and Anderson 1987).

Several studies document high chick mortality (Fitzner 1978, Allen 1980, Ohanjanian 1985, Redmond and Jenni 1986). In Idaho, the mortality of chicks from hatching to five days old was most often the result of inadequate parental care, starvation or a physical defect (Redmond and Jenni 1986). Predators of curlew chicks include Swainson's Hawk (*Buteo swainsoni*), Ferruginous Hawk (*Buteo regalis*), Black-billed Magpie, Great Horned Owl (*Bubo virginianus*) and weasels (*Mustela spp.*; Allen

1980, Redmond and Jenni 1986). Other causes of chick mortality include heat stress, diseases and collisions with man-made structures and vehicles (Allen 1980, Redmond and Jenni 1986). In Saskatchewan, radio transmitters were fitted on eight chicks that were two to three weeks old. Of these, six chicks survived to fledge, while two were taken by a terrestrial predator (J. Foster-Wilfong, pers. comm. 2001).

Adult mortality rates are unknown. Redmond and Jenni (1986) found that all adult mortality on the breeding grounds (n=9) was attributed to human activities, primarily illegal shooting. There are no records or reports of illegal shooting of curlews in Canada.

Pesticides may impact adult and young Long-billed Curlews. In Oregon, the death of one adult was attributed to lethal residues of chlordane that the bird likely accumulated on its winter range (Blus et al. 1985). The pesticides most likely to affect curlews are carbofuran and related compounds (D. Johnson, pers. comm. 2001). In the prairies, the pyrethroids currently used for grasshopper control are Decis (deltamethrin) and Matador (cyhalothrin-lambda), and both have very low or insignificant impact on birds (D. Johnson, pers. comm. 2001). Their primary impact may be indirect, causing a reduction or removal of the food supply.

Little is known about recruitment rates and productivity. Redmond and Jenni (1986) estimated annual productivity to be 0.5 young per breeding pair in their Idaho study.

Physiology

Reproductive effort by female Long-billed Curlews varied with environmental conditions in Idaho (Redmond 1986). In dry years when the vegetation was short, female curlews foraged almost exclusively on their breeding territory. In a wet year, female curlews traveled further to forage and subsequently laid smaller eggs. It is not known if chicks hatching from smaller eggs are less likely to survive.

Curlew eggs and chicks are sensitive to weather conditions. In a dry year in Idaho, 5% of nestlings died within three hours of hatching and showed signs of incomplete yolk sac retention and adherence of eggshell fragments. This was possibly a result of insufficient humidity caused by drought conditions (Redmond and Jenni 1986).

There is some evidence that chicks occasionally succumb to heat stress, especially in dry years when vegetative cover is limited (Redmond and Jenni 1986).

Movements/dispersal

In Saskatchewan and Alberta, Long-billed Curlews return to their breeding grounds from early to mid April, with most arriving during the third week of April (Renaud 1980, Saunders 2001a). In British Columbia, curlews return from mid March to late April, with major influxes from late March to early April (Cannings et al. 1987, Campbell et al. 1990).

After the chicks hatch, they disperse from their breeding territory. After two to three weeks the female leaves and the male assumes all parental duties until the young become independent at 41 to 45 days (Allen 1980). In British Columbia, post-breeding flocks of five to ten birds begin to assemble and disperse from nesting areas in July and most have left by mid-August, although a few birds remain until late October (Campbell et al. 1990). In Saskatchewan and Alberta, most curlews have left by the end of August (Pinel et al. 1991). In Alberta there are a number of records of large groups of curlews (from 58 – 400) observed feeding together in late June, July and early August (Dickson and Beyersbergen 1998, Dale et al. 1999, Alberta Conservation Association and Alberta Environment 2001, Saunders 2001a).

It is unclear whether non-breeding sub-adult curlews remain on the wintering grounds or migrate to the breeding grounds. Redmond and Jenni (1986) did not observe any yearlings on the breeding grounds and they cite reports of Long-billed Curlews remaining on their winter range throughout the year, suggesting that yearlings and possibly some two year olds do not attempt a northward migration. Allen (1980) observed small flocks of curlews in Washington in the summer that she assumed were sub-adults. Campbell et al. (1990) report small flocks of curlews on breeding areas in British Columbia in May and June, after nesting has begun and suggests that these are likely non-breeding birds. Ohanjanian (1985) reports flocks of pre-breeding birds on Skookumchuck Prairie in southeastern British Columbia. There are no similar observations from Alberta or Saskatchewan (Saunders 2001a; J. Foster-Wilfong, pers. comm.).

In Idaho, Redmond and Jenni (1986) found that male curlews were more likely to return and breed in their natal area than were females and they speculated that females may disperse long distances.

Nutrition and Interspecific Interactions

During the breeding season, Long-billed Curlews feed primarily on carabid beetles and grasshoppers (Redmond and Jenni 1985, Ohanjanian 1992). Curlews are opportunistic feeders and have been observed feeding on earthworms in alfalfa fields (Ohanjanian 1985, Ohanjanian 1992), eggs and chicks of other birds, particularly the horned lark (*Eremophila alpestris*; Sadler and Maher 1976, Goater and Bush 1986), and occasionally amphibians (Timken 1969).

On their wintering grounds, curlews forage in both intertidal habitats and coastal pastures. In the former they feed on bivalves, shrimp, marine worms, crabs and fish (Colwell and Mathis 2001). In coastal pastures, curlews primarily feed on earthworms (Colwell and Mathis 2001).

There is limited documented information about curlew interspecific interactions. Redmond and Jenni (1986) noted an increase in badger predation on curlew eggs in an area of high Townsend ground squirrel (*Spermophilus townsendii*) density. In that area 67% of all curlew nests were destroyed by badgers, compared with the overall mean of 11% for the entire study area.

Territory and Nesting Densities

Long-billed Curlews establish a territory that is used during courtship, egg-laying and incubation (Allen 1980). Once the young have hatched, family groups tend to disperse from these nesting territories and the adults defend an area around the chicks (Allen 1980). Nesting territories tend to be clumped in loose social clusters (Fitzner 1978; J. Foster-Wilfong, pers. comm. 2001). Saunders (2001b) found that curlews were distributed across Alberta in a clustered pattern during the breeding season. There is some evidence that the same nesting territories are used year after year (Allen 1980). In Alberta, a banded female was observed nesting in the same general area in 1998 and 1999, but with a different male (Gratto-Trevor 2001).

Territory size and nesting density appears to vary considerably across the curlew's range. In Washington, territory size ranged from 6 - 20 ha (Allen 1980). Table 1 gives breeding densities from Canadian studies. British Columbia density figures are likely higher than others shown because curlew habitat there is more restricted by forest edge, resulting in greater relative usage of available habitat.

Table 1. Long-billed Curlew Breeding Densities from Canadian Studies.

Province	Region/Habitat	Pairs per km^2	Study
British Columbia	Skookumchuck Prairie, mixture of native grassland and agricultural areas	4.2	Ohanjanian 1985
British Columbia	Cariboo-Chilcotin, primarily native grasslands ranging from heavily grazed to ungrazed by cattle	0.73 – 3.4	Ohanjanian 1987
British Columbia	Cariboo-Chilcotin grasslands	0.2 – 2.1	Hooper and Savard 1991
British Columbia	Cariboo-Chilcotin grasslands	0.7 - 1.1	Hooper and Pitt 1996
British Columbia	Skookumchuck Prairie, mixture of native grassland and agricultural areas	3.3 – 5.0	Ohanjanian 1992
Saskatchewan	Native grasslands	0.14 - 0.16 (from estimate of one pair per 6-7 km^2)	Sadler and Maher 1976
Alberta	Native grasslands	1.6 – 2.7 (from birds detected per 15ha site)	Prescott and Bilyk 1996, Prescott 1997
Alberta	Agricultural land	0.4 – 0.9 (from birds detected per 15ha site)	Prescott and Bilyk 1996, Prescott 1997
Alberta	Native grasslands (natural wetland basins)	0 – 0.3	Gratto-Trevor 2001
Alberta	Strata containing 0-5% native grassland	Mean = 0.1 (range 0 - 0.35)	Saunders 2001b
Alberta	Strata containing 6 – 50% native grassland	Mean = 0.09 \(range 0 – 0.47)	Saunders 2001b
Alberta	Strata containing 51 – 100% native grassland	Mean = 0.18 (range 0 - 0.47)	Saunders 2001b

Adaptability (Reaction to Disturbance)

Although curlews react to human intruders, there is no quantitative information available on the effect of direct human disturbance on breeding success. Incubating females flush from the nest if an intruder comes within two meters, and they may take up to an hour to settle back on the nest after being disturbed (Allen 1980). During hot weather, this may be enough time for the embryos to be killed (Allen 1980).

Curlews seem to be somewhat adaptable in their nesting habitats. In Alberta, curlews are present in some agricultural areas during the breeding season, including areas of intensive agriculture that contain little or no native grasslands (Saunders 2001b). Although curlews are observed in cropland in Saskatchewan, this is usually only where cropland is in the vicinity of native grassland. Curlews do not appear to use areas under intensive cultivation in Saskatchewan (Renaud 1980, J. Foster-Wilfong, pers. comm. 2001). In British Columbia, curlews have moved into agricultural habitats in otherwise unsuitable ecoregions (Cannings 1999) and they are frequently observed using agricultural habitats such as alfalfa fields, grain fields and tame pasture within British Columbia's grassland regions (Ohanjanian 1992, Cannings 1999).

The reaction of Long-billed Curlew populations to extremes of rainfall or drought is largely unknown and likely varies throughout their range. In Saskatchewan, there is speculation that wetter conditions may have led to an increase in curlew numbers in the 1990's (De Smet 1992). In Alberta, it has been suggested that nesting populations near Lost River declined as a result of drought in the late 1980's (De Smet 1992). In Washington, Allen (1980) suggested that drought conditions may reduce curlew breeding success by reducing areas of dense vegetation required for brood-rearing. Conversely, in Idaho, drought conditions were found to create more favourable conditions for curlews during the courtship and incubation phases (Bicak et al. 1982). Redmond and Jenni (1986) found that chick production was greatest during drought years and that chick mortality was highest in a year of heavy spring rains. In an abnormally wet year, productivity was lowest, likely because of the resulting lush vegetation (Redmond and Jenni 1986).

Although range fires during the nesting period would presumably be detrimental, Redmond and Jenni (1986) found that an August range fire improved curlew habitat the following year.

POPULATION SIZES AND TRENDS

The previous COSEWIC report (De Smet 1992) estimated the Canadian population between 4,900 and 7,800 birds. This was based on a prairie estimate of 4,600 to 7,300 birds derived from work conducted in Saskatchewan and extrapolated into Alberta, plus an estimate of 300 to 500 curlews in British Columbia (De Smet 1992).

Morrison et al. (2001) estimated the global population of Long-billed Curlews to be 20,000 birds (range of 15,000 to 20,000 birds) and the Canadian breeding population to number several thousand birds. These estimates are based on fall, winter and spring migration surveys. Estimates derived from extrapolations of BBS data suggest a global population of 168,000, but this is considered unrealistic (Morrison et al. 2001). Morrison et al. (2001) felt that it would be unlikely that major parts of the population would go unrecorded on migration or winter surveys and therefore recommended adopting a conservative population estimate of 20,000 until there is evidence to the contrary. Recent Canadian data (see below) suggest that this is an overly conservative estimate

In Saskatchewan, the Canadian Wildlife Service conducted a survey based on randomly selected townships in 1988 and 1989 (A. Smith, pers. comm. 2001). Because of high variance, it was not possible to calculate an accurate population estimate from this survey, but a rough estimate of a minimum of 2,000 pairs was made (A. Smith, pers. comm. 2001). An attempt to derive an updated population estimate for Saskatchewan is in progress, but it will not be completed until March 2002 (J. Foster-Wilfong, pers. comm. 2001). In general it is thought that the curlew population has remained relatively stable in Saskatchewan over the past 10 years (A. Smith, pers. comm. 2001), although there is some suggestion that curlew numbers may be increasing in some regions (e.g. in the Great Sandhills) and decreasing in other regions (e.g. in the eastern part of the range; W. Harris, pers. comm. 2002).

In Alberta, an inventory of Long-billed Curlews in the Grassland Natural Region was conducted in 2001, employing a random sampling design that was stratified by percentage of native grassland (Saunders 2001b). A total of 110 sample units of 26.5km^2 were surveyed. Sample units were centered along minor roads, although some off-road routes were established in roadless areas. An estimate of 11,942 curlew males (95% confidence interval of 9,560 - 14,323) was derived. If an even sex ratio is assumed, this translates to about 24,000 birds. It is possible that some males were unpaired as young males may return to the breeding grounds a year or two before young females (Redmond and Jenni 1986). If 25% of observed males were unpaired, this would yield an estimate of 20,898 ± 4,180 birds. However, as there is no reason to suspect an intrinsically skewed sex ratio in the total population, although the young females may not have been in Alberta during the inventory, they still exist as part of the overall curlew population.

Overall the Alberta inventory was considered a conservative estimate because: it was conducted from minor roads, some curlews were likely missed during the surveys due to topography and vegetation, and sampling was conducted primarily during the incubation period when birds are less conspicuous (Saunders 2001b). In addition, a few curlews nest in the southern part of the Parkland Natural Region (Semenchuk 1992) and that this area was not part of the 2001 Alberta inventory. Factors that could have caused overestimation included: curlews nesting in higher densities along roads, double counting of birds and including birds that were more distant than the 400m recording band. None of these factors is likely. First, there is no published data suggesting higher curlew densities along roads. Second, it is unlikely that birds were double-

counted because the survey was conducted primarily during the incubation phase and there were no occasions where more than one pair was observed at one survey stop (800m x 800m square). Finally, attempts made to minimize distance estimation errors included: having observers record birds outside of the 400m distance band and rigorous training in distance estimation prior to the surveys (Saunders 2001b). Hence, the estimate provided by Saunders (2001b) is likely accurate, if not conservative.

The large difference between the present and previous estimates of curlew numbers in Alberta might be because the prior estimate did not take into account the curlew population occupying areas of little or no native grassland. Although in Alberta curlews are half as numerous in areas of intensive cultivation, this represents a considerable part of southern Alberta and therefore a significant proportion (54%) of Alberta's curlews (Saunders 2001b).

In British Columbia there have been a number of studies in the past ten years, yielding more detailed information on population numbers. In 2000 and 2001, the British Columbia Conservation Foundation conducted a volunteer-based curlew count. The primary objective of the curlew count is to improve understanding of the regional curlew distribution in British Columbia rather than to estimate the population. Survey routes (ranging from 12 km to 67 km) were run along roads in areas where curlews were known to be. Eighty-two curlews were recorded in 2000 and 72 in 2001 (E. Palmer, pers. comm. 2001). These are clearly underestimates since some areas were covered well (i.e. the Thompson area) while others were not covered at all (i.e. the Cariboo region; B. Hammond, pers. comm. 2001). Additionally, because of windy conditions on the designated count days, it is likely that some curlews were missed (B. Hammond, pers. comm. 2001).

Cannings (1999) estimated a minimum population of 500 birds or 250 breeding pairs in British Columbia. This figure was based on estimates of the number of pairs in key breeding populations: East Kootenay (42 pairs), Creston (at least 4 pairs), South Okanagan-Similkameen (25 pairs), North Okanagan (9 – 61 pairs), Thompson-Nicola (50 pairs), Fraser-Chilcotin-Cariboo (100 pairs) and McBride (25 pairs). Although the estimate of a minimum of 500 birds is larger than the 1992 estimate of 300-500 birds, the increase is more likely a result of improved information rather than a significant increase in the population size.

By summing the existing minimum estimates from Saskatchewan (4,000 birds), Alberta (≥19,000 birds) and British Columbia (500 breeding birds), the Canadian Long-billed Curlew population can be estimated at a minimum of 23,500 mature birds. As maximum estimates are not available for Saskatchewan and British Columbia, it is not possible to estimate the maximum number of breeding birds. The majority of Canadian Long-billed Curlews occur in Alberta (approximately 80% of the Canadian population). This is also evidenced from BBS data. Of the 40 Alberta routes where curlews have been observed, there is an average of 7.40 birds per route (from 1966-2000) compared with 2.54 birds per route in Saskatchewan (n=12) and 1.12 birds per route in British Columbia (n=13; data derived from Sauer et al. 2001).

There is little information available on trends or variability in Long-billed Curlew numbers. In Saskatchewan and Alberta, there is no empirical or anecdotal evidence of an increase or decrease in the population in the past ten years. In British Columbia, some populations appear stable (Thompson-Nicola, Fraser-Chilcotin-Cariboo, Rocky Mountain Trench; Cannings 1999, P. Ohanjanian, pers. comm. 2001), and some show evidence of marked declines (North Okanagan; Cannings 1999).

The North American Breeding Bird Survey (BBS) shows a significant continent-wide decline of -1.7% per year from 1980 to 2000[5] (p=0.09, N=221; Sauer et al. 2001). Because of low numbers of curlews on BBS routes, there are very few significant regional trends. The data suggest that from 1980 to 2000 there has been a decline in the overall Canadian population of -1.5% per year (p=0.42, N=37; Sauer et al. 2001). In individual provinces, the data suggest a decline in Saskatchewan of -7.7% per year (p=0.11, N=6), a decline in Alberta of -2.0% per year, (p=0.32,N=22) and an increase in British Columbia of 2.9% per year, (p=0.6, N=9). Across their range, BBS data suggest that curlews are declining most rapidly in the eastern parts of their range, including Saskatchewan, eastern Montana, eastern Wyoming, South Dakota, Nebraska and Kansas. Moderate declines are occurring in the northern and central parts of their range, including most of southern Alberta, western Saskatchewan, Utah and Nevada. There is an increasing trend in the central and western parts of the species' range, encompassing the extreme southern parts of Alberta and much of British Columbia, as well as western Montana, Washington, Idaho, Western Wyoming and Oregon (Sauer et al. 2001; Figure 4).

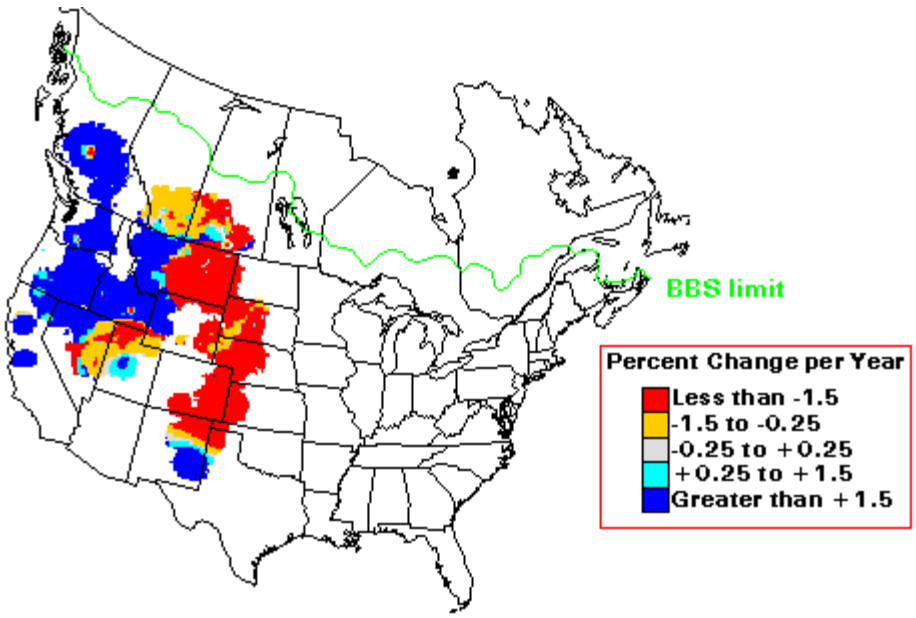

Figure 4. Breeding Bird Survey Trend Map for Long-billed Curlew, 1966-1996 (from Sauer et al. 2001).

[5]20 years is considered three generations (assuming the average age of parents is 6.5 years – note that this is based on limited data).

LIMITING FACTORS AND THREATS

Habitat Loss

Loss of native grasslands in Saskatchewan and Alberta contributed to the past declines in the curlew population (De Smet 1992). Native grasslands continue to be lost to agricultural conversion and urban encroachment. Remaining grasslands are often fragmented and their natural ecological functions disturbed by a variety of factors including industrial activity, livestock overuse, fire control and invasion of exotic plant species (PCAP Committee 1998; Prairie Conservation Forum 2001b; Hammermeister et al. 2001). In Saskatchewan, it is estimated that over 24% of existing native grassland is at medium or high risk of being broken (Hammermeister et al. 2001). There is no estimate of how much grassland habitat is at risk in Alberta. In British Columbia, habitat loss has been significant, primarily in the Thompson and Okanagan Valleys, where vineyards, orchards, ginseng plantations and urban areas are expanding (Cannings 1999).

The invasion of exotic plants further reduces the amount of habitat suitable for curlews. In Saskatchewan, leafy spurge (*Euphorbia esula*) has infested over 9,000 ha of pasture and native prairie in a diagonal belt from North Battleford to Estevan (Saskatchewan Agriculture and Food 2000). In British Columbia, grasslands infested with knapweeds (*Centaurea* spp.) and older plantings of crested wheatgrass are not suitable for curlews because of the tallness of these plants (Ohanjanian 1992). Forest encroachment is resulting in loss of available grassland habitat in some areas of British Columbia, such as the Chilcotin grasslands (Strang and Parminter 1980) and East Kootenay (Ohanjanian 1992). When patches of encroaching forest in East Kootenay were removed, curlew populations increased (Ohanjanian 1992).

Although Long-billed Curlews use agricultural habitats, there is no information available on habitat selection in agricultural areas or what the impact of changes in agricultural practices would have on these birds.

Illegal Shooting

Although hunting led to the original decimation of the Long-billed Curlew population (De Smet 1992), there is no recent evidence of illegal shooting of curlews in Canada. However, considering their conspicuous vocalizations, large size and tendency to mob intruders, curlews present a tempting target. It would seem likely that some curlews may fall victim to recreational shooters, especially in areas where shooting ground squirrels is common practice. In Idaho, Redmond and Jenni (1986) reported three nesting adults that had been shot and six others that were believed to have been shot.

Predation

There is evidence that coyote populations have increased in southern Alberta. Aerial observations of coyotes during winter deer surveys in southwestern Alberta

increased by 2.5 times between 1985 and 1996 (G. Erickson, pers. comm. 2001). In Saskatchewan, the coyote population is considered “high” and there is anecdotal evidence of dramatic increases in the last 10 to 15 years (A. Smith, pers. comm. 2001; W. Harris, pers. comm. 2002). In both prairie provinces, Red Foxes (*Vulpes vulpes)* are common and presumably have some impact on curlew populations (A. Smith, pers. comm. 2001).

In Northern Ireland, a recent range contraction of the Eurasian Curlew (*Numenius arquata*) has been attributed to increased fox populations as a result of declining predator control and changes in landuse (Grant et al. 1999). In Finland, predation on Eurasian Curlew nests was higher in areas of mixed farm and woodlands compared to areas of continuous farmland (Valkama et al. 1999). The presence of trees near curlew nesting areas provides perches for avian predators, likely increasing local probability of predation. This may be an important limiting factor in British Columbia, where nesting territories are in relatively small grassland patches, surrounded by trees. Ohanjanian (1986) suggested that there may have been increased predation at the Skookumchuck prairie nesting sites in southeastern British Columbia because of the proximity of trees.

Agricultural Activities

There is no information on the breeding success of curlews in agricultural areas in Canada. Presumably activities such as ploughing, haying and spreading manure would result in direct losses of nests, eggs and chicks. In Oklahoma, Shackford (1994) found two nests in cultivated fields: one was run over by a vehicle and the other was apparently ploughed under. In Utah, Forsythe (1972) reports a nest destroyed by a farm tractor. Pesticides spraying may also directly or indirectly impact curlews (see “Survival” in the Biology section above), although the pesticides now commonly used for grasshopper control in the prairies do not have significant direct impacts on birds (D. Johnson, pers. comm. 2001). The impact of herbicide application to fallow fields on curlews is unknown, although curlews do appear to favour fallow fields in agricultural areas (A. Smith, pers. comm. 2001; J. Foster-Wilfong, pers. comm. 2001). Moderate to heavy livestock grazing appears to create favourable nesting habitat for curlews, however, grazing during the incubation phase presumably would result in some nest and egg losses from trampling.

Vehicle Mortalities

There are a few records of curlew chicks being hit by vehicles (Allen 1980). As curlew chicks tend to favour areas of taller vegetation, in dry grassland areas they may spend a disproportionate amount of time in roadside ditches, increasing the chances of being hit by vehicles. On several occasions curlew chicks have been observed on minor roads, and sometimes running in front of vehicles (E. Stanley, pers. comm. 2001; W. Harris, pers. comm. 2002; pers. obs.). In many areas of Alberta and Saskatchewan, native grasslands are now riddled with gravel roads and tracks associated with oil and gas wells.

Climate Change

The impact of global climate change on the Long-billed Curlew and on its breeding range is unknown. On their wintering grounds, curlews occupy territories on exposed mud flats, often in intertidal areas. At the Elk River estuary in California, territoriality appears to limit the number of curlews using the intertidal habitats and it is suggested that moderate rises in sea level may reduce the carrying capacity of estuaries where levees preclude the creation of new intertidal habitat (Colwell and Mathis 2001).

SPECIAL SIGNIFICANCE OF THE SPECIES

Taverner (1934) captures the special significance of the Long-billed Curlew when he remarks that it "embodies the spirit of the open range more than does any other bird". As the largest sandpiper in the world, with its distinctive down-curved bill, the Long-billed Curlew is easily observed and recognized by even the most casual of wildlife watchers. The Grasslands Conservation Council of British Columbia uses the image of the Long-billed Curlew in its logo.

EXISTING PROTECTION OR OTHER STATUS

The Long-billed Curlew is protected from hunting and collection in Canada under the Migratory Birds Convention Act of 1994. In Canada, it is currently listed as a species of "special concern" (a species that is particularly sensitive to human activities or natural events). In Manitoba the curlew is listed as "extirpated". Should one or more pairs recolonize in Manitoba, their provincial status would be updated to endangered (E. Wiltse, pers. comm. 2002). In Saskatchewan the Long-billed Curlew has been recommended as "vulnerable" (of special concern because of low or declining numbers due to human activities or natural events) and will likely receive this designation sometime in 2002 (P. James, pers. comm. 2001; E. Wiltse, pers. comm. 2001). The Saskatchewan Conservation Data Centre ranks it S4 (i.e. common, >100 occurrences; generally widespread and abundant but may be rare in parts of its range; apparently secure but may be of long-term concern). In Alberta the curlew is designated as "May be at Risk" (Alberta Environment 2001) and is on the Alberta Natural Heritage Information Centre's "watch list" with a designation of S3 (i.e. 21-100 occurrences, may be rare and local throughout it's range, or in a restricted range, may be abundant in some locations). In British Columbia the curlew is on the provincial blue list, meaning that its status is vulnerable (Cannings 1999).

SUMMARY OF STATUS REPORT

In Canada, the Long-billed Curlew breeds in Saskatchewan, Alberta and British Columbia. Since the early 1900s there have been dramatic reductions in both population size and the species' breeding and wintering range. Curlews have been

extirpated from much of the eastern part of their range, including Manitoba and southeastern Saskatchewan. Long-billed Curlews are relatively long-lived and have a conservative breeding strategy; producing only a few young per year, delaying breeding until three to four years old and experiencing high chick mortality.

Although Long-billed Curlews prefer native grassland habitats, recent evidence suggests that are perhaps more adaptable than originally thought and in some areas, they are making use of agricultural habitats for foraging and breeding. There is no information on their breeding success in agricultural habitats. In all three provinces, Long-billed Curlew habitat is largely unprotected (likely less than 5%) and native grassland continues to be lost to urban development, agricultural expansion, invasive plant species and industrial activities. The rate of habitat loss is currently unknown.

The minimum population estimate for Canada is 23,500 birds, with the majority of these birds (approximately 80%) breeding in Alberta. BBS data suggests that the curlew population is continuing to decline in the eastern parts of its range, including Saskatchewan, but is relatively stable in the western parts of its range.

There are a number of limiting factors including continued habitat loss, increasing predator populations, agricultural and industrial activities. It is possible that climate change may impact wintering habitat in the future.

TECHNICAL SUMMARY

Numenius americanus
Long-billed Curlew — Courlis à long bec
Saskatchewan, Alberta, British Columbia

Extent and Area information	
• *extent of occurrence (EO)(km²)*	About 530,000 km^2
• *specify trend (decline, stable, increasing, unknown)*	Generally stable; though slight increase in central British Columbia
• *are there extreme fluctuations in EO (> 1 order of magnitude)?*	No
• *area of occupancy (AO) (km²)*	About 20,000 km^2
• *specify trend (decline, stable, increasing, unknown)*	Has probably been stable in the recent past, but projected decline
• *are there extreme fluctuations in AO (> 1 order magnitude)?*	No
• *number of extant locations*	n.a.
• *specify trend in # locations (decline, stable, increasing, unknown)*	n.a.
• *are there extreme fluctuations in # locations (>1 order of magnitude)?*	n.a
• *habitat trend: specify declining, stable, increasing or unknown trend in area, extent or quality of habitat*	Native grassland: declining (rate unknown, but likely substantial in the future (e.g., 24% is threatened in Saskatchewan) Suitable agricultural lands: currently stable, but expected decline
Population information	
• *generation time (average age of parents in the population) (indicate years, months, days, etc.)*	6 to 8 years
• *number of mature individuals (capable of reproduction) in the Canadian population (or, specify a range of plausible values)*	23,500 individuals; this might be a conservative estimate
• *total population trend: specify declining, stable, increasing or unknown trend in number of mature individuals*	Unknown, but likely declining in view of habitat losses
• *if decline, % decline over the last/next 10 years or 3 generations, whichever is greater (or specify if for shorter time period)*	Unknown, but likely between 5 and 20% over next 25 years
• *are there extreme fluctuations in number of mature individuals (> 1 order of magnitude)?*	No
• *is the total population severely fragmented (most individuals found within small and relatively isolated (geographically or otherwise) populations between which there is little exchange, i.e., ≤ 1 successful migrant / year)?*	British Columbia – unknown whether range fragmentation reflects population fragmentation Alberta – no Saskatchewan – no
• *list each population and the number of mature individuals in each*	n.a.
• *specify trend in number of populations (decline, stable, increasing, unknown)*	n.a.
• *are there extreme fluctuations in number of populations (>1 order of magnitude)?*	n.a.

Threats (actual or imminent threats to populations or habitats)	
- Habitat loss due to agriculture, industry, urban encroachment, forest encroachment - Agricultural activities (e.g., indirect effect of pesticides on prey populations, direct effects of livestock trampling, ploughing and farm machinery on nests) - Industrial activities (e.g., increasing roads and vehicle mortalities from oil and gas development) - Increasing predator populations (effect and extent is unknown)	
Rescue Effect (immigration from an outside source)	Moderate
• *does species exist elsewhere (in Canada or outside)?*	Yes
• *status of the outside population(s)?*	Suggested moderate declining continent wide
• *is immigration known or possible?*	Possible
• *would immigrants be adapted to survive here?*	Yes
• *is there sufficient habitat for immigrants here?*	Yes, but quantity declining
Quantitative Analysis	Not available

ACKNOWLEDGEMENTS

I would like to thank the Species Co-chairs, Gilles Seutin and Dick Cannings for their input, guidance and detailed review of the draft report. The following people are thanked for providing reports, data and other detailed information; Fred Beek, Bruno Delesalle, Ken De Smet, Ian Dyson, Janna Foster-Wilfong, Dave Fraser, Andy Hammermeister, Blair Hammond, Wayne Harris, Ryan Holmes, Jeff Keith, Archie Landals, Penny Ohanjanian, Erin Palmer, Martin Schmoll, Al Smith, John Surgenor and Earl Wiltse. Thank-you also to the many biologists, naturalists and bird-watchers who provided me with their invaluable records and knowledge.

Funding for this status report provided by the Canadian Wildlife Service, Environment Canada.

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