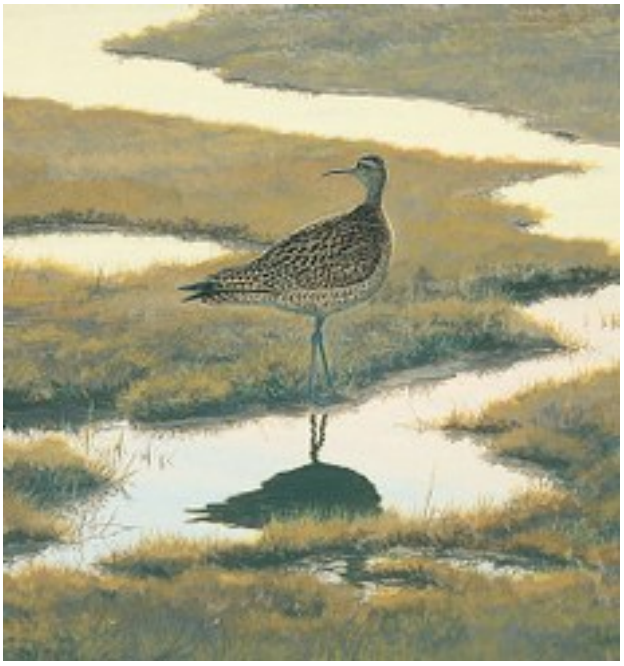
COSEWIC
Assessment and Status Report

on the

Eskimo Curlew
Numenius borealis

in Canada



ENDANGERED
2009

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:

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COSEWIC
Assessment Summary

Assessment Summary – November 2009

Common name
Eskimo Curlew

Scientific name
Numenius borealis

Status
Endangered

Reason for designation
This bird is a species of shorebird with 100% of its known breeding range in Arctic Canada. Formerly abundant, the population collapsed in the late 1800s, primarily owing to uncontrolled market hunting and dramatic losses in the amount and quality of spring stopover habitat (native grasslands). The population has never recovered, and there have been no confirmed breeding records for over 100 years, nor any confirmed records of birds (photographs/specimens) since 1963. As such, less than 50 years have elapsed since the last confirmed record. However, there are some recent sight records that suggest the possibility that a very small population (fewer than 50 mature individuals) may still persist in remote arctic landscapes. The primary factors limiting recovery are the very low population size, no known chance of rescue from outside populations, and the historic and ongoing conversion of native grasslands on its spring staging areas in Canada and the U.S. and on its wintering grounds in Argentina.

Occurrence
Yukon, Northwest Territories, Nunavut, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador

Status history
Designated Endangered in April 1978. Status re-examined and confirmed Endangered in May 2000 and November 2009.

COSEWIC
Executive Summary

Eskimo Curlew
Numenius borealis

Species information

Little is known about the Eskimo Curlew (*Numenius borealis*). Formerly common and perhaps even abundant, it has been a very rare species since the late 19th century. It is now one of the world's most endangered species, if in fact it still survives.

The Eskimo Curlew is a medium-sized, brownish shorebird with a thin, slightly down-curved bill. It can be easily confused with several other shorebird species, especially Whimbrel (*Numenius phaeopus)* and Little Curlew (*Numenius minutus*; a Eurasian species).

Distribution

The current distribution is unknown and there have been only a few unconfirmed sightings (mostly outside the breeding season) over the last four decades in Canada: in the Prairies, the Northwest Territories, and the Maritimes. Historically, nests are known only from two areas of tundra in the Northwest Territories. During fall migration, Eskimo Curlews fly southeastwards, staging primarily in Labrador and Newfoundland, with some found in northern Ontario, Quebec, the Maritimes, and the New England States. Fall migrants then fly non-stop over the Atlantic to South America, wintering principally in the Pampas of Argentina and farther south. The return spring migration follows a completely different mid-continental route, through Texas and the midwestern United States, with some birds staging in the Canadian Prairies.

Habitat

Eskimo Curlews nest in arctic and subarctic tundra in the Northwest Territories. This is a largely treeless area with dwarf shrubs and grassy tundra vegetation, as well as grassy meadows and shoreline habitat. During fall migration, a wide variety of inland and coastal habitats may be used, including ericaceous heathland with Crowberries (*Empetrum nigrum*), meadows, pastures, old fields, intertidal mudflats, salt marshes and sand dunes. In the Pampas of Argentina, where they historically spent the winter, Eskimo Curlews were found in treeless grasslands interspersed with wetlands. On spring migration, they were found in tallgrass and eastern mixed grass prairies, often in areas that had been recently burned or disturbed by grazing bison, and in cultivated fields.

Biology

The Eskimo Curlew is a monogamous, long-lived shorebird. It has delayed maturation and a relatively low reproductive rate. Following spring migration in April and May, it arrives on its arctic breeding areas in late May and early June. As with other curlews, its nest is a simple depression in the ground and usually four eggs are laid between mid- and late June. Eggs hatch from early to mid-July. Like other shorebirds, young are precocial, departing the nest with parents 1-2 days after hatching. Historically, autumn migration began in July and continued to October.

Population sizes and trends

While the precise historic population size is unknown, it is believed that it was in the range of hundreds of thousands of individuals prior to 1870. Accounts of “millions” of birds are now believed exaggerated. Dramatic declines in numbers were observed in the 1870s to 1890s, after which Eskimo Curlews became very rare. No nests have been reported for over 100 years, despite extensive surveys in historical breeding areas.

Although there have been a number of sightings reported in recent decades, mostly during migration, there have been no fully substantiated records since 1963, when a bird was collected in Barbados. While none of the post-1963 records have been authenticated, some seem plausible.

Limiting factors and threats

Limiting factors include conservative life history traits that historically made the Eskimo Curlew vulnerable to anthropogenic landscape change and human persecution. Three main threats are believed, in combination, to have contributed to the near or complete extinction of the Eskimo Curlew: 1) uncontrolled market hunting; 2) declines in native grassland area and quality (e.g., due to fire suppression and overgrazing) and increased grassland fragmentation at stopover and wintering sites; and 3) declines in a major invertebrate food source for spring migrants en route to their breeding grounds.

Special significance of the species

Together with the Passenger Pigeon *Ectopistes migratorious*, the Eskimo Curlew is often used as testimony to the pervasive effects of human alteration of landscapes as well as uncontrolled hunting. Its plight was highlighted to generations of Canadians in Fred Bodsworth's book, 'The Last of the Curlews'. Moreover, the uncertainty surrounding the current status of the Eskimo Curlew population is analogous to that of the Ivory-billed Woodpecker *Campephilus principalis,* and sparks a great deal of human interest.

Existing protection

The Eskimo Curlew is a Critically Endangered species on the IUCN Red List. COSEWIC assessed the Eskimo Curlew as Endandgered in May 2000. In Canada, it is protected as an Endangered species under the federal *Species at Risk Act* and as a migratory bird under the *Migratory Birds Convention Act*. It is also protected by provincial endangered species and/or wildlife acts in all provinces and territories. It is included as an Endangered species in the United States *Endangered Species Act* (1973), protected by law in Buenos Aires Province, Argentina, and is included in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention for the Conservation of Migratory Species of Wild Animals (the Bonn Convention), and the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere.

COSEWIC HISTORY

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. On June 5, 2003, the *Species at Risk Act* (SARA) was proclaimed. SARA establishes COSEWIC as an advisory body ensuring that species will continue to be assessed under a rigorous and independent scientific process.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species, subspecies, varieties, or other designatable units that are considered to be at risk in Canada. Designations are made on native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fishes, arthropods, molluscs, vascular plants, mosses, and lichens.

COSEWIC MEMBERSHIP

COSEWIC comprises members from each provincial and territorial government wildlife agency, four federal entities (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biodiversity Information Partnership, chaired by the Canadian Museum of Nature), three non-government science members and the co-chairs of the species specialist subcommittees and the Aboriginal Traditional Knowledge subcommittee. The Committee meets to consider status reports on candidate species.

DEFINITIONS (2009)

Wildlife Species	A species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years.
Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
Not at Risk (NAR)**	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)***	A category that applies when the available information is insufficient (a) to resolve a species' eligibility for assessment or (b) to permit an assessment of the species' risk of extinction.

* 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. Definition of the (DD) category revised in 2006.

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Canada

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

COSEWIC Status Report

on the

Eskimo Curlew

Numenius borealis

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2009

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SPECIES INFORMATION

Name and classification

Scientific name:	*Numenius borealis* (Latham, 1790)
English name:	Eskimo Curlew
French name:	Courlis esquimau
Inuit names:	Akpingak; Akpingek, -ik, -it (partim) (Labrador), Pi-pi-pi-uk (Alaska), Tura-lura (Point Barrow) from Gollop *et al*. 1986. Inuit names do not likely specifically apply to Eskimo Curlew; the species is likely grouped with Whimbrel and other large shorebirds.
Classification:	Class: Aves, Order Charadriiformes, Family Scolopacidae

The Eskimo Curlew has been considered conspecific with the Little Curlew by some authors (Dement'ev and Gladkov 1951), while others treat the two as closely related allopatric "superspecies" (Mayr and Short 1970; Labutin *et al*. 1982). However, most modern authorities treat them as two distinct species (Johnsgard 1981; American Ornithologists' Union 1983; Cramp and Simmons 1983; Hayman *et al*. 1986; Higgins and Davies 1996; van Gils and Wiersma 1996). There is some suggestion that geographical variation existed in the Eskimo Curlew, perhaps involving two races, based on fresh specimens collected by R.F. MacFarlane (Gollop *et al*. 1986), but this needs to be verified using modern molecular techniques (museum specimens are too few, worn and faded to do this visually).

Morphological description

The Eskimo Curlew is a medium-sized shorebird about 32-37 cm in length (about the same size as a Rock Pigeon *Columba livia*), with a fairly long, slender and slightly down-curved bill. Typical of other curlew species, in breeding plumage the upper parts have sooty black to greyish-brown feathers, with margins and spots of brown buff (Gill *et al*. 1998). The underparts are washed cinnamon to buff cinnamon (especially the under wing lining). The primary wing feathers are dark and unbarred and there is a faint superciliary stripe (above the eye). The iris is brown and bill blackish, with the base of the mandible flesh to pink in colour. The legs are dull slate or dark grey.

Within the curlew tribe (Numeniini), it is most similar to the Little Curlew *Numenius minutus*, which breeds in eastern Siberia, winters in Australasia and is a rare vagrant in North America. The Eskimo Curlew lacks or has an indistinct crown-stripe (which is conspicuous in the Little Curlew), and has uniformly dark primaries (which are barred in the Little Curlew), wing-tips that project well beyond the tip of the tail (whereas they just reach the tip in the Little Curlew), rich cinnamon wing linings (compared to buff in the Little Curlew), a faint superciliary stripe (which is well defined in the Little Curlew), a loral stripe to the anterior of the eye (only to the base of the bill in the Little Curlew). The scutes of the posterior tarsi on the Eskimo Curlew are reticulated (versus transverse in the Little Curlew) and when flying, the toes do not project beyond the tail tip (whereas in the Little Curlew, they do slightly).

The Eskimo Curlew can be confused with recently fledged juvenile or "runt" Whimbrel *Numenius phaeopus*. However, not only is the Whimbrel one-third larger than the Eskimo Curlew, but it also has barred primary wing feathers, well defined crown- and eye-stripes, streakings on the breast and flanks (in contrast to V- and Y-shaped markings on the Eskimo Curlew) and appears greyish overall (Gill *et al*. 1998). The Eskimo Curlew has also been confused by inexperienced observers with other shorebirds such as Upland Sandpiper (*Bartramia longicauda*), Pectoral Sandpiper (*Calidris melanotos*) and Stilt Sandpiper (*Calidris himantopus;* Farrand 1977; Labutin *et al*. 1982; Boswall and Veprintsev 1985; Lehman and Dunn 1985; Gollop *et al*. 1986; Walker and Gregory 1987; Alström and Colston 1991; Higgins and Davies 1996; Gill *et al*. 1998). Local hunters in the breeding range of the Eskimo Curlew group non-game species by general body shape and patterning, so lump a variety of large shorebirds such as Whimbrel, Eskimo Curlew, Hudsonian Godwit (*Limosa haemastica*) and Long-billed Dowitcher (*Limnodromus scolopaceus*) (J. Rausch, pers. comm. 2008). In the Mackenzie Delta, hunters still sometimes report sightings of Eskimo Curlew, but when shown photographs of Whimbrel confirm that this is the species they had seen (J. Rausch, pers. comm. 2008). A comparison of morphological features of the Eskimo Curlew, Little Curlew and Whimbrel is provided in Appendix 1.

In their first autumn and winter, young Eskimo Curlews can be distinguished from adults by the broad margins of narrow spots or bars of pinkish tan, russet, or cinnamon on their back-feathers, scapulars, tertials, and upperwing-coverts. Moreover, the overall ventral surface has fewer dark markings than is present on adults.

Genetic description

No genetic information is available for this species.

Designatable units

This species occupies a single biogeographic region; and there is no known genetic differentiation. Hence, there is only one designatable unit in Canada.

DISTRIBUTION

Global range

Confirmed nesting sites of the Eskimo Curlew have come from only two areas in the Northwest Territories of Canada — at the base of Bathurst Peninsula and near Point Lake (Gratto-Trevor 1999; see Figure 1). By extension it has been assumed that potential breeding habitat occurs between these two points, especially in the so-called barren grounds (Gollop *et al.* 1986; Gratto-Trevor 1999). Breeding is suspected elsewhere but has not been confirmed in Yukon Territory, Nunavut, Alaska and the Chukchi Peninsula, Russia (Gollop and Shier 1978; Gollop *et al*. 1986; Gill *et al*. 1998).

During fall migration, birds flew southeastwards, staging primarily in Labrador and Newfoundland, with some found in northern Ontario, Quebec, the Maritimes, and New England. Fall migrants then flew non-stop over the Atlantic to South America. The return spring migration followed a completely different mid-continental route, through Texas and the midwestern United States, with some birds staging in the Canadian Prairies.

Most winter records are from the eastern Pampas of Argentina, but Eskimo Curlews were also recorded in Uruguay and southcentral Chile, and quite possibly in southern Brazil and Patagonia, and the Falkland Islands (Gollop *et al*. 1986; Gill *et al*. 1998).

There are a few records of vagrants from Greenland, Iceland, and the British Isles (1852-1887), presumably of fall migrants caught in storms (Gollop *et al*. 1986; Canevari and Blanco 1994; Gill *et al*. 1998).

Canadian range

The Eskimo Curlew has been confirmed as breeding only in Canada (see **Global range** above, and Figure 1). Given that there have been no confirmed breeding records reported for over 100 years (Gill *et al.* 1998), it is not possible or appropriate to calculate current Extent of Occurrence or Area of Occupancy.

During migration, the Eskimo Curlew has been recorded in Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador.

HABITAT

Habitat requirements

In the breeding areas, Eskimo Curlews historically occurred in arctic and subarctic tundra in the Northwest Territories (Gollop *et al*. 1986, Gill *et al*. 1998). In the area called the "Barrens," the vegetation is composed of ericaceous heathland, including: 1) largely treeless areas with dwarf shrubs and graminoid tundra; and 2) grassy meadows (Polargrass *Arctagrostis latifolia*, Arctic Bluegrass *Poa arctica*, birch *Betula* spp., sedge *Carex* spp., cottongrass *Eriophorum* spp., and mountain-avens *Dryas* spp.; Gollop *et al*. 1986; Gill *et al*. 1998), such as in the vicinity of Bathurst Peninsula. Other breeding habitats include the "shore" of Point Lake east of Great Bear Lake (Gollop *et al*. 1986).

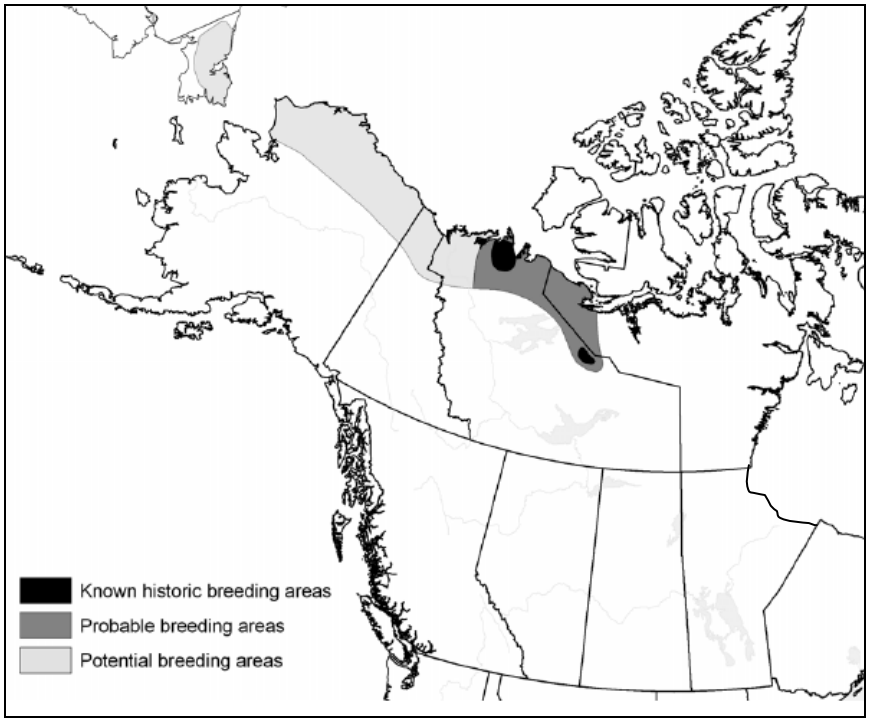

Figure 1. Breeding areas of the Eskimo Curlew (Environment Canada 2007; adapted from Gollop *et al*. 1986 and Gill *et al*. 1998).

On spring and fall migration, a wide variety of habitats was used historically, including both inter-tidal and terrestrial habitats, the latter including anthropogenic landscapes. As on the breeding areas, the Eskimo Curlew commonly used ericaceous heathland on fall migration in southern Quebec, Labrador, Newfoundland and the Maritime Provinces (Gill *et al*. 1998). Apparently, curlews concentrated their fall foraging activities in habitats where Crowberries (*Empetrum nigrum*) grew (Gollop *et al.* 1986).

For the most recent possible sighting in Nova Scotia, Hoffman (2007) described the habitat of a purported Eskimo Curlew in the following way: “The scenery was unforgettable. Granite boulders and rocky patches of wind-polished bedrock mixed with strange elfin plants. Shrubby areas with meter-high gnarly thickets of white spruce and green alder stood guard over mountain cranberry, creeping juniper, strawberry, and eyebright. Sedge and rush species ringed the ponds. Most prominent, however, was a ground-hugging crowberry-bayberry mat, which formed a green carpet among the rocks. The berries of crowberry were once popular with Eskimo Curlews and are referred to even today as curlew berry”.

In Massachusetts, fall migrant Eskimo Curlews were historically found in salt marshes, meadows, pastures, old fields, intertidal flats and sand dunes (see Gollop *et al.* 1986).

On spring migration, Eskimo Curlews traditionally foraged in tallgrass and mixed grass prairies. Recently burned areas and those near water or disturbed by grazing American Bison (*Bison bison*) were preferred (Gollop *et al*. 1986; Gill *et al*. 1998). As these native prairie grasslands were broken up and fragmented, Eskimo Curlews probably relied more and more on cultivated fields, particularly freshly planted cornfields or wheat fields (Gollop *et al*. 1986). In Paraguay, they foraged in dry or wet fields (Gollop and Shier 1978; Gollop *et al*. 1986; Gill *et al*. 1998).

Habitat trends

There are ongoing vegetation changes in the arctic tundra as a result of climate change in response to thawing permafrost and deepening soil active layer depths (Oelke *et al*. 2004); advances in the timing and duration of the growing season (Myneni *et al*. 1997; McDonald *et al*. 2004); and changes in vegetation growth (Nemani *et al*. 2003). However, climate-related habitat trends began occurring well after the initial collapse of the species.

There has been relatively little habitat change in the fall stopover areas on the east coast of Canada, though there have been changes along the coast of the New England states (Bromberg 2009). By contrast, habitat changes at spring migration staging sites in the Great Plains of the United States and Canada, and in wintering areas of South America, have been extensive and well documented (Gollop *et al*. 1986; Bucher and Nores 1988; Gill *et al*. 1998). On northward migration, Eskimo Curlew distribution closely matched that of tallgrass prairie and to a lesser extent, mixed-grass prairie. The main natural disturbance drivers in the original grassland ecosystems were drought, fire and grazing by large ungulates like bison (Gollop *et al*. 1986; Collins and Wallace 1990; Steinauer and Collins 1996). However, European settlement of the Great Plains precipitated major changes in landscape composition and arrested many natural disturbance factors; the intensity and magnitude of these changes were probably never greater than in the early 1870s, coinciding with the beginning of the precipitous decline in Eskimo Curlew numbers.

Major land use changes in the prairies in the mid- to late 19th century probably negatively affected Eskimo Curlews and likely help explain the dramatic declines that were witnessed then. During or shortly after the American Civil War (1861-1865), homestead acts in different states in the U.S. precipitated dramatic increases in human populations from Texas to North Dakota. The increased population of homesteaders, both in the U.S. and Canada, caused large-scale landscape changes.

Large areas of native prairie were ploughed and converted to cropland. By the mid-1990s, only 4% of the original 74 million ha of native tallgrass prairie remained, with much of it being lost during the late 1800s (Gill *et al*. 1998). In the case of eastern mixed grass prairie, which was historically less important to Eskimo Curlews, only 26% of the original 63 million ha remained in the early 1990s (Samson and Knopf 1994).

Loss of native grassland may have also changed the dynamic population cycles of grasshoppers in the prairies, which staging Eskimo Curlews may have been pre-adapted to exploit (Woodward 1980; Gill *et al*. 1998). From an arthropod biodiversity perspective, cultivated fields were impoverished habitats and provided unsuitable substrates for most rangeland grasshopper species to lay their eggs. Thus, conversion of grasslands to croplands also resulted in a decrease of an important food source: grasshopper egg pods and young (Woodward 1980; Gill *et al*. 1998).

Human interference in large-scale ecological processes (changes in natural herbivory and fire regimes) also had drastic repercussions on spring stopover habitat and foraging opportunities for Eskimo Curlews. The near-extinction of a keystone species, the American Bison, had a huge impact on ecological succession in native grasslands, encouraging woody species encroachment and other marked changes in plant species composition. Because of unsustainable market harvest; the mid- to late 1880s saw the local extirpation and range retraction of bison throughout the Eskimo Curlew's spring migration route in North America.

Foraging Eskimo Curlews and other shorebirds (e.g., Long-billed Curlew *Numenius americanus*, Mountain Plover *Charadrius montanus* and American Golden-Plover *Pluvialis dominica*) are attracted to recently burned areas (Knopf and Rupert 1995; Knopf 1996). Declines in the frequency and extent of these burned areas due to fire suppression also likely reduced curlew foraging opportunities in the spring, by changing the quality, number, patch size and spatial arrangement of spring stopover sites.

When Eskimo Curlews were forced to shift from exploiting native grassland areas disturbed by native grazing herbivores and recently burned areas to agricultural fields, they probably relied on spring cultivation for foraging. The widespread conversion from spring to winter wheat, which began around 1870 (Davis 1976), likely had negative effects on food availability for northward-bound Eskimo Curlews and perhaps meant that they could not attain body condition necessary for successful breeding. Moreover, reduction of suitable feeding habitat concentrated migrating birds further into fewer areas, which may in turn have increased ease of spring market hunting (Gill *et al*. 1998).

On the wintering grounds, overgrazing, soil compaction, and fires resulted in tall grasses being replaced by shorter grass species (Bucher and Nores 1988). There is disagreement as to the timing of habitat changes on the wintering grounds in Argentina. Some authors have suggested that habitat changes in the Pampas were considerable only in the very late 1800s to early 1900s, so may not have played a direct role in prompting the Eskimo Curlew population decline (Canevari and Blanco 1994). Nonetheless, such habitat changes would have placed an additional stress at a key time in the species' history. Others report large-scale dramatic habitat modification in Argentina as early as 1831 (Crosby 1986). Considerable areas of grassland remain in Argentina (Canevari and Blanco 1994), but it may not be optimal Eskimo Curlew wintering habitat (grassland type may be important as well as the spatial configuration of patches). Gill *et al*. (1998) suggest that large tracts of the eastern and southern Pampas of Argentina were converted to agriculture in the 1800s and 1900s and that the grassland remaining is severely modified; the least modified habitat remnants occur in "Depresión del Salado", which is also where most historical records of Eskimo Curlew occurred (and is today preferred by American Golden-Plovers).

Habitat protection/ownership

Various designated areas afford protection for the Eskimo Curlew in historic and potential breeding areas in Canada. These include three sites in the Northwest Territories: the Anderson River Delta Migratory Bird Sanctuary; putative breeding habitat in the Kendall Island Bird Sanctuary (Gollop and Shier 1978; Gollop 1988; Gill *et al*. 1998); and Tuktut Nogait National Park. However, in Kendall Island Bird Sanctuary, most shorebird habitat has been affected by overgrazing by geese and by major impacts from oil and gas development (J. Rausch, pers. comm. 2008). Vuntut and Ivvavik National Parks in the Yukon also protect potential breeding habitat.

Some suitable migration habitat is also protected in Canada. This includes, for example, Torngat Mountain National Park Reserve in northern Labrador, and Gros Morne National Park on the west coast of Newfoundland. Newfoundland's Avalon Peninsula has five other protected areas with potential suitable habitat for fall migrants: Cape St. Mary's Ecological Reserve; Avalon Wilderness Area; Mistaken Point Ecological Reserve; Chance Cove Provincial Park; and Baccalieu Island Ecological Reserve.

BIOLOGY

Life cycle and reproduction

Historically, nest densities are believed to have been low, at least in the areas of verified breeding. However, only about 40 nests were ever found so it is not possible to speculate further on this. It is possible that nests were clustered in some areas. For example, the closely related Little Curlew nests in small, loose colonies; each territorial pair is separated by 200-300 m from the neighbouring pair within a colony (Labutin *et al*. 1982; Gill *et al*. 1998).

As far as can be surmised, nests are initiated from mid- to late June, and eggs hatched from early to mid July. As with most other shorebirds, nests are merely depressions in the ground, lined with dead leaves with, in some cases, a “sprinkling of hay” in the centre (Gollop *et al*. 1986). Like other North American shorebirds, the clutch size is believed to be four eggs and young are precocial (i.e., capable of walking and feeding themselves from day of hatch, and leaving the nest with the parents within a day or two of hatch). Eskimo Curlews are monogamous, as are other Numeniini, with incubation shared by both sexes (Gollop and Shier 1978; Gill *et al*. 1998). As is the case of other northern shorebirds, only one brood is probably raised per season. Age of first breeding is unknown but it is likely delayed, possibly to three years of age, as in the Whimbrel (Skeel and Mallory 1996).

Adult survival rates are unknown, but most other Numeniini are long-lived (from 10 to more than 30 years; Cramp and Simmons 1983), so the Eskimo Curlew is probably also long-lived.

Predation

There is little known about predation by non-human predators on the Eskimo Curlew. According to Gollop *et al*. (1986), the most common nest predators of arctic breeding shorebirds are Arctic Fox (*Alopex lagopus)*, jaegers (*Stercocarius* spp.) and Glaucous Gulls (*Larus hyperboreus;* Gollop *et al*. 1986). Other gull species may also have depredated curlew nests. Predation on the Eskimo Curlew by humans is extensively documented (see **Limiting Factors and Threats**).

Physiology

Nothing is known about the physiology of the Eskimo Curlew.

Dispersal/migration

The Eskimo Curlew is a long-distance migrant. Historically, spring migration was primarily April and May; fall migration extended from July to October, with juveniles migrating after most adults (Gollop *et al*. 1986; Gill *et al*. 1998).

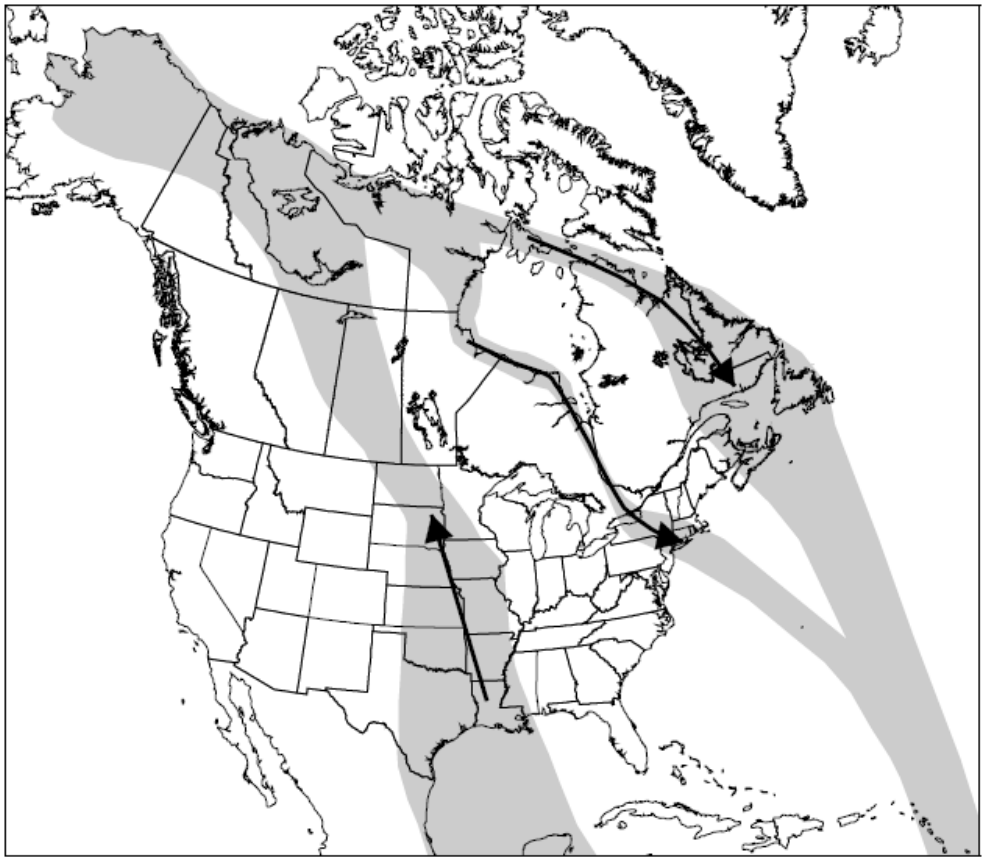

Figure 2. Spring (northward arrow) and fall (south-eastward arrows) migration routes of the Eskimo Curlew over North America (Environment Canada 2007; adapted from Gollop *et al*. 1986 and Gill *et al*. 1998).

Fall migration

From breeding grounds in northwestern Canada, Eskimo Curlews are believed to have migrated east-southeast, with most flying directly to Labrador and Newfoundland, then non-stop over the Atlantic to South America (see Figure 2). They sometimes occurred in numbers in the New England states (especially Massachusetts) if strong northeast winds or storms occurred during fall migratory flights. From northwestern Hudson Bay, some birds stopped in southwestern Hudson and James bays, then flew across the St. Lawrence River to New England. The species was also recorded in fall in Ungava and southern Quebec (especially the Magdalen Islands), New Brunswick, Prince Edward Island, Nova Scotia, Maine, Rhode Island, Connecticut, New Jersey, Maryland, the Carolinas, Michigan, Illinois, Bermuda, Barbados, Caribbean Islands, the Guianas, Brazil, Chile, Paraguay, Uruguay and Argentina.

Spring migration

Spring movements followed a completely different midcontinental track than fall (see Figure 2). Birds may have moved from the Pampas of Argentina up the Pacific coast to Peru or Ecuador across Central America and the Gulf of Mexico (observed in Costa Rica, Guatemala, Mexico) to Texas. Eskimo Curlews were formerly common in spring in tallgrass- and mixed-grass prairie west of the Mississippi River, in Oklahoma, Nebraska, Kansas, eastern South Dakota, southern Louisiana, western Missouri, Illinois, and western Minnesota (references in Gill *et al.* 1998). Most birds overflew North Dakota, southern Manitoba, and northern Alberta, but they may have been common in southern Saskatchewan, at least in some years (Gollop *et al.* 1986; Gill *et al.* 1998). However, there is a surprising lack of documentation of Eskimo Curlews in Saskatchewan; none of the early ornithologists mention the species (S. Houston, pers. comm. 2008).

Interspecific interactions

Little is known of interactions between the Eskimo Curlew and other shorebirds. Because of its larger size, the Whimbrel may be more aggressive than the Eskimo Curlew, and it may oust the species from potential nesting sites (Gill *et al*. 1998). On migration, the Eskimo Curlew foraged in mixed-species shorebird flocks, especially with the American Golden-Plover, but also with Long-billed Curlew and Whimbrel.

Adaptability

While the Eskimo Curlew adapted its foraging habits to some extent by making use of agricultural fields on spring migration (Gill *et al*. 1998), it did not adapt to the loss and fragmentation of native prairie grassland and fire suppression that effectively destroyed its spring stopover habitat. Moreover, if the species required social facilitation to find sporadic food on migration, then numbers would have been so reduced by the late 1800s that systems of social cohesion may have effectively collapsed.

POPULATION SIZES AND TRENDS

Search effort

Since the 1970s, searches of the Eskimo Curlew's historic and potential breeding areas and wintering areas have failed to produce any confirmed records. Despite extensively searching historic breeding areas between 1972 and 1986, and during several years in the 1990s (Gollop *et al*. 1986; Obst in Uriarte 1995; Obst in Gill *et al*. 1998), no Eskimo Curlews were discovered. Between 1972 and 1984, T.W. Barry searched extensively along the route originally used by MacFarlane on his collecting trips during the 1860s. Unlike MacFarlane, Barry found Whimbrels to be common; moreover, he found them in areas where MacFarlane had previously reported Eskimo Curlews (Gollop *et al*. 1986). Likewise, no Eskimo Curlews were found during widespread surveys in historic wintering areas of Argentina and Uruguay in 1992-1993 (Blanco *et al*. 1993).

There have been no recent sightings of Eskimo Curlew or evidence of breeding in any of the former breeding areas or in any of the potential breeding areas (B. Bennett, pers. comm. 2008; S. Cannings, pers. comm. 2008; S. Carriere, pers. comm. 2008; V. Charlwood, pers. comm. 2008; C. Eckert, pers. comm. 2008; R.E. Gill, pers. comm. 2008; T. Jung, pers. comm. 2008; P. Sinclair, pers. comm. 2008). Since 2005, skilled birders have surveyed the Mackenzie Delta intensively and extensively for shorebirds and have yet to report suspected Eskimo Curlews or even strange-looking Whimbrel (J. Rausch, pers. comm. 2008). Moreover, surveys done by the Alaska Department of Fish and Game in 2003 did not reveal any Eskimo Curlews (J. Rausch, pers. comm. 2008).

Abundance

It has been speculated that the Eskimo Curlew was once one of the most abundant shorebirds in the Arctic, but this is unsubstantiated, and likely overstated. Reports of "millions" of Eskimo Curlews and even comparisons with the now extinct Passenger Pigeon (which once numbered in the billions) are believed to be grossly exaggerated (Gill *et al*. 1998). These reports are attributed to the curlew's habit of flocking in large aggregations on migration.

For example, Swenk (1915) noted that, "These flocks reminded the settlers of the flights of passenger pigeons and the curlews were given the name of 'prairie pigeons.' They contained thousands of individuals and would often form dense masses of birds extending for a quarter to a half mile in length and a hundred yards or more in width. When the flock would alight the birds would cover 40 or 50 acres of ground."

The limited breeding range of the Eskimo Curlew, its presumed low nesting densities and confusion with similar shorebirds (e.g., Whimbrel, Hudsonian Godwit and Long-billed Dowitcher) suggest that the Eskimo Curlew population at the time of European settlement was likely in the range of a few hundreds of thousands of individuals at best (Gill *et al.* 1998).

Fluctuations and trends

Within the short span of about 20 years (1870-1890), the Eskimo Curlew almost completely disappeared. While documentation of the decline is largely anecdotal, and specific dates vary for the start of decreases, all of them encompass a period between the 1870s and 1890s (Banks 1977; Gollop 1988; Gill *et al*. 1998). No authenticated nests or young of Eskimo Curlews have been found for well over 100 years; the last confirmed nest was in 1866 (Gill *et al.* 1998).

The declines were first apparent during migration, especially during spring. For example, numbers passing through southern Texas declined after 1875, after the late 1870s in Kansas, and in the early 1880s in Nebraska and Labrador (references in Gill *et al*. 1998). Declines in the mid-western United States were followed about a decade later by declines during fall migration in Labrador (references in Gill *et al*. 1998). In the first half of the 20th century, the species was exceptionally rare, with no sightings in Texas, infrequent reports from the prairies and only 6-7 sightings/records from South America. The last specimen obtained was shot in Barbados in 1963 (Bond 1965).

Shorebirds are a notoriously difficult group of species to identify in the field. Because the Eskimo Curlew is easily confused with some other shorebird species, most sightings, even by those familiar with the species, are contentious and almost impossible to prove without photographic evidence and detailed field notes.

Eskimo Curlews are most likely to be confused with Whimbrel and Little Curlew (see **Description**). Reports of curlews with short-bills during fall may be explained by the fact that Whimbrel chicks fledge before bill growth is complete (Gollop 1988). Moreover, because injuries prior to completion of bill growth can shorten bill length of adult Whimbrels, it is important to compare the relative body size of any “short-billed” curlews to other shorebird species (Gratto-Trevor 1999; C. Gratto-Trevor, unpublished data).

Since 1900, there have been scattered reports of Eskimo Curlews, primarily during migration. Table 1 shows sightings since the last confirmed observation (a specimen record) in 1963. For a list of sightings before 1963, see Gollop and Shier (1978) or Gollop *et al*. (1986). While intriguing, none of the post-1963 records have been convincingly substantiated and all must be regarded as hypothetical.

Eleven of the post-1963 records are of possible sightings on historic and putative breeding areas (four from the Anderson River, NWT). Only two possible sightings since 1975 involved purported breeding birds: 1) a nest in the southern district of Keewatin on 7 July 1992, and 2) a bird with one young in the Arctic National Wildlife Refuge, Alaska on 1 August 1983. In the first case, an assessment of the nest photograph suggested that it was actually that of a Whimbrel (Obst and Spaulding 1994). Moreover, when suitable habitat in the vicinity of the Keewatin nest was searched extensively during the breeding season later in 1994, only Whimbrels were found. In the second case, no Eskimo Curlews were found in the summer following the Alaskan sighting, and the observers later suggested that the birds seen the previous year were actually Upland Sandpipers, which were common breeders in the area (Gill and Amaral 1984). In neither case was the original observer familiar with North American shorebirds (Gratto-Trevor 1999).

Likewise, none of the post-1963 sightings outside the breeding areas, while intriguing, have been substantiated by specimen or photographic evidence. Since 1963, 13 possible sightings of Eskimo Curlews have been recorded in the fall, with a spate of them in the 1970s in Ontario and Massachusetts (Table 1). The most recent possible observations on fall migration were in 2002 (one in Massachusetts, the other in Nova Scotia) and 2006 (Nova Scotia). These three sightings have been disputed for a variety of reasons, including lack of photographic or any other corroborating evidence. The 2002 Massachussetts observation was reported by an experienced birder but was challenged (Rines 2003). The 2006 record was documented by a reputable biologist (Hoffman 2007), but the evidence was likewise later disputed (Hagner 2007).

There is a total of 11 unconfirmed sightings during spring migration since 1963. (Table 1). Most notable is the report of 23 birds in Texas in 1981 (Blankinship and King 1984), which led to considerable excitement that the Eskimo Curlew was still extant. Though compelling, this record was not accepted by the state bird records committee.

It is conceivable that the Eskimo Curlew still persists in very small numbers. Based on best guesses, it has been suggested that the population numbers less than 50 individuals (Donaldson *et al*. 2000). As noted earlier, the last authenticated record was made in 1963. COSEWIC guidelines for the determination of Extirpated and Extinct species in Canada have a 50-year threshold since the last credible record was made. While this threshold is impending (circa 2013), it has not yet been crossed.

Rescue effect

The Eskimo Curlew has been confirmed nesting only in Canada. While it possibly nested in Alaska, no authenticated nests have been reported from there. Even if the bird is extant somewhere outside Canada, the population must be so low that the possibility of rescue is highly remote.

Table 1. Possible sightings of the Eskimo Curlew since 1963, when the last confirmed identification was made, to the present (spring 2009).

Date		Location	No.	Observers	Reference
Historic and putative breeding areas					
18 May	1964	Anderson River Forks, NWT	1	R. W. Frye and W. Simon	Gollop *et al*. 1986
28 May	1964	Fox Den Island, Anderson River Delta, NWT	1	T. W. Barry	Gollop *et al*. 1986
12 June	1964	Observation Monument, upstream from mouth of Anderson River, NWT	1	T. W. Barry	Gollop *et al*. 1986
6 July	1964	Husky Bend, Upstream from mouth of Anderson River, NWT	1	T. W. Barry	Gollop *et al*. 1986
8 August	1976	Lac Rendez-vous, NWT	1	T. W. Barry	Gollop *et al*. 1986
8 June	1980	Grassy (Kettle-hole) Point, Anderson River Delta, NWT	1	T. W. Barry and S. J. Barry	Gollop *et al*. 1986
15 August	1982	Atkinson Pt., Tuktoyaktuk Pen., NWT	1	D. L. Dickson	Gollop *et al*. 1986
1 August	1983	Arctic National Wildlife Refuge, Alaska	2	H. Behmann	Gill and Amaral 1984
10 July	1985	Kendall Island, Mackenzie Delta, NWT	6	M. Whitt and T. Blake	Gollop *et al*. 1986
24 May	1987	Lac Rendez-vous, NWT	2	B. Jacobsen	Gollop 1988
7 July	1992	Southern district Keewatin, NWT	1	K. Reading	Obst and Spaulding 1994
Summer	2004	Akimiski Island, NU	1	K. Abraham*	K. Abraham, pers. comm. 2009
Fall migration					
Fall	1968	Missisicabi River, Ontario	3	G. Faries pers. comm. to P. Prevett	Gollop *et al*. 1986
Fall	1974	Coastal Hudson Bay, Ontario	1	P. Prevett pers. comm. to Gollop et al. 1986	Gollop *et al*. 1986
Fall	1970	Shagamu River, Ontario	1	M. Hunter pers. comm. to H. Lumsden	Gollop *et al*. 1986
Fall	1970	Plymouth Beach, Massachussetts	1		Finch 1971
Fall	1972	Missisicabi River, Ontario	1	G. Faries pers. comm. to P. Prevett	Gollop *et al*. 1986
6 and 7 August	1972	Martha's Vineyard, Massachussetts	2		Daniels 1972
15 August	1976	North Point, James Bay, Ontario	2	A. Hagar & K. Anderson	Hagar and Anderson 1977
19 November	1977	Likin, Guatemala	1	K. Zedekar, P. Thompson & F. Thompson	Zedekar *et al*. 1980
24 August	1992	Forsythe National Wildlife Refuge, New Jersey	1	M. Hyett	Hyett 1992
Fall	1995	Labrador	10		Obst 1996
5 September	2002	Martha's Vineyard, Massachussetts	1	D. Edgarstown	Laux 2002; Rines 2003
26 September	2002	Beach Meadows, Nova Scotia	2	G.E. Lowe	Lowe 2006
24 September	2006	Peggy's Cove, Nova Scotia	1	R. Hoffman	Hoffman 2007
Historic wintering areas					
October	1990	Laguna Mar Chiquita, Cordoba, Argentina	4	P.L. Michelutti	Michelutti 1991

Date		Location	No.	Observers	Reference
Spring migration					
Spring	1964	Galveston Island, Texas	2		Webster 1964
Spring	1968	Texas	1		Lieftinck 1968
30 April	1968	Rockport, Texas	1		Blankinship and King 1984
Spring	1972	Padre Island, Texas	1		Lahrman 1972
Spring	1973	Pea Island National Wildlife Refuge, North Carolina	1		Sonneborn 1974
21 May	1980	St. Ambroise, Manitoba	1	D. Hatch	Gollop 1980
7 May	1981	Galveston Bay, Texas	23	D. Blankinship & K. King	Blankinship and King 1984
14 May	1982	Monica Slough, near Regina, Saskatchewan	1	R. Kreba	Wedgwood 1982
16 April	1987	Hall County, Nebraska	1	C.A. Faanes	Faanes 1990
17 April	1987	Sabine Pass, Texas-Louisiana border	1	J. Arvin	Gollop 1988
2 May	1987	Aransas Natl. Wildlife Refuge, Texas	3	W. & M. McAlister	Gollop 1988
15 May	1996	Killarney, Manitoba	3	G. & L. Powell	Waldon 1996; Gollop 1997
20 May	1996	Kipling, Saskatchewan	1	J. Pollock & B. Metzler	Pollock 1996; Gollop 1997

*Identification was not verified, and it may have been a Whimbrel (K. Abraham, pers. comm.)

LIMITING FACTORS AND THREATS

Limiting factors include conservative life-history traits that made the Eskimo Curlew vulnerable to anthropogenic landscape change and human persecution. These include delayed maturation, low reproductive potential, a dependency on a few restricted habitat types over the course of its annual cycle, and what may have been dependence on a few abundant invertebrate species at spring staging areas.

The Eskimo Curlew was considered a delicacy (Carroll 1910). So, its social habit of aggregating in large, dense flocks during migration made it a popular commercial target for 19th century market hunters. Moreover, its habit of circling back within gun range of market hunters, when flock members were shot, made it particularly susceptible to over-exploitation.

There are three main factors that are believed to have contributed to the decline of the Eskimo Curlew: 1) uncontrolled market hunting in the 19th century; 2) habitat loss and fragmentation, and human interference with ecological processes (particularly fire, and replacement of native herbivores, such as bison, with cattle) at stopover sites; and 3) changes in invertebrate food supply (especially grasshoppers) at spring stopover sites. It is quite possible that anthropogenic changes in winter habitat may also have been an additional factor.

There has been some debate about the relative importance of these different threats, though it is likely that their effects were cumulative. It has been widely assumed that uncontrolled market hunting was the primary factor responsible for declines (Swenk 1915; Bent 1929; Young 1953; Gollop and Shier 1978; Gollop 1988; Gratto-Trevor 2001). However, other large shorebirds (e.g., Hudsonian Godwit, Long-billed Dowitcher, plover spp.) were also hunted extensively, but did not decline to the extent that the Eskimo Curlew did, perhaps because they were more widespread and had different life-history strategies.

Moreover, there is evidence for some declines in Eskimo Curlew populations prior to market hunting (Banks 1977). Retrospective investigations of decline in the Passenger Pigeon have suggested that market hunting alone was probably not the only factor in its demise, despite the huge numbers killed (e.g., Bucher 1992; Kirk 1994). Like the Passenger Pigeon, the Eskimo Curlew aggregated in large flocks during spring migration to exploit temporally variable, sporadic, patchy food sources. It is possible that, like the Passenger Pigeon, the Eskimo Curlew relied on social facilitation to find food.

Just as berries were likely a critical food source for the Eskimo Curlew on fall migration, allowing it to accumulate fat stores for its non-stop migration over the Atlantic to South America, grasshoppers and other invertebrates may have been vital for attaining spring body condition prior to breeding. During spring migration, the Eskimo Curlew's most dependable invertebrate food sources at stopover areas in North America historically occurred in extensive areas of prairie grassland. As noted above, through the 1800s and later, North American homesteaders were responsible for massive disturbance of native grasslands. Their activities may have led to important impairments in the curlew's social ability to locate sufficient insect prey (Woodward 1980). While the most serious population declines of Eskimo Curlews pre-date the use of chemical control for grasshoppers and other insects, the use of modern-day insecticides could also be viewed as a current limiting factor.

Market hunters accounted for the shooting of huge numbers of curlews on spring migration through the Great Plains of the United States and the Canadian Prairies; hunting intensity may have increased in the late 1870s and 1880s coinciding with the commercial collapse of the Passenger Pigeon hunt (Gill *et al*. 1998). Thousands of Eskimo Curlews were also shot on fall migration in Labrador and, when stormy weather forced birds to land, in New England. Relatively few are believed to have been exploited on the wintering grounds (Canevari and Blanco 1994), but the extent of the hunt there is almost wholly undocumented.

Even slight changes in adult survivorship in a shorebird species such as the Eskimo Curlew can have a large effect on population stability (an effect that would be greater than large decreases in productivity; see Hitchcock and Gratto-Trevor 1997 for Semipalmated Sandpiper). This is because Eskimo Curlews are relatively long-lived. Given that the Eskimo Curlew population was probably much smaller than originally believed (numbering in the hundreds of thousands rather than millions), it is not hard to see why commercial "harvesting" of thousands of pre-breeding adult birds per year could quickly result in a population crash, especially when combined with decreases in the supply of critical stopover habitats.

SPECIAL SIGNIFICANCE OF THE SPECIES

Together with the Passenger Pigeon, the Eskimo Curlew is often used as testimony to the pervasive effects of human alteration of landscapes as well as uncontrolled hunting for commercial purposes. A species seemingly so abundant that it could not possibly go extinct, the Eskimo Curlew's plight and conservation message were highlighted to generations of Canadians in the book, 'The Last of the Curlews' (Bodsworth 1954). The uncertainty surrounding the current status of the Eskimo Curlew population is now analogous to that of the Ivory-billed Woodpecker *Campephilus principalis* and epitomizes human interest in defining the precise timing of extinction events, balanced against the hope that these species remain extant.

EXISTING PROTECTION OR OTHER STATUS DESIGNATIONS

The Eskimo Curlew is a Critically Endangered species on the IUCN Red List. It was assessed as Endangered in Canada by COSEWIC in May 2000. It is listed as Schedule 1 - Endangered (and therefore protected) under the Canadian federal *Species at Risk Act* (SARA 2002). The species is protected by wildlife acts in all provinces and territories in Canada. It is also listed in provincial legislation, such as Ontario's *Endangered Species Act, 2007*. Newfoundland and Labrador's *Endangered Species Act* lists it as a Schedule A Endangered species. The Eskimo Curlew is included as an Endangered species in the United States *Endangered Species Act* (1973). This species and all other shorebirds have been protected by law in Buenos Aires Province, Argentina since 1927.

In Newfoundland and Labrador, Prince Edward Island, Ontario, and Saskatchewan the Eskimo Curlew is ranked as SHN, which is a historical ranking for species that previously occurred but may have been overlooked during the past 20-70 years. In Nova Scotia and New Brunswick, it is listed as SXN (extirpated or extinct). The species is not tracked in Quebec.

As a migratory bird, the Eskimo Curlew has been protected under the *Migratory Birds Convention Act* in Canada since 1917. It is also protected under the Migratory Birds Treaty signed by Canada and the United States in 1916, and by the Convention for the Protection of Migratory Birds and Game Mammals signed by the United States and Mexico in 1936. The species is included in various conventions, among them the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, Appendix 1), and the Convention for the Conservation of Migratory Species of Wild Animals (the Bonn Convention). In non-breeding areas, it is protected by the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (1940).

TECHNICAL SUMMARY

Numenius borealis
Eskimo Curlew Courlis esquimau
Range of Occurrence in Canada: Nesting restricted to Northwest Territories (and potentially Nunavut and Yukon); recorded as a migrant in Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador.

Demographic Information

Generation time (usually average age of parents in the population; indicate if another method of estimating generation time indicated in the IUCN guidelines(2008) is being used)	Unknown
Is there an [observed, inferred, or projected] continuing decline in number of mature individuals?	Unknown
Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations]	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over the last [10 years, or 3 generations].	Unknown
[Projected or suspected] percent [reduction or increase] in total number of mature individuals over the next [10 years, or 3 generations].	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over any [10 years, or 3 generations] period, over a time period including both the past and the future.	Unknown
Are the causes of the decline clearly reversible and understood and ceased?	No (though causes are understood)
Are there extreme fluctuations in number of mature individuals?	No

Extent and Occupancy Information

Estimated extent of occurrence	Unknown (no proven occurrences in past 10 yr or 3 generations)
Index of area of occupancy (IAO)	Unknown
Is the total population severely fragmented?	Unknown
Number of “locations∗”	Unknown
Is there an [observed, inferred, or projected] continuing decline in extent of occurrence?	Unknown
Is there an [observed, inferred, or projected] continuing decline in index of area of occupancy?	Unknown
Is there an [observed, inferred, or projected] continuing decline in number of populations?	Unknown
Is there an [observed, inferred, or projected] continuing decline in number of locations?	Unknown
Is there an [observed, inferred, or projected] continuing decline in [area, extent and/or quality] of habitat?	Area and quality of habitat in stopover areas has declined, as has wintering habitat; however, there is abundant breeding habitat
Are there extreme fluctuations in number of populations?	No
Are there extreme fluctuations in number of locations?	No

Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

Number of Mature Individuals (in each population)

Population	N Mature Individuals
Canada	0-50
Total	0-50

Quantitative Analysis

Probability of extinction in the wild is at least [20% within 20 years or 5 generations, or 10% within 100 years].	Not done

Threats (actual or imminent, to populations or habitats)

Spring stopover and wintering habitat (native grasslands) have been greatly reduced and fragmented. Oil and gas exploration and mining threaten some potential breeding areas. Climate change and the projected loss of low Arctic tundra to shrubs and, ultimately, forest will impact breeding habitat. The largest limiting factor is the very small population size.

Rescue Effect (immigration from outside Canada)

Status of outside population(s)? USA: None known	
Is immigration known or possible?	No
Would immigrants be adapted to survive in Canada?	Not applicable
Is there sufficient habitat for immigrants in Canada?	Yes
Is rescue from outside populations likely?	No; there are no known outside populations

Current Status

COSEWIC: Endangered (November 2009)

Status and Reasons for Designation

Status:	**Alpha-numeric code:**
Endangered	D1

Reasons for designation:

This bird is a species of shorebird with 100% of its known breeding range in Arctic Canada. Formerly abundant, the population collapsed in the late 1800s, primarily owing to uncontrolled market hunting and dramatic losses in the amount and quality of spring stopover habitat (native grasslands). The population has never recovered, and there have been no confirmed breeding records for over 100 years, nor any confirmed records of birds (photographs/specimens) since 1963. As such, less than 50 years have elapsed since the last confirmed record. However, there are some recent sight records that suggest the possibility that a very small population (fewer than 50 mature individuals) may still persist in remote arctic landscapes. The primary factors limiting recovery are the very low population size, no known chance of rescue from outside populations, and the historic and ongoing conversion of native grasslands on its spring staging areas in Canada and the U.S. and on its wintering grounds in Argentina.

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Not applicable (population trend over the last 3 generations is unknown).
Criterion B (Small Distribution Range and Decline or Fluctuation): Not applicable (current distribution is unknown).
Criterion C (Small and Declining Number of Mature Individuals): Not applicable (population trend over the past 3 generations is unknown).
Criterion D (Very Small or Restricted Total Population): Meets Endangered D1 (<250 mature individuals).
Criterion E (Quantitative Analysis): Not done.

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BIOGRAPHICAL SUMMARY OF REPORT WRITERS

Born in the United Kingdom, Dr. David Anthony Kirk has been working for more than 20 years with the federal (Environment Canada and Parks Canada Agency) and provincial governments of Canada as well as non-government organizations (e.g., Bird Studies Canada, World Wildlife Fund and the Yellowstone to Yukon Conservation Initiative). He has a wide range of ecological and land use experience in different ecosystems from tropical to boreal. His company (*Aquila* Conservation & Environment Consulting) specializes in the use of multi-species and single species distribution models for use in conservation planning (integrating human resource use and biodiversity conservation), as well as literature reviews and objective analysis of a variety of human disturbance influences on biodiversity in anthropogenic landscapes. David is particularly interested in the spatial mapping of biodiversity and using this as an empirical basis for conservation planning; he also works extensively on the status, recovery and management of species at risk. He has written or co-authored 19 COSEWIC status reports and updates, as well as 8 recovery plans, 2 action plans and a management plan for species at risk. *Aquila*'s emphasis is on peer-reviewed scientific articles in ecological and conservation journals as a forum for changing policy and management practices and David has co-authored 27 papers in peer-reviewed scientific journals in the last 16 years (www.aquilaecology.com).

Dr. Jennie L. Pearce was born in Australia and immigrated to Canada in 1999. In both countries her research has focused on spatial modelling of the distribution and abundance of biodiversity; her Ph.D was on the endangered Helmeted Honeyeater *Lichenostomus melanops cassidix*. She is particularly interested in testing the accuracy of spatial models and how these can be used for solving landscape management concerns, such as conservation of endangered species, managing forests in an ecologically sustainable framework and allocating resource extraction industries over landscapes. She is also interested in the use of bio-indicators for sustainable forest management, particularly for birds, large and small mammals, amphibians, carabid beetle and spider communities. She has published more than 35 scientific papers in this area, as well as participated in numerous workshops and conference proceedings.

Together, David and Jennie have co-authored three previous COSEWIC reports as well as a paper on priority areas for birds in the Yellowstone to Yukon Region.

COLLECTIONS EXAMINED

No collections were examined during the preparation of this report. Information on specimens of Eskimo Curlews can be found at http://www.texasbirds.org/tbrc/eskimo2.html

Appendix 1. Identification features separating Eskimo Curlew, Little Curlew and Whimbrel (based upon Farrand 1977; Boswell and Veprintsev 1985; Gollop *et al.* 1986; Skeel and Mallory 1996; Gill *et al.* 1998).

Feature	Eskimo Curlew	Little Curlew	Whimbrel
Primaries	uniformly dark (unbarred)	barred	barred
Wing linings	pale to rich cinnamon	buff	greyish/rufescent
Wing tips and tail	wing-tips project well beyond tip of tail	wing-tips just reach tip of tail	wing-tips to tail
Toes and tail	toes do not project beyond tip of tail in flight	toes project slightly beyond tip of tail in flight	
Crown stripe	lacking or indistinct	thin, pale (white, buff), conspicuous	light brown (white?)
Eye stripe	faint	distinct	distinct
Loral stripe	to anterior of eye	to base of bill	
Belly	rusty-yellow belly	almost white belly	belly buff-white
Markings	V and Y shaped markings on breast and flanks	finely streaked face and neck, chevrons few, on flanks only	streaked breast and flanks
Plumage	warm brown	warm brown	greyish appearance overall
Base of lower mandible	flesh-coloured/pink for less than half its length	flesh-coloured/pink for more than half its length	flesh-coloured
Bill	slender, slightly down-curved bill	slender, slightly down-curved bill	juvenile bill length similar to others; longer, heavier, down-curved bill in adults
Leg colour	dark green, dark brown, dark grey-blue	light grey, blue-grey	light grey, bluish, blackish-grey
Posterior leg scutes	reticulated	transverse	hexagonal, reticulated
Relative size	2/3 size Whimbrel	2/3 size Whimbrel	1/3 larger than others
Size	270-454 g	119-274 g	489-570 g
Stretched length	30-38 cm		38-48 cm
Tarsus	40-46 mm	46-54 mm	50-63 mm
Bill	42-65 mm	34-48 mm	66-99 mm
Bill:head ratio	1.25:1; 1.75:1	1.5:1	1.5:1