Species at Risk Act
Recovery Strategy Series

Recovery Strategy for the Chestnut-collared Longspur (*Calcarius ornatus*) in Canada

Chestnut-collared Longspur

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For copies of the recovery strategy, or for additional information on species at risk, including the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Status Reports, residence descriptions, action plans, and other related recovery documents, please visit the Species at Risk (SAR) Public Registry[1].

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[1] http://sararegistry.gc.ca/default.asp?lang=En&n=24F7211B-1

Preface

The federal, provincial, and territorial government signatories under the Accord for the Protection of Species at Risk (1996)[2] agreed to establish complementary legislation and programs that provide for effective protection of species at risk throughout Canada. Under the *Species at Risk Act* (S.C. 2002, c.29) (SARA), the federal competent ministers are responsible for the preparation of recovery strategies for listed Extirpated, Endangered, and Threatened species and are required to report on progress within five years after the publication of the final document on the SAR Public Registry.

The Minister of Environment and Climate Change and Minister responsible for Parks Canada Agency is the competent minister under SARA for the Chestnut-collared Longspur and has prepared this strategy, as per section 37 of SARA. To the extent possible, it has been prepared in cooperation with the Government of Alberta, as per section 39(1) of SARA.

Success in the recovery of this species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions set out in this strategy and will not be achieved by Environment and Climate Change Canada and Parks Canada Agency, or any other jurisdiction alone. All Canadians are invited to join in supporting and implementing this strategy for the benefit of the Chestnut-collared Longspur and Canadian society as a whole.

This recovery strategy will be followed by one or more action plans that will provide information on recovery measures to be taken by Environment and Climate Change Canada and/or Parks Canada Agency and other jurisdictions and/or organizations involved in the conservation of the species. Implementation of this strategy is subject to appropriations, priorities, and budgetary constraints of the participating jurisdictions and organizations.

The recovery strategy sets the strategic direction to arrest or reverse the decline of the species, including identification of critical habitat to the extent possible. It provides all Canadians with information to help take action on species conservation. When critical habitat is identified, either in a recovery strategy or an action plan, SARA requires that critical habitat then be protected.

In the case of critical habitat identified for terrestrial species including migratory birds SARA requires that critical habitat identified in a federally protected area[3] be described in the *Canada Gazette* within 90 days after the recovery strategy or action plan that identified the critical habitat is included in the public registry. A prohibition against

[2] http://registrelep-sararegistry.gc.ca/default.asp?lang=en&n=6B319869-1#2

[3] These federally protected areas are: a national park of Canada named and described in Schedule 1 to the *Canada National Parks Act*, The Rouge National Park established by the *Rouge National Urban Park Act*, a marine protected area under the *Oceans Act*, a migratory bird sanctuary under the *Migratory Birds Convention Act, 1994* or a national wildlife area under the *Canada Wildlife Act* see ss. 58(2) of SARA.

destruction of critical habitat under ss. 58(1) will apply 90 days after the description of the critical habitat is published in the *Canada Gazette*.

For critical habitat located on other federal lands, the competent minister must either make a statement on existing legal protection or make an order so that the prohibition against destruction of critical habitat applies.

If the critical habitat for a migratory bird is not within a federal protected area and is not on federal land, within the exclusive economic zone or on the continental shelf of Canada, the prohibition against destruction can only apply to those portions of the critical habitat that are habitat to which the *Migratory Birds Convention Act, 1994* applies as per SARA ss. 58(5.1) and ss. 58(5.2).

For any part of critical habitat located on non-federal lands, if the competent minister forms the opinion that any portion of critical habitat is not protected by provisions in or measures under SARA or other Acts of Parliament, or the laws of the province or territory, SARA requires that the Minister recommend that the Governor in Council make an order to prohibit destruction of critical habitat. The discretion to protect critical habitat on non-federal lands that is not otherwise protected rests with the Governor in Council.

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Executive Summary

The Chestnut-collared Longspur (*Calcarius ornatus*) is a small ground-nesting songbird endemic to the Northern Great Plains of the United States and Canada. During the breeding season, males can be readily distinguished from females by their black and white plumage and chestnut patch on their nape. Females appear more sparrow-like and are greyish-buff overall with dusky stripes. Both sexes have dark inner, and white outer tail feathers that form a black triangle that is readily seen when the bird fans its tail. In Canada, the Chestnut-collared Longspur breeding population is found in grazed mixed-grass prairie parcels that are at least 39 ha in southeastern Alberta, southern Saskatchewan, and southwestern Manitoba.

The Chestnut-collared Longspur was designated as Threatened in Canada by COSEWIC in 2009 because of long-term population declines. In 2012, the species was listed as Threatened under Canada's *Species at Risk Act* (SARA). According to the Canadian analysis of Breeding Bird Survey (BBS) data, Chestnut-collared Longspur populations in Canada showed statistically significant declines of 6% per annum over the period 1970-2012. Moreover, population declines are greater in the Aspen Parkland ecoregion than in the prairie grasslands, resulting in a shift in range to the south and west.

The key threats to this species are most likely a combination of native prairie habitat loss and degradation as a result of annual and perennial non-timber crops, livestock farming and ranching, oil and gas development and spread of exotic species. Although the rate of grassland habitat loss has slowed in the past 30 years, it is still ongoing. Management of pasture or native grassland through grazing or fire is essential to provide habitat conditions suitable for breeding Chestnut-collared Longspurs.

Recovery is considered feasible for this species. The population and distribution objectives for the Chestnut-collared Longspur include stabilizing the Canadian population trend and then increasing and maintaining the population size at or above the mean abundance levels found during the 1980–1989 time period throughout the longspur's historic range in Canada. Broad strategies are recommended to achieve the above objectives and to address the threats to the survival and recovery of the species.

Critical habitat for the Chestnut-collared Longspur has been identified to the extent possible in southwestern Saskatchewan. A schedule of studies has been developed to provide the information necessary to complete the identification of critical habitat that will be sufficient to meet the population and distribution objectives. The identification of critical habitat will be updated when the information becomes available, either in a revised recovery strategy or action plan(s). One or more action plans for Chestnut-collared Longspur will be posted on the Species at Risk Public Registry by 2022.

Recovery Feasibility Summary

Based on the following four criteria that Environment and Climate Change Canada uses to establish recovery feasibility, recovery of the Chestnut-collared Longspur has been deemed technically and biologically feasible.

1. **Individuals of the wildlife species that are capable of reproduction are available now or in the foreseeable future to sustain the population or improve its abundance.**

   Yes. The current breeding population of Chestnut-collared Longspurs in Canada is estimated at approximately 600,000 birds (PFSC 2013).

2. **Sufficient suitable habitat is available to support the species or could be made available through habitat management or restoration.**

   Yes. While native prairie is limited in extent and distribution, sufficient overall grassland area is probably available in Canada given the potential for restoration and maintenance of suitable habitat. Moreover, Chestnut-collared Longspurs have adapted to using tame and seeded pastures, though they may experience lower reproductive success and reduced abundance in these grasslands compared to native pastures.

3. **The primary threats to the species or its habitat (including threats outside Canada) can be avoided or mitigated.**

   Yes. Conserving remaining contiguous native grassland habitats and implementing appropriate management practices will help mitigate threats to Chestnut-collared Longspurs.

4. **Recovery techniques exist to achieve the population and distribution objectives or can be expected to be developed within a reasonable timeframe.**

   Yes. Population and distribution objectives would be achieved through conservation of remaining tracts of native prairie and possibly reseeding of cropland to native grass cover.

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1. COSEWIC* Species Assessment Information

Date of Assessment: November 2009

Common Name (population): Chestnut-collared Longspur

Scientific Name: *Calcarius ornatus*

COSEWIC Status: Threatened

Reason for Designation: This species is a grassland specialist that occurs in Alberta, Saskatchewan and Manitoba. The species has suffered severe population declines since the late 1960s and the results of several surveys suggest that the declines have continued over the last decades albeit at a slower rate. The species is threatened by habitat loss and fragmentation from road development associated with the energy sector.

Canadian Occurrence: Alberta, Saskatchewan, Manitoba

COSEWIC Status History: Designated Threatened in November 2009

* COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

2. Species Status Information

The Chestnut–collared Longspur (*Calcarius ornatus*) is endemic to Canada and United States (Hill and Gould 1997). Overall, 35% of the continental breeding range of the Chestnut-collared Longspur occurs in Canada (CPPF 2004).

The Canadian population of the Chestnut-collared Longspur was assessed as Threatened in 2009 by COSEWIC and in 2012 was listed as Threatened under Canada's *Species at Risk Act* (SARA). The species is listed as Endangered under Manitoba's *Endangered Species and Ecosystems Act*, but it is not listed by the province of Alberta or Saskatchewan. In the United States, Chestnut-collared Longspur is not listed federally or by any of the states where it occurs. The NatureServe conservation status of Chestnut-collared Longspur throughout its range in Canada is described in Table 1(NatureServe 2015). NatureServe lists the Chestnut-collared Longspur as "secure" in the United States.

Table 1. NatureServe Conservation status for the Chestnut-collared Longspur in Canada

	Global (G) Rank	National (N) Rank	Sub-national (S) Rank
Chestnut-collared Longspur (*Calcarius ornatus*)	G5 (secure)	N5B (demonstrably widespread, abundant, and secure)	Alberta (S5B) Manitoba (S1S2B) Saskatchewan (S5B)

[1] NatureServe Rank: 1 -critically imperiled; 2– imperiled; 5– secure; G-global; N-national; S-sub-national; B-breeding.

3. Species Information

3.1 Species Description

The Chestnut–collared Longspur is a small songbird (length: 13-16.5 cm, mass: 17-23 g) that breeds in the Northern Great Plains. During the breeding season males can be readily distinguished from females by their black crown, eye-line and breast, yellowish-buff throat (sometimes white), a deep chestnut patch on their nape and black shoulders with white trim. Females appear more sparrow-like and are greyish-buff overall, with dusky stripes, sometimes with an obscure chestnut collar and dark feathers on their breast and belly. Winter plumage is similar to breeding plumage for both sexes except distinctive patterns are somewhat obscured by buffy feather tips (Hill and Gould 1997). The Chestnut-collared Longspur has a distinctive tail pattern that distinguishes it from other longspurs in all plumages. The dark inner and white outer tail feathers form a black triangle that is readily seen in flight or when the bird fans its tail. Males are most conspicuous while singing during their aerial display flight or when vocalizing from low perches. During the aerial display, males fly upwards within 15 m of the ground and then descend while singing, with tail feathers spread. The song is a sweet warble that begins on a high clear note and ends on a lower, buzzy note.

3.2 Species Population and Distribution

Distribution

The Chestnut–collared Longspur is endemic to the short– and mixed–grass prairie regions of the Great Plains in Canada and United States (Hill and Gould 1997). In Canada, it breeds in southeastern Alberta, southern Saskatchewan, and southwestern Manitoba. In the United States, the Chestnut-collared Longspur breeds from east of the Rockies in Montana, through North and South Dakota (except for the extreme southeast) (Figure 1). Some relict populations occur in western Minnesota, and breeding populations also occur in northeastern and southeastern Wyoming,

northwestern Nebraska, and northeastern Colorado (see references in Hill and Gould 1997).

Range contractions have occurred within the United States range (e.g., Minnesota, western Kansas), as well as in the eastern and northern parts of the Canadian range.

Overall, 35% of the continental breeding range of the Chestnut-collared Longspur occurs in Prairie Canada (CPPF 2004). Approximately 20% of the continental Chestnut-collared Longspur population occurs in Canada, where it is estimated there are 600,000 birds (PFSC 2013). In Canada, the species is most abundant in southeast Alberta and southwest Saskatchewan (Figure 2).

The Chestnut-collared Longspur winters from west-central Oklahoma and central Kansas to southeastern Arizona and south to northern Mexico (Figure 1). The species is most abundant in the lowlands of the eastern portion of the state of Chihuahua Mexico, west Texas, and southern New Mexico (Macías-Duarte et al. 2009, Pool et al. 2012).

Figure 1. Breeding and wintering distribution of the Chestnut-collared Longspur in Canada and United States (map based on Hill and Gould 1997).

Population Trends

Based on the U.S. analysis of North American Breeding Bird Survey (BBS) data, the Canadian Chestnut-collared Longspur population declined at a rate of 5.5% per annum (95% confidence limits = -7.0% to -3.7%; n = 97 routes) between 1966-2013 (Sauer et al. 2014). Over this same period, statistically significant annual declines occurred in Alberta and Saskatchewan (7.4% [95% CL = -9.2 to -5.7; n = 45 routes], and 3.7% [95% CL = -6.0 to -1.3; n = 40 routes]), respectively. Numbers of routes (n = 12) and birds from Manitoba were insufficient to determine reliable trends. The overall analysis of U.S. populations indicated a significant decline of 3.6% per annum (95% CL =-4.6 to -2.7; n = 131); all of the states with sufficient numbers of routes for confident trend analysis had long-term statistically significant declines (Montana, North Dakota, South Dakota) (Sauer et al. 2014). Analyses by Bird Conservation Region (BCR) showed similar patterns with Prairie Pothole populations undergoing a 4.6% per annum decline (95% CL = -5.7 to -3.4; n = 149) and Badlands and Prairie populations experiencing a 3.7% per annum decline (95% CL = -5.1 to -2.0; n = 57) (Sauer et al. 2014).

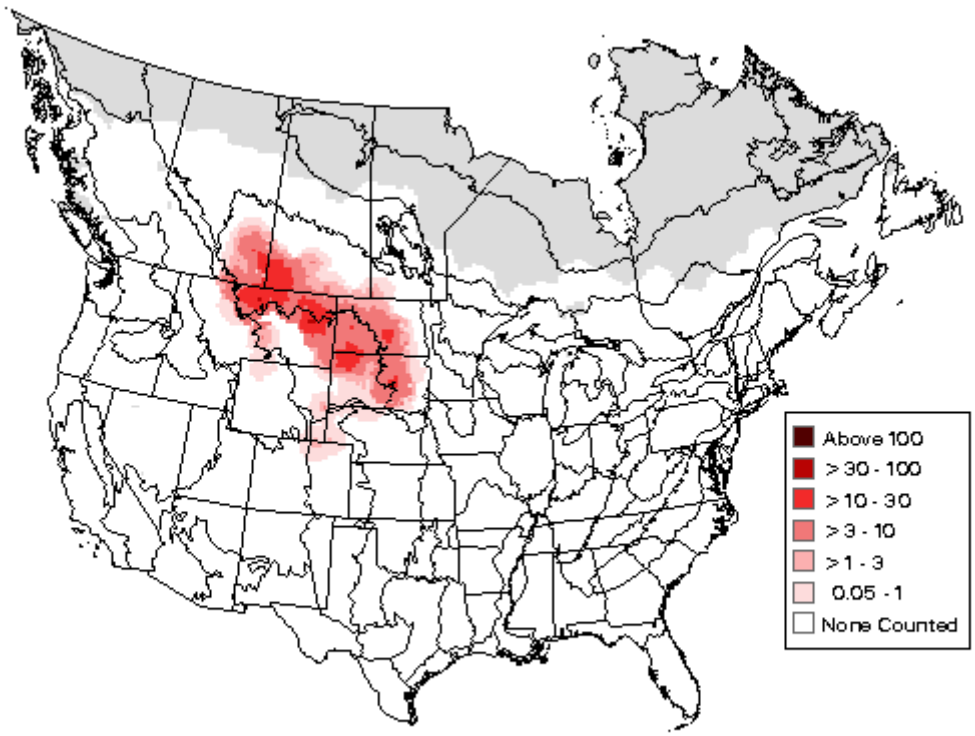

Figure 2. Breeding distribution of the Chestnut-collared Longspur based on the North American Breeding Bird Survey 2007-2013 (Sauer et al. 2014).

Environment Canada's Canadian Wildlife Service (CWS) BBS analysis shows similar patterns of declines (Environment Canada 2014). Annual rates of declines over the longest period (1970-2012) were 6.0% Canada-wide (n = 70 routes), 7.6% for Alberta (n = 26) and 4.3% for Saskatchewan (n = 32). Figure 3 shows the overall population trend in Canada, with the recovery population target indicated (an average of the 1980 to 1989 indices).

Analyses of the Grassland Bird Monitoring (GBM) program and BBS data from Alberta over the same time periods (1996-2004) suggest that declines are greater in areas with less grassland cover; overall declines were lower on GBM routes compared to BBS routes (B. Dale, pers. comm.). Also, analyses of the Prairie and Parkland regions show marked regional differences with declines being much steeper in the Parkland than the Prairie region (Wilson and Davis unpubl. data). Over the longest period (1970-2010), declines are greatest in the Parkland (97%), followed by moist grassland (91%) and mixed grassland (85%) (Wilson and Davis unpubl. data).

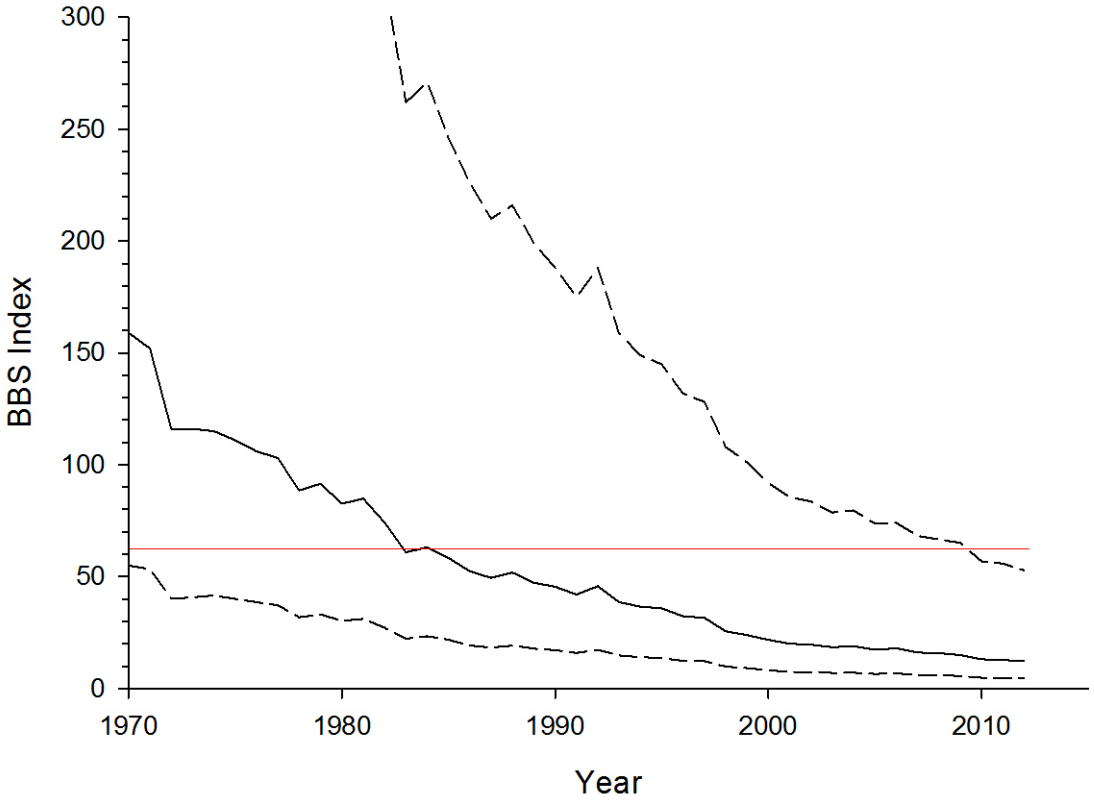

Figure 3. Population trend for the Chestnut-collared Longspur in Canada is based on Environment Canada's Canadian Wildlife Service analysis of BBS data, 1970-2012. The solid line represents the estimated population trend and dashed lines represent 95% credible intervals. The red line (horizontal line) indicates the population target.

3.3 Needs of the Chestnut-collared Longspur

Habitat and Biological Needs

Breeding grounds

The Chestnut-collared Longspur nests on the ground in grazed short or mixed-grass prairie and feeds primarily on insects (particularly grasshoppers and various caterpillars), along with spiders and seeds (Hill and Gould 1997). The nestling diet consists exclusively of invertebrates with grasshoppers being the most common prey item consumed (Hill and Gould 1997). Level to rolling topography is preferred in mixed-grass and short-grass prairies and drier vegetation within moist lowlands (Owens and Myres 1973, Kantrud and Kologiski 1983). The Chestnut-collared Longspur is area-sensitive, with the probability of occurrence increasing with pasture size and the minimum size requirement is estimated to be 39 ha (95% confidence interval = 18-56 ha; Davis 2004). Furthermore, Chestnut-collared Longspurs in southern Alberta avoided crop edges up to 1.9 km and longspur abundance increased as distance to crop edge increased (Sliwinski and Koper 2012). The Chestnut-collared Longspurs also avoided wetland edges up to 1 km and abundance was higher further from wetlands (Sliwinski and Koper 2012).

Preferred vegetation structure includes short (< 18-30 cm), sparsely vegetated pasture with low levels of litter accumulation (Owens and Myres 1973, Johnson and Schwartz 1993, Dieni and Jones 2003) and reduced woody cover (Grant et al. 2004). In Saskatchewan, Chestnut-collared Longspur nests were associated with sites characterized by short (≤ 17 cm) vegetation and a low density of standing dead vegetation (Davis 2005). In Montana, the species nested in sites with increased Blue Grama (*Bouteloua gracilis*) and Club Moss (*Selaginella densa*) cover (Dieni and Jones 2003). In both Montana and Saskatchewan the Chestnut-collared Longspurs established territories in areas with shorter and sparser vegetation than what was available, but selected nesting sites with taller and denser vegetation within these areas (Dieni and Jones 2003, Davis 2005).

Chestnut-collared Longspur densities are highest in native pasture compared to hayland and cropland (Davis et al. 1999). Chestnut-collared Longspurs nest in planted grassland (Davis et al. 1999, McMaster and Davis 2001, Davis et al. unpubl. data) but require management in the form of grazing, mowing or fire to maintain suitable vegetative structure. Although they nest in pastures dominated by exotic plant species, such as Crested Wheatgrass (*Agropyron cristatum*), such habitats are of poorer quality than native prairie (Lloyd and Martin 2005, Davis et al. unpubl. data). In Montana, the probability of a nest surviving on a given day was 17% lower in crested wheatgrass compared to native prairie; in addition, nestlings grew more slowly in the exotic grassland and had a lower average mass at fledging (Lloyd and Martin 2005), making them more vulnerable to post-fledging predation losses. Both Lloyd and Martin (2005) and Davis et al. (unpubl. data) found that Chestnut-collared Longspurs fledged 0.6 more

young per nest in native grassland than planted grassland dominated by Crested Wheatgrass.

Wintering grounds

The Chestnut-collared Longspur is a grassland specialist on the wintering grounds (Macías-Duarte et al. 2009), as well as on the breeding grounds. The occurrence of Chestnut-collared Longspurs in Mexico's Chihuahuan Desert grasslands is strongly influenced by the quantity of rainfall (Macías-Duarte et al. 2009); likely as a result of the effect of rainfall on seed production and vegetation structure. Chestnut-collared Longspurs wintering in the grasslands of the Chihuahuan Desert prefer areas with tall grass or high grass cover (Macías-Duarte et al. 2009) and avoid areas with high shrub cover (≥ 10%), tall shrubs (1.2 m) and forbs (30 cm; Pool et al. 2012). In addition, the Chestnut-collared Longspurs wintering in Chihuahua selected grassland sites that contained Black-tailed Prairie Dogs (*Cynomys ludovicianus*) and longspur abundance responded positively to grazing; however, the Chestnut-collared Longspur abundance decreased with increased grazing intensity (i.e. overgrazing) and shrub density (Desmond 2004). The diet of the Chestnut-collared Longspur during the winter appears to consist entirely of grass and forb seeds (Hill and Gould 1997).

4. Threats

4.1 Threat Assessment

The Chestnut-collared Longspur threat assessment is based on the IUCN-CMP (World Conservation Union–Conservation Measures Partnership) unified threats classification system. Threats are defined as the proximate activities or processes that have caused, are causing, or may cause in the future the destruction, degradation, and/or impairment of the entity being assessed (population, species, community, or ecosystem) in the area of interest (global, national, or subnational). In carrying out the threat assessment, only present and future (within a 10-year timeframe) threats are considered. Threats are characterized here in terms of scope, severity, and timing. The overall threat "impact" reflects a reduction of a species population or decline/degradation of the area of an ecosystem and is calculated from scope and severity. See the table footnotes for details on how the values are assigned in the table (Table 2). Historical threats, indirect or cumulative effects of the threats, or any other relevant information that would help understand the nature of the threats are presented in the narrative section. Limiting factors are not considered during this assessment process.

Table 2. Threat classification table for the Chestnut-collared Longspur in Canada

Threat #[e]	Threat description	Impact[a]	Scope[b]	Severity[c]	Timing[d]	Detailed threats/Comments
2	Agriculture & aquaculture	Medium	Pervasive	Serious	High	
2.1	Annual & perennial non-timber crops	Medium	Restricted	Serious	High	Primarily related to converting grassland to cropland and hayland on breeding and wintering grounds.
2.3	Livestock farming & ranching	Medium	Pervasive	Moderate	High	Overgrazing or under-grazing on breeding and wintering grounds.
3	Energy production & mining	Medium - Low	Large	Moderate - Slight	High	
3.1	Oil & gas drilling	Medium - Low	Large	Moderate - Slight	High	Disturbance at/near well sites
3.3	Renewable energy	Unknown	Restricted - Small	Unknown	Moderate (Possibly in the short term, < 10 yrs)	
4	Transportation & service corridors	Low	Small	Moderate	High	
4.1	Roads & railroads	Low	Small	Moderate	High	
4.2	Utility & service lines	Low	Small	Slight	High	Possible mortality from transmission lines and potential loss or degradation of habitat

Threat #[e]	Threat description	Impact[a]	Scope[b]	Severity[c]	Timing[d]	Detailed threats/Comments
7	Natural system modifications	Low	Small	Serious	High	
7.1	Fire & fire suppression	Low	Small	Serious	High	Fire suppression on breeding and wintering grounds.
8	Invasive & other problematic species & genes	Low	Small	Serious	High	
8.1	Invasive non-native/alien species	Low	Small	Serious	High	Conversion of native grassland to exotic vegetation
9	Pollution	Unknown	Unknown	Serious – Slight (1-70%)	High	
9.3	Agricultural & forestry effluents	Unknown	Unknown	Serious – Slight (1-70%)	High	Agricultural pesticides
11	Climate change & severe weather	Unknown	Unknown	Unknown	Unknown	Outside assessment timeframe
11.2	Droughts	Unknown	Unknown	Unknown	Unknown	
11.4	Storms & flooding	Unknown	Unknown	Unknown	Unknown	Nest losses due to increased extreme weather events

[a] **Impact** – The degree to which a species is observed, inferred, or suspected to be directly or indirectly threatened in the area of interest. The impact of each threat is based on Severity and Scope rating and considers only present and future threats. Threat impact reflects a reduction of a species population or decline/degradation of the area of an ecosystem. The median rate of population reduction or area decline for each combination of scope and severity corresponds to the following classes of threat impact: Very High (75% declines), High (40%), Medium (15%), and Low (3%). Unknown: used when impact cannot be determined (e.g., if values for either scope or severity are unknown); Not Calculated: impact not calculated as threat is outside the assessment timeframe (e.g., timing is insignificant/negligible or low as threat is only considered to be in the past); Negligible: when scope or severity is negligible; Not a Threat: when severity is scored as neutral or potential benefit.

[b] **Scope** – Proportion of the species that can reasonably be expected to be affected by the threat within 10 years. Usually measured as a proportion of the species' population in the area of interest. (Pervasive = 71–100%; Large = 31–70%; Restricted = 11–30%; Small = 1–10%; Negligible < 1%).

[c] **Severity** – Within the scope, the level of damage to the species from the threat that can reasonably be expected to be affected by the threat within a 10-year or three-generation timeframe. Usually measured as the degree of reduction of the species' population. (Extreme = 71–100%; Serious = 31–70%; Moderate = 11–30%; Slight = 1–10%; Negligible < 1%; Neutral or Potential Benefit ≥ 0%).

[d] **Timing** – High = continuing; Moderate = only in the future (could happen in the short term [< 10 years or 3 generations]) or now suspended (could come back in the short term); Low = only in the future (could happen in the long term) or now suspended (could come back in the long term); Insignificant/Negligible = only in the past and unlikely to return, or no direct effect but limiting.

[e] **Threat #** - Threats are numbered using the IUCN Classification System. Only those threats relevant to the Chestnut-collared Longspur are presented in this table and in Section 4.2 Description of Threats.

4.2 Description of Threats

IUCN 2 Agriculture & Aquaculture

2.1 Annual & perennial non-timber crops

Most losses of short and mixed-grass prairie in Canada and the United States occurred between 50 and 150 years ago. Because systematic monitoring using the BBS did not commence in the United States until 1966 (1968 in Canada), it is not possible to estimate the full impact of habitat loss on Chestnut-collared Longspur populations. However, the conversion of native grassland to annual cropping has likely played a large role in the historic and continued declines of the Chestnut-collared Longspur populations. Chestnut-collared Longspurs occur in hayland and cropland, but in substantially lower numbers than in native prairie and tame pasture (Davis et al. 1999, McMaster and Davis 2001). Farming practices such as mowing, haying and tillage negatively affect Chestnut-collared Longspur occurrence (Dale et al. 1997, Martin and Forsyth 2003). In central Saskatchewan, hayfields cut annually were occupied but those cut every three years were not (Dale et al. 1997). In a comparison of cropland varying in intensity of tillage in Alberta, minimum till summer fallow and spring cereals were occupied but longspurs avoided conventionally managed plots (tilled and seeded; Martin and Forsyth 2003). Longspurs also avoid cropland/hayfields up to 1.9 km and abundance is higher farther from these areas (Sliwinski and Koper 2012).

Increased demand for biofuels, such as ethanol, could exacerbate conversion of grasslands, including remaining tracts of native prairie, to cropland, which could adversely affect longspur populations. For example, in the United States between 2002 and 2007, more than 203,000 ha of native prairie were converted to cropland in North Dakota, South Dakota, and Montana; this conversion coincided with high corn prices, an increasing demand for ethanol, and reduced enrollment of land into the Conservation Reserve Program (Fargione et al. 2009). Furthermore, between 2006 and 2011, the cover of grass-dominated land in North Dakota, South Dakota, Nebraska, Minnesota, and Iowa decreased by nearly 530,000 ha at a rate of 1.0-5.4% annually due to planting of corn and soybeans for biofuel (Wright and Wimberly 2013). In 2007, the Canadian federal government created incentives for ethanol and biodiesel producers to increase production of renewable alternatives (derived mainly from corn and wheat) for gasoline and diesel (Natural Resources Canada 2010); it is unclear whether such incentives have resulted in increased rates of cropland conversion in Prairie Canada.

Loss or degradation of wintering habitat could exacerbate population declines of Chestnut-collared Longspurs. Conversion of native grasslands to farmland is the primary threat to the species on the wintering grounds (Macías-Duarte et al. 2009, Pool et al. 2014).

2.3 Livestock farming & ranching

Chestnut-collared Longspurs rely on disturbance (e.g., grazing, burning and mowing) to create the habitat conditions necessary for breeding. Insufficient grazing or too much grazing can render habitat unsuitable (Bleho et al. 2015). Chestnut-collared Longspurs were found to be more abundant in grazed than ungrazed areas in southern Alberta (Owens and Myres 1973). Davis et al. (2014) found Chestnut-collared Longspur abundance to increase as range condition improved. Sliwinski and Koper (2015) found Chestnut-collared Longspur abundance increased with stocking rate during the first month of introducing grazing in Grasslands National Park. Furthermore, the increased abundance continued after a second year of grazing and was most notable at stocking rates > 0.6 animal unit months per hectare. Although lower stocking rates did not affect nest survival (Lusk and Koper 2013), it is unknown whether these higher stocking rates negatively influence reproductive success or survival. In a separate study looking at direct effects of cattle on birds nesting in Canadian grasslands, Chestnut-collared Longspur nest destruction increased with grazing intensity (Bleho et al. 2014). A study in southeast Alberta found that clutch size tended to decrease near cattle water sources but the effect was weak (Yoo 2014). Inappropriate grazing management has also been cited as a primary cause of reduced grass cover and increased shrub cover on the wintering grounds (Pool et al. 2012). Although the species requires grazing to provide nesting and foraging habitat, Chestnut-collared Longspurs may be sensitive to intense grazing pressure.

IUCN 3 Energy Production & Mining

3.1 Oil & gas drilling

The effects of natural gas development activities on Chestnut-collared Longspur demographics are mixed. Longspur abundance increased with well density and within 50 m of wells in southwestern Saskatchewan (Kalyn Bogard and Davis 2014). In southeastern Alberta there was either no significant effect of well density on abundance or occurrence (Hamilton et al. 2011), or abundance decreased closer to wells (Rodgers 2014). In southwest Saskatchewan, the density of Chestnut-collared Longspurs decreased as the amount of disturbance due to natural gas development increased, and longspur nests were located farther from wells than expected based on random chance (Gaudet 2013). The number of young fledged from longspur nests was higher closer to natural gas wells in southwest Saskatchewan (Gaudet 2013), but lower near gas well pads in southeast Alberta (Yoo 2014). Longspur clutch size was lower closer to well pads and in areas with newer wells pads in Alberta, likely due to altered vegetation structure in these areas (Yoo 2014).

Information regarding the influence of oil extraction activities on the Chestnut-collared Longspur is lacking, as most research to date has focused on natural gas (Hamilton et al. 2011, Gaudet 2013, Kalyn Bogard and Davis 2014). However, abundance of longspurs in southeast Saskatchewan was lower at sites containing active oil wells than at sites without wells (J. Unruh, unpubl. data). More research is needed to better

determine the extent to which this species is influenced by energy development activities both during and after construction.

3.3 Renewable energy

The effects of renewable energy on the Chestnut-collared Longspur are unclear. A United States Geological Survey study found that longspurs did not avoid wind turbines (Shaffer and Johnson 2008). However, the potential impacts of using habitat near wind turbines on survival and reproduction are unknown.

IUCN 4 Transportation & Service Corridors

4.1 Roads & railroads

Sutter et al. (2000) found that the Chestnut-collared Longspurs were less common along roads than trails in southern Saskatchewan and that their lower abundance was greater than what could be explained by the loss of suitable habitat associated with the road itself. A study in southeast Alberta detected a weak effect of low impact roads on Chestnut-collared Longspur fledging success, with the number of fledglings per nest increasing further from these linear disturbances (Yoo 2014).

4.2 Utility & service lines

Although research is currently lacking, Chestnut-collared Longspurs may be susceptible to collisions with transmission lines and loss or degradation of habitat via pipeline construction. Sutter et al. (in review) found that pipeline construction and clean-up activities could negatively influence Sprague's Pipit (*Anthus spragueii*) reproductive success and may influence nest-site selection of Vesper Sparrows (*Pooecetes gramineus*). The impact of pipeline construction and clean-up activities on longspur habitat will likely depend on the success of reclamation efforts.

IUCN 7 Natural System Modifications

7.1 Fire & fire suppression

The lack of a fire and grazing interaction in moister parts of the longspur range will likely degrade native grasslands for the species. Without this interaction, native grasslands are susceptible to increased encroachment by woody vegetation and exotic plants making the habitat unsuitable for longspurs. Nest predation may be exacerbated in locations with small patches of grassland, large amounts of edge and/or encroaching shrubs and trees. The encroachment of woody vegetation is an ongoing issue in the moister regions of the prairies and poses a threat to many grassland bird species. Woody vegetation encroachment is also a major threat on the wintering grounds (Pool et al. 2012).

IUCN 8 Invasive & Other problematic Species & Genes

8.1 Invasive non-native/alien species

Although Chestnut-collared Longspurs nest in fields dominated by exotic plant species, such as Crested Wheatgrass (Davis et al. 1999, Davis and Duncan 1999), such habitats are of poorer quality than native prairie (Lloyd and Martin 2005, Davis et al. unpubl. data). In Montana, the probability of a nest surviving on a given day was 17% lower in Crested Wheatgrass compared to native prairie; in addition, nestlings grew more slowly in the exotic grassland and had a lower average mass at fledging (Lloyd and Martin 2005), making them more vulnerable to post-fledging predation losses. Both Lloyd and Martin (2005) and Davis et al. (unpubl. data) found that Chestnut-collared Longspurs fledged 0.6 more young per nest in native grassland than planted grassland dominated by Crested Wheatgrass.

IUCN 9 Pollution

9.3 Agricultural and forestry effluents

Pesticides could have lethal or sub-lethal effects on Chestnut-collared Longspur adults or young. Hatching success (though not fledging success, nestling growth, or parental behavior) was reduced when birds were exposed to insecticides used to control grasshoppers (Martin et al. 1998, 2000); the authors attributed this lack of effect to the ability of Chestnut-collared Longspurs to switch to alternate prey items (Martin et al. 2000). Although the aforementioned studies (Martin 1998, 2000) found minimal effects of pesticides on longspur reproduction and survival, those studies focused on a single type of pesticide and it remains unclear whether other types of pesticides will have similar effects.

IUCN 11 Climate Change & Severe Weather

11.2 Droughts / 11.4 Storms & flooding

Wet and dry cycles are natural weather patterns. However, human-induced climate change may affect the frequency and duration of these wet and dry cycles. In addition, climate change is likely to increase the frequency of ‘extreme weather events,’ including greater precipitation variability (Polley et al. 2013). Increased frequency of extreme events, such as droughts, intense precipitation or hailstorms, may reduce nest and post-fledging survival, as well as increase nest desertion rates of grassland songbirds (George et al. 1992). For example, heavy rain and hailstorms caused 25 of 27 nest abandonments by grassland songbirds in Montana (Jones et al. 2010). Furthermore, although the overall survival of longspur nests in southwest Saskatchewan was not influenced by temperature or precipitation, direct nest losses occurred due to severe weather events (e.g., hailstorm; Gaudet 2013). The effects of extreme events on grassland songbird reproductive success and survival are likely to be localized within a population but may be amplified over multiple years.

5. Population and Distribution Objectives

The population and distribution objectives for the Chestnut-collared Longspur are to:

1) Ensure that the Breeding Bird Survey (BBS) trend for the Canadian population is either stable or increasing in the next 15 years (2016-2030).
2) Ensure that the population size and distribution of the Chestnut-collared Longspur is at or above mean abundance levels found during the 1980–1989 time period in each of the prairie provinces by 2045 (Table 3).

The period 1980-1989 is used as a benchmark for two reasons; first, the rate at which natural grasslands were cultivated stabilized during the mid-1980s (Statistics Canada 1997) and second, these years were characterized by a mix of wet and dry periods. Thus, a mean abundance of longspurs based on these years should be a reasonable benchmark for achievable population levels over the long term (i.e., 30 years). Setting recovery goals based on (unknown or modeled) historic populations of longspurs prior to intensive cultivation would be challenging given the extent and severity of habitat change in these areas. However, the opportunity still exists to improve the status of the species and rectify ongoing declines in numbers as well as habitat quality. Populations would be expected to be stable when BBS results demonstrate a statistically non-significant change (95% credible limits include 0) or increasing when BBS results demonstrate a statistically significant increase (95% credible limits that do not include 0) in population size over this time period in Canada.

Table 3. Population and distribution objectives derived from Breeding Bird Survey (BBS) data for Canada and the Prairie Provinces.

Region	BBS 10-year trend (2003-2012)	Current BBS index[1] (2003-2012)	Target BBS index (1980-1989)	Population increase required to meet recovery objective
Canada	-4.6 (-7.8, -1.1)	15.8 (5.8, 67.1)	62.5 (23.0, 266.7)	4x
Alberta	-5.6 (-10, 0.4)	14.5 (4.7, 64.8)	88.4 (28.6, 399.0)	6.1x
Saskatchewan	-4.3 (-8.0, -0.05)	18.9 (5.5, 96.7)	53.5 (15.3, 283.0)	2.8x
Manitoba[2]	-8.3 (-15.2, -3.4)	0.3 (0.1, 8.1)	1.7 (0.4, 60.2)	5.7x

[1] BBS index represents the mean numbers of birds per route (lower, upper 95% credible limit) whereas the BBS trend represents the % annual change in population size (lower, upper 95% credible limit).

[2] Population trends deemed to have low reliability (Environment Canada 2014).

6. Broad Strategies and General Approaches to Meet Objectives

6.1 Actions Already Completed or Currently Underway

- Population monitoring has been principally through the BBS across the entire Chestnut-collared Longspur range.

- Little research in Canada has focused specifically on Chestnut-collared Longspurs (O'Grady et al. 1996, Davis et al. 2002, Kirkham and Davis 2013) but the species has been included among a suite of other grassland species on studies of distribution, habitat use, area requirements, brood parasitism, and breeding productivity in grasslands (Dale et al. 1997; Sutter and Brigham 1998; Davis et al. 1999, 2006; Davis and Sealy 2000; McMaster and Davis 2001; Davis 2003, 2004, 2005; McMaster et al. 2005; Koper and Schmiegelow 2006a, 2006b; Klippenstine and Sealy 2008, 2010). Recent research has investigated the effects of natural gas disturbance on the Chestnut-collared Longspur occurrence and abundance (Hamilton et al. 2011, Kalyn Bogard and Davis 2014) and density and reproductive success (Gaudet 2013). Research regarding the influence of oil and gas development on the occurrence and abundance (S.K. Davis unpublished data) and the density and breeding success of Chestnut-collared Longspurs is ongoing (N. Koper unpublished data).

- There are many large-scale prairie conservation initiatives with a mandate to identify, restore and conserve priority grasslands as well as promote voluntary stewardship and improve land management. These include federal programs such as the *Species at Risk Act,* Species at Risk Partnership on Agricultural Landscapes, and the Habitat Stewardship Program, provincial programs such as Prairie Conservation Action Plan and South of the Divide Action Plan, and various programs by non-governmental organizations. Such projects will make positive contributions to the recovery and conservation of the Chestnut-collared Longspur throughout the prairie region.

6.2 Strategic Direction for Recovery

Table 4. Recovery Planning Table

Threat or Limitation	Priority[a]	Broad Strategy to Recovery	General Description of Research and Management Approaches
All threats except 11.2 & 11.4	High	Habitat conservation	• Identify and implement conservation and management strategies for the Chestnut-collared Longspur's critical habitat (policy reform, tax relief, stewardship, conservation easements, acquisition etc.). • Review land use guidelines and management practices that benefit Chestnut-collared Longspurs across their Canadian range. Coordinate with provinces to influence land use decisions and policies that affect grassland habitat.
2.3, 7.1, 8.1	Medium-High	Habitat restoration and management	• Prioritize target areas for grassland enhancement or restoration. • Develop, promote and implement appropriate restoration/management tools to enhance and maintain breeding habitat quality for the Chestnut-collared Longspur.
2.1, 2.3, 3.1, 4.1, 7.1, 7.3, 8.1, 9.3	High Low	Inventory and monitoring	• Evaluate whether new habitat monitoring programs are required or existing ones augmented to ensure that Chestnut-collared Longspur habitat is monitored throughout its range. • Provide incentive to recruit more volunteers to train participants for the BBS to increase coverage of grassland.
All threats	High Medium	Research	• Develop GIS products reflecting the spatial distribution and health of native grassland across the Chestnut-collared Longspur's range to enhance the development of critical habitat models and assess the risk of habitat destruction. • Determine relationships (if any) between oil and gas development on the density, survival and productivity of Chestnut-collared Longspurs. • Refine descriptions of biophysical attributes of critical habitat by determining ecological thresholds for each qualitative attribute. • Investigate whether non-native grassland habitats operate as sources or sinks and whether the type of management can enhance reproductive success and survival of Chestnut-collared Longspurs. • Investigate spatial and temporal variation in density and reproductive success in relation to grassland patch size and configuration and landscape matrix (amount of native and tame grassland, cropland area, wetlands and woody vegetation). • Determine whether native grassland can be created or restored to the extent that the new habitat can support viable populations of Chestnut-collared Longspurs. • Determine the extent to which survival and reproduction on the breeding grounds and over-winter survival are limiting Chestnut-collared Longspur populations.

	Low		• Determine the extent to which survival and reproduction is affected by grazing. • Collaborate with other researchers and agencies on the wintering grounds to determine: 1) quantitative descriptions of migration and wintering habitat; 2) habitat spatial distribution and amount and status; 3) the significance of threats to migration and wintering habitat for the Canadian population.Determine relationships (if any) between wind energy projects on the density, survival and productivity of Chestnut-collared Longspurs. • Assess risk of exposure to pesticides in breeding, migration and wintering areas. • Set up long-term monitoring plots to follow demographics of breeding populations. • Investigate fluctuations in populations and demographic implications of changing weather patterns on suitable habitat and how these interact with other factors.
All threats	Medium	Public outreach	• Provide information to conservation practitioners on factors influencing management decisions by landowners/stakeholders. • Ensure that current recovery strategy is integrated with other federal and provincial species at risk recovery plans and grassland conservation initiatives. • Integrate communication about Chestnut-collared Longspurs into existing education programs about prairie conservation. • Provide educational materials to general public in urban areas regarding Chestnut-collared Longspurs and their role in prairie grassland habitat conservation.

[a] *"Priority" reflects the degree to which the broad strategy contributes directly to the recovery of the species or is an essential precursor to an approach that contributes to the recovery of the species.*

6.3 Narrative to Support the Recovery Planning Table

Conservation activities that prevent native pasture being converted to other land uses are of the utmost importance in recovering Chestnut-collared Longspur populations. The Chestnut-collared Longspurs require habitat that overlaps with other species at risk such as Sprague's Pipit (*Anthus spragueii*), Burrowing Owl (*Athene cunicularia*), and Swift Fox (*Vulpes velox*). Thus, a strategic approach to conserving grassland habitat is essential for this and other grassland-dependent species. A method for identifying important breeding areas and critical habitat is required to effectively prioritize recovery actions. Conservation and restoration of native prairie may be realized through incentive programs, stewardship and management agreements, conservation easements, and land purchase. Extensive programs, such as extension, policy reform, and tax incentives, will also play a large role in conserving and maintaining good quality grassland habitat. Communication and outreach are required because of the limited public profile and awareness of the Chestnut-collared Longspur. Education programs targeted to youth, landowners and managers, and the general public, are needed to increase awareness of longspurs and their habitat requirements. Research and monitoring will play important roles in the adaptive management process by ensuring that remaining critical habitat is identified and information gaps are filled, enabling recovery activities and goals to be evaluated.

7. Critical Habitat

7.1 Identification of the Species' Critical Habitat

Critical habitat for the Chestnut-collared Longspur has been identified to the extent possible. This recovery strategy identifies Chestnut-collared Longspur critical habitat only in southwest Saskatchewan within a region designated in the South of the Divide (SoD) multi-species action plan (Environment and Climate Change Canada 2016) and in Grasslands National Park. This region was targeted over other areas because grassland bird surveys were conducted there to develop a critical habitat model for Sprague's Pipit and important habitat models for McCown's Longspur (*Rhynchophanes mccownii*) and Long-billed Curlew (*Numenius americanus*) as part of the SoD action plan. Furthermore, classified landcover imagery was created specifically for the region to facilitate critical habitat identification. The same quality and quantity of habitat and bird information was not available for other regions at the time of drafting this recovery strategy.

In this Recovery Strategy, identification of Chestnut-collared Longspur critical habitat was guided by a spatially explicit predictive model based on longspur occurrence data collected from 2002-2011 as well as remotely-sensed habitat data. The model was based on 1,335 randomly selected sites where territorial Chestnut-collared Longspurs occurred, and a further 4,000 randomly selected sites that were used to characterize the habitat generally available in the region. Reliance on a predictive model was necessary because surveys and observations are widely scattered and tend to sample only a small

proportion of a given area. Use of predictive models is a precautionary approach that allows one to determine the potential suitability of sites that were not sampled but can reasonably be expected to be inhabited by longspurs. Models were validated using independent data sets, which demonstrated that the final model correctly predicted 90% of known Chestnut-collared Longspur locations.

Critical habitat for the Chestnut-collared longspur is found within 489,078 ha (Figures 4 and 5) distributed over 10,961 quarter-sections. Most of the proposed critical habitat is composed of provincial land[4] (78%) followed by federal (11%, mainly within Grasslands National Park), and private lands (9%) with the remainder falling within road allowances.

Approximately 90% (412,796 of 452,572 ha) of the critical habitat identified for Chestnut-collared Longspur outside Grasslands National Park (GNP) has been identified as critical habitat for other species included in the South of the Divide Action Plan for southwestern Saskatchewan (Environment and Climate Change Canada 2016). The South of the Divide Action Plan did not identify critical habitat within GNP because Parks Canada Agency was identifying critical habitat within its own action plan (Environment and Climate Change Canada 2016).

The biophysical attributes of critical habitat include the characteristics listed below. However, it is not currently possible to provide the specific amounts or levels of all of these biophysical attributes required by Chestnut-collared Longspurs.

- open areas of upland native pasture ≥39 ha in fair to excellent range condition
- limited woody vegetation
- limited invasion by exotic grasses
- flat to gently rolling topography

The critical habitat identified in this Recovery Strategy identifies all suitable habitat for Chestnut-collared Longspur in the South of the Divide area and in Grasslands National Park. Unsuitable habitat (e.g., dense patches of woody vegetation, open sand dunes, coulees, riparian areas, water bodies, grasslands planted with non-native species, eroded slopes, badlands), existing infrastructure (e.g., roads, gas and oil wells, buildings, pipelines, fence lines, and watering sites) and perennial watering and salting sites for livestock, do not possess the biophysical attributes required by Chestnut-collared Longspur so they are not identified as critical habitat.

Critical habitat has not been identified elsewhere in the range of the Chestnut-collared Longspur and therefore critical habitat can only be partially identified at this time. A schedule of studies (Table 5) has been developed to provide the information necessary to complete the identification of critical habitat that will be sufficient to meet the population and distribution objectives. The identification of critical habitat will be updated when the information becomes available, either in a revised recovery strategy or action plan(s).

[4] Provincial lands include federal community pastures that are being divested to the province.

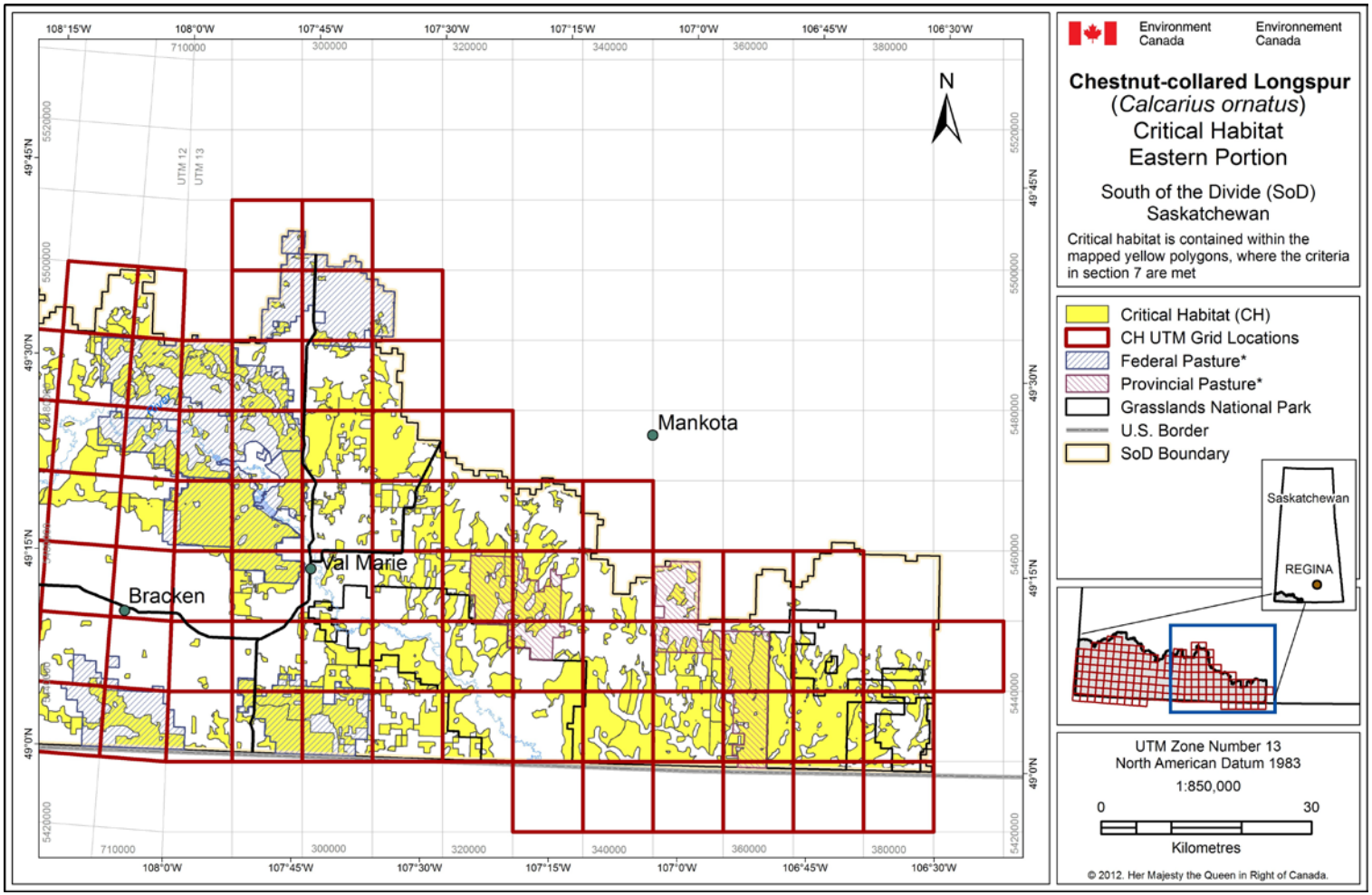

Figure 4. Critical habitat for the Chestnut-collared Longspur in the eastern portion of southwestern Saskatchewan is represented by the yellow shaded polygons comprising 489,078 ha, where the criteria and methodology set out in Section 7.1 are met. The 10 km x 10 km UTM grid overlay shown on this figure is a standardized national grid system that indicates the general geographic area containing critical habitat. Areas outside of the yellow shaded units do not contain critical habitat. *indicates community pasture boundaries as of August, 2015. Most federal pastures are in the process of being transferred to the province.

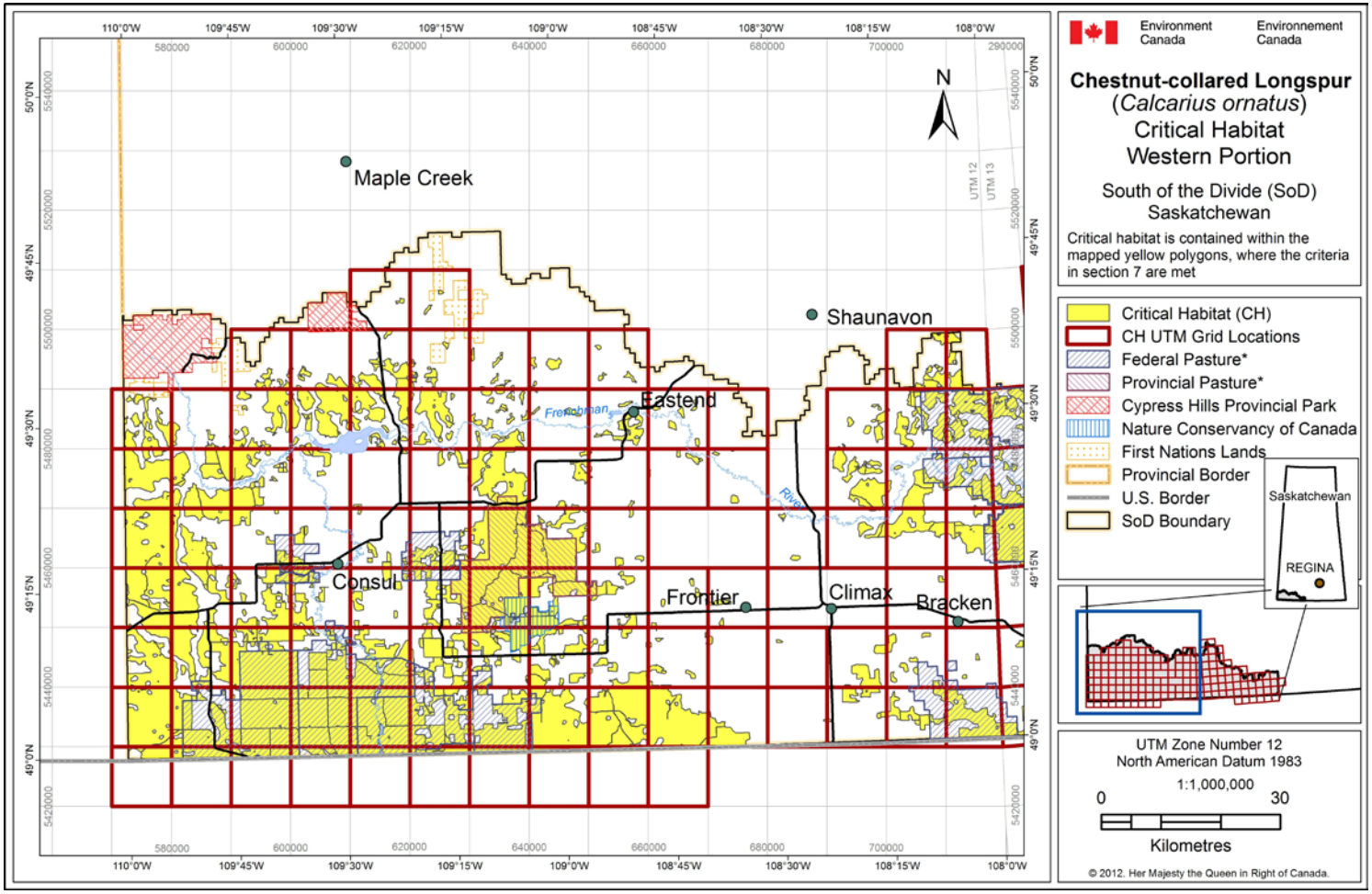

Figure 5. Critical habitat for the Chestnut-collared Longspur in the western portion of southwestern Saskatchewan is represented by the yellow shaded polygons comprising 489,078 ha, where the criteria and methodology set out in Section 7.1 are met. The 10 km x 10 km UTM grid overlay shown on this figure is a standardized national grid system that indicates the general geographic area containing critical habitat. Areas outside of the yellow shaded units do not contain critical habitat. *indicates community pasture boundaries as of August, 2015. Most federal pastures are in the process of being transferred to the province.

7.2 Schedule of Studies to Identify Critical Habitat

Table 5. Schedule of Studies to Identify Critical Habitat outside of southwestern Saskatchewan

Description of Activity	Rationale	Timeline
Construct predictive statistical models based on occurrence and abundance data to facilitate the identification of critical habitat locations.	Spatially explicit maps showing high probability of occurrence and abundance. Results used to identify candidate areas for potential critical habitat.	March 2019
Carry out new field surveys to monitor the distribution and abundance of Chestnut-collared Longspurs and to verify predictive models.	Confirm that prioritized (highly-ranked sites) hold high densities of Chestnut-collared Longspurs.	Ongoing
Collect information on the distribution and abundance of Chestnut-collared Longspurs throughout Prairie Canada.	Enter data on distribution and abundance into an electronic database to later use for mapping distribution, abundance and persistence of Chestnut-collared Longspurs.	Ongoing
Determine thresholds for critical habitat biophysical attributes.	Determination of thresholds for woody vegetation, exotic species, topographic relief, and anthropogenic disturbance will facilitate identification of critical habitat and the extent to which human activities destroy critical habitat.	Ongoing
Determine influence of woody vegetation encroachment on Chestnut-collared Longspurs in northern and eastern parts of range.	Identify potential critical habitat in the mesic parts of range where there is woody encroachment.	March 2020
Investigate effects of exotic vegetation on density and reproductive success.	Determine whether critical habitat includes non-native or semi-natural grassland.	March 2017

7.3 Activities Likely to Result in the Destruction of Critical Habitat

Destruction is determined on a case-specific basis and may depend on the timing of the disturbance. Destruction would result if part of the critical habitat were degraded, either temporarily or permanently, such that it would not serve its function when needed by the species. Destruction may result from single or multiple activities at one point in time or from the cumulative effects of one or more activities over time. Activities described in Table 6 outline examples of activities likely to cause destruction of critical habitat for Chestnut-collared Longspurs; however, destructive activities are not limited to those listed.

Critical habitat for Chestnut-collared Longspurs may be destroyed by anthropogenic activities that have the following effects (see Davis et al. 1999, Sutter et al. 2000, Davis 2005, Kalyn Bogard and Davis 2014, Henderson and Davis 2014):

- loss of native vegetation
- deliberate establishment and growth of woody vegetation
- deliberate planting of exotic plant species (e.g. Crested Wheatgrass, Smooth Brome Grass (*Bromus* sp.), alfalfa (*Medicago* sp.), Sweet Clover (*Melilotus* sp.))
- establishing anthropogenic structures on critical habitat

Activities required to operate, inspect, or maintain, existing facilities and infrastructure, which are not critical habitat but may be adjacent to it, are not likely to result in the destruction of critical habitat. In addition, construction or repair of anthropogenic structures required to improve or maintain the condition of critical habitat, are not likely to destroy critical habitat. Examples of such activities include:

- Operation and maintenance of existing fence lines, shallow water pipelines, dugouts, salting locations, prairie trails for vehicles including two-rut trails, and emergency fireguards.
- Prescribed burns (with consideration of timing and extent).

Table 6. Activities Likely to Result in the Destruction of Critical Habitat

Description of Activity	Description of effect in relation to function loss	Details of effect
Conversion of native prairie to non-native grassland	Compared to native grasslands, non-native grasslands may have lower invertebrate biomass and potentially deficient food resources, and so are of lower habitat quality. Decreased food availability may result in poor reproductive success due to lower nest survival, decreased nestling growth rates, and lower weights at fledging, which could lead to higher post-fledging mortality.	Related IUCN Threat # 2.1. This activity is a widespread threat that is of high concern. It must occur within the bounds of critical habitat to cause destruction, is a direct effect, and could cause destruction at all times of the year.
Conversion of native prairie to cropland	Conversion of native grasslands to cropland reduces the amount of habitat available for Chestnut-collared Longspurs. Chestnut-collared Longspurs tend to avoid cropland during the breeding season and reproductive success is likely low for Chestnut-collared Longspurs that attempt to nest in cropland.	Related IUCN Threat # 2.1. This is a widespread threat that is of high concern. It must occur within the bounds of critical habitat to cause destruction, is a direct effect, and could cause destruction at all times of the year.
Construction of roads, including paved, gravel or dirt surfaces of > 2 m width with ditches or	Road construction may result in the destruction and degradation of native grassland habitat, the invasion of native prairie by exotic plants, alterations to the activities, behaviour, or distribution of	Related to IUCN Threat # 4.1. This is a widespread threat that is of low concern. It must occur within the bounds of critical habitat or in close proximity to it to cause destruction. It

raised road bed	predators, and disruption or alteration to adjacent vegetation structure and composition. Chestnut-collared Longspur abundance is reduced along roads.	is a direct effect, and could cause destruction at all times of the year.
Prolonged over-grazing (excessively high intensity, duration, and/or frequency of grazing)	Over-grazing may reduce habitat quality by altering the vegetation structure and community to the point where it is no longer favoured by Chestnut-collared Longspurs.	Related to IUCN Threat # 2.3. This is a widespread threat that is of high concern. It must occur within the bounds of critical habitat to cause destruction. Effects are predominantly cumulative; it would likely take repetitive occurrences to cause destruction of critical habitat. The activity could cause destruction at all times of the year.
Construction of infrastructure, including oil and gas wells, gathering system pipelines, and buildings.	Anthropogenic infrastructure placed on native grassland excludes longspurs from using habitat directly associated with the infrastructure. Chestnut-collared Longspurs may avoid habitat near gas wells.	Related to IUCN Threat # 3.1. This is a widespread threat that is of high concern. It must occur within the bounds of critical habitat to cause destruction. Effects are direct and cumulative. The activity could cause destruction at all times of the year.

8. Measuring Progress

The performance indicators presented below provide a way to define and measure progress toward achieving the population and distribution objectives.

- The trend of the Canadian Chestnut–collared Longspur population is stable or increasing based on the BBS (2016-2030) trend data.
- The Canadian Chestnut-collared Longspur population size increases to the levels recorded in the 1980s. Mean abundance per BBS route should be at or above the population objective by 2045.
- The Canadian Chestnut-collared Longspurs occupy a similar distribution to that in the 1980s. Chestnut-collared Longspurs are recorded along, or near routes where surveyors recorded them in the 1980s by 2045.

9. Statement on Action Plans

An action plan has been completed by Environment and Climate Change Canada, Canadian Wildlife Service, for the South of the Divide region of southwest Saskatchewan (Environment and Climate Change Canada 2016). Although Chestnut-collared Longspur is not included in the action plan, the plan is extremely relevant to the species. Environment and Climate Change Canada will include the Chestnut-collared Longspur in an amendment to the action plan within five years of posting this recovery strategy on the SAR Public Registry. Additional action plans will be initiated for other regions or jurisdictions that are important for the species.

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Appendix A: Effects on the Environment and Other Species

A strategic environmental assessment (SEA) is conducted on all SARA recovery planning documents, in accordance with the *Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals*[5]. The purpose of a SEA is to incorporate environmental considerations into the development of public policies, plans, and program proposals to support environmentally sound decision-making and to evaluate whether the outcomes of a recovery planning document could affect any component of the environment or any of the Federal Sustainable Development Strategy's[6] (FSDS) goals and targets.

Recovery planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that strategies may also inadvertently lead to environmental effects beyond the intended benefits. The planning process based on national guidelines directly incorporates consideration of all environmental effects, with a particular focus on possible impacts upon non-target species or habitats. The results of the SEA are incorporated directly into the strategy itself, but are also summarized below in this statement.

This recovery strategy will clearly benefit the environment by promoting the recovery of the Chestnut-collared Longspur. The potential for the strategy to inadvertently lead to adverse effects on other species was considered. The SEA concluded that this strategy will clearly benefit the environment and will not entail any significant adverse effects. The reader should refer to the following sections of the document in particular: Habitat and Biological Needs and Broad Strategies and General Approaches to Meet Objectives.

Recovery efforts that are designed to conserve and restore native prairie or create grassland habitats could benefit a wide variety of grassland species. Specifically, protection and proper management of native prairie will also benefit other federally listed grassland species, such as Sprague's Pipit, Burrowing Owl, Ferruginous Hawk (*Buteo regalis*), Long-billed Curlew, Swift Fox, and Greater Sage-Grouse (*Centrocercus urophasianus*). However, the specific requirements of the Chestnut-collared Longspur (with regards to elimination of woody vegetation) may conflict with some other listed species, such as Loggerhead Shrikes (*Lanius ludovicianus*). Moreover, grassland species requiring particularly tall and dense or short and sparse vegetation may be negatively affected to some degree by habitat management programs directed at Chestnut-collared Longspur.

[5] www.ceaa.gc.ca/default.asp?lang=En&n=B3186435-1
[6] www.ec.gc.ca/dd-sd/default.asp?lang=En&n=F93CD795-1