

FACT SHEET McCown's Longspur (*Rhynchophanes mccownii*)

Breeding Distribution: McCown's Longspur (MCLO, Fig. 1) is a grassland-dependent songbird that breeds exclusively on the western Great Plains (1). The breeding range extends north from CO into WY, NE, MT, ND, and southern Canada (Fig. 2). Most MCLO in CO breed in the northeast part of the state, on or near the Pawnee National Grassland (PNG; Fig. 2).

Among North American grassland birds, MCLO have perhaps the most restrictive habitat requirements (2), which may explain sharp population declines (3). They are primarily found in shortgrass steppe habitat and not in habitats (such as fallow crop fields) that appear qualitatively similar to preferred habitat (1). MCLO require low, sparse vegetation, and their abundance increases with cover by plains pricklypear (2). Such conditions are generated through heavy grazing, and it is thought that MCLO coevolved with grazing by bison (4). Domestic cattle can produce similar habitat, and MCLO are often found in areas with heavy grazing by cattle (5).



Figure 1. McCown's Longspur is a small songbird in a family of grassland- and tundra-dependent species (Calcariidae). Although most grassland bird populations are on the decline, MCLO has experienced sharper declines than most (3), likely due to its restrictive habitat requirements (2).

Photo: Amber Carver

McCown's Longspur Breeding Season Distribution

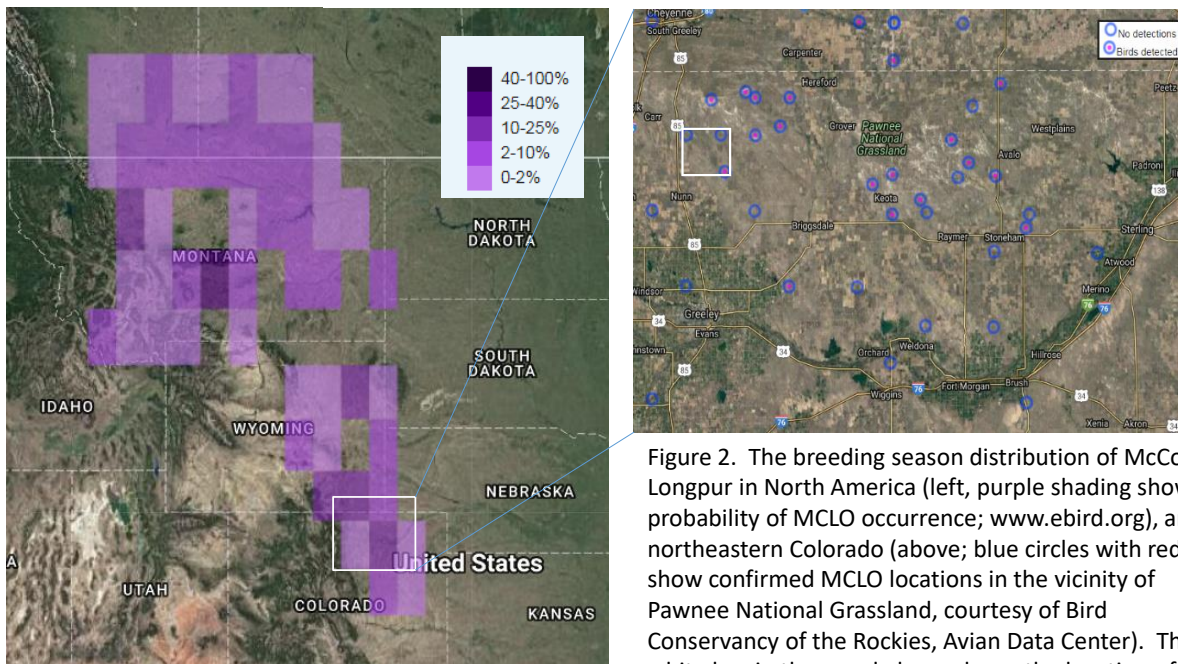


Figure 2. The breeding season distribution of McCown's Longspur in North America (left, purple shading shows probability of MCLO occurrence; www.ebird.org), and in northeastern Colorado (above; blue circles with red show confirmed MCLO locations in the vicinity of Pawnee National Grassland, courtesy of Bird Conservancy of the Rockies, Avian Data Center). The white box in the panel above shows the location of the Central Plains Experimental Range.

The Central Plains Experimental Range (CPEER) is located on the western edge of PNG (Fig. 2). This is a core breeding area for MCLO, and they have nested at the CPEER for at least the past 50 years (6). It has been suggested that MCLO is nomadic, based on fluctuations in local abundance. However, at least some individuals at the CPEER are extremely site-faithful regardless of habitat variability. This underscores the importance of providing consistent high-quality habitat in pastures where MCLO have historically nested.

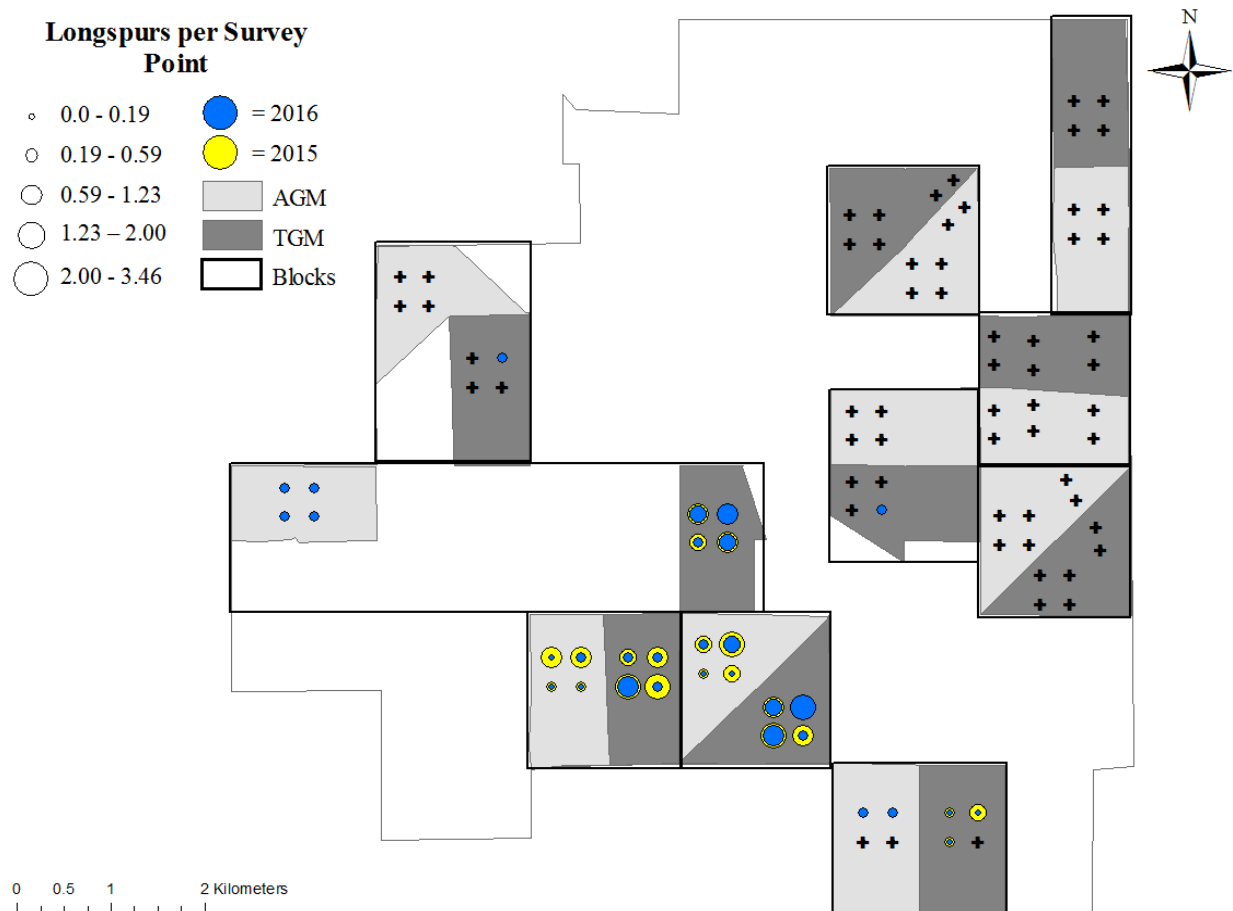


Figure 3. MCLO abundance on the CPEER in 2015 (yellow) and 2016 (blue). Circles represent point count locations, where an increasing size of circles indicates higher MCLO abundance at those points. Black crosses represent point count locations where no MCLO were detected in either year.

Distribution and Abundance at CPEER: While local MCLO populations fluctuate from year to year, bird monitoring within the CARM experiment during 2013 – 2017 has consistently documented MCLO in the southwestern half of CPEER. The highest densities occur in sections 24, 25, and 26 (Fig. 3). Models of MCLO distribution show they are most abundant in upland topographic positions associated with the Loamy Ecological Site. MCLO are consistently rare or absent on Sandy and Salt Flat Ecological Sites associated with floodplains and terraces adjacent to Owl Creek, which often support vegetation that is taller than typical MCLO breeding habitat (see below). However, even when fire and grazing management have significantly reduced vegetation height on these ecological sites (e.g. patchburn grazing in Saltflat in 2015 and

Snowfence in 2017), we have not documented use by MCLO. Furthermore, following patchburn grazing in Nighthawk in 2015, we did not document an increase in MCLO abundance in 2016 or 2017. MCLO declined from 2015-2016, in association with pastures 25NW, 26W, and 31W being rested in 2015.

Timing of Breeding: Nesting at CPER begins in early May and continues through early July (7). Nests are typically incubated by the female for 11 days, followed by a 7-day period when hatchlings are fed in the nest until they can run and/or attempt flight. Adults that nest early or lose their first nest often initiate a second nest.

Breeding Habitat in Shortgrass Steppe:

Territories. MCLO nests typically occur in pastures with short vegetation (blue grama, buffalo grass) and less so in pastures with tall vegetation (midgrasses and shrubs) (Table 1). Canopy cover in pastures where MCLO nest is shorter, sparser, and contains a greater proportion of dead vegetation than canopies in pastures where they do not nest. Nest density decreases sharply in areas with increasing cover of cool-season perennial grasses. Mean VOR in MCLO territories during 2011 (average precip) was ~3 cm (17). During a series of both wet and average precipitation years (2014-17), mean VOR in MCLO territories increased to 4.8 cm.

Vegetation structure and composition at the CPER are influenced strongly by elevation, soil, and annual weather. These environmental attributes generally cannot be modified, but knowledge about how they influence habitat should inform management protocols.

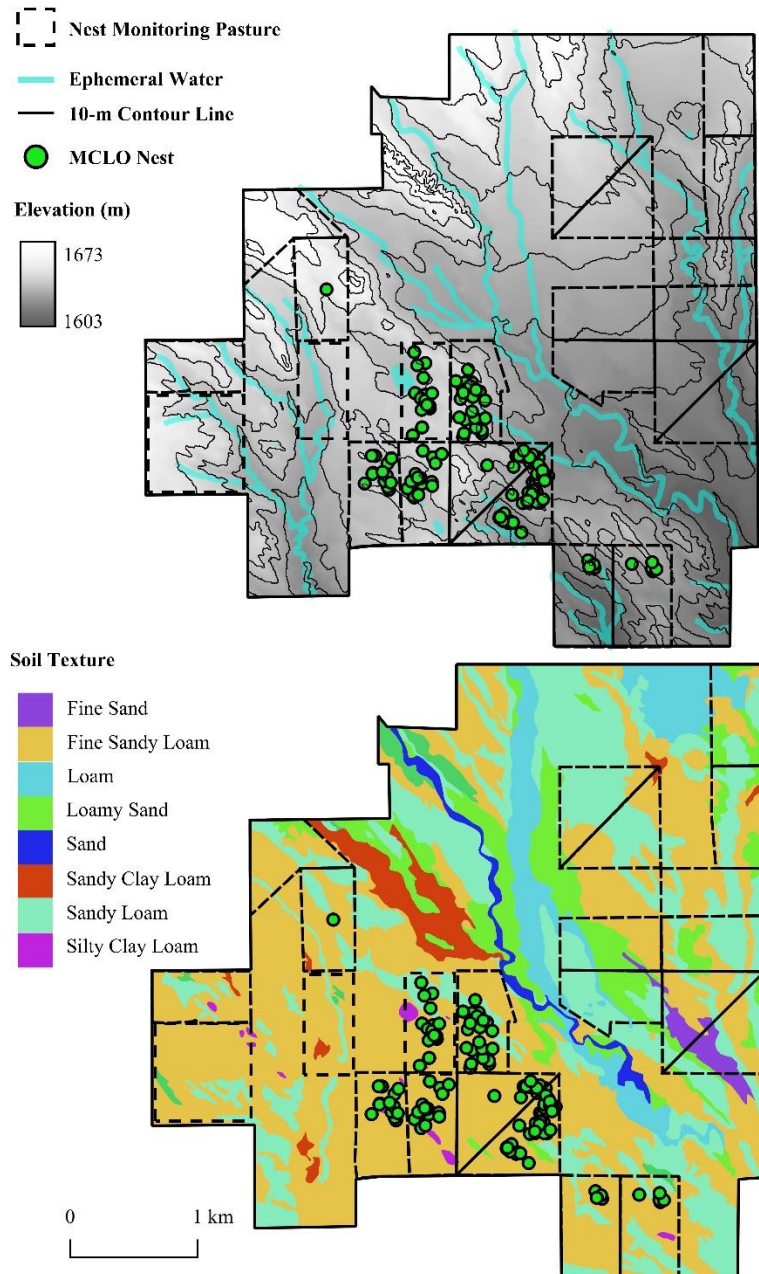


Figure 4. Position of MCLO nests in relation to elevation and soil texture at the CPER. MCLO consistently nest in the same few pastures, which are $\geq 1,619$ m. Soil texture in these pastures is nearly uniform and is dominated by fine sandy loam.

Most MCLO territories at CPER are in upland pastures with well-drained, fine sandy loam soil (Fig. 4), which primarily supports blue grama, buffalo grass, and plains pricklypear.

Nests: Nests consist of a shallow depression in the ground (Fig. 5), typically placed next to an individual plant or clump that provides partial protection from sun during the hottest part of the day (8). Vegetation at the nest is similar to that in the territory, except MCLO often place the nest bowl next to a clump of cactus or shortgrass (Table 1). In addition, vegetation next to MCLO nest bowls often includes some midgrass or forb cover (74% of nest sites had one or more of these in the canopy), but these plants usually constitute a low proportion of the total nest-site canopy cover (mean of 10% for forbs and midgrass combined). MCLO nest sites are highly exposed, with 19% of the nest site having no cover.



Figure 5. Typical MCLO nest. Nest-sites are dominated by low-stature grasses and dead vegetation, with high exposure.

Sources of nest mortality: Nest survival rates varied annually and were generally low (Table 2). The lowest survival rate occurred in the drought of 2012, when vegetation height in much of the landscape was shorter than what MCLO typically select (17). Across all years, depredation accounted for 85% of nest failures, potentially due to snakes (9), thirteen-lined ground-squirrels (10), skunks (11), badgers (12), and swift foxes (13). During the bird breeding season at CPER, songbird feathers can usually be found at the edges of burrowing owl nest holes, suggesting owls may be an important cause of mortality for adult songbirds.

Nests are smaller than the diameter of the hoof of yearling cattle, which may prevent trampling damage. Nest monitoring during 2011 – 2017 has not documented any losses to cattle trampling at CPER.

Table 1. Comparison of % canopy cover of vegetation at nests, territories, and portions of the study that were not used for nesting by McCown's Longspur at CPER.

| Vegetation Selected | Example Species | Nest Site | Territory | Areas Not Used by MCLO |
|------------------------------|---------------------------|------------------|------------------|-------------------------------|
| Perennial shortgrasses | blue grama | 38.0 (16.5) | 33.2 (8.7) | 23.6 (12.3) |
| Cool-season annual grass | six-weeks fescue | 9.5 (16.1) | 9.0 (12.0) | 4.3 (5.6) |
| Cactus | plains prickly-pear | 2.7 (5.7) | 1.2 (0.9) | 1.5 (0.8) |
| Forbs | scarlet globemallow | 4.1 (9.5) | 5.3 (7.9) | 3.8 (4.1) |
| Vegetation Avoided | | | | |
| Perennial mid-height grasses | squirrel-tail bottlebrush | 6.6 (5.9) | 6.6 (3.66) | 15.6 (6.6) |
| Subshrubs and shrubs | fringed sagewort | 1.3 (2.2) | 1.1 (0.6) | 1.8 (0.9) |

During our study, weather was rarely a direct source of nest or parent mortality. However, a severe hailstorm in 2014 destroyed at least 75 nests from 5 bird species, including the only two

known MCLO nests that were active at the time (14). Hail likely causes more nest mortality for MCLO when it occurs during peak nesting. Because MCLO nest in such sparse vegetation, there is no direct way to manage for hail mitigation. However, by providing long-term suitable habitat conditions, it should be possible to promote population recovery after severe weather events. Daily weather could affect depredation risk in grassland birds by influencing predator behavior or food availability (15, 16), but weather other than hail did not consistently affect DSP at the CPER.

MCLO nests near shrubs or subshrubs have greater predation risk (7), which could be linked to the shelter that shrubs provide for snakes and ground squirrels (9). Cover by warm-season perennial shortgrasses and dead vegetation within MCLO territories are key influences on reproductive success (Fig. 8). The former has a strong negative impact on DSP, while the latter has a more modest positive impact on DSP. At the nest site, DSP decreases with VO and total canopy cover. In the territory, DSP increases with VO and total canopy cover. Collectively, these relationships suggest MCLO reproductive success is highest in pastures with low VO that are dominated by but have modest cover of warm-season shortgrasses.

Table 2. Summary of weather and nesting outcomes for each year of the study.

| Year | Total Precip. (inches, Mar-Jun) | # of Nests | Daily Survival Probability (SE) | Estimated Proportion Fledging \geq 1 chick |
|-------------|--|-------------------|--|--|
| 2011 | 6.9 | 69 | 0.923 (0.010) | 17% |
| 2012 | 1.6 | 64 | 0.889 (0.014) | 8% |
| 2014 | 6.0 | 27 | 0.918 (0.019) | 22% |
| 2015 | 9.3 | 36 | 0.915 (0.018) | 20% |
| 2016 | 4.7 | 19 | 0.939 (0.018) | 32% |
| 2017 | 7.0 | 50 | 0.906 (0.015) | 17% |

The effect of dead vegetation on MCLO nest survival is probably tied to weather. Hot, dry weather during the growing season can decrease canopy cover and height—and increase cover by dead vegetation—the following year. Under these conditions, MCLO reproductive success is relatively high.

Recommendations for habitat management:

Where: Upland pastures dominated by the loamy plains ecological site (fine sandy loam soils) with a prior history of MCLO breeding activity. Prioritize Hilltank (Section 26), Crossroads (Section 25), and South (section 31). Outside of the AGM pastures, 24W and 23E (long-term heavy grazing pasture) support high MCLO nest densities.

When: Emphasize shorter vegetation structure after average to above-average precipitation years and below-average temperature years, with heavier grazing. MCLO appear to be compatible with but do not require intensively grazed shortgrass in dry/drought years (17).

What: Specific goals should include: 1) reducing cover by midgrasses, 2) decreasing VO and total canopy cover, and 3) reducing vegetation cover through focal grazing and/or fire. To provide opportunities for re-nesting, maintain stable habitat conditions throughout the course of each breeding season.

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