

# Mountain Plovers in Thunder Basin National Grassland

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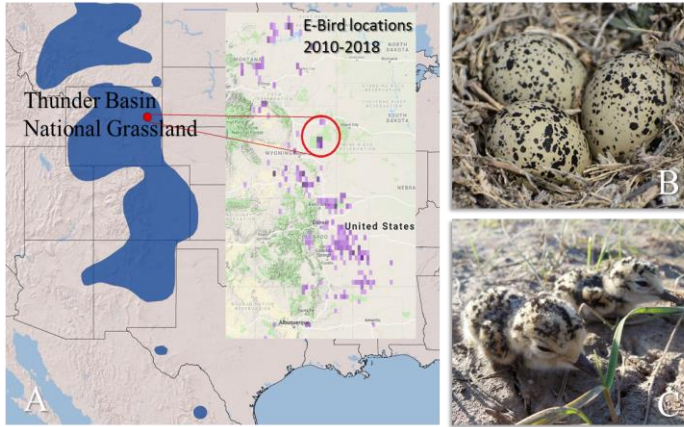


Figure 1. Map of mountain plover breeding range (A), with inset representing current plover distribution across their range (A, inset; purple shading represents localities with breeding plovers, 2010 – 2018 eBird data). Plovers rely on crypsis (camouflage) in eggs (B) and chicks (C) to avoid predators. Photos J. Hennig and C. Duchardt

**Background:** The mountain plover (*Charadrius montanus*) is native to the Great Plains and Intermountain West (Fig. 1). Like many grassland birds, it is adapted to intense disturbance from fire, large mammal grazing, and burrowing mammals like black-tailed prairie dogs (*Cynomys ludovicianus*; Brawn et al. 2001). While plovers can be found in many areas with ample bare ground (e.g., crop fields, recent burns, high desert), they are often associated with black-tailed prairie dog colonies across the western Great Plains. Thunder Basin represents important breeding habitat for this rare bird.

## Conservation Priority:

- *Wyoming Species of Greatest Conservation Need*
- *Forest Service Tier I Sensitive Species*
- *IUCN Redlist – Near-Threatened*
- *Partners in Flight (PIF) – Watchlist Red*

Mountain plovers are in decline due to habitat loss and alteration of historic disturbance regimes, including reductions in black-tailed prairie dogs throughout their range. Plovers are found at lower densities than songbirds. One important breeding location within their range is the Thunder Basin National Grassland (TBNG), where average on-colony densities are similar to other plover hotspots within their range (e.g., Dinsmore et al. 2003, Pierce 2017).

## Prairie dogs and mountain plovers:

Prairie dog colonies are important for providing mountain plover breeding habitat within the Thunder Basin National Grassland (TBNG). In a study conducted throughout the northern Great Plains in the 1990s, mountain plovers primarily occurred on active prairie dog colonies (average of 6.2 plovers/mi<sup>2</sup> on colony in Wyoming and Montana); no mountain plovers were observed outside prairie dog colonies at TBNG, and only three total were observed outside colonies in Montana (Augustine and Baker 2003). During recent surveys on TBNG designed to allocate survey effort equally between prairie dog colonies and undisturbed sites, breeding plovers were observed almost entirely on-colonies (one observation off-colony), and were typically not detected in undisturbed habitats or historic wildfires (Fig. 2a, Duchardt et al. 2018). After sylvatic plague struck prairie dog colonies in late-summer 2017, killing the majority of prairie dogs, plover numbers plummeted in summer 2018, declining by a factor of 15 compared with numbers observed from 2015–2017. Although birds have also been observed nesting off-colonies on clayey sites with little grass and extensive bare ground

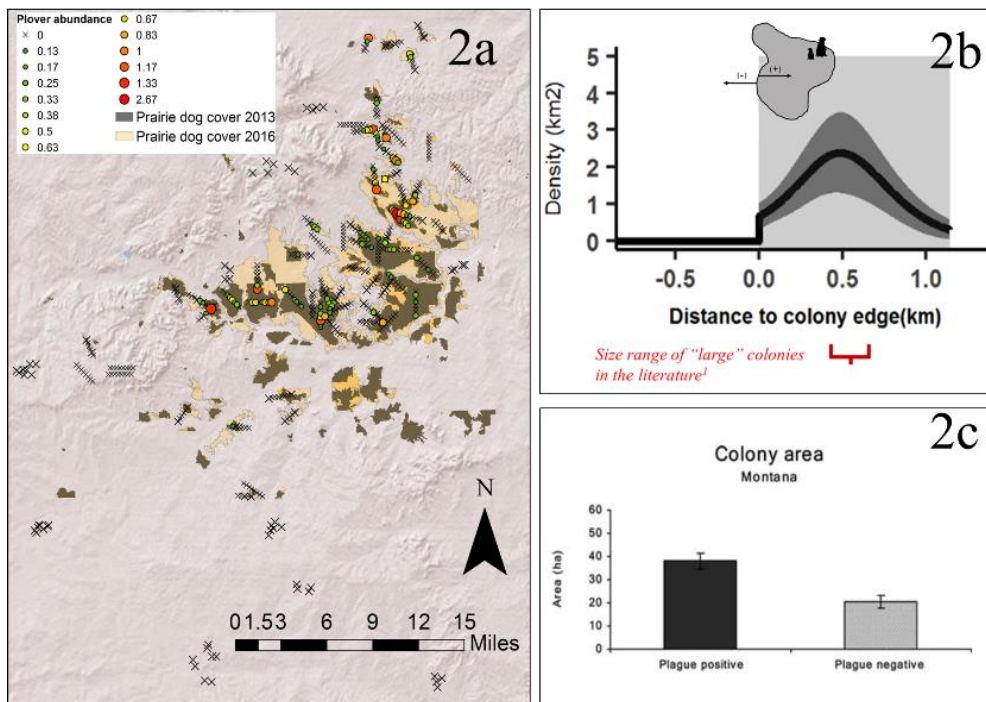
## Mountain Plover FAQ

- Q.** Are plovers *only* found on prairie dog colonies?  
**A.** No. In Thunder Basin, prairie dog colonies *are* most important during the nesting season (late April–mid June). Birds rely on this habitat throughout the breeding season (April–July), but after eggs hatch, will also take chicks to forage and shelter in sagebrush or taller grass.
- Q.** Can we detect plovers off colony?  
**A.** Yes! Although plovers are more difficult to observe in dense vegetation, we can easily detect similar species that generally breed in thicker vegetation (e.g., upland sandpiper). We also rely on bird vocalizations during surveys, which are not affected by vegetation height.
- Q.** Where do plovers spend the rest of the year?  
**A.** Many individuals over-winter in southern California or Mexico, but we re-captured a tagged bird from TBNG that overwintered in southern Texas!

(Parrish Master's Thesis, 1988, Parrish et al. 1993), observed densities outside colonies have been far lower (0.21–0.26 birds/mi<sup>2</sup> [Parrish et al. 1993] as compared 4.7–9.7 birds/mi<sup>2</sup> [Duchardt et al. 2019, Duchardt et al. in prep]).

## The “Goldilocks effect” and colony size:

Although prairie dogs are important for mountain plovers, preliminary research indicates you can have “too much of a good thing.” Surveys over the past four years at TBNG indicate mountain plover density was greatest on portions of colonies ~0–0.5 miles (0–800 m) from the colony edge, whereas plover density is lower in portions of the colonies >0.5 miles from the edge (Fig. 2b). Although we do not yet know the reason, one explanation is that colony edges provide better cover for brood rearing and thermoregulation (Graul 1975, Shackford 1996, Schneider et al. 2006). Increased distance to these resources may increase risks associated with reaching them, especially for unfledged chicks. How the results portrayed in Fig. 2b translate into a particular colony size depends on colony geometry, but as a first approximation, a circular colony with radius of 0.5 miles corresponds to 497 acres (201 ha). Other studies in Colorado and New Mexico also found that mountain plover density was greater on colonies in the range of 203 – 1190 acres compared to smaller colonies (Gougen et al. 2012; Augustine and Skagen 2014), but these studies did not include individual colonies exceeding 1200 acres—some colonies exceeded 9900 acres in the TBNG during 2015–2017, with the complex containing more than 37000 acres. Indirectly, complexes of very large colonies may also negatively impact plovers because of increased sylvatic plague spread in these areas (Fig. 2c, Collinge et al. 2005.)



**Figure 2. The relationship between mountain plovers and prairie dogs in the TBNG.** (A) Distribution and abundance of mountain plovers in the TBNG study area, 2016–2017. (B) Response of plover density to distance to colony edge 2015–2017. Red brackets indicate the average colony radii among large colonies in other studies (Duchardt et al. 2019). (C) From Collinge et al. 2005. Increased probability of sylvatic plague in larger colonies in MT.

## SUMMARY

- Mountain plover abundance is tightly tied to prairie dog disturbance in the TBNG
- Plover density was maximized on portions of colonies within 0.5 miles of the colony edge, and is lower in portions of colonies >0.5 miles from the edge
- Long-term persistence of mountain plovers in the TBNG landscape requires consideration of the amount and configuration of prairie dog colonies, likely with complexes with multiple colonies between 200 and 1200 acres

## Further Reading:

- Augustine, D., and B. Baker. 2013. Associations of grassland bird communities with black-tailed prairie dogs in the North American Great Plains. *Conservation Biology* 27:324–334.
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- Collinge, S., W. Johnson, and C. Ray. 2005. Landscape structure and plague occurrence in black-tailed prairie dogs on grasslands of the western USA. *Landscape Ecology* 20:941–955.
- Duchardt, C.J., Augustine, D.M., Porensky, L., and Beck, J.L. 2018. Disturbance shapes grassland bird communities on a grassland-sagebrush ecotone. *Ecosphere*, 9(10), e02483.
- Duchardt, C. J., Augustine, D. J., & Beck, J. L. (2019). Threshold responses of grassland and sagebrush birds to patterns of disturbance created by an ecosystem engineer. *Landscape Ecology*.
- Goguen C.B. 2012. Habitat use by mountain plovers in prairie dog colonies in northeastern New Mexico. *Journal of Field Ornithology* 83:154–165.
- Parrish et al. 1993. Mountain plover habitat selection in the Powder River Basin, Wyoming. *Prairie Naturalist* 25(3). 219–226