

Annual Interim Report: F19AP00849 Ungulate Movements and Spatial Ecology in Montana
Reporting Period: October 1, 2022 – September 30, 2023
State: Montana
Agency: Montana Fish, Wildlife and Parks

Background and Purpose

In 2019, Montana Fish, Wildlife and Parks (MFWP) Statewide and Regional Wildlife Program Managers identified two priority ungulate populations where movement data were needed to inform ungulate habitat management. The purpose of this project is to collect ungulate movement data in these two populations:

- 1) Devils Kitchen elk,
- 2) Carbon County mule deer

This information will inform ungulate habitat and management decisions, and enhance the management of Montana's ungulate populations, their habitats, and the public's opportunity to enjoy them.

Location

The Devils Kitchen elk data collection is occurring in Cascade and Meagher Counties, and the Carbon County mule deer data is being collected in Carbon County, Montana.

Objective 1: *Collect elk movement data in the Devils Kitchen area.*

The primary information need for elk in the Devil's Kitchen area is to delineate current seasonal ranges and movement corridors, and document elk movements during the hunting seasons. The elk population far exceeds numerical population objectives, and recent observations regarding changing elk distributions and timing of seasonal movements has resulted in local conflict and controversy, challenging the community's ability to develop effective harvest and habitat management strategies. Recent elk GPS movement data do not exist in this area, and the only existing movement data are from VHF collars deployed in 1990, making decisions regarding elk habitat and harvest management challenging. Fine-scale location data will identify important seasonal habitats and movement corridors, as well as provide information regarding the timing of movements to refine harvest management strategies that maximize the effectiveness of harvest regulations in achieving harvest objectives in this area. This project funded the initial captures and collar deployments of elk in this study area during FY20. However, subsequent research efforts and expenses for that project have instead been managed and spent through a second research grant (W-179-R | F20AF10828-00; *Elk habitat management in Montana*). For the current reporting period, please see Proffitt et al. (2023) for updated results regarding elk in the Devil's Kitchen study area:

Proffitt K, Rotella J, Bealer N. 2023. Elk habitat management in Montana W-179-R. Annual interim report, December 2023. Montana Fish, Wildlife and Parks, Bozeman.

Objective 2: *Collect mule deer movement data in southern Carbon County*

We used helicopter netgunning to capture 49 female and 21 male mule deer in the Carbon County study area during winters of 2020 and 2021 (Figure 10). Each mule deer was outfitted

with a Lotek LiteTrack collar programmed to collect locations every 2-hours for 3-years. Location data are uploaded daily through the Iridium satellite service. Collars transmit a mortality notice if the collar is stationary for more than 6 hours.

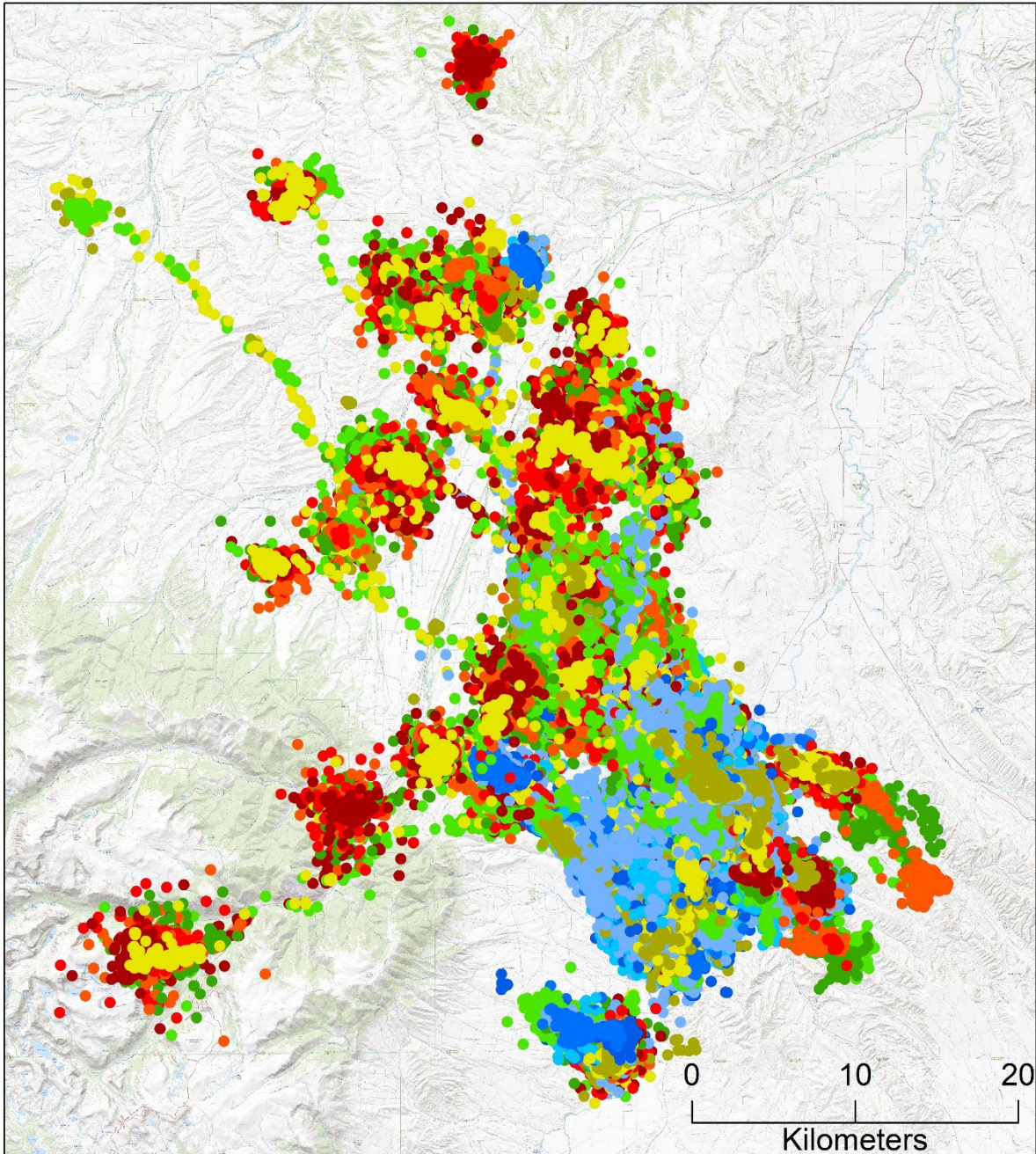


Figure 10. Net-gunning mule deer in the Carbon County study area, January, 2021. Photo by Shawn Stewart.

During 2023, the first cohort of collars deployed in 2020 reached the end of their programmed life and dropped-off of animals using 3-year timed release mechanisms. As of 29 November 2023, 8 of 49 female and 0 of 21 male deer remain alive with functioning collars for continued movement monitoring.

We have collected a total of 513,174 GPS locations from collared mule deer to date (Figures 11, 12). Mule deer were captured on winter range within 1–4km of the Clark’s Fork of the Yellowstone River near Belfry, Montana and south to the Wyoming border. In the subsequent summers of 2020–2022, mule deer in this population were partially migratory. Some deer remained resident in the same area with overlapping winter and summer ranges (Figure 11, 12, 13). However, many others migrated to distinct summer ranges, predominately to the west and northwest, with the longest migrations being approximately 40–45km straight-line distance (Figure 11, 12, 13). Generally, there was no clear distinction in migration patterns between males and females. There appeared to be variation in the proportionate use of migration paths, such that some areas were used by a single deer while others by multiple deer during migration (Figure 13).

Additional summary and analyses of mule deer spatial ecology and demography will be provided in the project final report, due 30 June 2024.

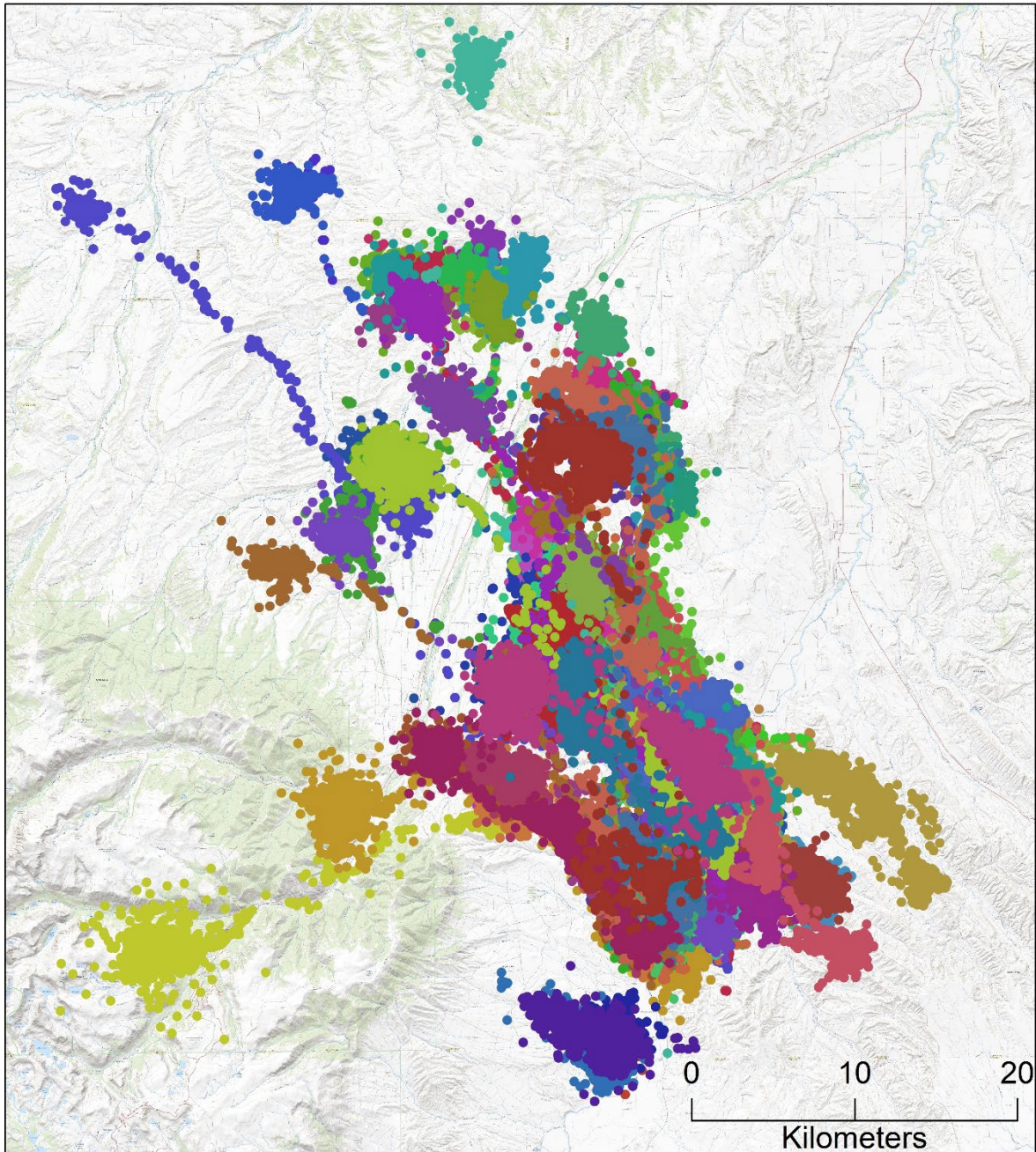


Mule deer GPS data, by individual

- | | | |
|------------|----------|-------------|
| ● January | ● May | ● September |
| ● February | ● June | ● October |
| ● March | ● July | ● November |
| ● April | ● August | ● December |



Figure 11. GPS location data spanning March 2020–October 2022, color-coded by month, collected from collared 49 female and 21 male mule deer in the Carbon County study area, near Red Lodge, MT.

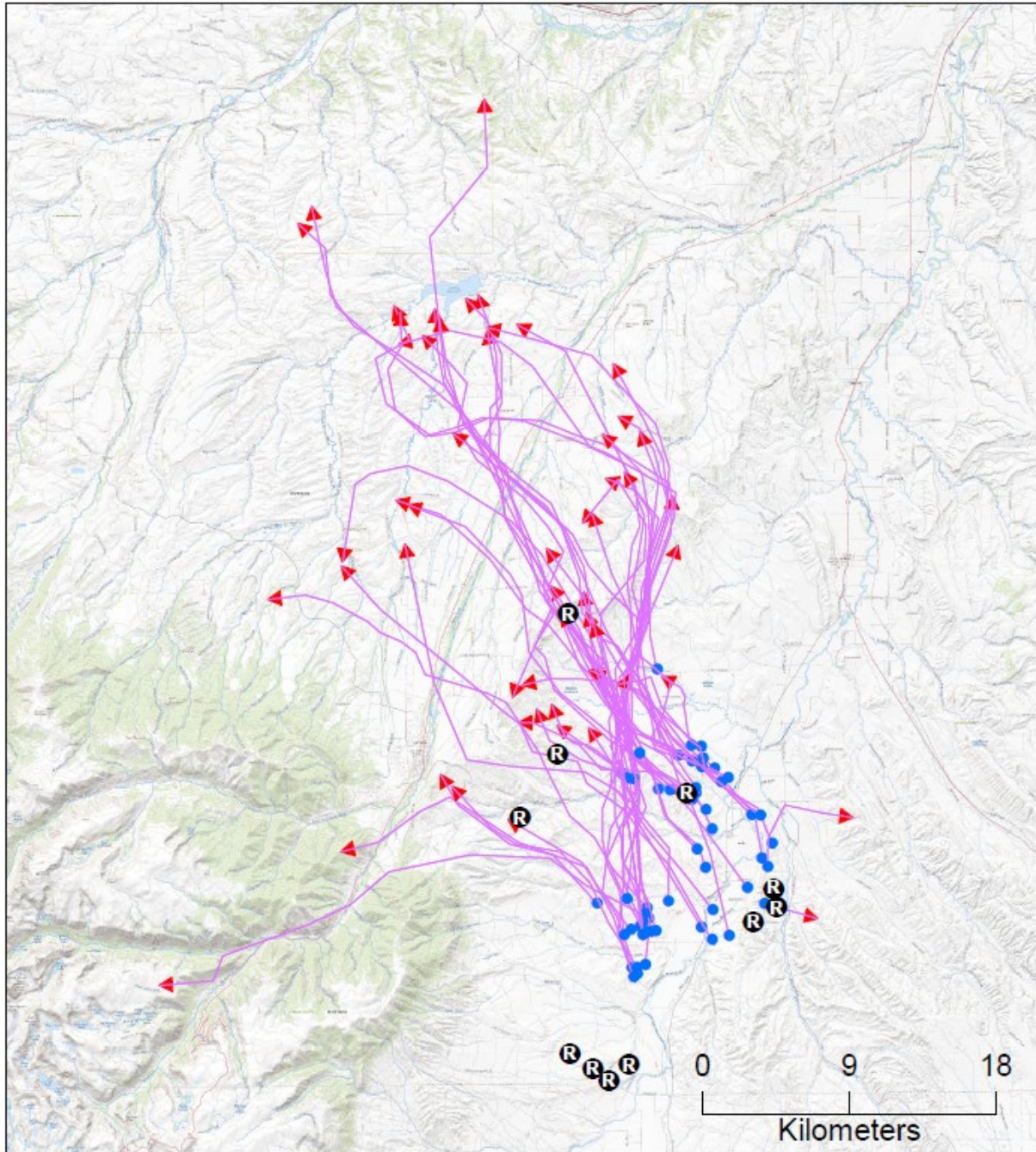


Mule deer GPS data, by individual

- CCO_001
- ...
- ...
- CCO_070



Figure 12. GPS location data spanning March 2020–October 2022, color-coded by individual deer, collected from collared 49 female and 21 male mule deer in the Carbon County study area, near Red Lodge, MT.



- resident_centroids
- cco_migrations



Figure 13. Hand-sketched (informal) spring migration paths following mule deer GPS location data, March 2020–December, 2021, in the Carbon County study area, near Red Lodge, MT. Summer range centroids for deer that did not migrate are shown in black dots, labelled “R”, and this map has not been updated for 2022-2023 monitoring periods.