Evaluation of Iridium-transmitted GPS Telemetry Data for Use in Assessments of Wildlife Space Use

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Remote transmission of GPS data from free-ranging animals provides insurance against data loss and near real-time knowledge of animal location. Miniaturization of batteries and processors have made this technology accessible for smaller-bodied animals, which behave and use space differently than larger-bodied animals. This feature of small animals could result in biased transmitted datasets which could propagate to the inferences we draw from movement behavior for management and conservation. Using free-ranging animals and stationary trials, we investigated the quality of data transmitted via the Iridium network relative to the stored-on-board (SOB) dataset and determined whether inferences regarding behavior and space use are dependent on the quantity of data recovered. We also determined whether Iridium transmission rates were collar-specific and therefore repeatable. We deployed Lotek Litetrack-150 collars on 10 free-ranging raccoons in Manitoba, Canada in spring and summer 2019 and conducted stationary trials outside Chicago, IL in spring 2020. We found no difference in precision (DOP) or quality of data (3D locations), estimated size of the home range, or habitat use ratios between the SOB and Iridium-transmitted datasets. However, only home range sizes estimated using an autocorrelated kernel density estimate were consistent across all data recovery levels. Transmission rates during the stationary field trials were variable and not a repeatable element of our collars. This work highlights the necessity of pre-deployment evaluation and error calibration of collars, as well as the importance of using analytical methods that account for the autocorrelated nature of clustered, Iridium-transmitted data in wildlife studies.