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Research Outline of Cassin’s Sparrow Study

Background:

Cassin’s Sparrow, *Peucaea cassinii,* is a little studied species whose migratory patterns continue to puzzle biologists. These birds remain elusive for much of the year with the exception of the impressive song and flight display given by males during their breeding season. Despite the enthusiasm with which Cassin’s Sparrows defend their territories however, they rarely return to the same location in the following year.

Movement of these sparrows on a species-wide scale is also unusual. The approximate breeding range begins in ne. Colorado and extends south through e. New Mexico, w. Oklahoma, se. Arizona, Texas and northern Mexico. Movement within this range is sensitive to variation in summer rainfall, and the appearance or disappearance of large numbers of birds in certain years in unexpected areas isn’t uncommon.

Several hypotheses have been proposed to explain this behavior, including an east-to-west migratory pattern unique for North American sparrows, regional nomadism, and the attempt of failed breeders to succeed in new territories. These hypotheses have not acquired a substantial amount of direct evidence at this time, and so the mystery of what causes such low return rates in these sparrows remains.

Locations:

Three principle areas within the state of Oklahoma will be studied.

* Optima Wildlife Management Area

Once intended to be a lake, Optima WMA became instead a 4,333 acre expanse of mixed-grass prairie. The uplands of the area are characterized by shortgrass prairie species such as buffalo grass, blue grama and yucca. In the bottomlands tallgrass prairie species predominate, including big and little bluestem as well as Indiangrass. Located in Texas County, the area is 30 minutes east of Guymon.

* Rita Blanca Wildlife Management Area

Although broken up by privately owned land, Rita Blanca WMA covers 15,575 acres of southwestern Cimarron County in the farthest reaches of the Oklahoma panhandle. The area also extends into northern Texas and northeastern New Mexico. The shortgrass prairie in this region consists primarily of buffalo grasses, although yucca is also present. The area is around 30 minutes south of Boise City.

* Black Mesa State Park

The smallest of the three areas at 549 acres, Black Mesa is a dividing point where the Rocky Mountains merge into shortgrass prairie. Lake Carl Etling is located centrally in the park. Juniper trees and Cholla cactus are of particular interest in this area, as they are absent or marginally present in the other study sites. Also located in Cimarron County, the park is 45 minutes from Boise City.

Cassin’s Sparrows have been found to inhabit sections of all three sites. Variation in population abundance and choice of habitat within each area will be a focal point of this study.

Methods:

As of June 1, 2014, one survey has been taken in each of the three areas of interest. The surveys were set up as a grid system of points using Google Earth. Each grid was plotted as five parallel transects running in an east to west direction. Each transect consisted of five points, with 100m between each point. The transect lines were also spaced at 100m apart to create a square of 400m by 400m.

In order to better ascertain what habitat preferences the sparrows have when choosing a territory, the grids were plotted so as to contain vegetation predicted to be both favorable and unfavorable to the birds. The Optima WMA had been thoroughly scouted prior to creating a grid, and so a more balanced ratio of habitat was likely attained in that area. Rita Blanca WMA and Black Mesa State Park grids were placed based on terrain appearance on Google Earth.

Once plotted on Google Earth, the points were exported into Garmin BaseCamp and then loaded onto a Garmin Foretrex 301 GPS. The surveys began at Point 1 of Transect A, then continued in an east-to-west line through Points 2-5. At Point 5, surveyor walked 100m south to Point 6 on Transect B. Points 7-10 were completed in the same manner and opposite direction. Surveyor continued this zigzag pattern for Transects C-E.

Upon reaching each point, a Western Rivers Apache game caller (i.e. playback) was used to play the primary song of the Cassin’s Sparrow. This song was played once, followed by 30 seconds of observation. The sparrow’s call was then played once, followed by another 30 seconds of observation. Behavior of the sparrows was categorized from least to most aggressive response, **Fig. 1**. The distance (m) and angle (in 360° circle from central point with 0° in direction of current transect) of each bird was recorded as well. The playback was held at arm’s length, at full volume, and played with both speakers facing along the line of the transect. Song and call were exported to playback using Xeno-canto.

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| **Behavior** | **Code** | **Level of Aggression** |
| Distant song | DS | 1 |
| Chip notes | CN | 2 |
| Counter song | CS | 3 |
| Counter display | CD | 4 |
| Approach | APP | 5 |
| Circling the playback | CPB | 6 |
| Aggressive counter song | ACS | 7 |

**Table 1:** Table showing categorization of Cassin’s Sparrow behavior by level of aggression. Level 1 is least aggressive and Level 6 is most aggressive response.

In addition to the counts specific to Cassin’s Sparrows, general point counts were conducted at Points 1,3,5,11,13,15,21,23,25. Point counts lasted for three minutes each. Observations recorded included start time, cloud cover, wind speed, whether the bird was heard or seen, the distance (m) and the angle (in 360° circle from central point with 0° facing north).

Time between points averaged approximately 5 minutes and total time for each survey ranged from 2 to 3 hours.

Vegetation Surveys

At each sampling location we evaluated the vegetation at the spot as well as at 10m distances toward each cardinal direction using a Daubenmire sampling approach (1m2 plot). We recorded the estimated proportion of live grasses, live forbs/woody vegetation, standing dead plant material, bare ground, and vegetative litter. At each location we also took georeferenced photographs of the plot using a GPS-enabled digital camera (make/model?).

Furthermore, around each point we assessed the abundance of dominant types of structural vegetation (e.g., woody shrubs, yucca plants, etc.) according to height over or under 1m. To accomplish this, a pole was sunk into the ground at the survey location and to this a 10m string was tied at 1m above the ground. A technician then attached the other end of the string to a 1m tall pole and walked the circumference of the 10m radius circle while keeping the line taught at 1m above the ground. A second technician then walked up and down the string to record how many individual plants of each type the string either passed over (i.e., <1m height) or intersected (>1m height). The following classifications were noted (particularly because they had been suggested to be important territorial habitat components for Cassin’s Sparrow): yucca, sagebrush, sandplum, cholla, tree, or other type of shrub. For the latter, notes were taken about the species and it was identified where possible.

Adjustments for Future Surveys:

After running the initial three trial runs, several adjustments will likely be made in future surveys.

* The grid will be expanded to a 10x10 point plot.
* The general point counts will take place only at Points 1, 5, 13, 21, 25.
* Angle of Cassin’s Sparrow counts will have 0° facing north.

Initial Goals:

The early stages of this study will focus on forming a general idea of Cassin’s Sparrow abundance and territories in each of the three areas. Research into past Cassin’s Sparrow studies as well as vegetation surveys of the three regions will provide a foundation on which to build the current study. Color banding of males may provide greater accuracy in determination of sparrow territories.