Evaluating mechanisms for area sensitivity in density and occupancy in Bobolinks (*Dolichonyx oryzivorus*) in Massachusetts

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Summary:
We are studying habitat selection by grassland birds. Specifically, we are addressing the question of why there are fewer grassland birds per unit area present on small fields relative to large fields. Understanding the mechanism of this process is important for conservation, as it will either underscore the importance of preserving large fields or provide a means of managing small fields to be more suitable for grassland birds. We have been examining this question in Bobolinks, and have tested hypotheses relating to two specific mechanisms: 1. that Bobolinks select fields based on how open they are, rather than how large they are, and 2. That animals perceive a greater risk due to avian predators on small fields relative to large fields.

We have collected data pertaining to both of these hypotheses in previous field seasons, and the primary goal of this field season was to fill in gaps and increase sample sizes. For the first hypothesis, we examined Bobolink body condition in relation to field openness & field size. For the second hypothesis, we measured flight initiation distance in Bobolinks to assess sensitivity to predators, both in response to people and in response to a hawk mount. We also conducted bird surveys and vegetation surveys as these data are relevant to our analyses. Our research took place at 25 fields in Eastern & Central Massachusetts, although not all measures were taken at all fields.

While driving to 25 fields generates a non-trivial amount of CO_2, which in turn is contributing to global climate change, all CO_2 emissions generated as a consequence of this project were off-set via environmentally sustainable projects. Off-sets were purchased from the company Native Energy, www.nativeenergy.com because their off-sets are transparent (it is clear where the money is going), additional (i.e. would not have happened without the purchase), and environmentally sound (e.g. increasing energy efficiency and not something crazy like seeding the ocean with iron).

This year was an unusually warm year, and Bobolinks returned earlier and bred earlier this year relative to previous years. This resulted in modification of my field protocols to adjust for the changes in timing and increased temperatures. As I did not collect nesting data (see below), I do not know what effects this had on the Bobolink populations; many fields were hayed earlier this year than in previous years, but it is unclear how much impact this had on Bobolinks since they were able to begin breeding earlier.

Species observations from individual fields are available upon request. Results from my analyses are being prepared for publication and copies of the publications will be sent upon publication.

2010 Accomplishments:

Bobolink body condition
We captured a total of 25 bobolinks from 9 sites. We measured wing chord (measure of size), body mass (measure of size), fat score, and corticosterone levels (a "stress" hormone). Bobolinks were color banded at 6 sites (it took us a little while to acquire bands of the correct size) for ease of resighting and to allow the possibility of associating body condition with other measurements (e.g. Flight Initiation Distance).

Body condition was assessed at Drumlin Farm Sanctuary*, Tufts Grafton Veterinary campus*, Woodsom Farm* (Amesbury), Upper Browning Field (Lincoln), Moore State Park (2 sites), High Ridge WMA, Old Town Hill Reservation, and at Farm Meadow (Lincoln).
* No color banding took place at these sites.

Bird surveys
We performed bird surveys in 25 fields in 2010. We focused on fields where Bobolinks had been detected in the past, as this summer we were not assessing the relationship of Bobolink numbers to field area, but were trying to measure Bobolink density as a covariate for our Flight Initiation Distance analysis.

Again, density estimates represent an index, which can be compared across fields since the same procedures were used, but cannot safely be used as actual estimates of the number of Bobolinks present in a field.

Openness measures:
We collected openness data from new fields added in 2010: Dexter Drumlin (Lancaster), East Over Field (Rochester), and Daniel Webster Audubon Sanctuary. Pierpont Meadow Audubon Sanctuary was visited, but it was determined that it was not suitable for evaluating the research question. The Bullit Reservation was not visited, due to a change in research plans and insufficient time to reach the site.

Nest Searching:
We did not collect any useful nest-searching data in 2010. We evaluated using a thermal camera but the thermal camera did not increase the rate of nest finding to the point where it was feasible to include in our summer field work. We did not use rope-dragging methods at any field sites due to time and logistical constraints.
While doing other field work, we found a probable savannah sparrow nest at Woodsom Farm south field, and a Bobolink nest at Daniel Webster Audubon Sanctuary.

Vegetation surveys
We collected vegetation data. This data will be incorporated as a covariate when estimating detectability of Bobolinks, and for testing for vegetation effects on Bobolink density and occupancy.

We collected vegetation data from: Upper Browning, Clark Conservation Area, Little Meadow, Drumlin Farm, Lake Wampanoag, High Ridge WMA (Chapel St. fields & Smith St. field), North Mowing- Wachusett Meadow, Assabet NWR, Moose Hill WMA,

Moore State Park (3 fields), Old Town Hill (2 fields), Charles River Peninsula, and Woodsom Farm (partially hayed at time of data collection).

Flight initiation distance (FID) measurements:
We visited 19 fields during June, and 8 fields during July. Bobolink FID was increasingly difficult to assess in July due to cryptic behavior in response to the warm weather. In June, we examined individual consistency in flight initiation distance, while in July we looked for a differential response to human only approaches versus approaches made by humans with a hawk mount.

FIDs were collected from Woodsom Farm (2 fields), Old Town Hill Reservation (2 fields), Tufts Grafton Veterinary Campus, High Ridge WMA (2 fields), Lake Wampanoag Sanctuary, Department of Conservation and Recreation Public Water Supply fields, Drumlin Farm Sanctuary, Farm Meadow (Lincoln), Upper Browning Field (Lincoln), Watt Fields (Oxbow NWR), Moore State Park (1 fields), Appleton Farm Broad Meadow, Dexter Drumlin Reservation (Lancaster), East Over Reservation (Rochester), Daniel Webster Sanctuary, Moose Hill WMA, Clark Conservation Area.

FID data were collected from four color-banded individuals.

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