

Migratory connectivity of At-Risk grassland birds

Project 14-764, Year 1 Review

Rosalind Renfrew & Jason Hill



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Photo by Alex Lehner

Project Synopsis

- Partnership with six DoD installations in six states
- Elucidate the migratory pathways and wintering grounds of three At-Risk grassland bird species:
Grasshopper Sparrow (*Ammodramus savannarum*),
Upland Sandpiper (*Bartramia longicauda*), &
Eastern Meadowlark (*Sturnella magna*).
- Cutting-edge technology: geolocators and GPS satellite tags
- Ultimate goals to understand:
 1. Non-breeding movements & timing
 2. Annual life cycle
 3. Population connectivity



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MOUNTAINS

- Mountain Birdwatch
- Mountain Songbird Research and Conservation
- Alpine Butterflies
- International Bicknell's Thrush Conservation Group

LAKES AND PONDS

- Common Loon Conservation
- Green Damer Dragonfly Migration

FORESTS

- National Park Service Landbird Monitoring
- Forest Bird Monitoring Program
- Vermont Breeding Bird Survey
- Rusty Blackbird Conservation
- Vernal Pool Conservation

CARIBBEAN

- Forest Bird Research
- Rapid Conservation Assessments
- Building a Conservation Foundation
- Conservation Action

GRASSLANDS

- Bobolink Research and Conservation
- Grassland Bird Conservation
- Grassland Bird Migration Project
- New England Grassland Bird Resurvey
- Upper Valley Grassland Bird Initiative

GLOBAL REACH

- Mercury
- Stable Isotopes



VERMONT ATLAS OF LIFE

The Vermont Atlas of Life (VAL) is VCE's ambitious project to list and map every living thing in the state. VAL will be a library of biodiversity knowledge – an online, real-time resource with maps, photographs, and data. You can be part of it. Help us document the biodiversity in the Green Mountain State.

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Grasslands

Among the most disturbing trends in North American wildlife conservation is the steep population

Responsibilities of DoD Installations



Executive Order 13186

“Responsibilities of Federal Agencies to Protect Migratory Birds“

- Promote conservation of migratory birds via MOUs with USFWS
- Emphasis on DoD activities not related to military readiness

Sikes Act:

- Ensures that the valuable natural resources on military lands are protected and enhanced while allowing the military to continue its operations.
- Requires installations to develop and implement Integrated Natural Resources Management Plans (INRMPs) that protect and conserve migratory birds through research, habitat management, partnerships, and education.

Full Life Cycle Conservation

Migratory birds spend approximately two-thirds of their year away from the breeding grounds



Each piece of the life cycle puzzle is vital to the species survival

Full Life Cycle Conservation: Migratory Connectivity

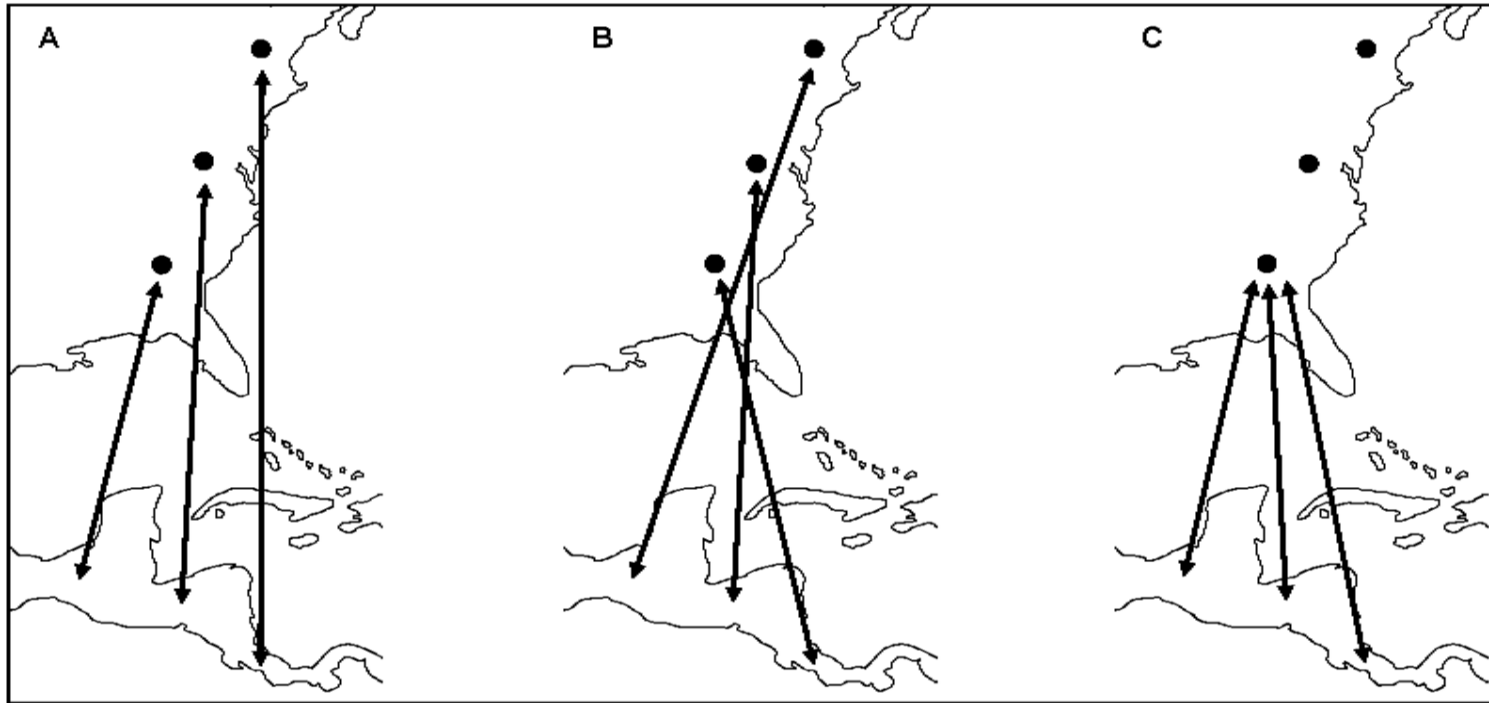


Figure 1. Illustrations of strong (A & B) and weak (C) migratory connectivity for a hypothetical population of Neotropical-Nearctic migratory bird. Strong connectivity may occur as either A) Leap Frog or B) Chain migration strategies traveled between tropical wintering and temperate breeding grounds.

The geographic linking of individuals or populations between different stages of the annual cycle - breeding, migration and winter. Marra et al. 2010.

Full Life Cycle Conservation: Seasonal Interactions

Ecological
circumstances in one
season may affect
subsequent seasons



Marra et al. 1998

Grassland Birds

Migratory grassland birds have experienced substantial declines
e.g., ~80% decline for E. Meadowlarks (1966-2013)

OPEN ACCESS Freely available online

PLOS ONE

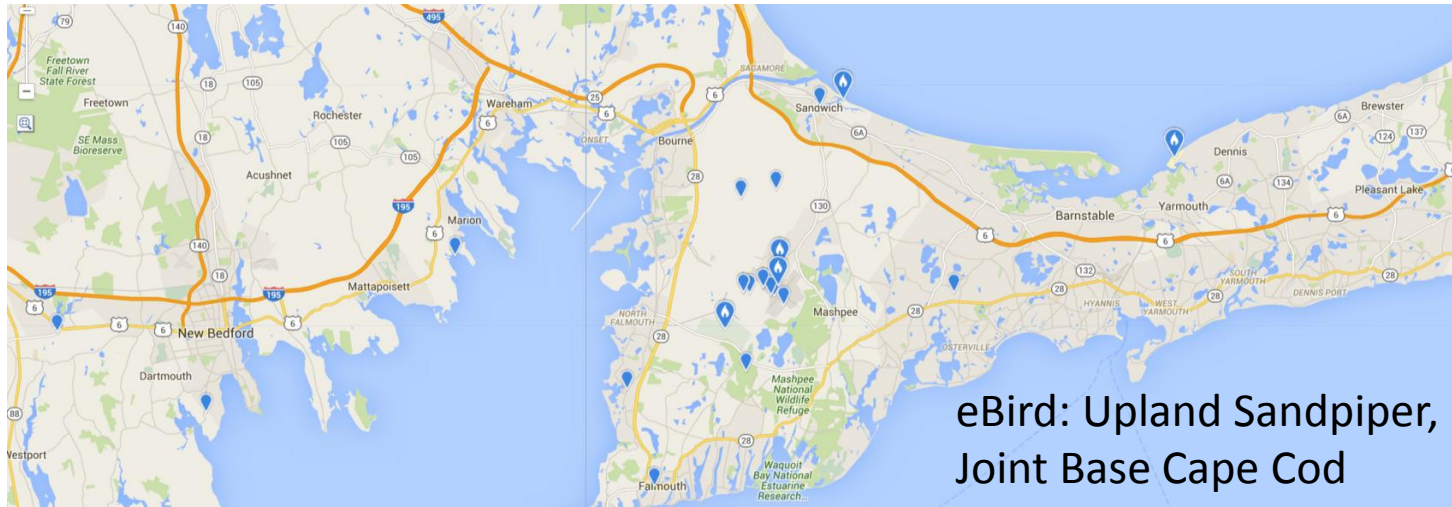
Habitat Availability Is a More Plausible Explanation than Insecticide Acute Toxicity for U.S. Grassland Bird Species Declines

Jason M. Hill^{1*}, J. Franklin Egan², Glenn E. Stauffer¹, Duane R. Diefenbach³



Grassland Birds

DoD lands provide habitat for many grassland bird species



Focal Grassland Bird Species

Contrasting migration strategies

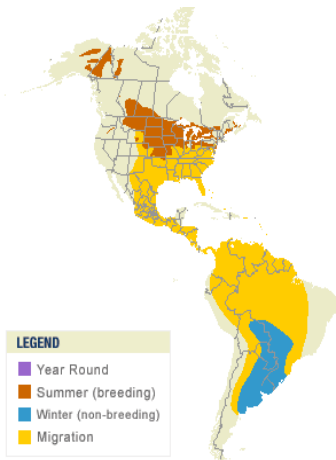
Upland Sandpiper



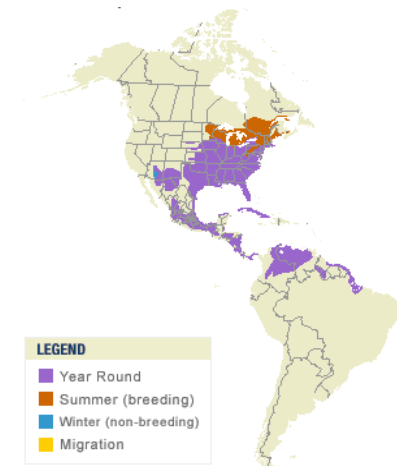
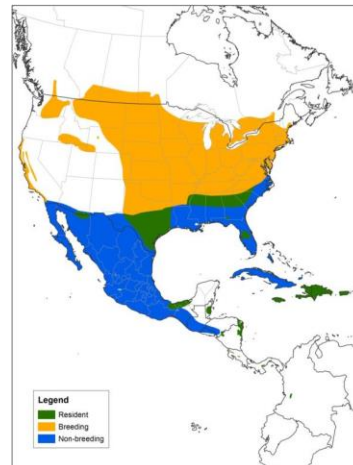
Grasshopper Sparrow



Eastern Meadowlark



Map by Cornell Lab of Ornithology
Range data by NatureServe



Map by Cornell Lab of Ornithology
Range data by NatureServe

Tracking Migration & Non-breeding Movements

Light-level geolocators: lightweight, ~9 month operation



Satellite GPS tags: for larger birds, communicate with ARGOS/GPS



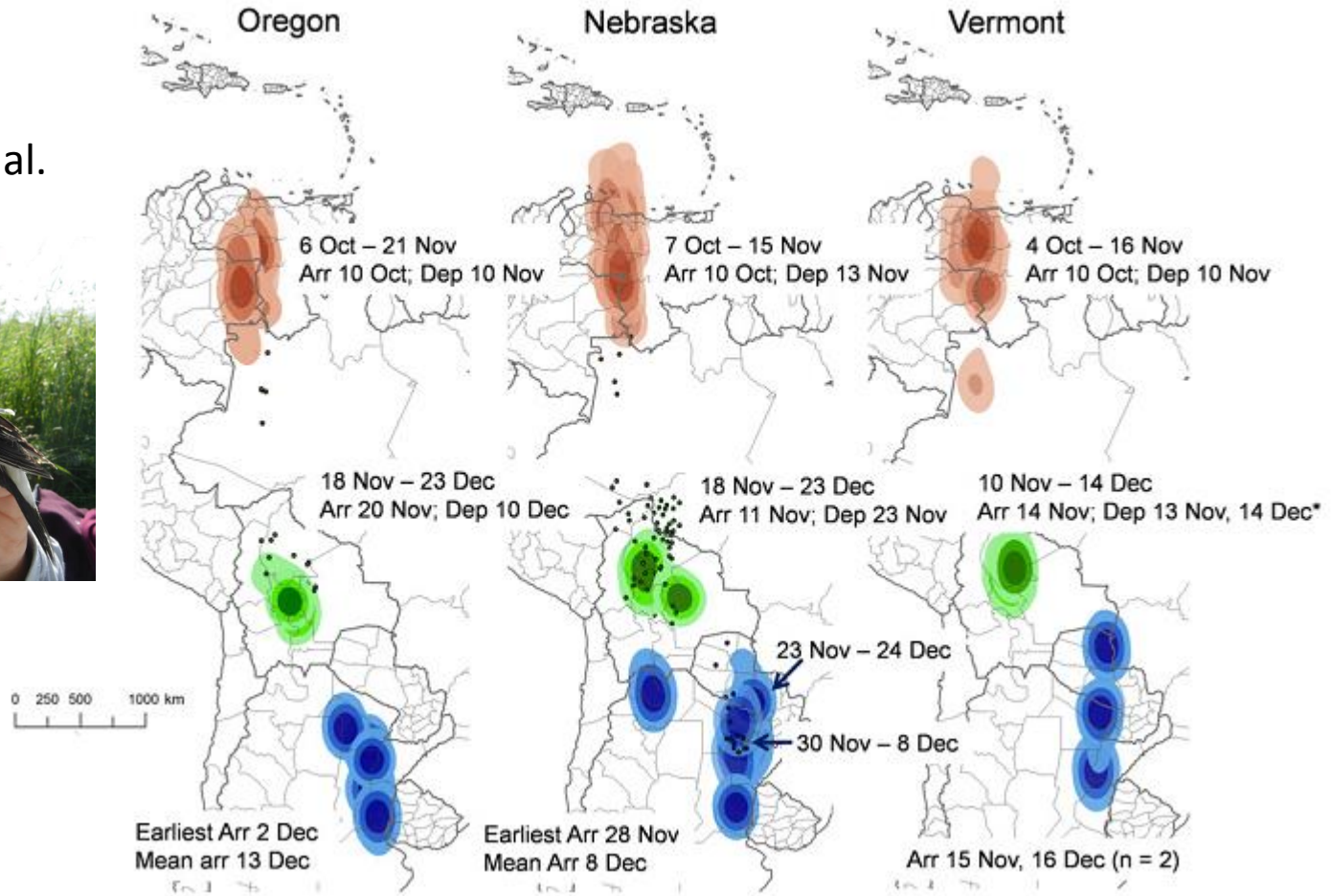
Golden Plover with satellite tag

Information from Geolocators

- Duration/speed of migration
- Important staging/stopover sites
- Wintering areas
- Migration Routes
- Timing of movements
- Migratory connectivity
- Fidelity to routes, breeding sites, migratory stops, and wintering areas within and among years
- Finer-scale movements (GPS, PTT)
- Habitat use (GPS, PTT)

Bobolink Geolocator-recorded Movements

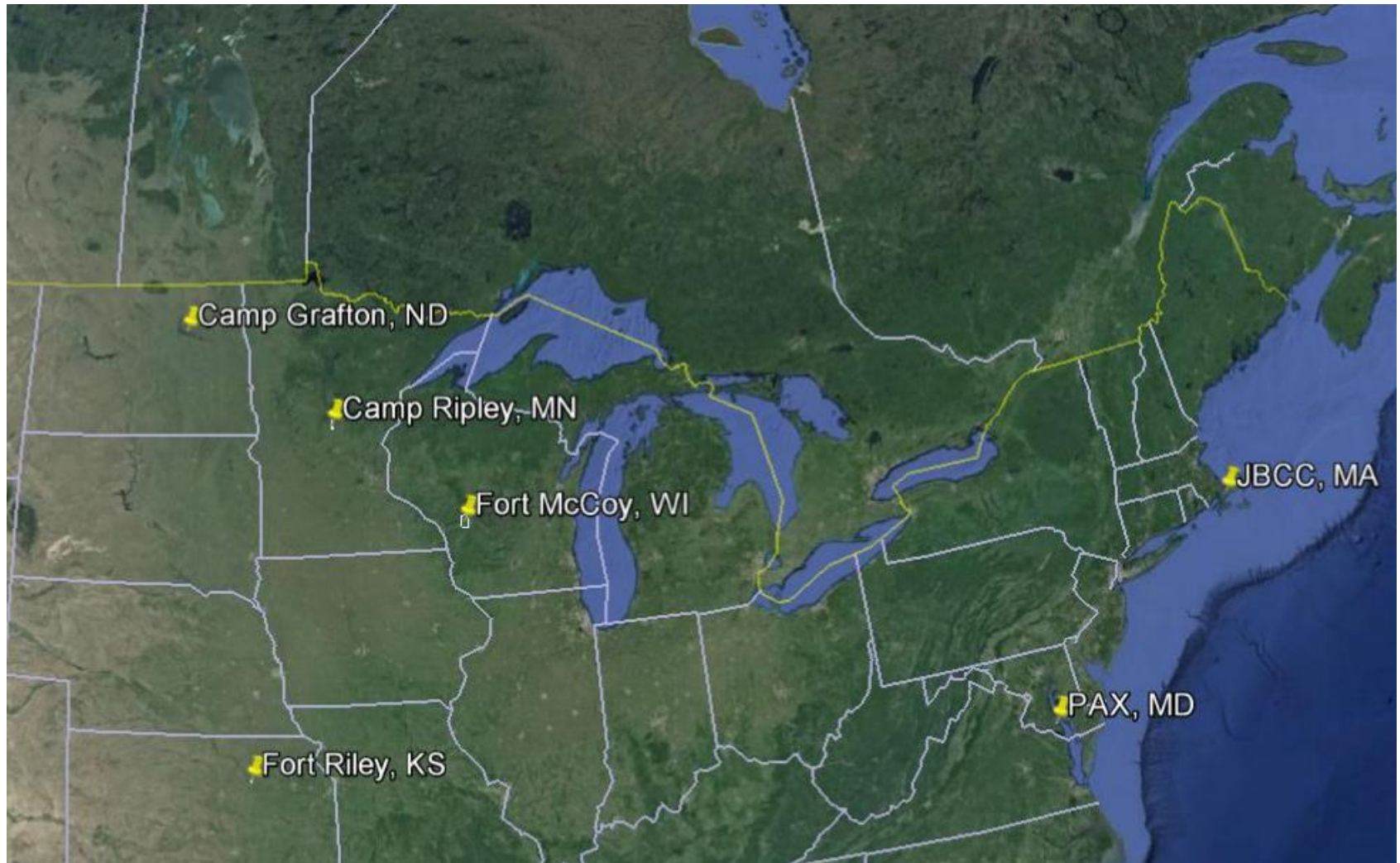
Renfrew et al.
(2013)



Primary Study Objectives

- Determine migratory routes, stopover sites, and wintering areas of three DoD Priority At-Risk grassland bird species
- Determine population connectivity between breeding, migration, and wintering sites
- Identify habitats used during the non-breeding season (Upland Sandpiper & E. Meadowlark)
- Build conservation partnerships (across borders)

DoD Partner Installations



Study Timeline

2015 (April-June):

Deploy 180 geolocators on Grasshopper Sparrows

2016 (April-June):

Recapture & recover geolocators from Grasshopper Sparrows

Deploy 20 GPS-PTT & 4 solar PTTs on Upland Sandpipers

Deploy 20 GPS-PTT satellite tags on Eastern Meadowlarks

2017: continue to receive GPS/PTTs data from meadowlarks and sandpipers

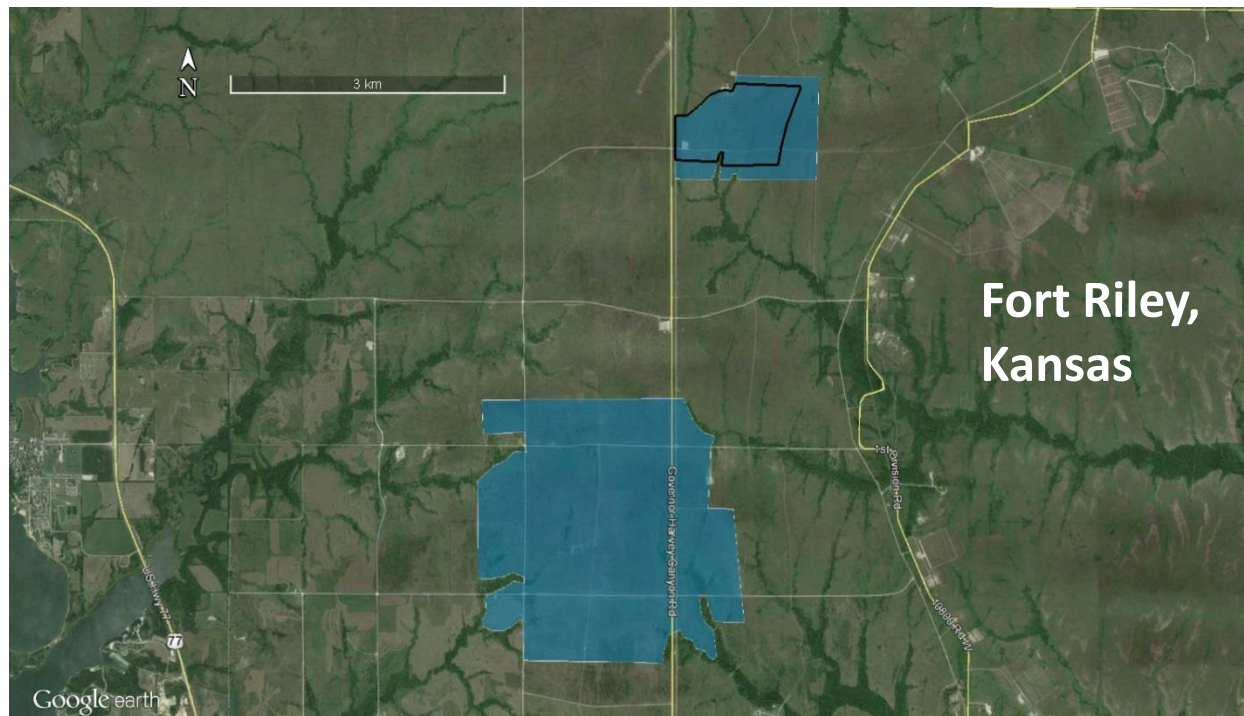


Camp Grafton, ND, 2015

Survey & Capture Areas

At each DoD installation in 2015 we identified areas:

1. with concentrated populations of grassland birds & extensive grasslands,
2. not adjacent to permanently-closed areas (e.g., firing ranges),
3. with minimal training loads,
3. & without prescribed fire scheduled for spring 2016.



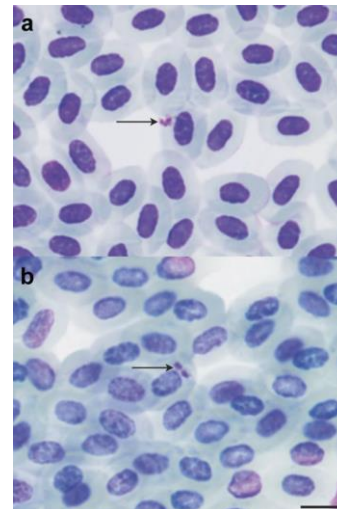
Capture and Geolocator Deployment



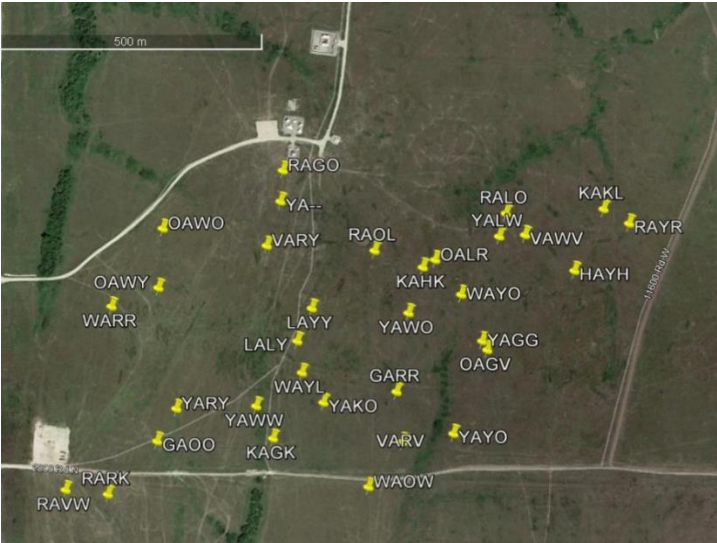
Capture and Geolocator Deployment in 2015

2015 (April-June):

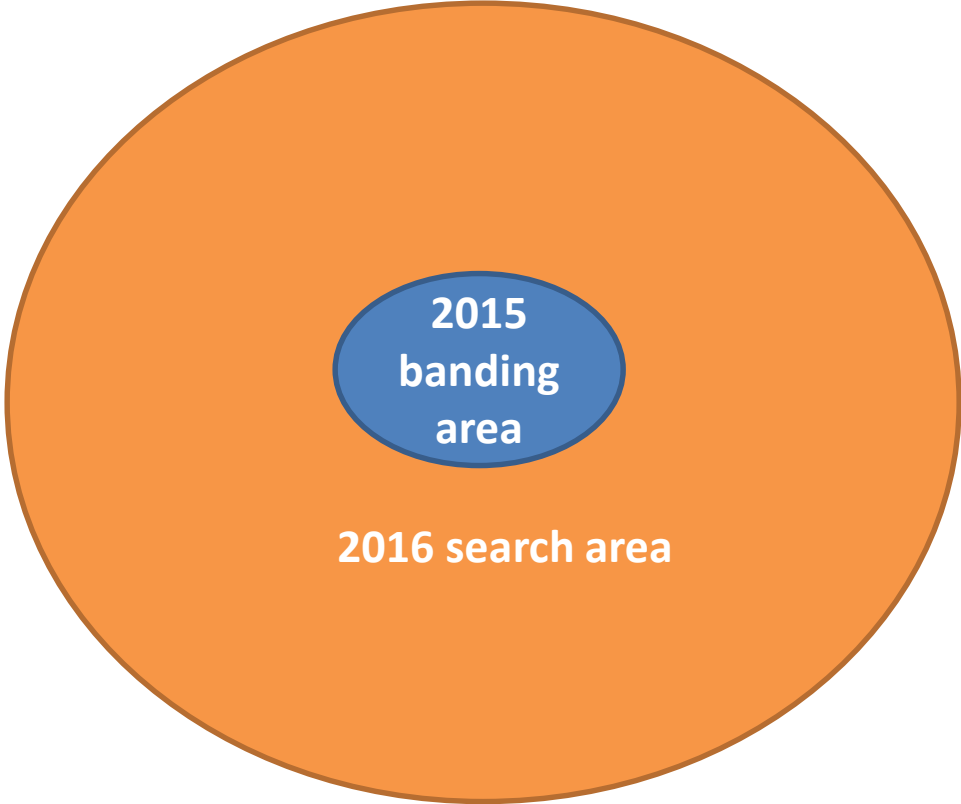
- We captured & banded 347 Grasshopper Sparrows across the six DoD installations
- Deployed 30 geolocators onto male Grasshopper Sparrows at each installation
- Collected blood from 97 birds, and feather samples from 133



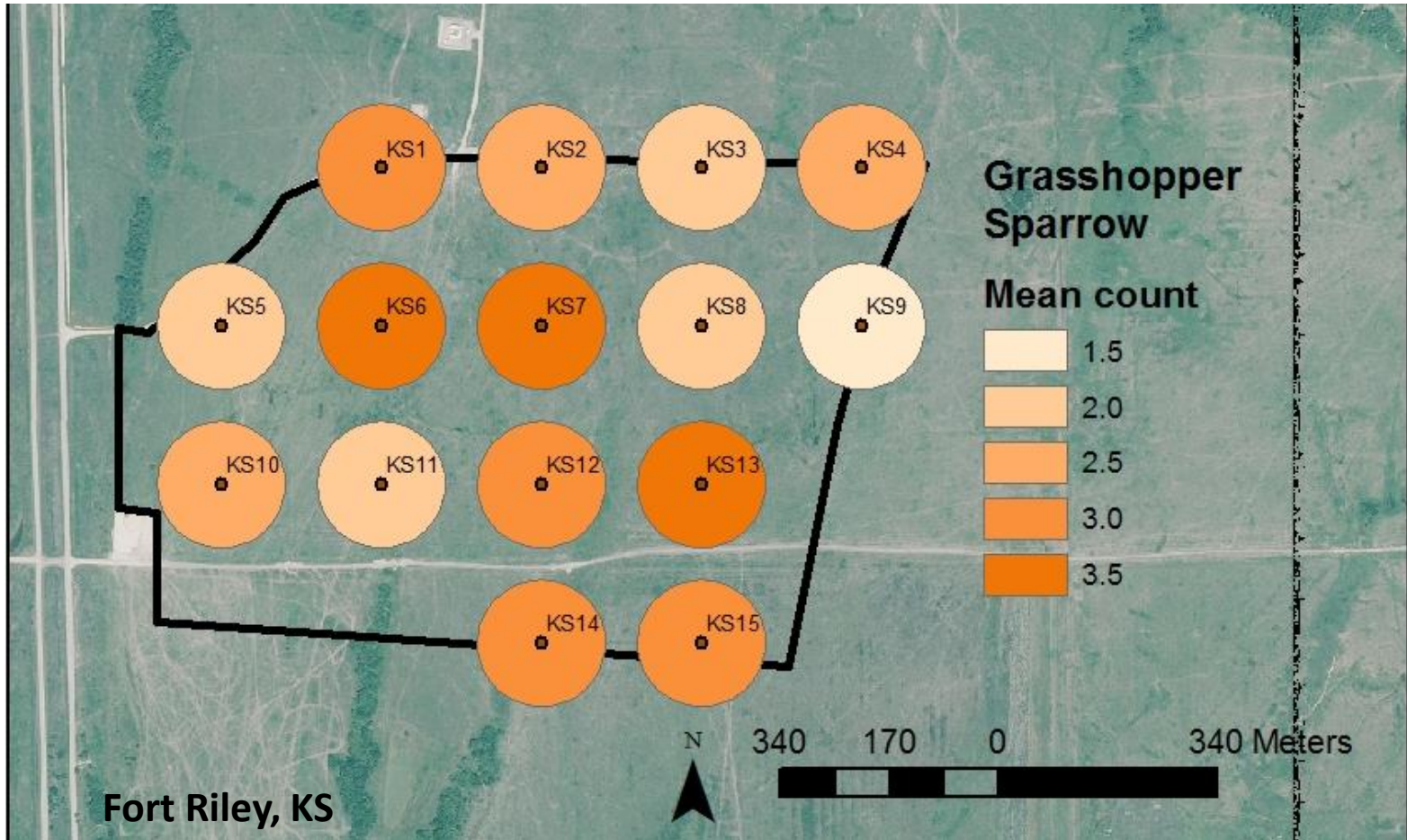
Geolocators Deployed in a Concentrated Area



Fort Riley, Kansas
Geolocator deployments



Grassland Bird Surveys



Visibility of the DoD-VCE Partnership

Promotion of the VCE-DoD research partnership

- Social media posts to Facebook birding groups
- Frequent emails to local birding group listservs
- Blog posts to VCE webpage, and newsletter updates
- Article in the Minnesota Ornithologists' Union newsletter
- All bird observation data posted to eBird (a publically-available citizen science database).



Additional Benefits to DoD Installations



Photo by Alex Lehner: Upland Sandpiper next to tank track, Fort Riley, KS

Thank You

Please contact me at jhill@vtecostudies.org.

