## Site-specific habitat and landscape associations of Rusty Blackbirds wintering in Louisiana

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## Rusty Blackbird (*Euphagus carolinus*)

- Ground forager
- "Forested wetland specialist"
- Shallow water, wet
  leaf litter, grass
  important variables
  (DeLeon 2012)





#### **The Decline**



Courtesy of Emma DeLeon

## Wintering Habitat Loss/Degradation?

- 80% of bottomland hardwood forests converted to agriculture
- Mississippi Alluvial Valley
  - 57% wetland loss
  - 25% of floodplain forested
- 1950s-1960s hydrological change





#### Determine habitat needs using site (100 m) and landscape scale (600 m) variables





#### SE Louisiana, USA

68 sites total

57 sites year 2

534 surveys total

≥ 1200 m apart







- 3 repeated surveys within a season
- 4 day closure period (most completed within 3 consecutive days)



## Single-season Occupancy

Package unmarked for R

- Model detectability (p) with occupancy (Ψ)
- Model how habitat covariates affect Rusty Blackbird presence at a site



#### **Detection Covariates**

- air moisture (sunny to rain 1-4)
- Beaufort wind speed (1-5)
- prior detection
- other blackbirds (flock size)
- Common Grackles
- Red-winged Blackbirds
- open space (grass cover)

Most important:

Common Grackles + open space + prior detection

## Habitat Covariates

site % ground cover (100 m):

- shallow water (≤ 5 cm)
- wet leaf litter
- leaf litter
- wet grass
- woody debris



landscape % cover (600 m):

- floodplain forest
- woody wetland
- developed
- agriculture
- rainfall
- soil hydrologic group C
- soil hydrologic group D

## **Habitat Models**

<b>Model</b> P(COGR + open + prior)	ΔΑΙΟ	weight	k
Ψ(wet litter + wet grass)	Ο	0.18	7
Ψ(woody wetland + wet litter)	0.23	0.16	7
Ψ(wet litter)	1.03	0.11	6
Ψ(global)	4.42	0.02	13
Ψ(null)	10.62	0.00	2

## **Habitat Models**

**Model** P(COGR + open + prior)

 $\Psi$ (wet litter + wet grass)

 $\Psi$ (woody wetland + wet litter)

Ψ(wet litter)

Ψ(global)

Ψ(null)

- wet leaf litter + (site scale)
- wet grass + (site scale)

 woody wetland – (landscape scale)
 (but overall positive when with wet leaf litter)

## **Model Fit**

Ψ(wet litter + wet grass)	(t <sub>0</sub> = 24.5, α = 0.05, p = 0.18)
Ψ(woody wetland + wet litter)	(t <sub>0</sub> = 25.1, α = 0.05, p = 0.18)
Ψ(wet litter)	(t <sub>0</sub> = 25.4, α = 0.05, p = 0.36)

All top models had good fit (parametric bootstrap method)

Model averaged occupancy: 0.50 ± 0.23 (SD)

#### Conclusions

- Top model: presence of wet leaf litter and wet grass at a site
  - site-level substrate more important than land cover?



## Conclusions

- Wet leaf litter and woody wetland had an overall positive effect on occupancy
  - woody wetland class = baldcypress (*Taxodium distichum*) tupelo (*Nyssa aquatica*) swamp
  - wet leaf litter = shallow swamps
  - shallow swamp > deep swamp







What does this mean for Rusty Blackbird habitat management in Louisiana? - Diversions

Low water (timing & frequency)

Tree buffers around swamps

# **Ongoing Work**

- Dynamic N-mixture (abundance) modeling
- Invertebrate biomass estimate as a measure of food availability
- Landscape variables at the 6 km scale
- Louisiana Winter Bird Atlas landscape analysis





#### Questions?

Erik Breden

Naïve Detection probability:  $0.65 \pm 0.07$ Naïve Occupancy probability:  $0.37 \pm 0.07$