HABITAT SELECTION BY COLUMBIAN WHITE-TAILED DEER ALONG THE LOWER COLUMBIA RIVER

(Odocoileus virginianus leucurus)

Jon Heale - WSU
Co-Authors: Lisa Shipley & Dan Thornton - WSU
Paul Meyers - USFWS
Background – Columbian white-tailed deer

• Historically, ranged through Washington and Oregon

• Extirpated from most of range by 1900s

• 2 Distinct Population Segments (DPS)
  • Douglas County, OR
  • Lower Columbia River
Background – Columbian white-tailed deer

• Lower Columbia River DPS lacking research

• Remnant populations restricted to islands and bottomlands

• Translocations have been a key management tool

Press Release
Conservation Coalition’s Efforts Move Columbian White-tailed Deer Along Road to Recovery in Washington, Oregon

Service changes status from endangered to threatened, adding to growing list of ESA successes

October 13, 2016
Background – Current and historic range

Julia Butler Hansen Refuge
Mainland Unit

Lower Columbia River DPS
Columbia River
Background – Julia Butler Hansen Refuge (JBH)

- Established in 1971
- Contains >2,400 ha
- Supports 20% of DPS population

Photo credits: J. Heale
Why translocate deer?

- Imminent levee failure at JBH Refuge
  - Failure would be catastrophic for LCR population

- Facilitate population connectivity and recovery
Emergency deer captures

- Multiple capture methods
- GPS on adult/yearling females

Photo credits: USFWS
Translocations & resident collar deployment

• Translocations: 2013 - 2015
  • 88 deer moved
  • 18 GPS collars deployed

• Collar deployment at JBH Refuge 2014 - 2017
  • 16 GPS collars deployed
Collar deployment locations

- **Ridgefield NWR**

- **JBH**
  - Mainland
  - Tenasillahe Island
Pasture management

Grasslands managed by mowing/haying

Reed canarygrass (Phalaris arundinacea) - Invasive

April – October

Cattle grazing used to maintain pastures

April – October

Photo credit: USDA
Objectives and hypotheses

• Characterize habitat selection of the Lower Columbia River DPS of CWTD

• Deer select for the edge of habitat types offering concealment cover

• Deer select against cattle-grazed pastures
  • Preferring managed pastures
JF7 - Cattle Pasture Use

# of GPS Locations

Jan      Feb      Mar     Apr    May    June     July     Aug     Sept    Oct      Nov     Dec

Cattle Present

Daily Use
Habitat selection analysis

- Resource Selection Functions (RSF)
  - Annual
  - Summer (cattle present)
  - Winter (cattle absent)

- Generalized Linear Mixed Models
  - Deer ID as random effect
  - Random slopes
Methods – Model variables

• Habitat type
  • Scrub Shrub
  • Deciduous Forest
  • Coniferous Forest
  • Upland Herbaceous
  • Wetland Herbaceous
  • Managed Pasture
  • Grazed Pasture
  • Other
Methods – Model variables, continued

- **Distance to Open (DTO; m)**
- **Distance to Cover (DTC; m)**
- **Elevation (m)**
Results – Habitat selection
## Results – Habitat selection

* significant variable

*a habitat type significantly differs from grazed pasture

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n=30, n=21, n=29
Results – Relative use of cover habitats
Results – Relative use of open habitats
Conclusions

• Deer are selecting for the edge of habitat offering concealment cover

• Deer are selecting against cattle pastures year-round
  • Managed pastures > Grazed pastures
  • Summer > Winter

• Use of cover and open habitat is seasonally variable and dependent on habitat type
Implications & future work

- Selection may be driven by cattle presence or other factors
- Conduct vegetation monitoring in pastures
- Intersperse cover within pastures
- An eye toward delisting
Acknowledgements

• WSU – School of the Environment
• WSU grad students
• USFWS
• LCREP
Questions?
Results – RSF validation

• k-fold cross-validation, Spearman Rank Correlation
Annual NDVI on JBH Mainland Unit

Grazing Season

Month

Treatments:
- Green: Grazed
- Orange: Mowed
Results – Relative use of all habitats

![Graph showing the relative use of various habitats across different distances to the edge of concealment cover (m).](image_url)
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Model selection

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HabType + dto + dtc + elev + (1|Deer_ID)
- dto, dtc, elev had random slope terms