# White-tailed Prairie Dog Occupancy in the Pinedale Anticline Project Area: Summary of 2020 Annual Report

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# See Report for Full Details

White-Tailed Prairie Dog Occupancy in the
Pinedale Anticline Project Area

2020 Annual Report

Prepared for:
Pinedale Anticline Project Office,
Wyoming Game and Fish Department, and U.S. Bureau of Land Management
Pinedale, Wyoming

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WEST

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# Species Monitored

- White-tailed Prairie Dog (WTPD, *Cynomys leucurus*)
- Considered a “sensitive species” in the Sept 2008 Record of Decision relative to oil and gas development in the Pinedale Anticline, Wyoming

# Monitoring Goals and Mitigation Triggers

- Changes that will be monitored
  - 3-year change in presence/absence of species, and in numbers of individuals of each species, compared to reference areas

- Specific change requiring mitigation
  - 3 consecutive years of decline in presence/absence of a species
  - An average of 15% decline in numbers of individuals each year over 3 years

*Wildlife Monitoring and Mitigation Matrix*
*(Appendix B of Sept 2008 Record of Decision)*

# Methods for 2010 Pilot Year

## Occupancy at a Sample of Plots

- Select a spatially balanced random sample of 129 plots (each 25 ha)
- Conduct two independent surveys to determine presence/absence of WTPD
- Use occupancy model to estimate proportion of PAPA and Reference Area regions occupied, while accounting for imperfect detection

*(see Thompson et al. 2010)*

# Methods for 2011 – 2018

## Colony Delineation and Burrow Transects

- Revisit colonies identified previously
- Delineate colony boundaries on foot using GPS
- Calculate colony acreage using GIS
- Count burrows along transects in each colony, classifying each as active or inactive
- Use Biggens et al. 1993 conversion to estimate number of WTPD based on numbers of active WTPD burrows

*(see LeBeau et al. 2019)*

# Methods for 2019

## Plot Sampling

- Count burrows at 60 plots (1 ha each), classifying each as active or inactive
- Correct for imperfect detection
- Use Biggens et al. 1993 conversion to estimate number of WTPD based on numbers of active WTPD burrows

## Remote Sensing

- Collect high-resolution aerial imagery (pixels 20 x 20 cm)
- Use locations of burrows counted in plot sampling to train Neural Network to detect burrows in imagery
- Calibrate output to predict number of active WTPD burrows in historic colony areas

*(see Carlisle et al. 2020)*

# Methods for 2020

## Occupancy at a Sample of Plots

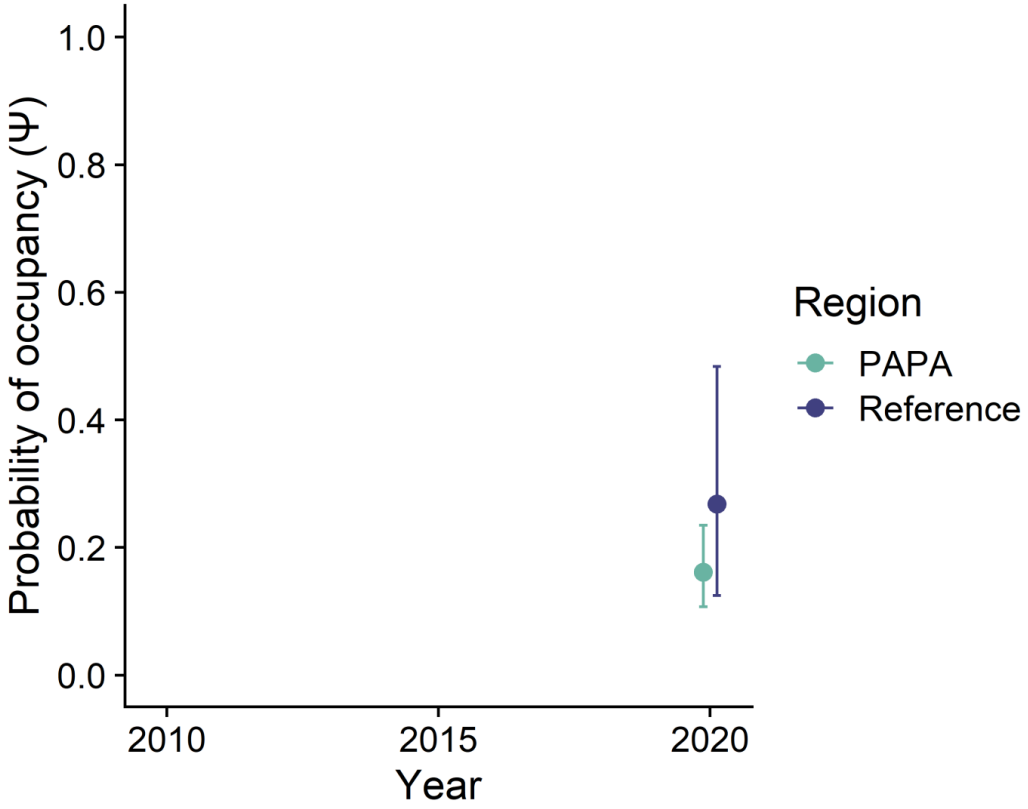
### *Return to method similar to 2010 pilot for cost efficacy*

- Select a spatially balanced random sample of 156 plots (each 16 ha)
- Conduct two independent surveys (one survey visit with two observers) to determine presence/absence of WTPD
- Use occupancy model to estimate proportion of PAPA and Reference Area regions occupied, while accounting for imperfect detection
- Compare changes in occupancy from 2010 (Thompson et al. 2010) to 2020

*(see this report, Carlisle et al. 2021)*

# Findings Relative to the Mitigation Triggers

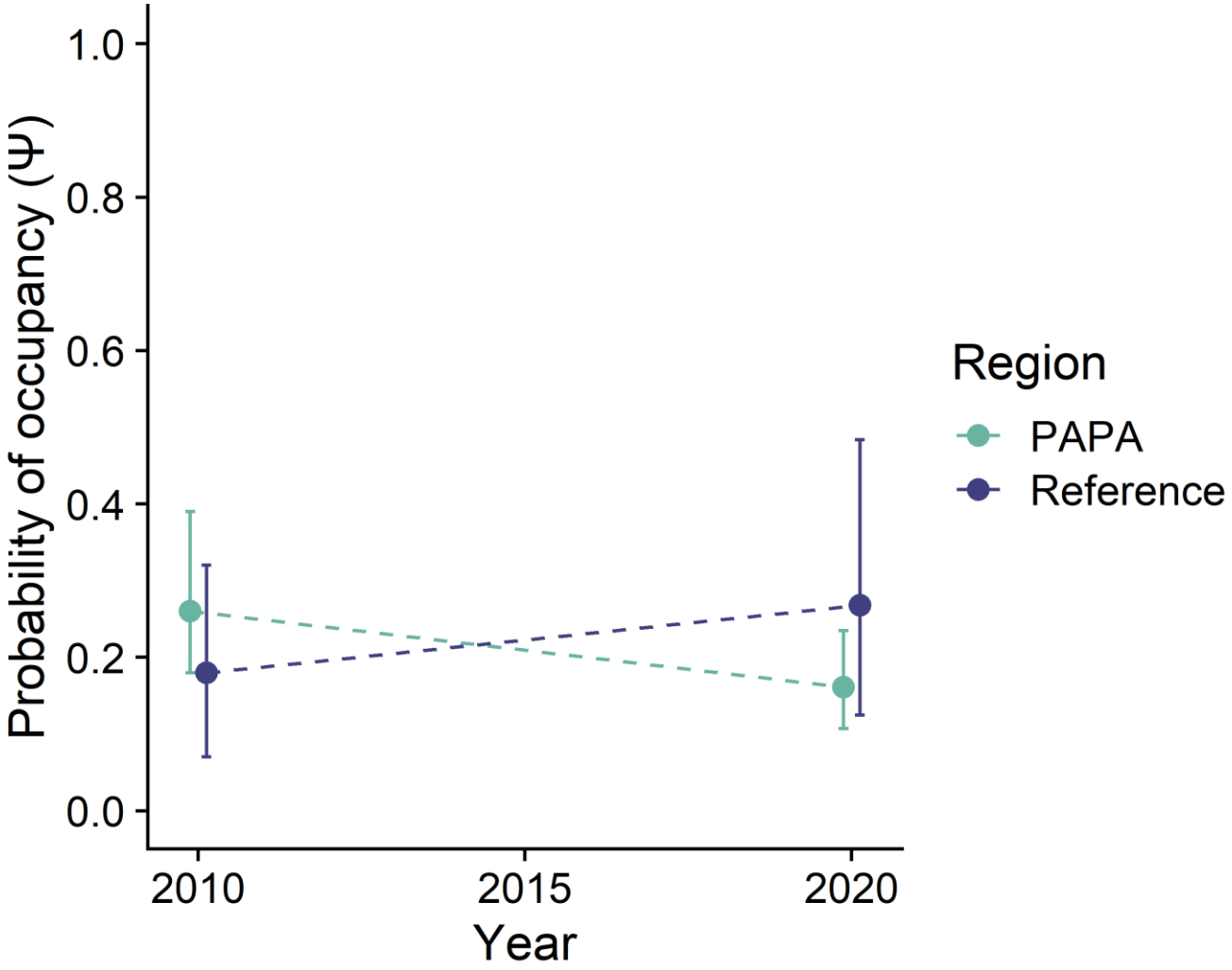
- WTPD occupy between 11–24% (95% CI) of the PAPA and 12–48% of the Reference Area in 2020, with no evidence of a difference in occupancy rates based on a null-hypothesis test using $\alpha = 0.05$



# Findings Relative to the Mitigation Triggers

- The Wildlife Monitoring and Mitigation Matrix suggests trends during a 3-year period be assessed; however, a comparable occupancy survey has not been conducted since 2010
- Relative to 2010, WTPD were estimated to occupy between 14% less to 2% more of the PAPA in 2020, and 1–32% more of the Reference Area in 2020
- The difference in these 10-year trends between the two regions provides some evidence that WTPD occupancy may have decreased in the PAPA from 2010 – 2020 relative to WTPD occupancy in the Reference Area; however, the difference in trends was not large enough to conclude (based on a null-hypothesis test using $\alpha = 0.05$) that the 10-year trends in WTPD occupancy differed between the PAPA and Reference Area from 2010 – 2020

# 10-year Trend in WTPD Occupancy by Study Region



# Discussion

- Survey Methods
  - A handful of methods have now been used to meet the monitoring objectives
  - Focus on occupancy (like in 2010 and here in 2020) likely provides good balance of cost-efficacy and rigor
  - Does not provide abundance or colony acreage

# Discussion

- Trends in Occupancy
  - We found suggestive evidence that WTPD occupancy may have decreased in the PAPA from 2010 – 2020 relative to WTPD occupancy in the Reference Area
  - Prairie dog population sizes can vary dramatically by year or even season, so inferring a trend based solely on two years of monitoring spaced 10 years apart is tenuous
  - Given the Wildlife Monitoring and Mitigation Matrix specified that trends should be evaluated on a 3-year timescale, these 2020 estimates can be used as the baseline data against which to assess future trends in the coming years, provided a similarly designed occupancy study is conducted each year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