

Deer Density on Blackwater NWR

Results from Distance Sampling Surveys (2018)

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What is distance sampling?

Road distance sampling is a widely used method for estimating the density of biological populations. The observer performs a standardized survey along a series of road transects searching for deer or groups of deer. For each group, they record the distance from the road. Not all the deer that the observer passed will be detected. Deer become harder to detect with increasing distance from the road, resulting in fewer detections with increasing distance. The key to distance sampling analyses is to fit a detection function to the observed distances (Fig. 1), and use this fitted function to estimate the proportion of objects missed by the survey. Once we estimate how many animals were not detected, we can combine that estimate with the number of animals that were observed to estimate the density of animals within the surveyed area.

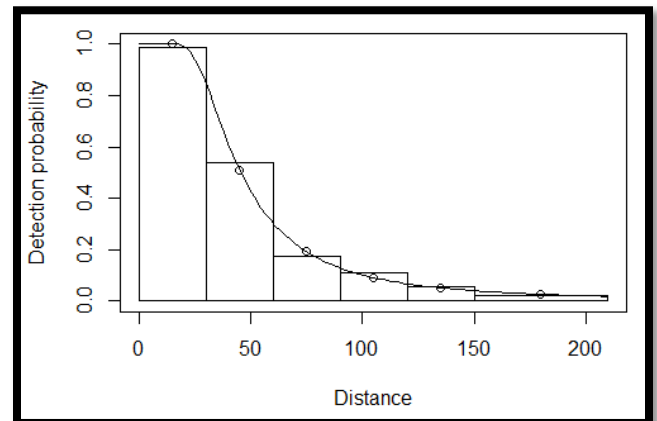


Figure 1. An example of a modeled detection function. Probability of detection decreases the farther an animal is from the road.

Surveys on Blackwater



Refuge staff used forward-looking infrared sensors to continuously survey for deer along 25 miles of roadside within Blackwater National Wildlife Refuge 5 times during September 2018. Road transects were selected to be representative of the available habitat within the refuge. They observed 219 deer groups, for a total of 367 individual deer. The number of deer in each group, age classes (fawn vs. adult), sex (adults only), and species (white-tailed vs. sika deer) were recorded and distance to the road was measured with a rangefinder. We estimated deer density using 'distance' package in the statistical software program R



Results from the Survey

All Deer	Estimate	Std. Error	CV	Lower 95% CI	Upper 95% CI	DF
2017 Survey	70.77	5.42	8%	60.25	83.13	17.93
2018 Survey	38.98	5.21	13%	28.98	52.45	17.01

Sika Deer Only	Estimate	Std. Error	CV	Lower 95% CI	Upper 95% CI	DF
2017 Survey	54.18	4.58	8%	45.39	64.67	20.04
2018 Survey	30.77	4.81	16%	21.89	43.25	11.41

Estimates in the above table are presented in number of deer per mile². The 2018 survey was a continuation of an ongoing effort to monitor deer density within the refuge that began in 2017. We suggest caution when interpreting these results due to changes to the survey methodology and the limitations of only 2 years of data. Deer density estimates in 2018 were lower than estimates from 2017, but were likely impacted by unusually high water levels and precipitation during the survey period. In addition, a reclassification of habitat types in 2018 complicates year-to-year comparison, although the new classification is more appropriate. We suggest a continuation of the surveys to establish population trend data over multiple years.

What is next?

The benefit of distance sampling is the relatively affordability and repeatability of the protocol. This allows surveys to be run in successive years to reliably measure trends in population abundance and responses to management practices. Blackwater NWR plans to use the methods established from this research to monitor deer population trends over time.

Acknowledgements

