

Temporal Trends in Sea Turtle Nesting: Effects of Environmental and Anthropogenic Events

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INTRODUCTION

- Many analyses done have relied on a Frequentist statistical framework rather than a Bayesian approach.
- Nesting data gathered from Pensacola Beach helps us assess how environmental factors and anthropogenic activities may have influenced nesting behavior.
- Pseudo-absence points were generated at a 1:1 ratio to account for areas where turtles did not nest.
- Nesting status was modeled using binary logistic regression under both the frequentist and Bayesian frameworks.
- Predictors of interest:
 - Nest year (2010, 2016, 2020)
 - Nest elevation
 - Interaction between nest year and nest elevation
 - Does the relationship between nesting status and nest elevation change depending on the nesting year?

FREQUENTIST

- Probability is based on the proportion of times an event would occur over time
 - p-value: Probability results this extreme if the null is true.
- Does not consider known data collected previously
 - Estimation is more reliable in large data sets.

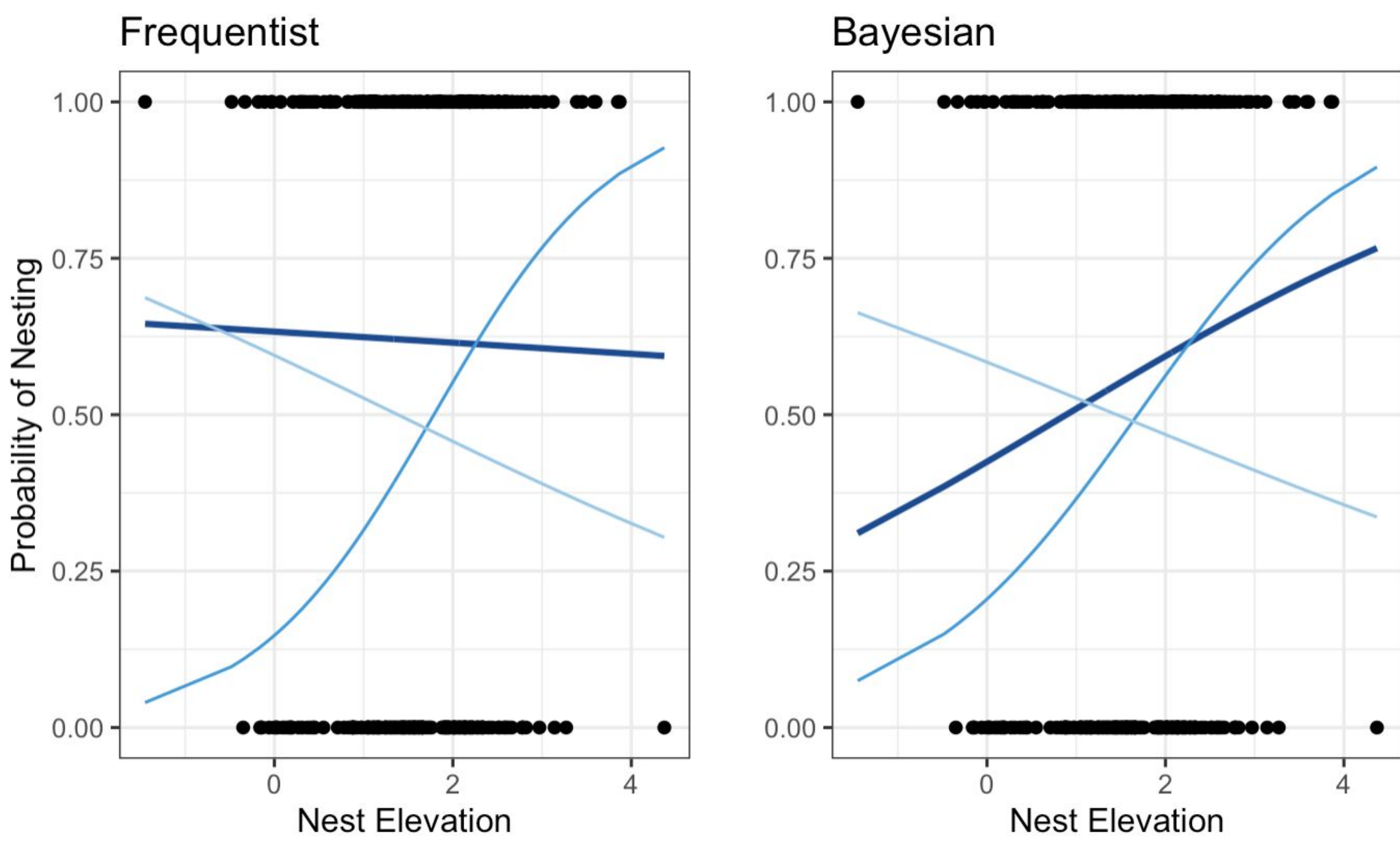
Data is used to construct models for prediction and inference.

- Probabilities based on prior information
 - Bayes' Factor: How much the data shift support toward one hypothesis over the other.
- Considers prior relationships and data collected
 - Smaller sample sizes result in weighting towards the prior

BAYESIAN

CONCLUSION

- The frequentist model suggests a weaker relationship during the 2010 nesting season (OR 0.96) as compared to the Bayesian model (OR 1.41).
- We hypothesize that the sample size disparity between 2010 and the other years is driving this difference.



		OR (95% Conf. Int.)	p-value	OR (80% Cred. Int.)	Bayes' factor
Nest Year	2010	reference		reference	
	2016	0.10 (0.01, 0.55)	0.445	0.35 (0.17, 0.72)	23.046
	2020	0.85 (0.17, 3.99)		1.90 (0.96, 3.75)	
Nest Elevation		0.96 (0.40, 2.36)	0.042	1.41 (0.95, 2.12)	0.343
Interaction: Year x Elevation	2010	reference		reference	
	2016	2.78 (1.01, 7.68)	< 0.001	1.59 (1.02, 2.47)	23.871
	2020	0.79 (0.29, 2.09)		0.56 (0.36, 0.88)	