

**Attachment B**  
**Eagle Collision Risk Model**

The pre-construction eagle use surveys conducted at the Project substantially comply with the protocols listed in the Eagle Conservation Plan Guidance, and were developed through coordination with the U.S. Fish and Wildlife Service since 2009. However, because the surveys began in 2011, two years prior to publishing the final Eagle Conservation Plan Guidance and five years prior to the 2016 Eagle Rule, not all protocols were followed for all of the surveys, and we made assumptions for the Collision Risk Model to accommodate these differences. Specifically, the surveys conducted from April – June 2011 were only 30 minutes in duration, as opposed to 60 minutes, and the survey plots did not cover 30% of the final Project footprint as recommended in the Eagle Conservation Plan Guidance. A full review of the Project’s consistency with pre-construction survey protocols can be found in Appendix D of the Applicant’s ECP. The modeling approach implemented here is Project-specific and should not be used as a precedent for future eagle take permits as the data was collected prior to the Eagle Conservation Plan Guidance and 2016 Eagle Rule. Additionally, permitting at the 80th Confidence Interval from the Bayesian Collision Risk Model and adaptive management would allow for adjustments of this uncertainty.

The Service analyzed the risk to eagles both by grouping the data all together, and stratifying the eagle use by season. Seasons were defined as winter, breeding, and fall to reflect the biology of eagle breeding. We found a slight difference in the output of these analyses, but once the numbers were applied to each 5-year period and rounded up to the nearest number, the grouped estimate and seasonally stratified estimate were the same. This analysis of the data stratified by season is presented, because we determined that it best captured the differential risk to eagles (as well as any uncertainty of risk by season) throughout the year. This analysis better enables us to apply appropriate temporal adaptive management measures.

### **Collision Risk Model Inputs**

Turbines: 39

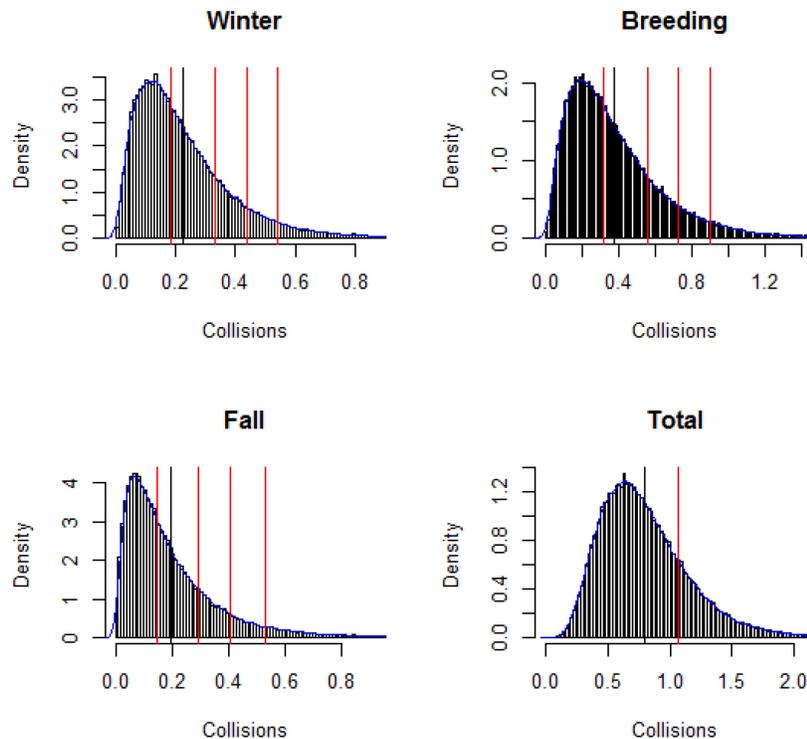
Hazardous Area: 55 meters

<b>Season</b>	<b>Daylight Hours</b>	<b>Eagle Minutes</b>	<b>Survey Effort (hours)</b>
Winter (November 1- February 28)	1,132.845	14	80
Breeding (March 1 – July 31)	2,184.823	17	110
Fall (August 1 – October 31)	1,147.601	3	23

## Collision Model Output

Season	Exposure (Mean)	Exposure (SD)	Annual Collision (Mean)	Annual Collision SD	Annual Collision (80CI)*
Winter	0.09159142	0.02358086	0.2248923	0.1627402	0.3323556
Breeding	0.08026798	0.01891543	0.2248923	0.2684014	0.5555192
Fall	0.08008763	0.04008751	0.1953442	0.1732576	0.2934040
Total			0.1953442	0.3580070	1.0633763

\* The Service uses the 80th Confidence Interval from the Bayesian Collision Risk Model as the number to examine for the National Environmental Policy Act analysis.



Distributions of predicted fatalities are presented above based on the output from the Service’s Collision Risk Model, showing the seasonal (winter, breeding, and fall) and total annual predicted rates. From left to right on each of the above graphs, vertical lines represent the 50<sup>th</sup> quantile (red line); the mean (black line); and the 80<sup>th</sup>, 90<sup>th</sup>, and 95<sup>th</sup> quantiles (red lines). Based on the output of the Service’s model at the 80<sup>th</sup> quantile, we estimate that 1.06 bald eagles per year are at risk of collision. We propose to allot this take based on an average of 6 eagles every 5 years. The total amount of eagle take (and the impact of this take) we are analyzing is up to 32 eagles over the 30-year life of the wind Project.