

Apple Blossom Wind Energy Project Risk Analysis Summary and Recommendations

Prepared by the U.S. Fish & Wildlife Service - National Eagle Support Team

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Facility Information

Facility: Apple Blossom Wind Energy

Location: Huron County, MI

Latitude & Longitude: 43.818092, -83.309591

Year Online: 2017

Number of Turbines: 29

Hub Height: 87 m

Rotor Diameter: 126 m

Total Facility Hazardous Volume: 0.072 km³

Data Summary

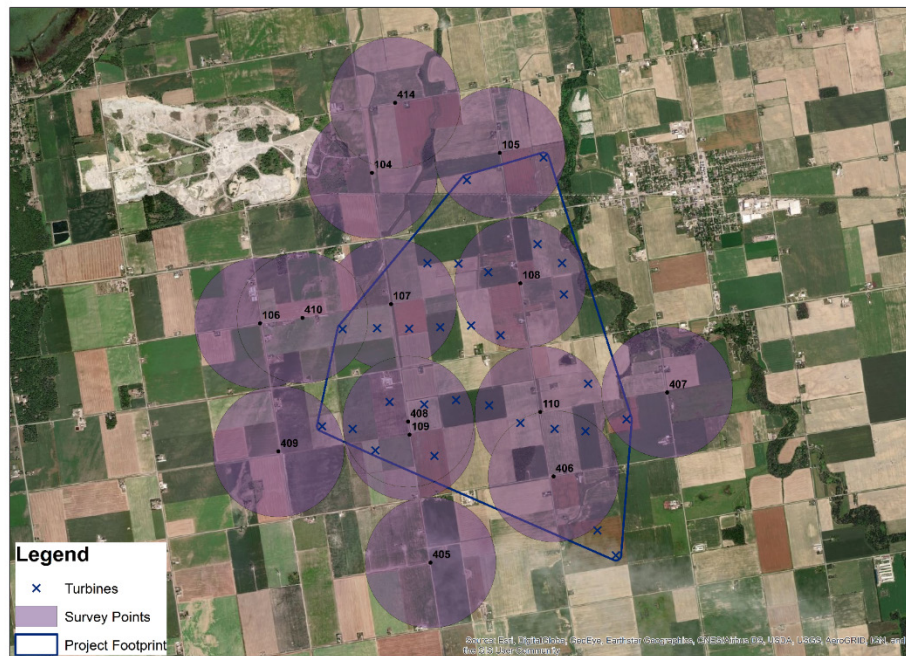


Fig. 1. Apple Blossom Wind Energy Project eagle use survey points (2011–2014) and turbine locations (Huron County, MI).

- Survey points APBL 405-410 & 414 (Fig. 1):
 - 2 of 7 survey points are within the current project footprint – the survey points are not spatially representative of the project footprint, however the FWS Regional permit

biologist (C. Mensing) determined that due to similar habitat characteristics and knowledge of the general area, the sampled areas around the project could be comparable in terms of expected eagle use.

- Only 30 minute surveys conducted in Nov 2011 and Feb 2012 – the surveys are not temporally representative of the monitoring period.
- Survey points APBL 104-110 (Fig. 1):
 - 5 of 7 survey points are within the project footprint – 2 points outside of the project are in close proximity to the project in habitat similar to that within the project footprint.
 - 60 minute surveys conducted once every month from Aug 2013 to July 2014.
 - All eagle minutes are within the project footprint – 3 of 4 during 2013-2014, including over 89 total survey hours.
- Post-construction fatality monitoring:

Applicant initially provided 6 months of post-construction fatality monitoring data (later the applicant provided an additional 6 months of data; 1 year of data provided in total), which was collected using 4 different survey methods – we recommend at least 2 years of post-construction data and need at least 1 complete year covering all seasons to consider post-construction mortality data minimally representative of all potential eagle use periods. In this case, though 1 year of post-construction data was ultimately available, based on the initial evaluation of survey methods, we anticipated that the overall detection probability for eagle remains would be low across the site. Additionally, including only 1 year of data from the project site does not account for year-to-year variability in eagle use, collision risk, or detectability of mortality events. Therefore, we did not include the post-construction data in the analyses for now. This data may be appropriate to incorporate after additional post-construction monitoring data is available, though may provide limited information with a low overall probability of detecting mortality events. Two bald eagle mortalities have been discovered at the project site.
- The “priors-only” CRM estimate = 5.01 bald eagle fatalities annually at the 80th quantile (Table 1; Fig. 2a). This estimate accounts for the project size and turbine configuration but does not include any site-specific monitoring data. We recommend using the “priors only” estimate for this project due to the increased possibility of underestimating take when updating exposure or the collision probability in the collision risk model with insufficient or non-representative data.
- Exposure update (incorporating pre-construction survey data from 2013–2014 surveys, APBL 104 – 110): Limiting the exposure data to the 2013-14 surveys at survey points 104-110 provides improved spatial overlap of the project footprint and better temporal coverage of the monitoring period—a ‘survey year’. These data are likely more representative of eagle use at the site for the monitoring year, however, there could be substantial annual variation in eagle use that is not captured by using a single year of eagle use data to inform the model. The CRM estimate (based on the one year of eagle use observed) = 0.39 bald eagle fatalities annually at the 80th quantile (Table 1; Fig. 2b). This estimate includes 3 eagle flight minutes observed during 69 total survey hours from Aug 2013 through July 2014.

Note: All analyses are based on the assumption that the data provided are accurate.

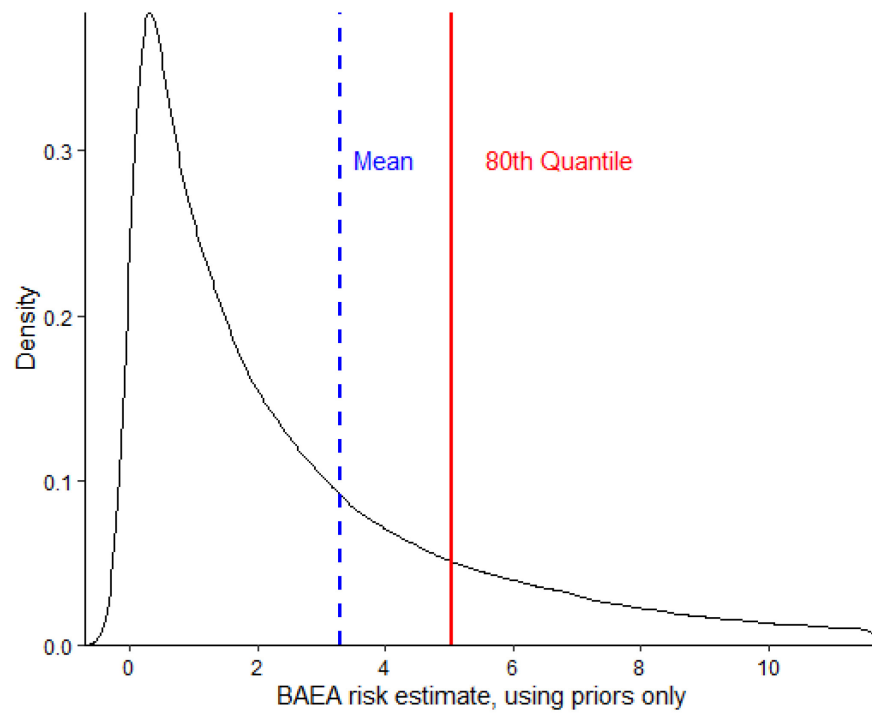


Fig. 2a. Priors only model results. The vertical red line represents the 80th quantile estimate (5.01 fatalities per year).

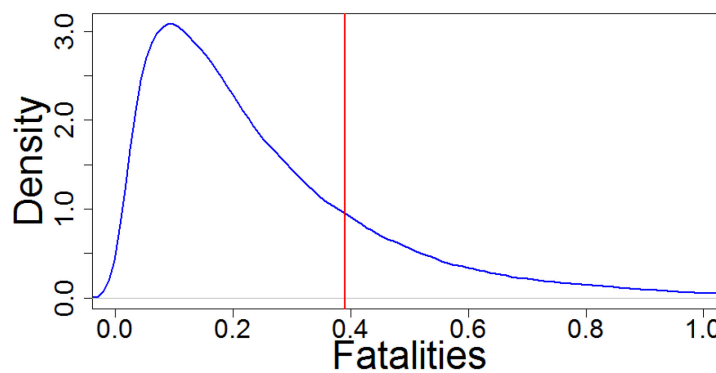


Fig. 2b. Posterior density fatality distribution for the exposure update model. The vertical red line represents the 80th quantile estimate (0.39 fatalities per year).

Table 1. Annual bald eagle fatality estimates at the Apple Blossom Wind Energy Project.

	No Updates/Priors-Only	Exposure Update
mean \pm SD	3.27 \pm 4.49	0.26 \pm 0.23
80th quantile	5.01	0.39

Golden Eagle Seasonal Priors-only Model Results

Observers did not detect golden eagles during the pre-construction surveys. Region 3 eagle permit biologists indicated that golden eagles may occur in the general area of the projects from mid-October through mid-May (16 October – 14 May; see Figure 3), therefore, we restricted the CRM to the assume potential golden eagle use of the project site would be limited to this specified "season" (assumes no golden eagle use of the project area outside of this time period).

Based on the seasonal use assumed, we estimated the fatality rate for golden eagles at the 80th quantile as 2.59 annual fatalities; the mean fatality rate was less than 2 (Table 2).

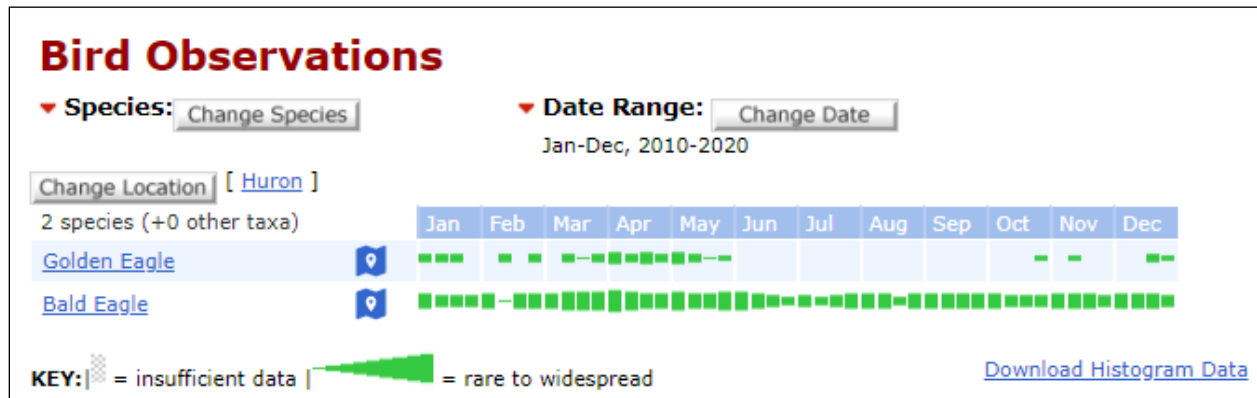


Figure 3. Bar chart of eBird observations of bald and golden eagles in Huron County, MI by date (<https://ebird.org/>)

Table 2. Seasonal (16 October – 14 May) golden eagle fatality estimates at the Apple Blossom Wind Energy Project.

	Seasonal Priors-Only
mean \pm SD	1.70 \pm 2.34
80th quantile	2.59

Changes in Eagle Use Over Time

There are indications (e.g. [USGS Breeding Bird Survey Data](#)) are that bald eagle populations are continuing to grow and many areas are likely to experience increases in overall eagle densities (e.g. mean trend from 2000-2014 of 7.8%). Continued bald eagle population growth in many areas contributes to concerns that eagle use data from 2014 surveys may no longer represent eagle use of the project area and could initially underestimate risk of eagle fatalities at the site.

Summary

Given the potential for bald eagle use of an area to vary between years, the limitations of the data provided, and general concerns that recent fatalities at the site may indicate that the 2013-14 eagle use data may under-estimate risk of bald eagle fatalities at the site, the Service supports setting authorized take for this permit based on the priors-only estimated annual take rate of 5.01 bald eagles per year at the 80th quantile of the fatality estimate and planning on a shorter initial check-in period for the permit as proposed by the project and Regional permit biologist. For a 30-yr permit, this would mean that initially the total authorized take for the project will be 151 bald eagles over 30 years, though using the “priors-only” estimate at the 80th quantile is likely a conservative estimate and may be reduced after additional monitoring data are available.

The Service strongly recommends simplifying the current post-construction monitoring design and increasing the likelihood of detecting any eagle fatalities that may occur (e.g. increasing the proportion of turbines searched) to better inform reevaluation of the estimated take at the check-in period.

At the first check-in, following the adaptive management framework described in the Programmatic Environmental Impact Statement for the 2016 eagle rule, the estimated annual fatality rate for the project will be adjusted and the permitted take authorization may be amended if appropriate. All information available for the project at this time (e.g. the one complete year of exposure data) indicate that estimates are likely to be reduced at a future check-in period.

Local Area Population (LAP) & Cumulative Effects

The LAP of bald eagles for the Project is 819 bald eagles, including land area that extends into Canada. The anticipated authorized take for the Project and cumulative take from other take authorizations in the area total 6 bald eagles annually. The total take authorization is 0.8% of the LAP.

The Service eagle mortality database includes records of 421 reported unpermitted bald eagle mortalities within the LAP between 2011–2020. This represents a minimum known level of unpermitted take (reported opportunistically) occurring at an average rate of approximately 33 per year, which is about 4% of the LAP annually.

The anticipated authorized take for the Project is consistent with Service management objectives for local population and cumulative impacts based on the 2016 PEIS.