Appendix O

EAGLE AND RAPTOR NEST REPORT

Barrelhead Solar, LLC

Wayne County, Kentucky

COPPERHEAD
ENVIRONMENTAL CONSULTING

Ground-based Raptor Nest Survey Report for the Proposed Barrelhead Solar Project

Wayne County, Kentucky

Prepared by:

Copperhead Environmental Consulting, Inc.
421 Main Street
Paint Lick, KY 40461

17 September 2025

TABLE OF CONTENTS

FIGURES

TABLES

INTRODUCTION

Barrelhead Solar, LLC (the Applicant) contracted Copperhead Environmental Consulting, Inc. (Copperhead) to complete a raptor nest survey for the proposed Barrelhead Solar Project in Wayne County, Kentucky. The Project is approximately 307 acres (Project Area, Figure 1) located approximately nine miles southwest of the town of Monticello. The purpose of the survey was to document bald eagle (*Haliaeetus leucocephalus*) nests within the Project Area and 0.5-mile buffer, and non-eagle raptor (raptor) nests within the Project Area. Bald eagles are the only eagle species with the potential to nest in the Project Area. Bald eagles have become increasingly common in central and eastern Kentucky, with known eagle nests on the northern edge of Wayne County (KDFWR 2021).

The survey was completed in accordance with the U.S. Fish and Wildlife Service (USFWS) Land-based Wind Energy Guidelines (USFWS 2012), the USFWS Eagle Conservation Plan Guidelines (ECPG), Eagle Incidental Take and Eagle Nest Take Regulations (USFWS 2013, USFWS 2016), and the Eagle Nest Survey Guidance Memo issued by the United States Department of the Interior on 21 April 2020 (Ford 2020). Copperhead Environmental Consulting (Copperhead) conducted a ground-based survey on 18 May 2025.

Ecological Setting

The proposed Project Area is on the western border of Wayne County, Kentucky, and located in the Pennyroyal physiographic region.

Kentucky is also separated into 25 distinct ecoregions based on physical and biological similarities, such as geology, topography, soils, vegetation, and land use. The proposed project is located within the Eastern Highland Rim ecoregion of the Interior Plateau. The Eastern Highland Rim ecoregion is primarily composed of oak-hickory forest. A pure mixed mesophytic forest could also be found in ravines in the eastern part of this region. This region has a mixture of land uses, including wild forest and managed woodlands, pasturelands and croplands, and oil and gas development. The area is mostly underlain by Mississippian limestone, chert, shale, siltstone, and sandstone. Streams are nutrient-rich and moderate in gradient (Woods et al. 2002).

METHODS

Desktop Habitat Analysis

A desktop habitat assessment was performed within the Project Area and a 0.5-mile buffer to identify areas most likely to support eagle nests and to focus ground-based survey efforts. Desktop analysis utilized aerial photography and the 2021 United States Geological Survey National Land Cover Database (NLCD) and ArcGIS Pro Version 3.4.3 to assess the quantity of potential suitable eagle habitat.

Land cover/use types generally optimal for eagle and raptor nesting include large trees capable of holding relatively substantial nests (Anthony and Isaacs 1989), which include the NLCD land use types of deciduous forest and mixed forest.

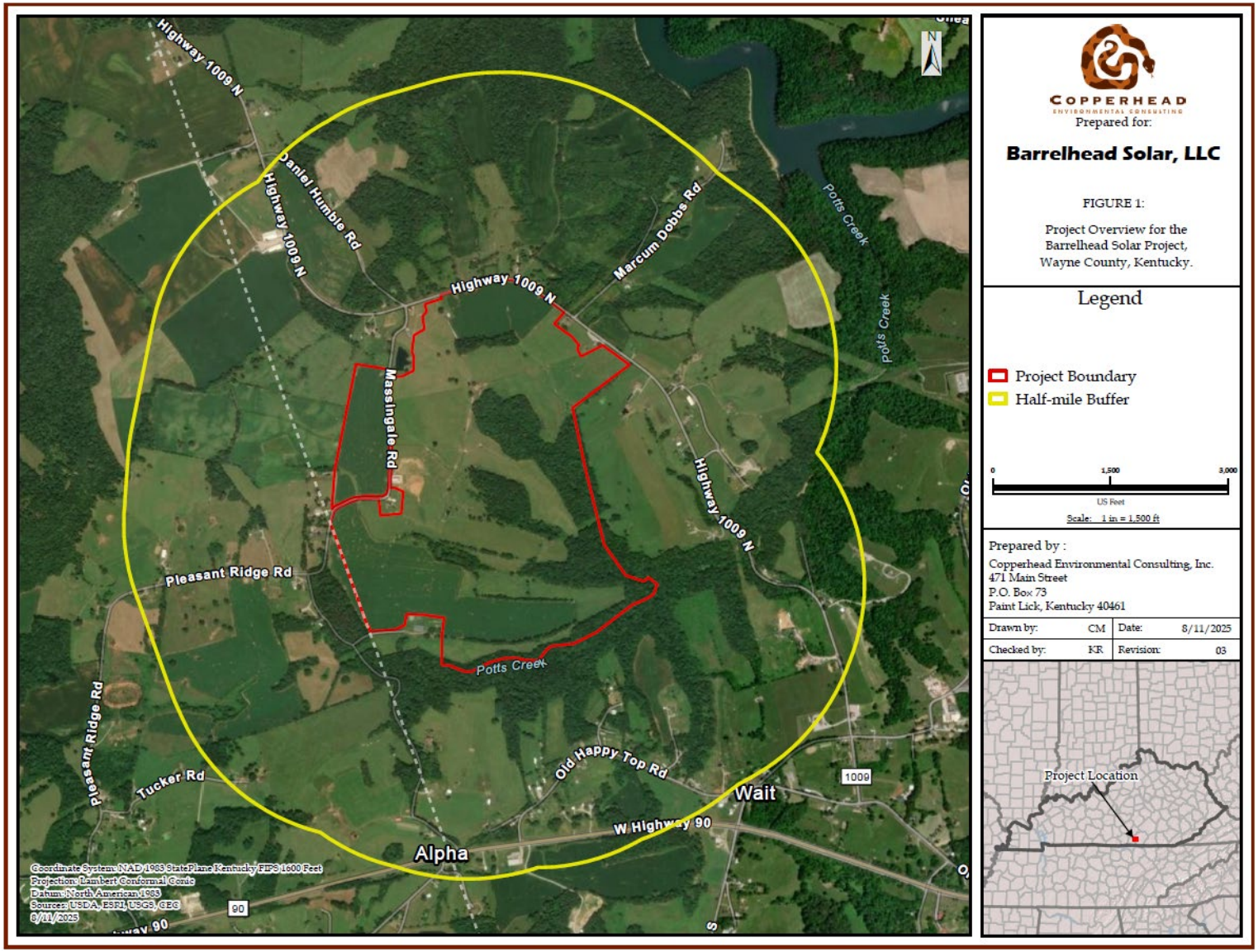

Figure 1. Project Area Overview for the Barrelhead Solar Project, Wayne County, Kentucky.

Ground-based Survey

Copperhead completed a ground-based survey on 18 May 2025, to document bald eagle nests within the Project Area and 0.5-mile buffer, and non-eagle raptors within the Project Area. All public roads within the Project Area and 0.5-mile buffer were driven by Copperhead biologists, and all forested habitat was scanned for nests using binoculars.

Data Collection

If a nest was located during the ground-based survey or aerial survey, the location of the nest was estimated using a tablet with mapping software and aerial imagery. Photograph(s) were taken, and the following data were recorded for each nest identified:

- Date
- Latitude/Longitude
- Nest Substrate: coniferous tree, deciduous tree, or manmade structure.
- Nest Type:
    - **Eagle:** large stick nest, typically 1.5 to 1.8 m [5.0 to 6.0 ft] in diameter and 0.6 to 1.2 m [2.0 to 4.0 ft] tall, placed approximately two-thirds to three-quarters of the way up the height of the tree (Buehler 2000).
    - **Raptor:** stick nests smaller than a bald eagle nest but larger than a crow nest.
- Species (if observed)
- Nest Condition:
    - **Good:** Nest bowl intact; nest requires only routine maintenance for use.
    - **Fair:** Nest bowl present but ill-defined; nest requires partial repair or rebuild for use.
    - **Poor:** Nest bowl absent; site requires full rebuild for use.
- Nest Status:
    - **Occupied:** a nest used for breeding in the current season by a pair of birds. This includes nests with recent construction activity (i.e., fresh boughs or material added to the eyrie), nests with eggs, hatchlings, or fledglings, and those nests with adults present but no eggs or young. Freshly molted or plucked down feathers also suggest occupancy.
    - **Unoccupied:** a nest that did not show signs of occupancy, and adults were not present.
- Nest Activity:
    - **Active:** one or more adults present and exhibiting breeding behaviors, and/or fledglings, chicks, or eggs visible.
    - **Inactive:** nest has evidence of occupancy, [e.g., whitewash, new nest materials, etc.] but adults, fledglings, chicks, and eggs are absent during the defined nesting season for the region.

If individual raptors, separate from their nests, were located during the ground-based survey, their location was estimated using a tablet with mapping software and aerial imagery. Photograph(s) of the bird were taken if possible, and the bird's activity was recorded.

RESULTS

Desktop Habitat Assessment

As characterized by the NLCD, the dominant land cover type within the Project Area is hay and pasture (66 percent), which offers limited nesting habitat for eagles (Table 1, Figure 2). Eagles are also known to nest in proximity to open water (Andrew and Mosher 1982, Anthony and Isaacs 1989), which is limited in the Project Area and the 0.5-mile buffer. However, an arm of Lake Cumberland is approximately 600 feet outside of the 0.5-mile buffer.

Potentially suitable raptor/eagle nesting habitats include the NLCD land cover types of deciduous forest and mixed forest, and accounts for approximately 27 percent of the land cover in the Project Area and 0.5-mile buffer (Table 1, Figure 2; NLCD 2021; Homer et al. 2020). These habitats primarily occur near the portion of Potts Creek that runs the southern boundary of the Project area, and in the north-west portion of the 0.5-mile buffer that lies near Lake Cumberland.

Table 1. National Land Cover Database land cover classes within the Project Area.

Land Cover Type	Project Area	0.5-Mile Buffer
Barren Land	-	1 (<1%)
Cultivated Crops	11 (4%)	124 (7%)
Deciduous Forest	60 (20%)	322 (18%)
Developed, High Intensity	-	<1 (<1%)
Developed, Low Intensity	3 (1%)	65 (4%)
Developed, Medium Intensity	-	14 (1%)
Developed, Open Space	4 (1%)	66 (4%)
Evergreen Forest	-	2 (<1%)
Hay/Pasture	213 (69%)	987 (56%)
Herbaceous	1 (<1%)	1 (<1%)
Mixed Forest	9 (3%)	157 (9%)
Shrub/Scrub	6 (2%)	8 (<1%)
Total	307	1,748

Ground-based Survey

No eagle or non-eagle raptor nests were located within the Project Area or the 0.5-mile buffer during survey efforts.

No bald eagle individuals were observed during survey efforts. Two species of non-eagle raptors were, however, observed within the Project Area (Figure 3). A single red-tailed hawk (*Buteo jamaicensis*) was observed flying at point RA-01 (36.773414, -85.010156), and two American kestrels (*Falco sparverius*) were observed perched on a utility line at point RA-02 (36.780938, -85.010698) (Figure 3)

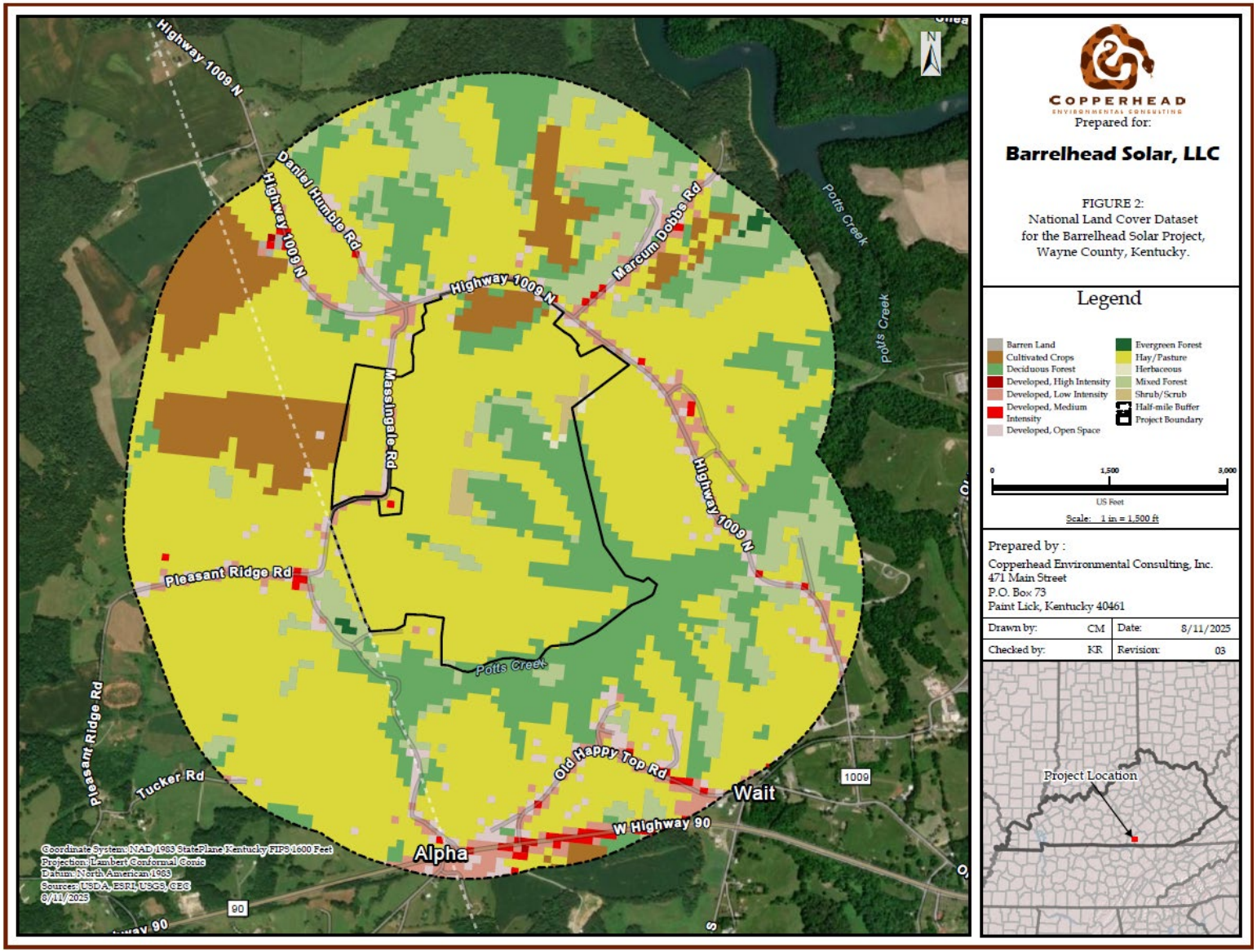

Figure 2. NLCD Landcover Classes within the Project Area and 0.5-mile Buffer.

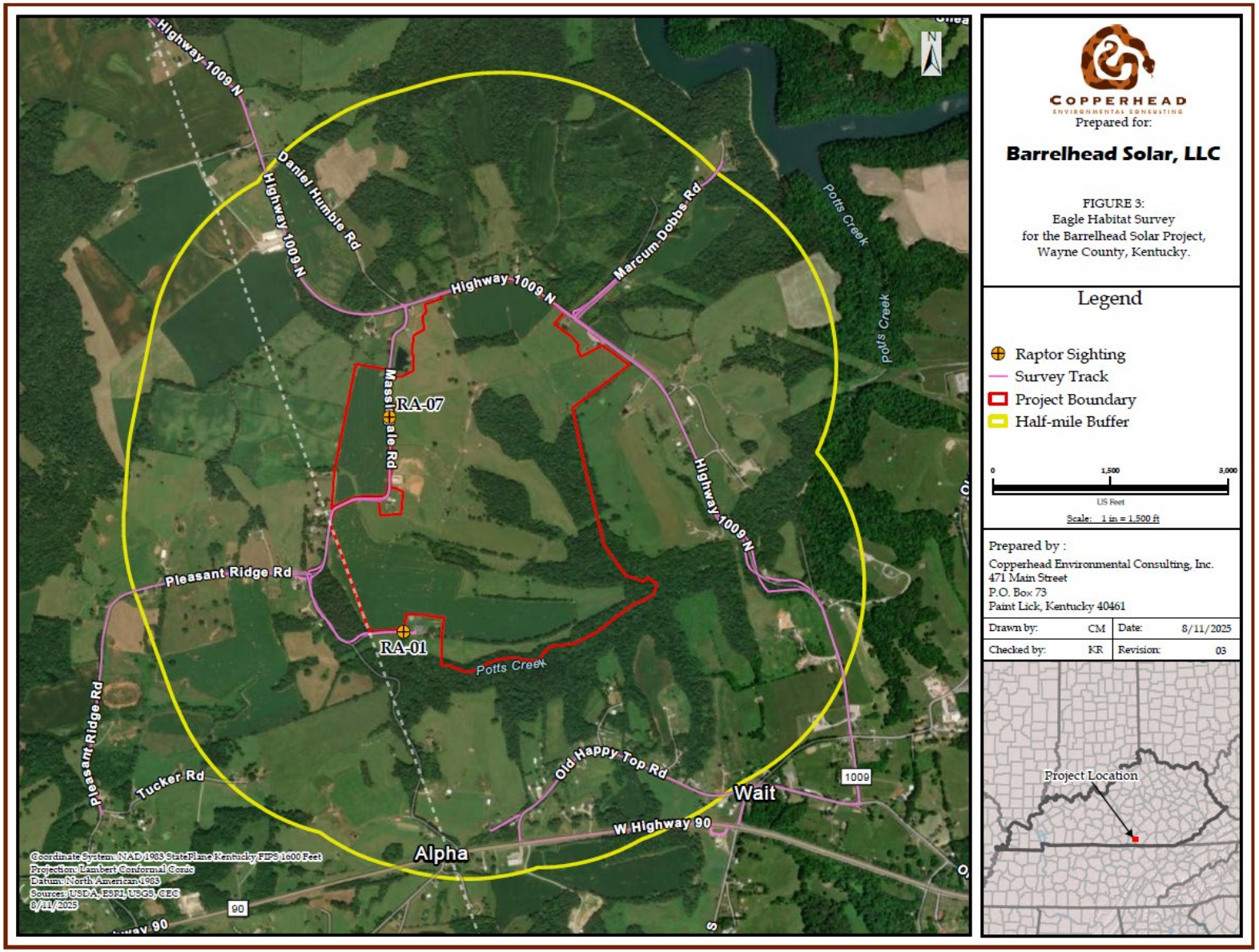

Figure 3. Non-eagle Raptor Sightings within the Project Area.

CONCLUSION

No eagle or non-eagle raptor nests were located within the Project Area or the 0.5-mile buffer during the ground-based survey efforts completed by Copperhead. Three non-eagle individual birds (one red-tailed hawk and two American kestrels) were observed within the Project Area. Should any bald eagle or raptor nests be discovered during Project construction activities, a 660-foot buffer around the nest would be required and an incidental take permit needed.

LITERATURE CITED

Andrew, J.M. and Mosher, J.A. 1982. Bald Eagle nest site selection and nesting habitat in Maryland. *Journal of Wildlife Management, 46,* 382-390

Anthony, R.G. and Isaacs, F.B. 1989. Characteristics of Bald Eagle nest sites in Oregon. *Journal of Wildlife Management, 53,* 148-159.

Buehler, D.A. 2000. Bald Eagle (*Haliaeetus leucocephalus*), version 2.0. In The Birds of North America (P.G. Rodewald, editor). Cornell Lab of Ornithology, Ithaca, New York, USA.

Ford, J. Memo to Regional Directors, Regions 1-12, Assistant Director, Ecological Services. Subject: Eagle Surveys. 21 April 2020.

Homer, C.G., Dewitz, J.A., Jin, S., Xian, G., Costello, C., Danielson, P., Gass, L., Funk, M., Wickham, J.D., Stehman, S., Auch, R., and Ritters, K. (NLCD). 2020. Conterminous United States land cover change patterns 2001–2016 from the 2016 National Land Cover Database. *ISPRS Journal of Photogrammetric Engineering and Remote Sensing*, v. 162, p. 184-199.

Kentucky Department of Fish and Wildlife Resources (KDFWR). 2021. Kentucky Balde Eagle Nest Monitoring Plan. https://fw.ky.gov/Wildlife/Documents/Eagles/KYBaldEagleMonitoringPlan2021.pdf.

US Fish and Wildlife Service (USFWS). 2012. U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines. https://www.fws.gov/sites/default/files/documents/land-based-wind-energy-guidelines.pdf.

US Fish and Wildlife Service (USFWS). 2013. Eagle Conservation Plan Guidance: Module 1 – Land-based Wind Energy Version 2. USFWS, Division of Migratory Bird Management.

US Fish and Wildlife Service (USFWS). 2016. Eagle Incidental Take and Eagle Nest Take Regulations. 50 CFR 13 and 22. 81 Federal Register 91494. December 16, 2016.

Woods, A.J., J.m. Omernik, W.H. Martin, G.J. Pond, W.M. Andrews, S.M. Call, J.A. Comstock, and D. D. Taylor. 2002. Ecoregions of Kentucky. y (color poster with map, descriptive text, summary tables, and photographs): Reston, VA., U.S. Geological Survey (map scale 1:1,000,000). https://dmap-prod-oms-edc.s3.us-east-1.amazonaws.com/ORD/Ecoregions/ky/ky_front.pdf. Accessed 7 July 2025.