COPPERHEAD
ENVIRONMENTAL CONSULTING

2024 Eagle and Raptor Nest Survey Report
Lost City Solar Project
Logan & Muhlenberg Counties, KY

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INTRODUCTION

Copperhead Environmental Consulting, Inc. ("Copperhead") completed an aerial raptor nest survey for the proposed Lost City Solar Project ("Project") in Logan and Muhlenberg counties, Kentucky (Figure 1). The purpose of the survey was to document bald eagle (*Haliaeetus leucocephalus*) nests within the Project and a 660-foot buffer. Bald eagles are the only eagle species with the potential to nest in the general vicinity of the Project. The survey was completed in accordance with the U.S. Fish and Wildlife Service (USFWS) Eagle Conservation Plan Guidance (ECPG 2013) and Eagle Incidental Take and Eagle Nest Take Regulations (50 CFR 13 and 22; USFWS 2016).

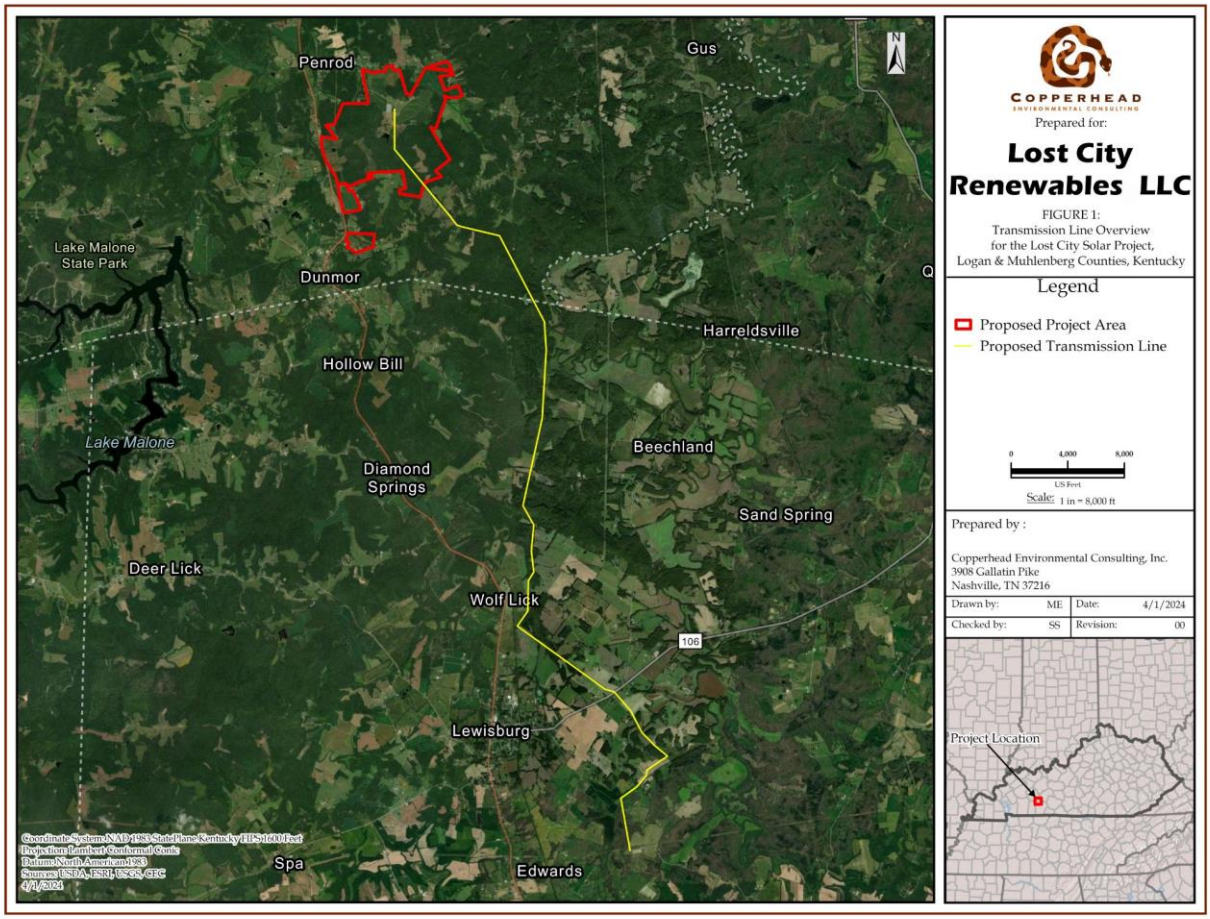

Figure 1. Project boundary for the proposed Lost City Solar Project, Logan & Muhlenberg Counties, KY.

PROJECT AND SURVEY AREA

Based on the U.S. Geological Survey's National Land Cover Database (NLCD) landcover classification, the predominant land cover/use type within the Logan and Muhlenberg counties' Project area and 660-foot buffer (herein referred to as 'Survey Area') is deciduous forest (54%), which provides nesting habitat for eagles (Table 1). Land cover/use types that are considered generally optimal for eagle and raptor nesting include large trees suitable for holding relatively substantial nests (Anthony and Isaacs 1989). Eagles are also known to nest near open water (Andrew and Mosher 1982, Anthony and Isaacs 1989), which consists of multiple streams within or crossing the Survey Area. Suitable raptor/eagle nesting habitats, specifically deciduous forest, woody wetlands, mixed forest, evergreen forest, and open water account for approximately 59% of the Survey Area and are mainly concentrated along riparian areas in the northern (e.g. Rocky Creek, Lazy River) and southern (e.g. Jockys Branch, Mud River, Wolf Lick Creek, Alum Lick Creek, Austin Creek) portions of the Project area (Figure 2, Table 1; NLCD 2011; Homer et al. 2020).

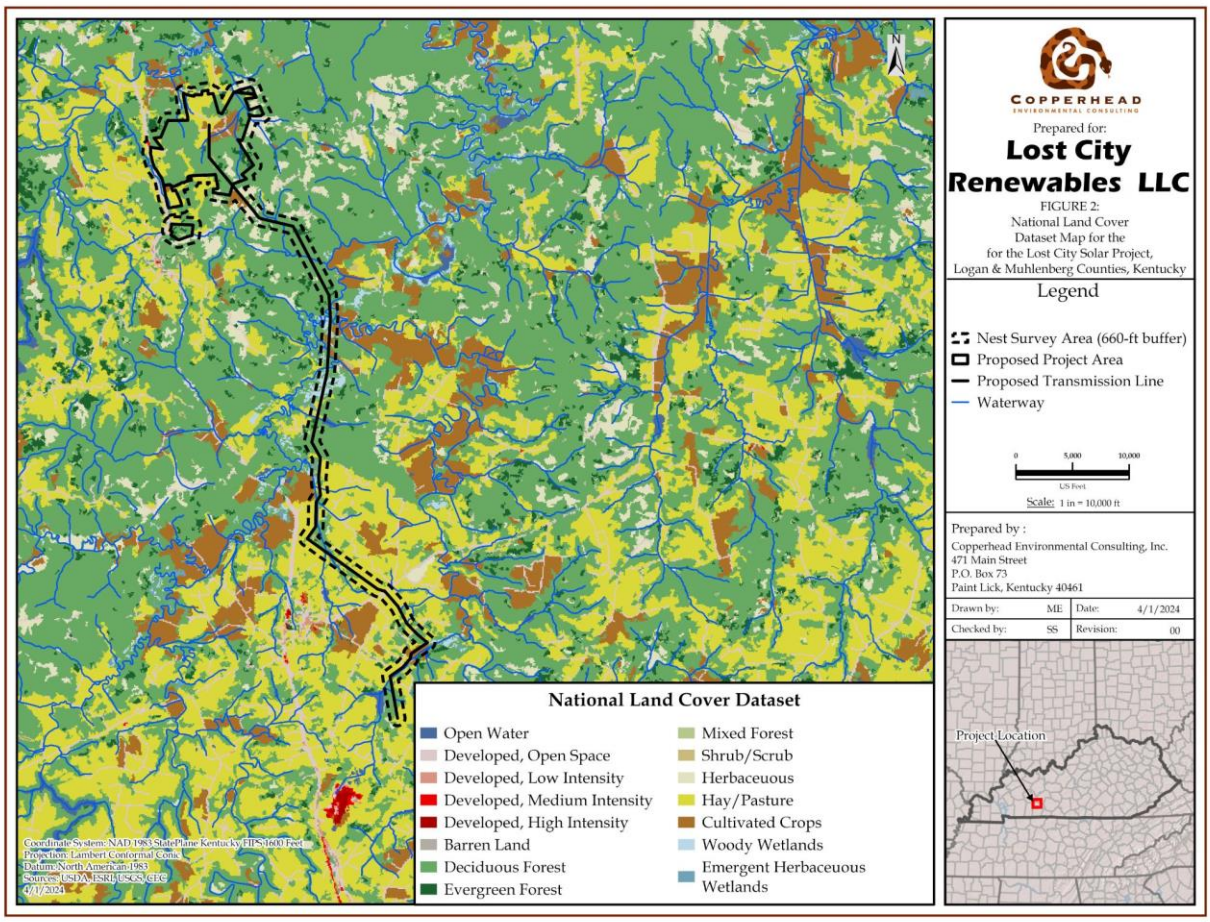

Figure 2. Landcover classifications from the NLCD for the proposed Lost City Solar Survey Area, Logan & Muhlenberg counties, KY.

Table 1. Land use and land cover proportions within the proposed Lost City Solar Project and Survey Area, Logan & Muhlenberg counties, KY.

Land Use/Land Cover Classification	Project (acres)	Survey Area (acres)	Potential Eagle Nest Habitat
Deciduous Forest	832	2,137	Yes
Hay/Pasture	284	1,001	No
Cultivated Crops	100	219	No
Herbaceous	38	201	No
Developed	46	172	No
Evergreen Forest	52	111	Yes
Woody Wetlands	-	92	Yes
Emergent Herbaceous Wetlands	-	14	No
Mixed Forest	8	12	Yes
Shrub/Scrub	3	6	No
Open Water	4	5	Yes

METHODS

Copperhead completed an aerial eagle and raptor nest survey 21 March 2024, from a Cessna 172 fixed wing aircraft carrying one pilot/biologist and one additional wildlife biologist experienced with aerial raptor nest searches. Nest searches within the Project and 660-foot buffer focused on locating eagle and raptor nests (i.e., stick nest structures). The aerial survey focused on suitable eagle and raptor nesting substrate (e.g., trees, transmission lines structures, etc.).

To ensure adequate coverage, the entire Survey Area was flown and areas with high quality eagle and raptor habitat were surveyed more intensively. Flight paths are included in Appendix A. All observed nest locations were recorded using aerial mapping software. For each nest, the following data were collected whenever possible: location, species, and occupancy status.

If located, eagle nests were classified as "In Use" or "Alternate" nests consistent with definitions amended from the ECPG and presented in the Eagle Incidental Take and Eagle Nest Take Regulations (50 CFR 13 and 22; USFWS 2016). Under these definitions, an In Use classification would be applied if eagles were observed displaying courtship or nest building behavior in proximity to the nest, or if any of the following were observed: (1) an adult eagle in an incubating position, (2) eggs, (3) nestlings or fledglings, (4) occurrence of a pair of adult eagles (or, sometimes subadults, e.g., Steenhof et al. 1983) at or near a nest through at least the time incubation normally occurs, (5) a newly constructed or refurbished stick nest in the area where territorial behavior of a raptor had been observed early in the breeding season, or (6) "A recently repaired nest with fresh sticks (clean breaks) or fresh boughs on top, and/or droppings and/or molted feathers on its rim or underneath" (Postupalsky 1974). If no eagles, courtship behavior, or nest-building were observed, and the nests did not appear to have any of the aforementioned use indicators, the nest would be classified as Alternate.

For all other raptor nests, occupancy status can be challenging to confirm from the air because the nests are smaller and generally lower in the canopy. If other raptor nests were found, nests were classified as Occupied if one of the following were observed: (1) an adult raptor in an incubating position, (2) occurrence of an adult raptor at or near a nest, or (3) if there was evidence of new material in the nest. If none of the aforementioned occupancy indicators were observed, the nest would be classified as Unoccupied. The raptor species would be recorded if it was possible to confirm which species the nest belonged to. When species could not be confirmed, the nest would be recorded as an "Unknown" raptor nest.

RESULTS

Eagles

No bald eagle nests were documented during the surveys.

Other Raptors

One Occupied unknown raptor nest was documented within the Project boundary during the survey (Table 3, Figure 4). No raptor was present when RAPT1 was documented but new nest material was observed in the bowl. This nest was too small to be a potential eagle nest. A photo of the raptor nest is included in Appendix B.

Table 2. Raptor nest location and occupancy status within the proposed Lost City Solar Project and Survey Area, Logan & Muhlenberg counties, KY.

Nest ID	Species	Occupancy Status	Distance to Project (mi)	Latitude	Longitude	Habitat
RAPT1	Unknown Raptor	Occupied	Inside	37.103593	-86.983217	Woodlot

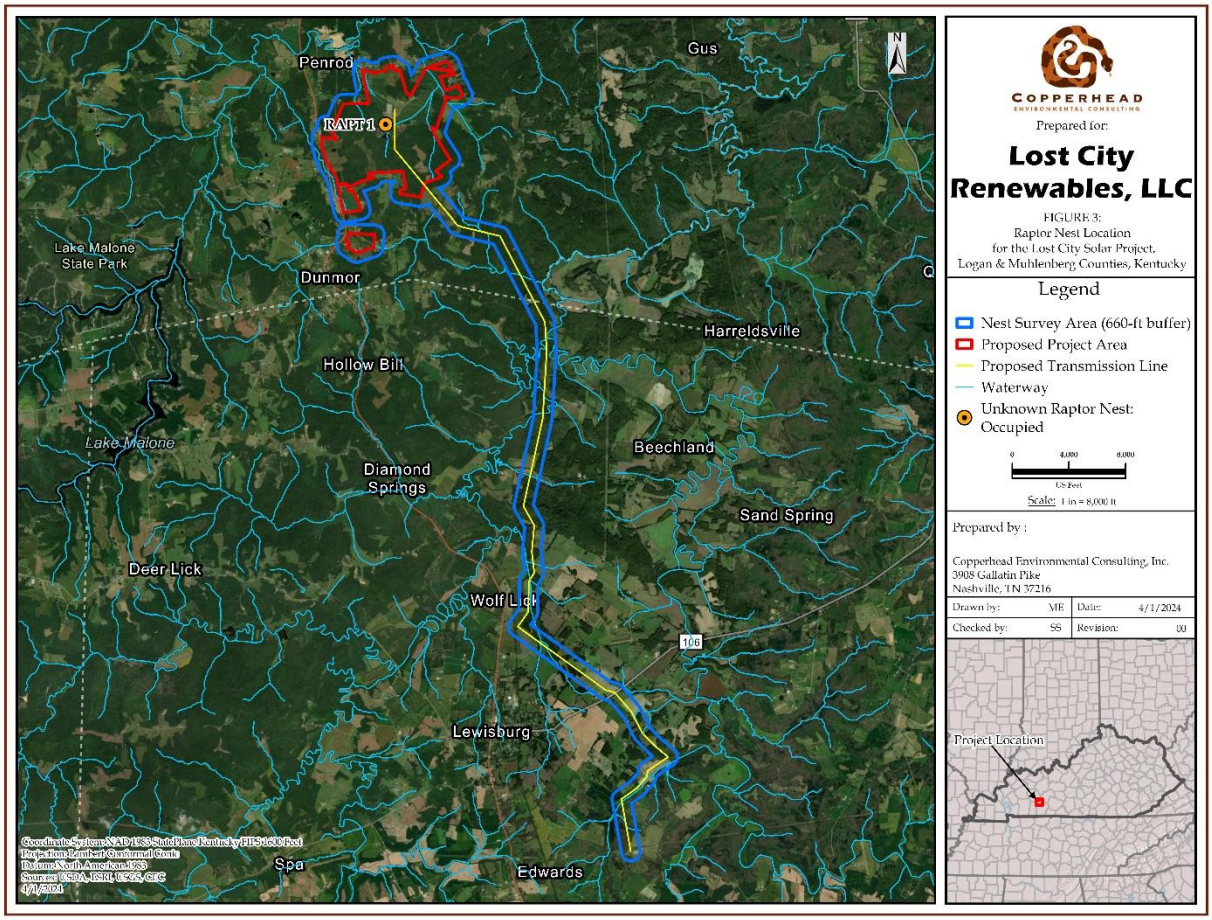

Figure 3. Raptor nest location within proposed Lost City Solar Project and Survey Area, Logan & Muhlenberg counties, KY.

CONCLUSION

No bald eagle nests were observed within the Project or Survey Area. Suitable eagle nesting habitat made up 59% of the total land use within the Survey Area; primarily located in the Project area to the north. Additionally, one Occupied, non-eagle, unknown raptor nest was observed within the Project boundary.

REFERENCES

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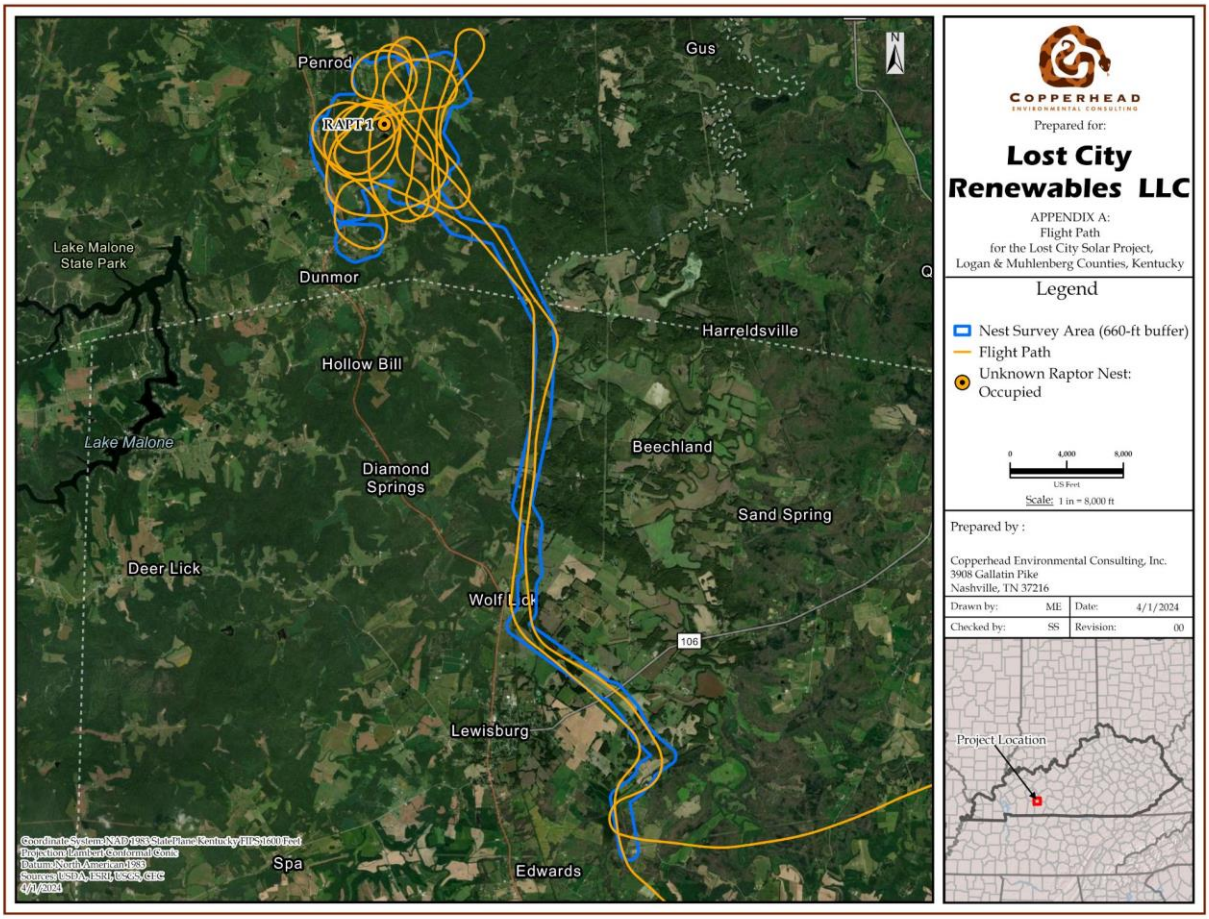
Appendix A: Flight Path of the 2024 Lost City Solar Aerial Raptor Nest Surveys



Appendix B: 2024 Raptor Nest Photographs

COPPERHEAD ENVIRONMENTAL CONSULTING	2024 Eagle and Raptor Nest Survey Report for the Proposed Lost City Solar Project Muhlenberg County, KY Photographic Record	
Project No.: 1543	**County, State:** Muhlenberg County, KY	**Client:** Lost City Renewables, LLC

Photo No. 1: RAPT1	
Date: 21 March 2024	
Location: 37.103593, -86.983217	
Description: Aerial survey image of an unknown raptor nest.	