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Bald Eagle Telemetry at the Holtwood Redevelopment Project

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**BALD EAGLE TELEMETRY
AT THE
HOLTWOOD REDEVELOPMENT PROJECT**



**CENTER FOR CONSERVATION BIOLOGY
COLLEGE OF WILLIAM AND MARY
VIRGINIA COMMONWEALTH UNIVERSITY**

BALD EAGLE TELEMETRY AT THE HOLTWOOD REDEVELOPMENT PROJECT

Final Report January 2014

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Project Funded by:

PPL Holtwood, LLC

Front Cover: Eagle chicks fitted with GSM-GPS transmitters. Photo by Bryan Watts.



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INTRODUCTION

The Holtwood Dam is located on the lower Susquehanna River between York and Lancaster Counties, PA, 1.5km upstream from the Rt 372 Bridge (Figure 1). The area around the dam is known to support two breeding pairs (Kleinschmidt pers. comm.). PPL Holtwood LLC (PPL) is currently redeveloping the Holtwood Hydroelectric Plant which includes blasting activities within the construction zone. In consultation with the US Fish and Wildlife Service (USFWS) and Pennsylvania Game Commission (PGC), PPL developed a management and monitoring plan prior to initiating construction to minimize the effects of blasting noise on the two eagle pairs. A federal eagle take permit was issued in 2012 after eagles at the nesting territory on Piney Island were observed flushing after two blasting events. A condition of the take permit required PPL to conduct a telemetry project to study the movements of bald eagles using the habitat near the dam to nest and forage. The original goal of the study was to deploy transmitters on eagles at the Piney Island nest with the Holtwood nest as an alternative. In early April 2012, the breeding attempt at the Piney Island nest failed and this project focused solely on the eagles at the Holtwood Dam nest.

OBJECTIVES

1. Deploy transmitters on two bald eagles near the Holtwood Dam
2. Use tracking data to support management of eagles at Holtwood during redevelopment activities

METHODS

We deployed transmitters on eagles from the Holtwood Dam nest by climbing the nest and capturing nestlings during the pre-fledging period. The nest was accessed using standard arborist equipment when the chicks were between 50 and 55 days old. We calculated chick age based on initiation of incubation during February 14-16, 2012 (J. Pignatelli per. comm). We ascended the nest tree and lowered the nestlings to the ground to complete banding and transmitting activities.

Banding Techniques

Both eagles were banded, measured, and sampled for genetic material. Wing and tail length were measured with a ruler (± 1 mm). Eagles were sexed using measurements and foot pad size. Methodology for animal handling and tissue collection was in compliance with protocols approved by the Institutional Animal Care and Use Committee at the College of William and Mary. Banding, transmitter attachment, and tissue collection were in accordance with state and federal permits.

Tracking Techniques

We fit eagles with 70g solar-powered GSM-GPS (Global System for Mobile Communications-Global Positioning System) transmitters (Microwave Telemetry Inc, Columbia, MD). The transmitters were attached using a backpack harness constructed with 0.63 cm Teflon ribbon (Bally Ribbon Mills, Bally, PA).

Transmitters recorded an eagle's location based on global positioning system satellites. Transmitters were programmed to record a locational fix based on voltage. The minimum time between fixes was 2 minutes but frequency was dependent on battery charge from the solar cells. The transmitters are programmed to upload the day's data through the cellular network every 24 hours. We downloaded the data and parsed it to extract GPS locations, altitude, and engineering data on transmitter voltage and temperature. Parsed data was cataloged in a Microsoft Access database.

We calculated fixed kernel home range utilization distributions and minimum convex polygons using Geospatial Modeling Environment (Bayer 2012). We produced a shapefile with polygons for 25%, 50%, 75% and 95% probability distributions.

RESULTS

Banding

On May 16th, we banded two male eagles at the Holtwood Dam nest using federal bands 0679-01373 and 0679-01374. Biologists from USFWS, PGC, and Kleinschmidt assisted with banding activities. Both eagles appeared healthy with only a mild infestation of feather lice.

Tracking Data

Both transmitters began collecting data immediately upon returning the eagles to the nest. Using the tracking data, we determined the eagles fledged between 11-12 weeks old which is within the normal range for the species (Buehler 2000, Watts et al. 2012). Since fledging the nest on June 11, transmitter 004 has collected 31,630 GPS locations and 005 has collected 23,887 GPS locations. These range from 21-92 fixes a day.

Both eagles successfully dispersed from their natal territory at the Holtwood Dam in August after a 2 month post-fledging dependency period. Pre-dispersal movements concentrated around Piney Channel within the construction zone below the dam (Figures 2 & 3).

Eagle 004

Eagle 004 dispersed from Holtwood on August 26, 2012 with minimal visits back to the site until the eagle returned May 2013. The eagle explored many areas of the Upper

Chesapeake Bay and southeastern Pennsylvania but focused movements along the Susquehanna River at Aberdeen Proving Ground, Conowingo Dam, Holtwood Dam, Safe Harbor Dam, and Turkey Hill Wind Farm (Figure 4 and 6). Holtwood Dam and nearby Muddy Run Reservoir had the most use of any of the sites on the Susquehanna. While at Holtwood, the eagle roosted at three main sites 1) the west bank of the Susquehanna 1km North of the Holtwood Dam, 2) the transmission towers on Piney Island, and 3) the main communal roost at Muddy Run Reservoir (Figure 8).

Eagle 005

Eagle 005 travelled more broadly and farther south on the Delmarva Peninsula than its sibling (Figure 5). After dispersing in August 2012 the eagle only returned to Holtwood briefly in November 2013. Most of its time was spent at known eagle concentration areas at Conowingo Dam and on the Sassafras River in Kent Co, MD (Figure 7 and 9).

DISCUSSION

The bald eagle chicks from the Holtwood Dam nest behaved within the normal range for the species. The post-fledging dependency period in the Upper Chesapeake Bay ranges from 2 weeks to 8 months (Watts et al 2012). The Holtwood eagles stayed within the 4km post-fledging distance documented elsewhere for the species for approximately 2 months (Wood and Collopy 1995).

Before dispersing from their natal territory, both eagles concentrated their movements on the southwestern shoreline of Piney Island and adjacent smaller islands. This location is along a section called Piney Channel where discharge from Unit 1 flows from the dam. The channel is attractive to the eagles because it was designed to provide a fish passage route and additional fish habitat. The eagles also perch and roost on the transmission towers on Piney Island. Piney Channel was the focus of daytime GPS locations for one of the eagles which suggests foraging behavior. The eagles' dispersal from Holtwood, exploratory movements in the Susquehanna and upper Chesapeake Bay, and later return to their natal area around Holtwood are comparable to tracked eagles of similar age (Watts et al. 2012). One of the eagles has consistently used Piney Island from May 2013-January 2014.

In addition to nest monitoring, future management of the species along the Susquehanna River should focus on protection of communal roosts that frequently host 5-100 eagles per night, including these two eagles from the nest at Holtwood. Both eagles utilized communal roosts which are important sources of information for juveniles about local food resources and provide opportunities for interspecific socialization (Watts and Mojica 2012).

ACKNOWLEDGMENTS

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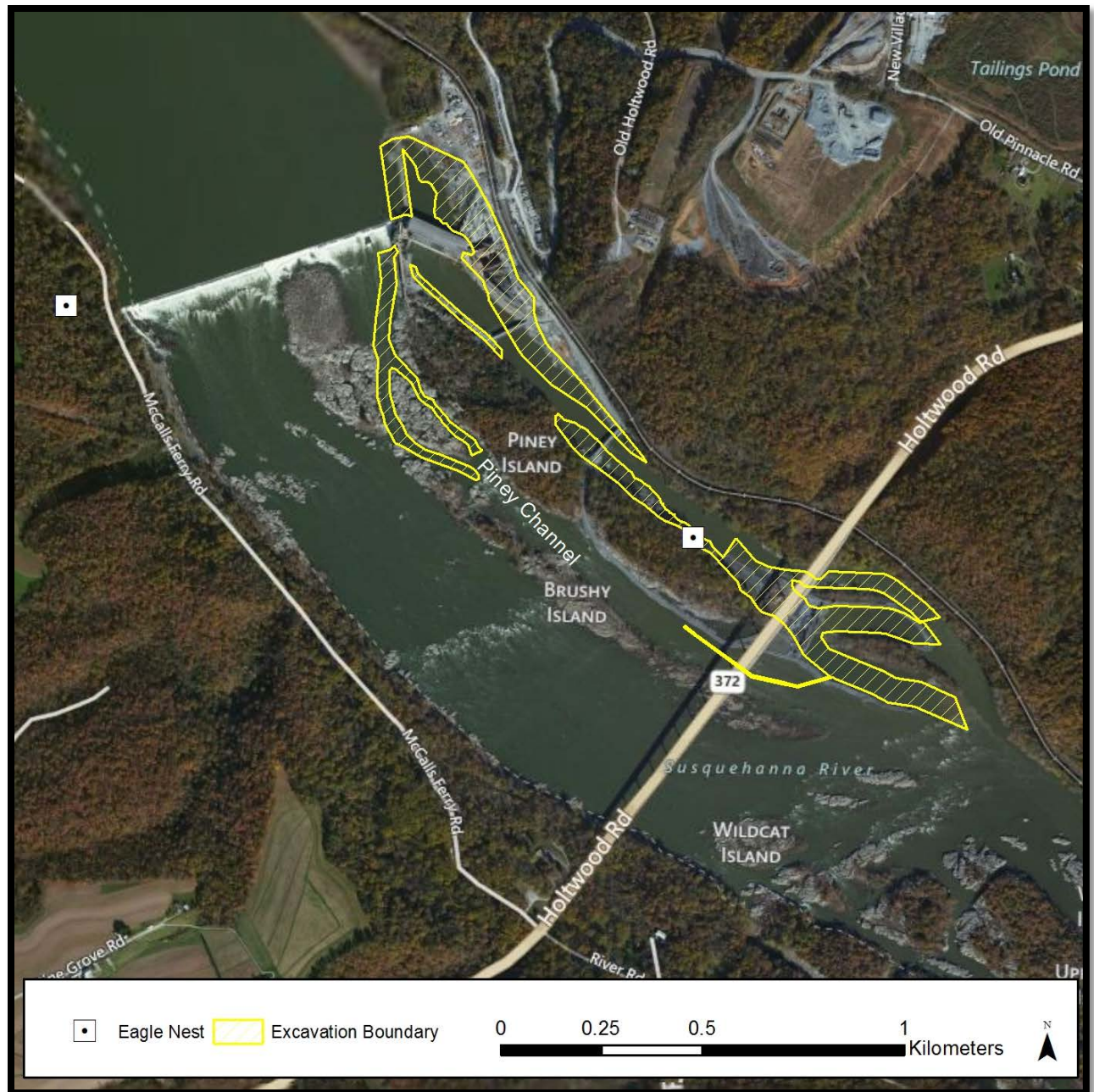


Figure 1. Study area at the Holtwood Dam in York and Lancaster Counties, PA.

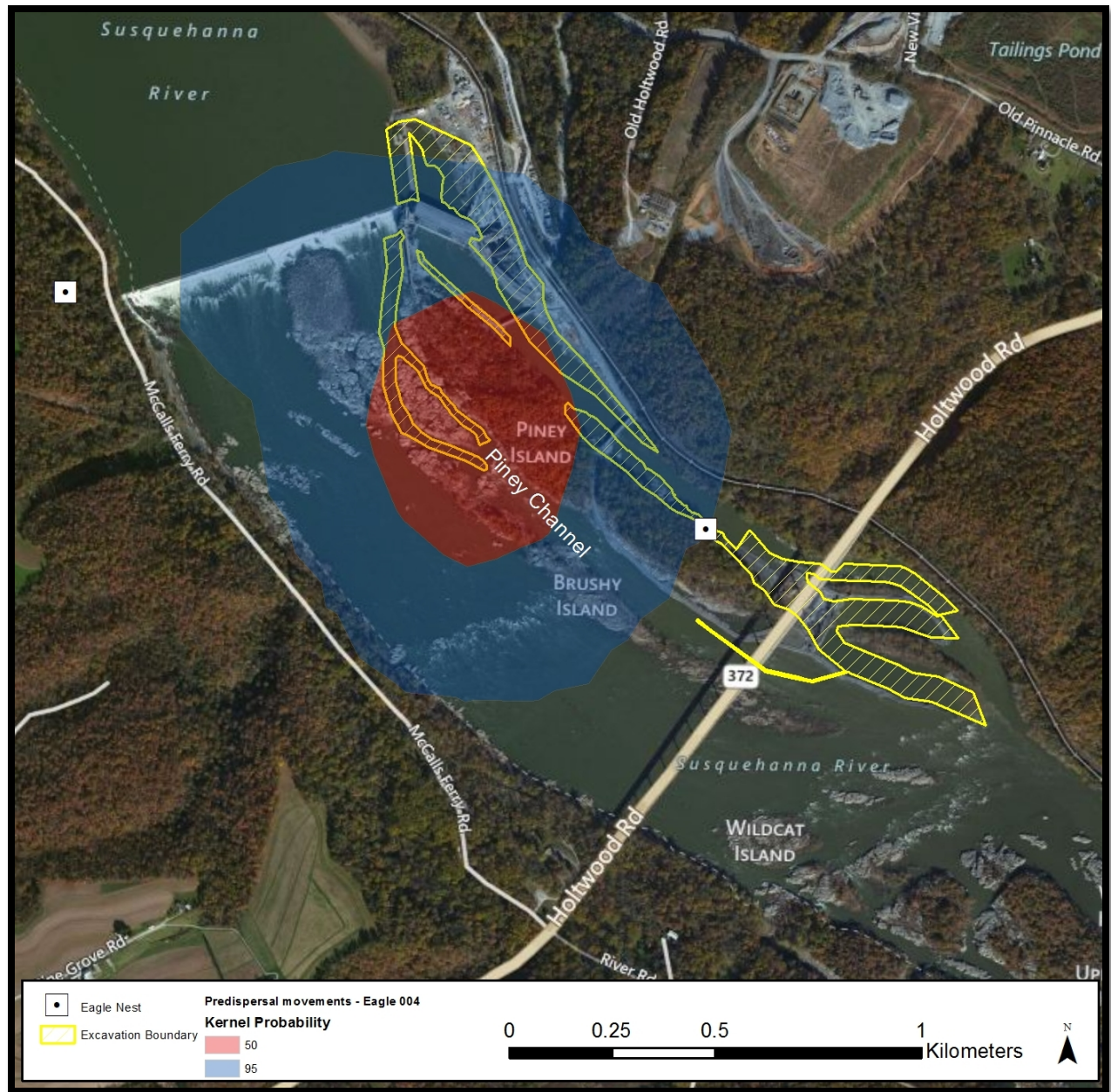


Figure 2. The predispersal home range of bald eagle 004 concentrated around Piney Channel.

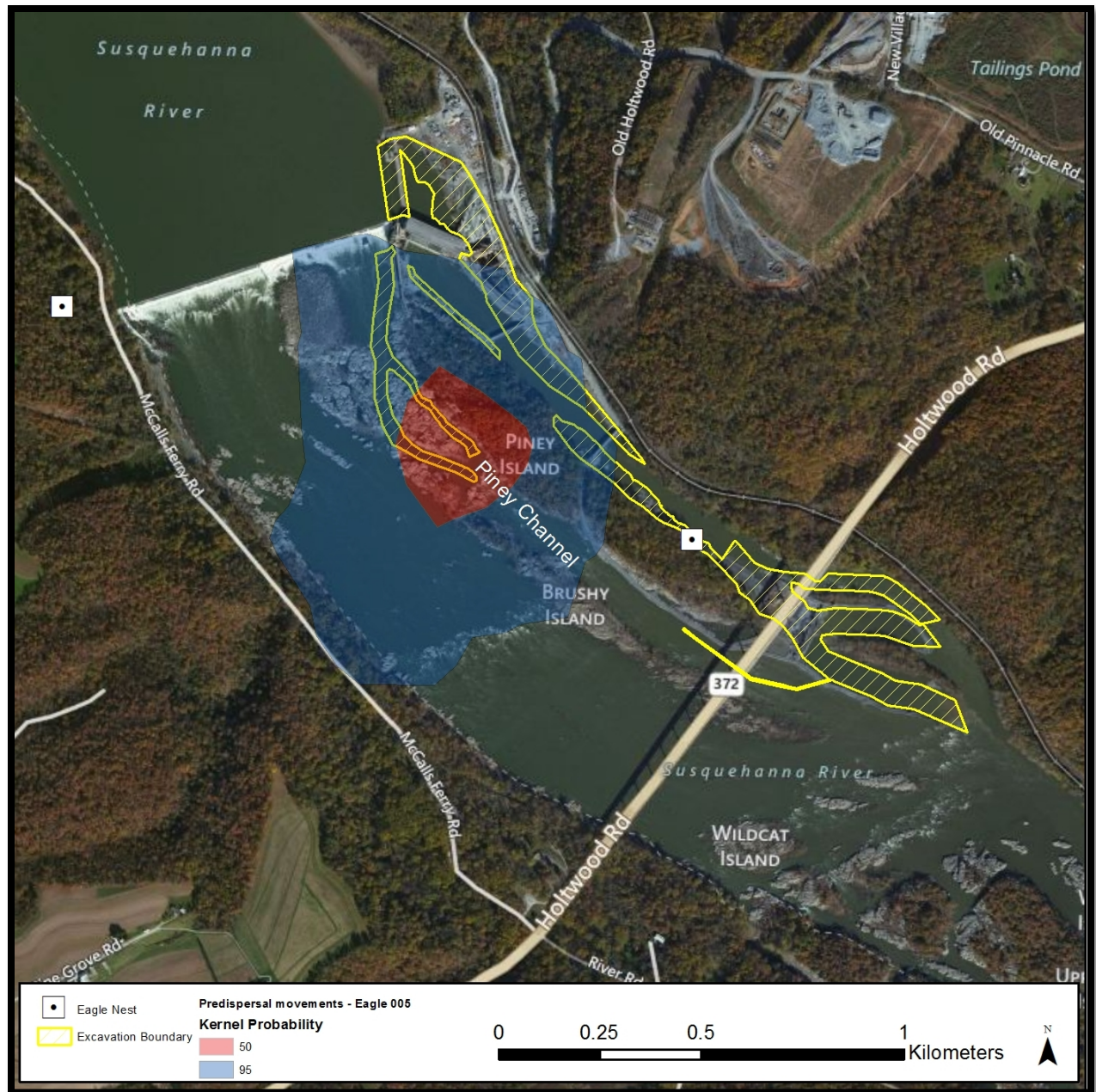


Figure 3. The predispersal home range of bald eagle 005 concentrated around Piney Channel.

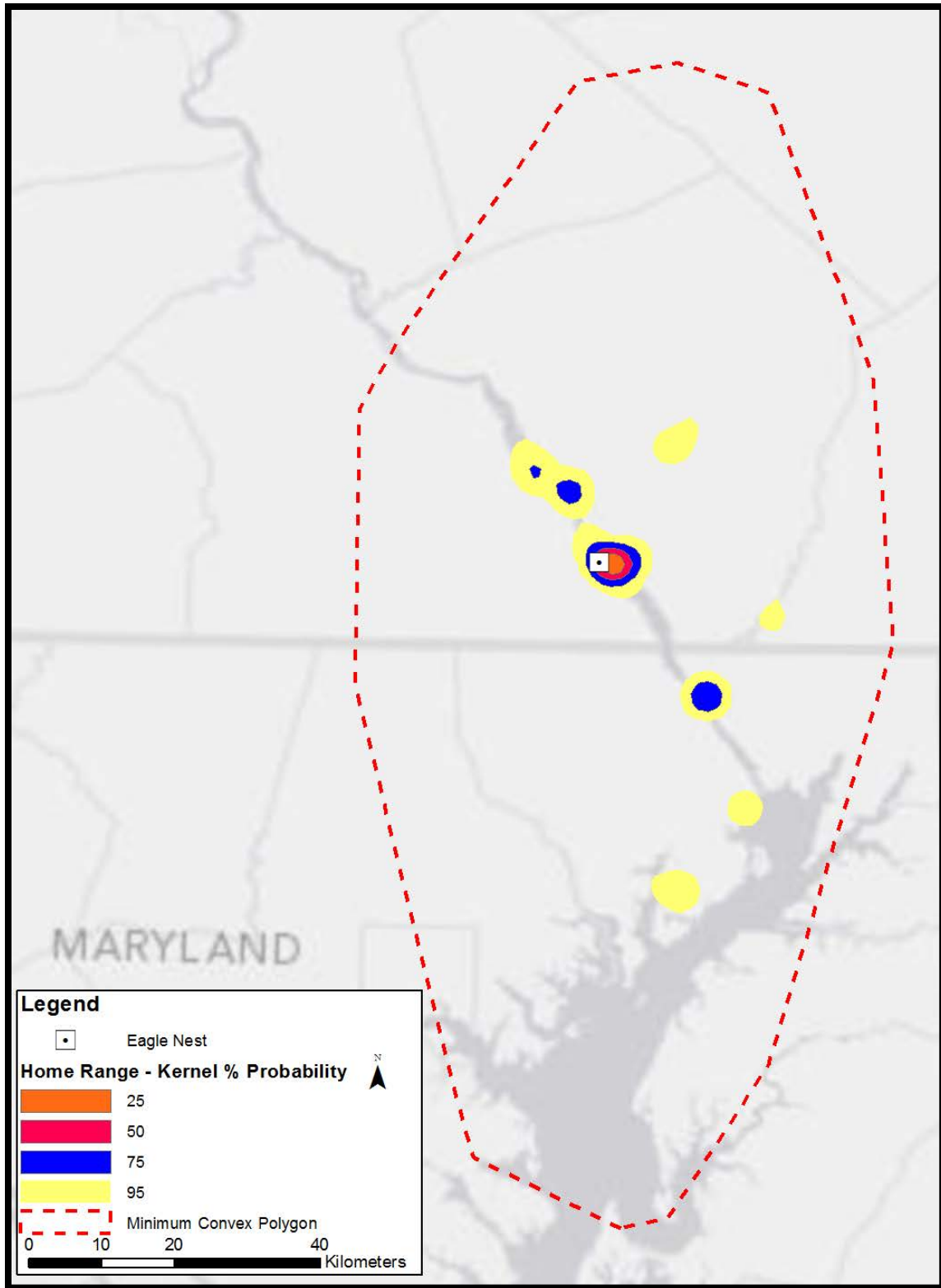


Figure 4. The post-dispersal movements of bald eagle 004 concentrated along the Susquehanna River and upper Chesapeake Bay region.

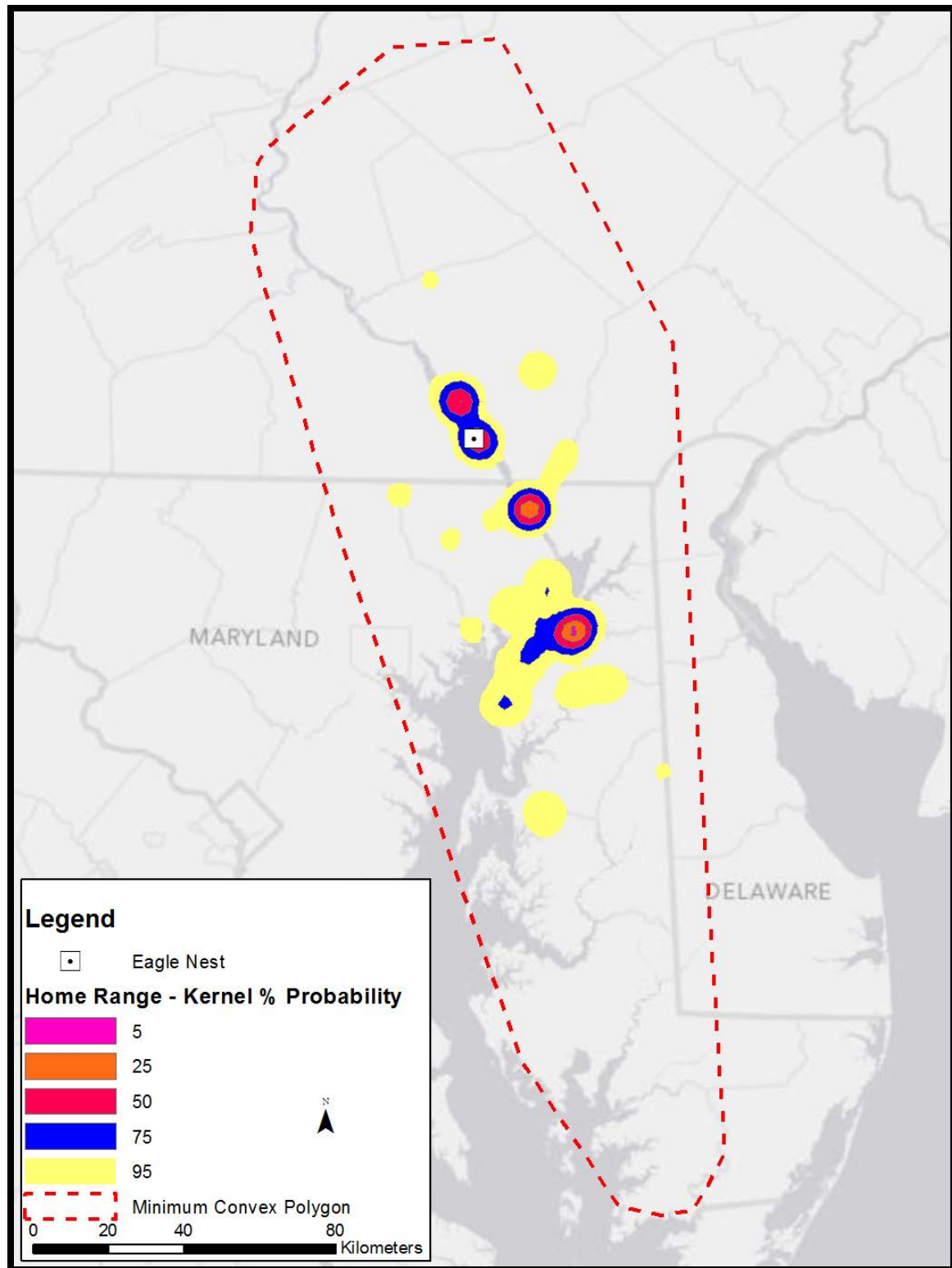


Figure 5. The post-dispersal movements of bald eagle 005 concentrated along the Susquehanna River and upper Chesapeake Bay region.

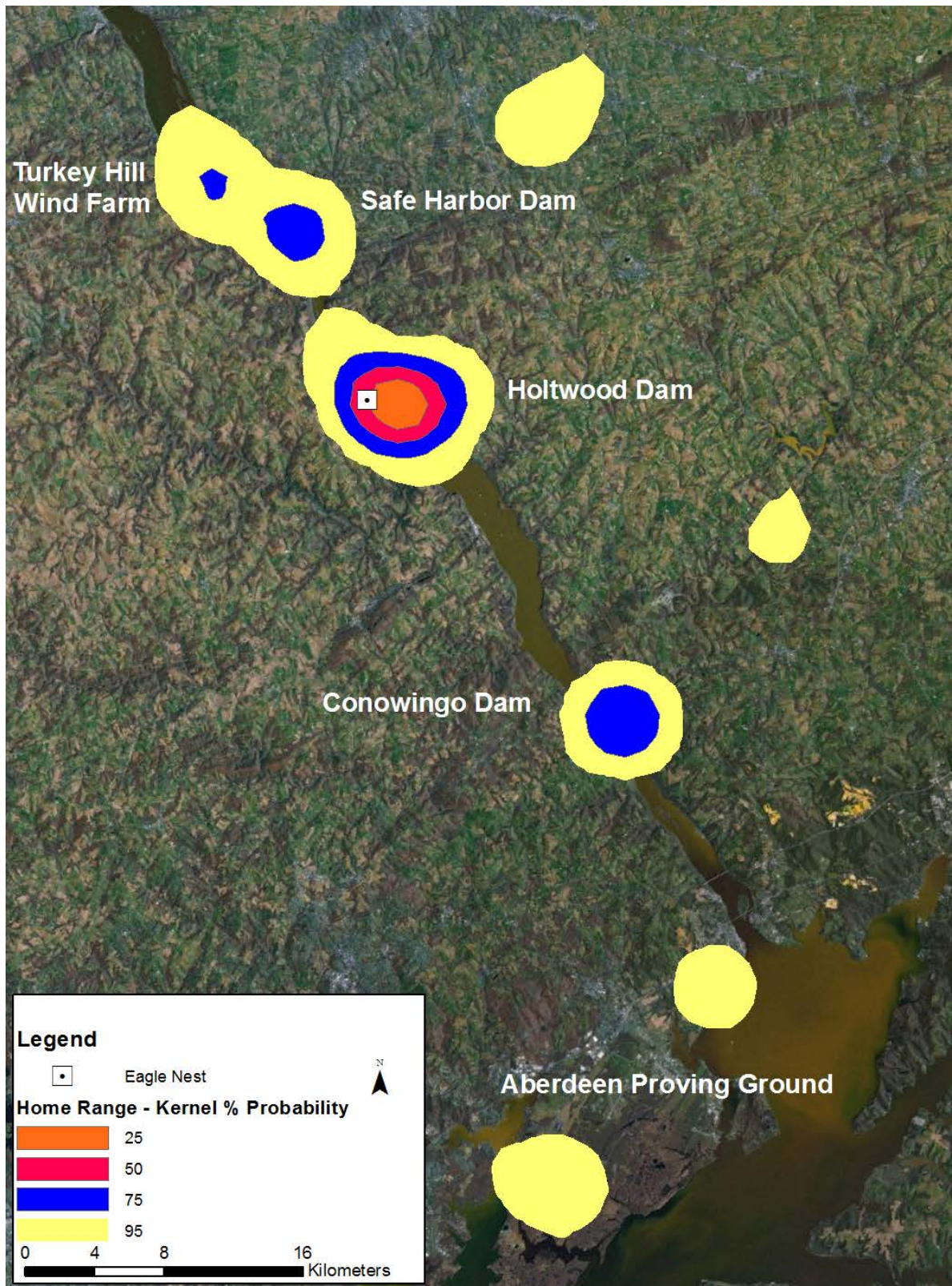


Figure 6. Home range polygons show concentrated movements of Eagle 004 at Holtwood Dam and along the Susquehanna River.

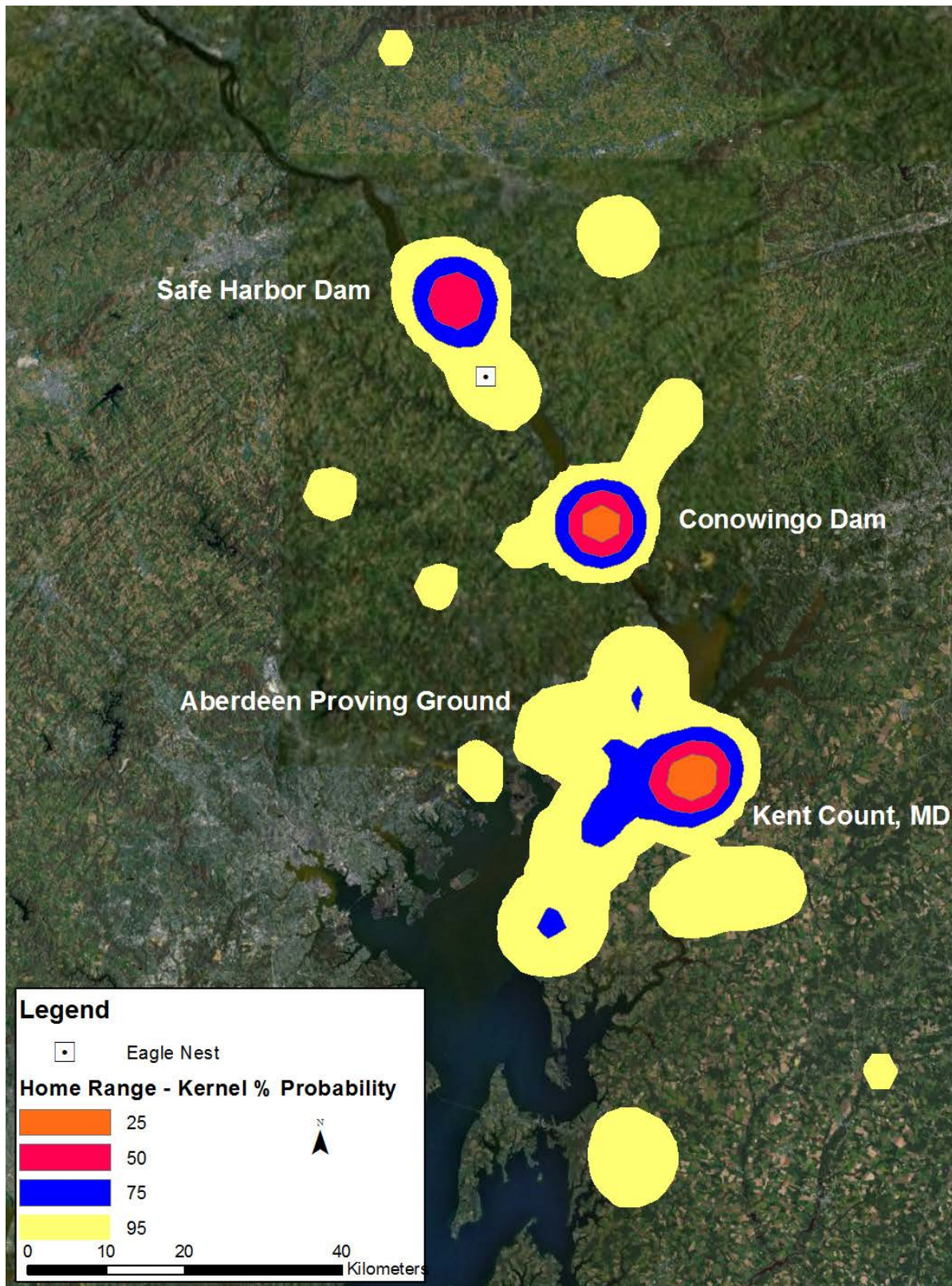


Figure 7. Home range polygons show concentrated movements of Eagle 005 along the Susquehanna and Sassafras Rivers.

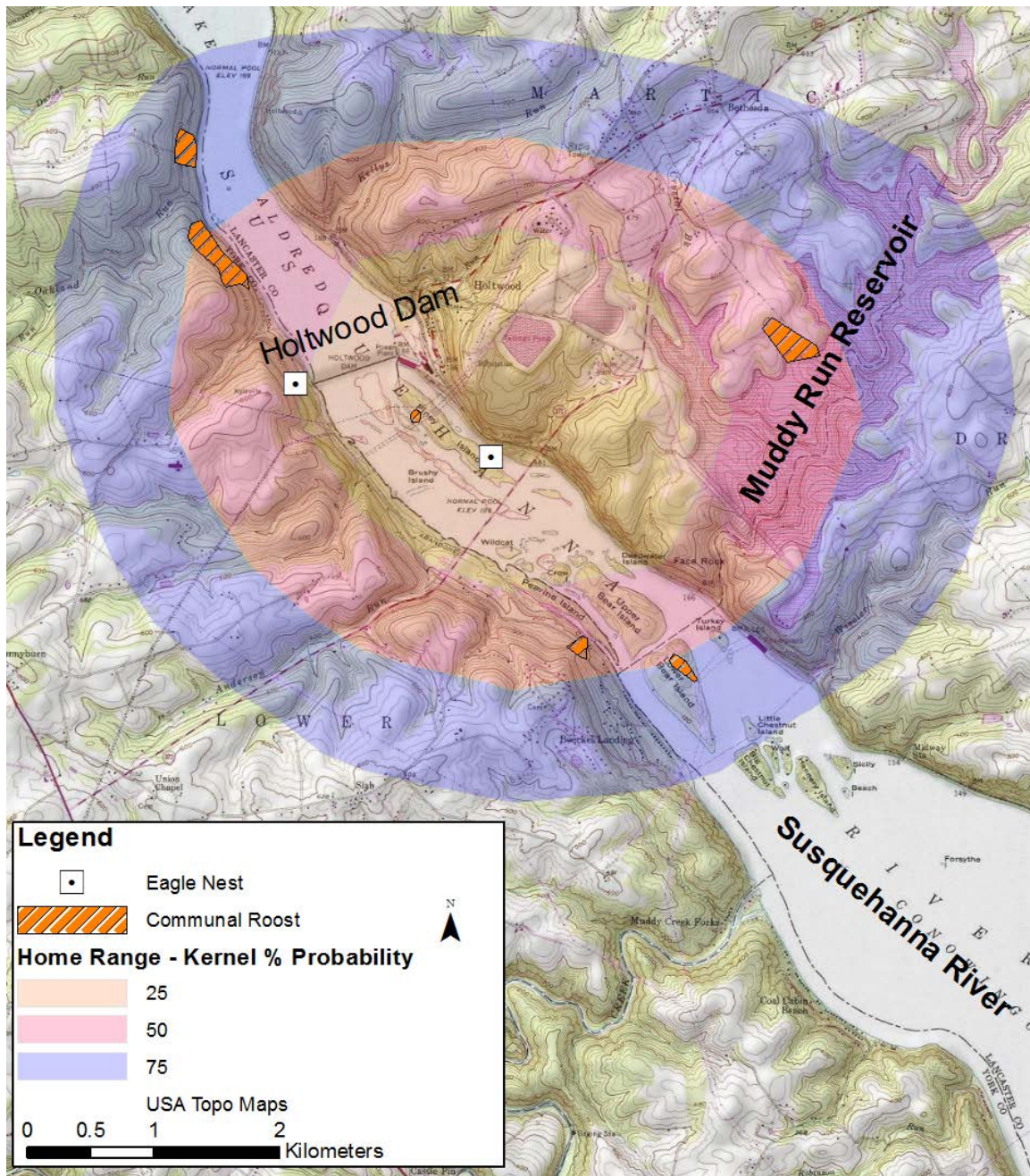


Figure 8. Eagle 004 spent a majority of its time post-dispersal at Holtwood Dam and Muddy Run Reservoir frequently roosting in communal roosts.

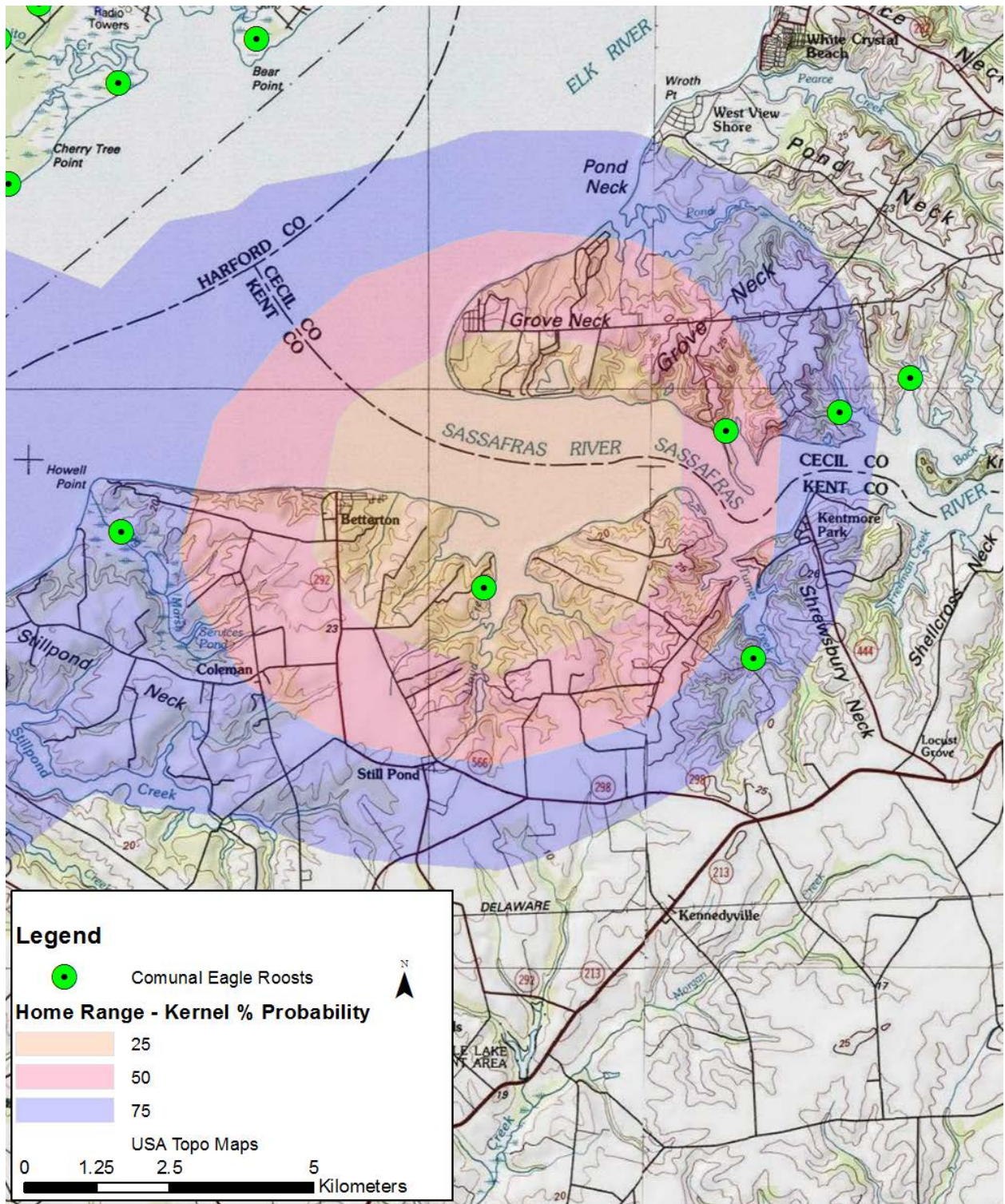


Figure 9. Eagle 005 spent much of its time on the Sassafras River which hosts several communal roosts.