



University of Illinois
Institute of Natural Resource Sustainability
William Shilts, Executive Director

ILLINOIS NATURAL HISTORY SURVEY
Brian D. Anderson, Director
1816 South Oak Street
Champaign, IL 61820
217-333-6830

Habitat Inventory and Search for Ivory-billed Woodpeckers in the Cache River Watershed, Illinois

by Jeff Hoover

INHS Technical Report 2010 (29)
Prepared for United States Department of the Interior Fish and Wildlife Service
Issue Date: 7/26/2010

Habitat inventory and search for Ivory-billed Woodpeckers in the Cache River watershed,
Illinois

Grant/Contract Number: Cooperative Agreement 401818J504

Habitat Inventory and Search for Ivory-billed Woodpeckers in the Cache River Watershed, Illinois

Final Report to: United States Fish and Wildlife Service

Cooperative Agreement Number 401818J504

Duration of Research: 15 February 2008 to 01 June 2010

Location of Research: Cache River watershed, Union, Johnson and Pulaski Counties, Illinois

By:

Dr. Jeff Hoover

University of Illinois

Institute of Natural Resource Sustainability

Illinois Natural History Survey

1816 S. Oak Street, Champaign, IL 61820

ph: (217) 244-2922; e-mail: jhoover@inhs.uiuc.edu

Background and Justification

The Ivory-billed Woodpecker (*Campephilus principalis*) historically was a common occupant of floodplain forests of the southeastern United States. By 1900, its numbers and range had been reduced substantially as a result of habitat loss and various types of persecution. The last known population was studied in a remnant patch of old-growth forest known as the Singer Tract in northeast Louisiana during the late 1930's by J. Tanner. The Singer Tract was subsequently logged and the population of Ivory-billed Woodpeckers (IBWOs) did not persist. Since then, many individual sightings of IBWOs have occurred, mostly in or near the few remaining large patches of contiguous bottomland forest in the southeastern U.S. For many years the IBWO was thought to be extinct because of the lack of compelling evidence to the contrary. During the past six decades, efforts to conserve and restore bottomland forest ecosystems have resulted in the protection of a number of mature bottomland forests and in the completion of several large-scale reforestation projects within the historic range of the IBWO.

In 2004, the IBWO was "rediscovered" in the Cache and lower White River basins in Arkansas. This evidence coupled with more recent evidence of the presence of IBWOs along the Florida panhandle and in South Carolina has motivated numerous agencies, NGOs, and individuals to initiate, coordinate and continue efforts to search for IBWOs in mature bottomland forests throughout their historic range. These searches are being coordinated range-wide, but are organized and conducted at the state-level whereby areas of substantial mature bottomland forest (promising habitat) and/or locations where sightings of IBWOs have been reported are searched.

The northern extent of the historical range of the Ivory-billed Woodpecker was thought to include the southern tip of Illinois, particularly along the Mississippi and Ohio Rivers. Audubon noted seeing Ivory-billed Woodpeckers along the Mississippi River from near the confluence of the Ohio and Mississippi Rivers to as far north as the Missouri River, and Robert Ridgeway believed that he saw one not far from the confluence of the Wabash and Ohio Rivers in the mid-1800s (see Appendix 1 for IBWO reports by decade from the central Mississippi River region). There is little to no information available on habitat use or historic numbers of birds in these areas, but IBWOs likely occurred in the once-vast bottomland forests associated with the floodplains of these major river systems. What little old-growth bottomland forest remains in Illinois is moderately to highly fragmented and found primarily in the Cache River watershed in southernmost Illinois. There are presently several thousand acres of old-growth and mature bottomland/swamp forest along the Cache River in Illinois, and an ongoing effort by conservationists has resulted in the conversion of over 15,000 acres of agricultural land to early-successional bottomland forest within the watershed during the past 20 years.

The Cache River watershed of Illinois presently contains >10,000 ha of mature bottomland forest habitat distributed among a National Wildlife Refuge (Cypress Creek NWR) and state-owned Nature Preserves and Natural Areas. Several thousand more hectares will likely be reforested in the coming years. The Cache River watershed in Illinois provides possibly the best habitat for woodpeckers in the state and is home to thousands of Pileated (*Dryocopus pileatus*), Red-bellied (*Melanerpes carolinus*), and Downy (*Picoides pubescens*) Woodpeckers year-round, and also hosts thousands of Red-headed Woodpeckers (*Melanerpes erythrocephalus*) each winter. Tens of thousands of field hours logged in the mature bottomland forests of the Cache River watershed by Avian Ecologists and their research assistants since 1993 have yielded

no evidence of the presence of IBWOs. However, other individuals have made unsubstantiated reports of IBWO sightings from at least two separate locations within the watershed since the beginning of 2005. The combination of habitat, overall woodpecker densities, and recent unsubstantiated sightings of IBWOs warranted an intensification of search efforts in the Cache River watershed of Illinois.

Goals and Objectives

The goals of this research were to search for IBWOs in the Cache River watershed (CRW) of Illinois across two search seasons, inventory habitat, deploy multiple cameras (color and black-and-white) to monitor trees with bark-scaling or large cavities, and coordinate with local as well as national search and inventory efforts. Our specific objectives were to:

1. Actively/Systematically search for IBWOs at the locations (a 2-km² area of mature forest centered on each sighting) of where two unsubstantiated sightings of IBWOs have occurred (e.g., Section 8 Woods, and Heron Pond).
2. Actively/Systematically search 8 additional 2-km² plots of “suitable” habitat including 4 plots associated with a “trigger” patch (one of the plots in number 1 above), for a total of 10 plots of mature forest searched.
3. Conduct point counts throughout each of the 10 2-km² plots to document the diversity and densities of woodpeckers in the watershed during the winter/early-spring period (January-April).
4. Deploy RECONYX cameras to collect images at trees with “promising” cavities or bark scaling and document the visitation to trees by various bird species.

5. Assess and inventory habitat in each of the 10 2-km² plots that were searched, and provide information to the region-wide effort that is using site-occupancy modeling techniques to predict where IBWOs are more likely to occur.
6. Passively search for IBWOs within an additional 1,300 ha of mature bottomland forest that was visited every 3-4 days by researchers studying the bottomland forest bird community during the breeding season (April-June).

Methodology

1. Active/Systematic searches were conducted within a 2-km² area (centered on the location of sightings) of each of the two locations where unsubstantiated sightings of IBWO have been reported. Searches were conducted during January through April 2008 and followed the general protocols outlined in the Cornell Search Plan, the South Carolina Specific Monitoring and Survey Techniques, and the Region-wide Search Proposal (including the adaptive design) put forth by R. Cooper et al. as part of the IBWO Search and Recovery Plan. Active searches involved slowly, quietly, discretely surveying the two areas of primary interest. Trained searchers looked and listened for IBWOs throughout each area as they walked or kayaked through appropriate habitat along transects separated by approximately 100 m. Searchers covered approximately half of a given 2-km² plot of forest during a 5-6 hour period on a given day and these 2 plots were visited at least 3 times.
2. We searched for IBWOs on an additional 8 2-km² plots of “suitable” habitat (mature forest of varying quality) for a total of 10 plots (Fig. 1). These 10 plots included the 2 mentioned above (in number 1 of the goals section), 4 plots in association with a

“trigger” patch (the “trigger” is one of the 2 locations mentioned above in number 1 of the goals and methods sections), and 4 other plots chosen from other areas of suitable habitat within the CRW. Five of the focal plots were each searched systematically at least three times during January-April, and the remaining 5 (the “trigger” and its 4 associated patches) were each searched systematically at least five times during the same period (per the adaptive design for the IBWO occupancy protocol).

3. We established 10 or 11 census stations within each of the 10 2-km² plots of forest and used a standardized point-count method to document the relative abundance and diversity of woodpeckers during the winter/early spring (January through March 2008 and 2009). Point-count stations were separated from each other by 300 m. Point counts occurred during morning hours (from a half-hour after sunrise to 1200 hours during the winter) on days with no precipitation and calm to no wind. We visited each point one time during the time period and recorded the location of each census point with a GPS unit. At each point we recorded the compass bearing of and estimated distance to each individual bird heard and seen. Data from these censuses resulted in a list of the species present on the sites (diversity) as well as an estimate of the relative abundance for each species.
4. We searched for trees containing large cavities and trees where bark was being scaled. We used existing classification schemes to categorize cavities and bark scaling as either a) probably associated with a large woodpecker, or b) unlikely associated with a large woodpecker. Those trees with particularly promising cavities or foraging sign (bark scaling) were put on a priority list for RECONYX camera deployment. We used 4 color-image and 2 black-and-white image RECONYX cameras for deployment within the various habitat patches. Cameras were programmed to take an image every 2-10 seconds

from 30 minutes before sunrise to sunset each day. Cameras were deployed for 3-7 days at a time or longer if a) there were no other trees on the priority list or b) there continued to be interesting activity at the location. Memory cards were swapped out (replaced with an empty card) as necessary (depending on memory card size and rate of image-taking) and images downloaded and screened within 1-3 days of memory card collection. With RECONYX camera deployment, our hope was to get an image of an IBWO if one exists in the Cache River watershed, but also to get several images of Pileated Woodpeckers (PIWOs). Given the high density of PIWOs in the watershed, we hoped to document any variation in plumage (amount and location of black and white on feathers) among individual PIWOs that may confuse observers and lead to reports of IBWOs being seen.

5. Habitat surveys and inventories were completed on the 10 actively-searched plots of forest. On each plot, measurements were taken at 5 0.2-acre sub-plots along each of 4 transects (approximately 20 sub-plots per plot). These habitat sub-plots coincided with our bird census points whenever possible. In each plot we recorded the number of large (24 to 35-inch dbh) and very large (>36-inch dbh) trees, number of snags (>10-inch dbh), and the dominant tree species.
6. Passive searches for IBWOs occurred on an additional 1,300 ha of mature bottomland forest comprising 15 study sites (within 8 forested areas) which were visited every 3-4 days from early April through June to monitor breeding populations of Prothonotary Warblers (*Protonotaria citrea*). Trained field technicians (associated with the research program of J. Hoover) looked and listened for IBWOs while monitoring study populations of Prothonotary Warblers.

7. Data collected from our habitat inventory was shared with the Site-Occupancy Modeling Team and included information from the 10 2-km² plots of forest. Results from our search efforts were shared with USFWS, other members of the Joint Venture Partnership in the Cache River watershed (IDNR, IL TNC) as well as with members of the region-wide IBWO search and recovery team (including Cornell and the search teams from all of the states within the historic range of the IBWO).

Results and Discussion

From January through June of 2008, totals of 3,200 person-hours in the field and 1,400 person-hours screening digital images were involved in search efforts. We visited and searched for IBWOs within the 10 2-km² plots of forest (Fig. 1) multiple times, conducted 108 point-counts across the 10 plots, and collected basic forest structure data from nearly 200 sub-plots. From January through June of 2009, totals of 4,200 person-hours in the field and 400 person-hours screening digital images were spent searching for IBWOs, and we again conducted 108 point-counts across the 10 plots. In addition, 15 sites (within 8 forested areas) in mature bottomland and swamp forest habitat (Fig. 1) were passively searched in both 2008 and 2009 during spring migration and the early portion of the breeding season. In short, we obtained no conclusive evidence of an IBWO being present within the areas we searched.

We recorded 47 species of bird with our winter point counts across the two years (Table 1). Eleven of these species were only detected at distances greater than 100 m from point-count stations, and we were unable to estimate relative abundances for them. Of the remaining 36 species, the most abundant included the Tufted Titmouse (scientific names given in Table 1), Carolina Chickadee, White-breasted Nuthatch, Blue Jay, and various species of woodpecker

(Table 1). The two species of woodpecker most commonly mistaken for IBWOs (Pileated and Red-headed) were moderately (0.4 per 10 ha) and highly (2.6 per 10 ha) abundant, respectively. During the winter and early spring months, one can encounter many individuals of both species during the course of walking through mature bottomland forest habitat. The relatively diverse and abundant woodpeckers are indicative of a mature bottomland forest with ample large trees, standing dead and decaying trees (snags) for nesting and roosting, and food in the form of mast and insects capable of supporting a thriving woodpecker community.

During our search and inventory efforts, we encountered a number of things that sounded somewhat like the “kent” calls or “double-knocks” associated with IBWOs. In all cases, we attempted to track down the sound and determine what was producing it, or hear it enough times to figure out what the sound was and was not. Several different bird species produced sounds that from a distance were “similar” to what would be expected from an IBWO. The variety of species that made sounds similar to an IBWO “kent” call included White-breasted Nuthatch, Blue Jay, Common Grackle, Fish Crow, Wood Duck, and a distant solitary Canada Goose. These sounds were all part of the typical repertoire for this group of species. “Double-knocks” were heard coming from a Pileated Woodpecker, a Hairy Woodpecker on a very large hollowed-out tree, and very distant shotgun blasts and their associated echoes.

In total over two search seasons, we screened approximately 3.1 million images collected at different locations in the search area (Fig. 2). Of this total, there were 190 images of PIWOs (including some from 2 nests, some from bark-scaled trees, and some of birds perched on the trunks of trees with no cavities or bark-scaling) and 107 images of Red-headed Woodpeckers (RHWOs; mostly on bark-scaled trees). Images were of varying quality and clarity, but none indicated the presence of an aberrantly plumaged Pileated or Red-headed woodpecker within the

watershed. We also recorded images of other wildlife (e.g., white-tailed deer, bobcat, fox squirrel, raccoon, Wild Turkey, Wood Duck, Hooded Merganser, Yellow-crowned Night-Heron and Great Blue Heron, and other bird species) (Table 2). We were able to identify all of the objects detected in the images that we screened either to species or to say with certainty that the object was not an IBWO. While the lack of an image of an IBWO does not negate the possibility of one existing in the Cache River watershed in Illinois, we were unable to obtain any photographic evidence in support of the unsubstantiated reports of sightings of IBWOs that have come from the Cache River watershed in Illinois from 2005 to the present (see Appendix 2 for panel review of the Sheridan Image).

One of our initial goals was to use the cameras in an attempt to determine amounts and kinds of bark scaling that could and could not be attributed to PIWOs. We did not pursue this avenue of research once we realized that in order to meet this goal, we needed to aim our cameras at non-scaled trees and hope that a woodpecker would eventually start the bark scaling process. This would have taken our cameras away from our primary goal of trying to get an image of an IBWO in the search area (if an IBWO existed there). Instead, we focused our cameras on trees that were already in the process of being bark-scaled and found that a variety of species visited the bark-scaled portions of trees once the process had begun (e.g., Pileated, Red-headed, Red-bellied, Downy and Hairy Woodpeckers, Northern Flickers). Therefore, it is difficult to say whether any one species of woodpecker is responsible for initiating the extensive bark scaling that exists throughout the Cache River watershed and many species seem to contribute to the removal of bark from dead and dying trees once the process has begun.

Data on the basic structure of the forest within our search area were derived from vegetation surveys conducted at 173 points distributed throughout the search plots. The basic

vegetation data from these points, along with encounter information, were uploaded to the site-occupancy model developed by R. Cooper et al. for the IBWO search and recovery effort. Our focus was on the basic structure of the forest in terms of the numbers of medium (24-35 inch dbh) to large (>36 inch dbh) living trees, and snags (dead and dying trees) >10 inch dbh. The presence of large hardwood trees (for nest sites) and numerous snags (foraging substrate) is thought to be critical for the presence of large woodpeckers including PIWOs in the present time and IBWOs historically. Averaged over all of the search plots, the mature bottomland forests in the Cache River watershed of Illinois contained substantial numbers of large trees including 11 24-35 inch dbh trees/acre, 4 >36 inch dbh trees/acre, and nearly 6 snags/acre. The primary overstory tree species included oaks, hickories, baldcypress, tupelo, hackberry and sycamore. Historic habitat for IBWOs has been described often as extensive old forests with large trees and numerous snags. Large birds that nest and roost in tree cavities require large trees so that they can nest high above ground making it harder for predators to find or gain access their nest and roost sites. Also, large old trees tend to have thicker bark and a better microclimate for the wood-boring beetles that are the mainstay of both PIWO and IBWO diets.

The forests of the Cache River watershed may be extensive by Illinois' standards, but they are relatively small and fragmented compared to the vast areas of old bottomland forest that once existed in the places where IBWOs were historically more common (e.g. Florida, Louisiana, Georgia and South Carolina). There are several natural forces that continue to occur in the Cache River watershed in Illinois that help to maintain the presence of the large dead and dying trees that are important to woodpecker populations. These forces include beavers, ice storms, violent weather (wind, lightning and tornadoes), and flooding. Taken together, it may be possible for an IBWO to exist in the Cache River watershed in Illinois, but we currently lack the

unequivocal evidence necessary to confirm this possibility. We will, however, continue our passive search for IBWOs in Illinois (specifically in the Cache River watershed) as we continue in the coming years to study the birds that overwinter in the bottomland forests of southern Illinois as well as those birds that breed in the Cache River watershed during the summer.

Table 1. Species detected during point-counts (n=108) within 10 bottomland forest plots during the winter (January-March) of 2008 and 2009 in the Cache River watershed in southern Illinois. Relative abundances given as the average number of individuals detected per 100-m radius point count and average number per 10 ha. Woodpecker species given in bold, species arranged alphabetically based on 4-letter code.				
Species code	Species	Average number per*		
		100-m radius point count	10 ha	
AMCR	American Crow (<i>Corvus brachyrhynchos</i>)	0.083	0.265	
AMGO	American Goldfinch (<i>Carduelis tristis</i>)	0.083	0.265	
AMRO	American Robin (<i>Turdus migratorius</i>)	0.009	0.029	
BAEA	Bald Eagle (<i>Haliaeetus leucocephalus</i>)	D	D	
BAOW	Barred Owl (<i>Strix varia</i>)	D	D	
BEKI	Belted Kingfisher (<i>Megacerlye alcyon</i>)	D	D	
BLJA	Blue Jay (<i>Cyanocitta cristata</i>)	0.315	1.003	
BLVU	Black Vulture (<i>Coragyps atratus</i>)	D	D	
BRCR	Brown Creeper (<i>Certhia familiaris</i>)	0.120	0.383	
CACH	Carolina Chickadee (<i>Parus carolinensis</i>)	0.472	1.504	
CAGO	Canada Goose (<i>Branta canadensis</i>)	0.037	0.118	
CARW	Carolina Wren (<i>Thryothorus ludovicianus</i>)	0.398	1.268	
COGR	Common Grackle (<i>Quiscalus quiscula</i>)	0.074	0.236	
DEJU	Dark-eyed Junco (<i>Junco hyemalis</i>)	0.009	0.029	
DOWO	Downy Woodpecker (<i>Picoides pubescens</i>)	0.472	1.504	
EABL	Eastern Bluebird (<i>Sialia sialis</i>)	0.028	0.088	
EAPH	Eastern Phoebe (<i>Sayornis phoebe</i>)	0.009	0.029	
GADW	Gadwall (<i>Anas strepera</i>)	0.046	0.147	
GCKI	Golden-crowned Kinglet (<i>Regulus satrapa</i>)	0.056	0.177	
GWFG	Greater White-fronted Goose (<i>Anser albifrons</i>)	D	D	
HAWO	Hairy Woodpecker (<i>Picoides villosus</i>)	0.046	0.147	
HETH	Hermit Thrush (<i>Catharus guttatus</i>)	0.009	0.029	
HOME	Hooded Merganser (<i>Lophodytes cucullatus</i>)	0.009	0.029	
KILL	Killdeer (<i>Charadrius vociferus</i>)	D	D	
MALL	Mallard (<i>Anas platyrhynchos</i>)	0.046	0.147	
NOCA	Northern Cardinal (<i>Cardinalis cardinalis</i>)	0.120	0.383	
NOFL	Northern Flicker (<i>Colaptes auratus</i>)	0.093	0.295	
PIWO	Pileated Woodpecker (<i>Dryocopus pileatus</i>)	0.120	0.383	
RBWO	Red-bellied Woodpecker (<i>Melanerpes carolinus</i>)	0.500	1.592	
RHWO	Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>)	0.806	2.565	
RSHA	Red-shouldered Hawk (<i>Buteo lineatus</i>)	0.139	0.442	
RSTO	Rufous-sided Towhee (<i>Pipilo erythrophthalmus</i>)	0.009	0.029	
RTHA	Red-tailed Hawk (<i>Buteo jamaicensis</i>)	D	D	
RWBL	Red-winged Blackbird (<i>Agelaius phoeniceus</i>)	D	D	
SACR	Sandhill Crane (<i>Grus canadensis</i>)	D	D	
SNGO	Snow Goose (<i>Chen caerulescens</i>)	D	D	
SOSP	Song Sparrow (<i>Melospiza melodia</i>)	0.019	0.059	
SWSP	Swamp Sparrow (<i>Melospiza georgiana</i>)	0.074	0.236	
TUTI	Tufted Titmouse (<i>Parus bicolor</i>)	0.963	3.067	
TUVU	Turkey Vulture (<i>Cathartes aura</i>)	D	D	
WBNU	White-breasted Nuthatch (<i>Sitta carolinensis</i>)	0.593	1.887	
WITU	Wild Turkey (<i>Meleagris gallopavo</i>)	0.019	0.059	
WIWR	Winter Wren (<i>Troglodytes troglodytes</i>)	0.231	0.737	
WODU	Wood Duck (<i>Aix sponsa</i>)	0.019	0.059	
WTSP	White-throated Sparrow (<i>Zonotrichia albicollis</i>)	0.324	1.032	
YBSA	Yellow-bellied Sapsucker (<i>Sphyrapicus varius</i>)	0.046	0.147	
YRWA	Yellow-rumped Warbler (<i>Dendroica coronata</i>)	0.028	0.088	

* D represents that a species was detected, but not ever within 100 m of a point-count station

Table 2 . Number of camera deployments (total deployments and images screened were 124 and 2.1 million, and 69 and 1.06 million, in 2008 and 2009, respectively) in which various organisms were detected during the 2008 and 2009 search seasons (January-June).

Organism	Detections*		Total
	2008	2009	
Fox Squirrel	25	17	42
Pileated Woodpecker	19	12	31
Tufted Titmouse	14	8	22
Downy Woodpecker	11	7	18
Hairy Woodpecker	8	6	14
Red-bellied Woodpecker	9	5	14
White-tailed Deer	8	5	13
Red-headed Woodpecker	10	3	13
Blue Jay	7	4	11
Wild Turkey	6	4	10
Canada Goose	7	3	10
Yellow-crowned Night-Heron	6	4	10
Raccoon	5	4	9
Nothorn Cardinal	4	4	8
Hooded Merganser	6	2	8
Nothorn Flicker	5	2	7
Red-shouldered Hawk	4	2	6
Crow	2	3	5
White-breasted Nuthatch	3	2	5
Wood Duck	4	1	5
Mallard	3	1	4
Great Blue Heron	3	1	4
Turkey Vulture	1	2	3
Eastern Bluebird	2	1	3
Carolina Wren	2	1	3
Carolina Chickadee	2	1	3
Eastern Phoebe	2	1	3
Yellow-rumped Warbler	1	1	2
Winter Wren	1	1	2
Hawk spp.	1	1	2
Brown Creeper	1	1	2
Bobcat	1	1	2
Human	1	1	2
Bald Eagle	0	1	1

*At least one image was obtained from a camera deployment; range of images screened per deployment was 10,000-22,500).

Appendix 1. Illinois (and adjacent Arkansas, Missouri, Kentucky, Tennessee, and Mississippi) Reports of Ivory-billed Woodpecker by decade (Revised May 5, 2008); compiled by USFWS.

Locations alph-numeric codes in **bold type** represent reports from more than one year within the decade; * indicates at least one specimen known from that location during that decade.

Upper Mississippi Delta (#'s where indicated are cross-referenced to Figure 8 in Tanner 1942), subregions: (A) White-Cache rivers (i.e., Big Woods), AR, (B) Mississippi mainstem from MS-AR-TN north to Reelfoot, (C) Ohio River to confluence with Mississippi south to include Reelfoot, MO-TN-KY-IL

Historic locations north, east, and west of distribution as defined by Tanner (1942) along the Mississippi and Ohio drainages (Jackson 2004):

Near Stanford, Lincoln County, KY (three observed, one collected, by Col. W. Fleming);

March 1780 (Schorger 1949, McKinley 1958, Jackson 2004)

Ross, Scioto, and Muskingum county, OH (tarsometatarsi found from an

excavated archaeological sites and argued likely to have not been trade items);

dated from 1100s to 1500s (Wetmore 1943, Peterjohn 2001, Jackson 2004)

Franklin and Monroe counties, IN (reported to have occurred, a specimen from Franklin

County is mentioned but not now known to exist); prior to 1869 and possibly

during the 1890s (Jackson 2004)

Along the Mississippi River north to near the confluence with the Missouri, MO and IL

(reported by Audubon); early 1800s (Jackson 2004)

Cahokia, near East St. Louis, IL (tarsometatarsus found from excavated site, not part of

the skull suggesting it was locally acquired and not a trade item); 1500s or earlier

(Parmalee 1967, Jackson 2004)

Near the confluence of the Missouri and Mississippi rivers at Forest Park (spec. near

St. Louis), MO, May 8, 1886 (Hahn 1963, Jackson 2004)

Along the Missouri River from at Fayette and Kansas City, central to western MO

(scattered reports); late 1800s and early 1900s (Cooke 1888, Jackson 2004)

Specimens from Arkansas with either unknown location, year, or both:

1 specimen December 27, 1884

1 specimen March 1845

1 specimen March 7, 1844

1800-1849

(B-6) Along Mississippi River, north of Fulton, Lauderdale County, TN (reports by Audubon); November 1820 (Jackson 2004)

(C-1) Junction of Ohio and Mississippi Rivers; about 1825 (#2)

(C-7) Along Mississippi River, either Carlisle or Hickman County, KY (reports by Audubon); early 1800s (Jackson 2004)

1850-1859

(C-2) White County, 40 miles south Mount Carmel, IL; about 1852 (#1)

1860-1869

None

1870-1879

(B-4*) St. Francis River (near Helena?), AR (two specs.); 1870 (Hahn 1963)

(C-3) Fulton County, KY; 1872-1874 (#4)

1880-1889

(A-1) Newport, Jackson County, AR; about 1885 (#6)

(B-1) Osceola, Mississippi County, AR and Northeast AR; 1887 and 1888 (#5)

(B-2) Marked Tree, Poinsett County, AR; March 1889 (#7)

1890-1899

(B-3*) Bolivar County, MS (two specs.); March 1893 (#9)

(C-4) Little River, Stoddard County, MO; November 1895 (#3; Jackson 2004 clarifies

that allegedly a bird was shot near Morley, Scott County, then brought to St. Louis from Stoddard County, supposedly mounted but there is no longer any record of the mount ever existing)

1900-1909

(C-6) Ullin, Pulaski County, IL (one possibly heard by B. Gault); 1900
(Jackson 2004)

1910-1919

(B-4) Helena, Phillips County, AR; 1912 (#8)

1920-1929

None

1930-1939

(B-3) Nine miles south of Rosedale, Bolivar County (6 pairs present until World War II
Until logged over to support war effort); 1930s (Jackson 2004, USFWS 2007)
(C-5) Reports from southern Missouri; into the 1930s and as late as 1949 (Jackson 2004,
Moore 1949 [G. E. Moore, Elusive Ivory-bills. Bluebird 16(12):1]).

1940-1949

None

(B-3) Nine miles south of Rosedale, Bolivar County (6 pairs present until World War II
Until logged over to support war effort); 1930s (Jackson 2004, USFWS 2007)
(C-5) Reports from southern Missouri; into the 1930s and as late as 1949 (Jackson 2004,
Moore 1949 [G. E. Moore, Elusive Ivory-bills. Bluebird 16(12):1]).

1950-1959

None

1960-1969

None

1970-1979

None

1980-1989

(A-1) Near Diaz in Village Creek floodplain, Jackson County, AR (possible visual encounter by H. Hagar); October 1985 (Jackson 2004, USFWS 2007)

1990-1999

(B-5) Hatchie River, Lauderdale County, TN (3 reports by private landowner reported to R. Ford and P. Hamel); mid-to-late 1990s (USFWS 2007)

2000-

(A-2) South end of White River NWR, Desha/Phillips/Arkansas Counties County, AR (possible visual encounter of female by M. Scott [but not seen by others present]; and possible visual encounter of one bird by S. Sietler, multiple recordings of possible vocalizations and double-knocks;) March 2003 (Gallagher 2005; USFWS 2007) and January-December 2005 (Rosenberg et al. 2005, USFWS 2007)

(A-3) Bayou de View, Cache River NWR, Monroe County, AR (multiple visual reports of male bird, possible vocalizations and double-knocks, and a 4 second poor, grainy [and controversial] video of bird of unknown sex; many observers); February 2004 to December 2005 (Fitzpatrick et al. 2005, Gallagher 2005, Rosenberg et al. 2005, USFWS 2007)

(A-4) Wattensaw WMA, Prairie County, AR (one 10 minute and one brief sighting by R. Everett, one brief sighting by A. Mueller, multiple kents [many recorded by hand-held video camera] and double-knocks [several recorded by ARU]); December 2006-May 2007 (USFWS 2007)

(B-5) Hatchie River, Lauderdale County, TN (followup to reports from the 1990s, numerous auditory encounters, both kents and double-knocks, one distant visual

by R. Ford); January 2006 (continued searching in February resulted in no additional reports, but additional sounds detected in January 2007; USFWS 2007)
(C-6) Cache River, Pulaski County, IL (visual reports by J. White; also possible encounters by G. Erdy and S. Sheridan); 2004-2007 (USFWS 2007)

Appendix 2. Draft Panel Review Summary and Discussion (completed in January 2009) of mystery woodpecker photographed in southern Illinois during June 2007.

Addendum: As actual distances from camera position to the tree where the bird appeared to be were being measured by J. Hoover in spring 2009, Mr. Sheridan admitted that the image was a fake and that the mystery woodpecker (actually a Pileated Woodpecker) had been inserted and subsequently doctored via Photoshop®.

Summary. The image is interesting and several thorough analyses were conducted to determine if there could be any conclusion as to the mystery woodpecker's identity. Three of the panel members believe the bird is a Pileated Woodpecker where several coincidental and confounding effects result in some apparent plumage characteristics seemingly at odds with a normally-plumaged Pileated. Two additional panel members developed approaches to estimate the size of the mystery bird given the information available and both concluded that the mystery woodpecker was well below the size expected for an Ivory-billed Woodpecker, but one concluded it was more the size of Pileated while the other concluded it was more the size of a Red-headed Woodpecker. In sum the mystery woodpecker remains a mystery, with definitive identification determined to be impossible. Given the information made available, all panel members agreed that the evidence **does not** support the conclusion that this bird is an Ivory-billed Woodpecker

Discussion points

(a) Did the recovery process (see statement written by Mr. Sheridan in pdf) potentially influence what we seem to be seeing on the second woodpecker?

None of the reviewers saw anything obvious that suggested a manipulated image due to recovery process or manipulation in any other way. Manipulation may never be eliminated as a possibility, but could be all but excluded through a Canon (company) process designed to determine if an image has been doctored. A couple of visual anomalies were noted including some “ghosting” surrounding the head and body of the second woodpecker and the relative sharpness of the second bird compared to the surrounding foliage. It's not a blurry image, but is out of focus.

(b) Are lighting conditions or other field conditions (see field notes written by Mr. Sheridan in pdf) potentially responsible for influencing what we see on the second woodpecker?

Flash going off (on that frame only) may have influenced what we see by changing the image, but most panel members believe the flash would not affect the lighting given the distance to second bird. Flash could have affected shutter speed or depth of field. There was a unanimous view that the white shield, though appearing to represent actual white secondaries, very well could be a reflection or a dispersion of light from out-of-focus foliage moving in front of the bird.

(c) Are there any other potential factors that may influence what we see on the second woodpecker?

Given the rangefinder estimates, both detailed analyses conducted to judge size of the mystery woodpecker concluded that the second woodpecker is too small to be an Ivory-bill. By size, adjusted for distance (a same sized bird would appear about 73% smaller at 90 feet further away from the front bird), one analysis indicates the size of the bird is more in line with Pileated Woodpecker, the other more in line with Red-headed Woodpecker.

One recommendation of the panel is to have Jeff Hoover use a tape measure to get actual distance from the camera location to the tree with the near bird and to the tree with the far bird to verify distances.

(d) Regardless of the answers to the above, which features match normal Pileated, match putative Ivory-bill, match both or neither species in normal appearance?

The shade of red on the heads of Ivory-billed, Pileated, and Red-headed woodpeckers may differ, or may not, depending on age of the bird or lighting (based on specimens). In life, Ivory-bill crest should be more scarlet than what the mystery bird looks like. Nothing can be concluded based on head color as none of the three species can be excluded from consideration based on this character. All panel members agree the head color is the same on both birds in the image, but that may be meaningless. To most reviewers, the red on the head is consistent with a crested woodpecker, ruling out Red-headed. However, possibly the out-of-focus image could be due to motion blur which could support the possibility of Red-headed Woodpecker.

Position of head is unknown but may be important. If tilted up and bill pointed at a one o'clock direction, black on the crown should have been obviously visible if the bird was a male Ivory-billed Woodpecker. Black is not seen. However, if the bird is looking directly away, the black on the crown may not be visible, especially if the crest was partially raised. Either way, lack of black on the crown and lack of an obvious scarlet crest is not supportive of an Ivory-billed Woodpecker, but does not exclude the possibility either.

There was apparent red down the nape of the bird of interest consistent with a male Ivory-billed Woodpecker, but a Pileated Woodpecker could show this feature too depending on head position (if tilted particularly). However, red appearing down the nape of a Pileated is not likely to be visible in combination with broad black neck bordered with a narrow white stripe. That is, there is no photograph that any of the panelists have seen of a Pileated showing this combination of features. Again, most reviewers believe the bird has a crest and that it is raised slightly (eliminating Red-headed Woodpecker, if correct).

White narrow neck stripe angling backward, broad black neck, and black in front of stripe all seem inconsistent with Pileated and consistent with Ivory-billed Woodpecker. However the white stripe could be an anomaly (ghosting, white shifting left as an artifact, in combination with an out-of-focus image). In addition, the potential exists for a combination of the bird stretching its head and motion blur, giving the false appearance of a narrow white neck stripe, which if so does not exclude the possibility for a Red-headed Woodpecker.

Although there may be ways the back stripes of an Ivory-billed Woodpecker could be obscured by wing and/or body position, having both stripes missing appears unlikely for this bird given what appears to be a good look at the back. One possibility is that the position of the right wing is pulled back obscuring right back stripe, but doubtful that the left back stripe would be obscured as well. Also, back color does not appear different from the Pileated in the foreground. Back color on an Ivory-billed Woodpecker should be shiny dark black, though again, lighting may play a role here. Lack of any white back stripes and back color similar to Pileated are not suggestive of an Ivory-billed Woodpecker and clearly are suggestive of Pileated Woodpecker regardless of how other features appear.

While the white shield (secondaries) look about right in color and extent for an Ivory-billed Woodpecker, the fact that it is mostly obscured by vegetation raises many doubts as to the reliability of this feature. Although some in the group believe the white shield is in fact part of the bird, others believe this appearance is likely due to a lighting artifact. For those that believe it is part of the bird, the possibility of Red-headed or abnormally-plumaged Pileated is more likely than this bird being an Ivory-billed Woodpecker.

Conclusion

If the distances from observer to both the foreground Pileated Woodpecker and the mystery woodpecker in the background are accurate, then this evidence alone excludes the possibility of Ivory-billed Woodpecker. Even if direct (as opposed to range-finder based) measurements require re-evaluation of the size of the mystery woodpecker, features that appear superficially similar to an Ivory-billed Woodpecker all have alternative explanations that are not excluded by the available evidence. Whether the mystery woodpecker is (1) a normal Pileated subjected to multiple factors that obscure its true identity, (2) an abnormally-plumaged Pileated, or (3) even a Red-headed Woodpecker remains unresolved.

Reviewers:

Bobby Harrison

James R. Hill, III

Jeffrey Hoover

Jerome A. Jackson

Ron Rohrbaugh

Chuck Hunter, compiler

Figure Legends

Figure 1. Location of 10 2-km² actively- (solid lines) and 8 passively- (dashed lines) searched plots in southern Illinois, 2008-2009. Each actively-searched plot was visited at least 3 times during January-April in 2008 and 2009. The plot with “T” inside was a trigger plot (unsubstantiated observation of an Ivory-billed Woodpecker reported) and was visited 5 times each year. There were approximately 20 bird/vegetation points located within each plot.

Figure 2. Locations of RECONYX camera deployments in southern Illinois, 2008 and 2009. Each point represents 1 to 4 deployments of cameras with each deployment lasting at least 4 days. Cameras were deployed to locations where bark was being scaled off of trees (presumably by woodpeckers) or where a tree contained a large (i.e., > 3-inch diameter) cavity that looked suitable for a large woodpecker to use for nesting or roosting.

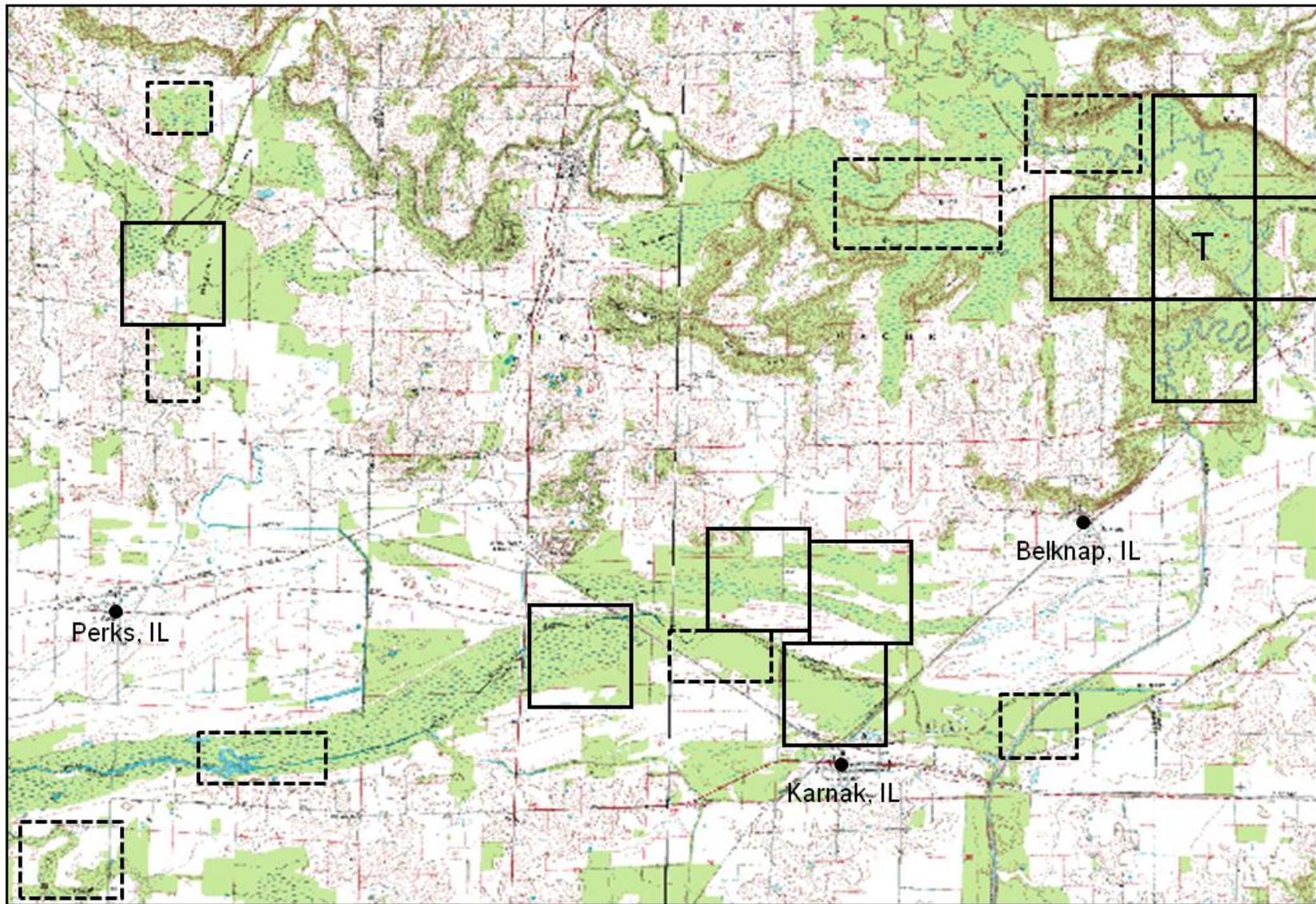
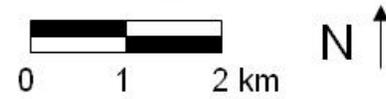


Figure 1



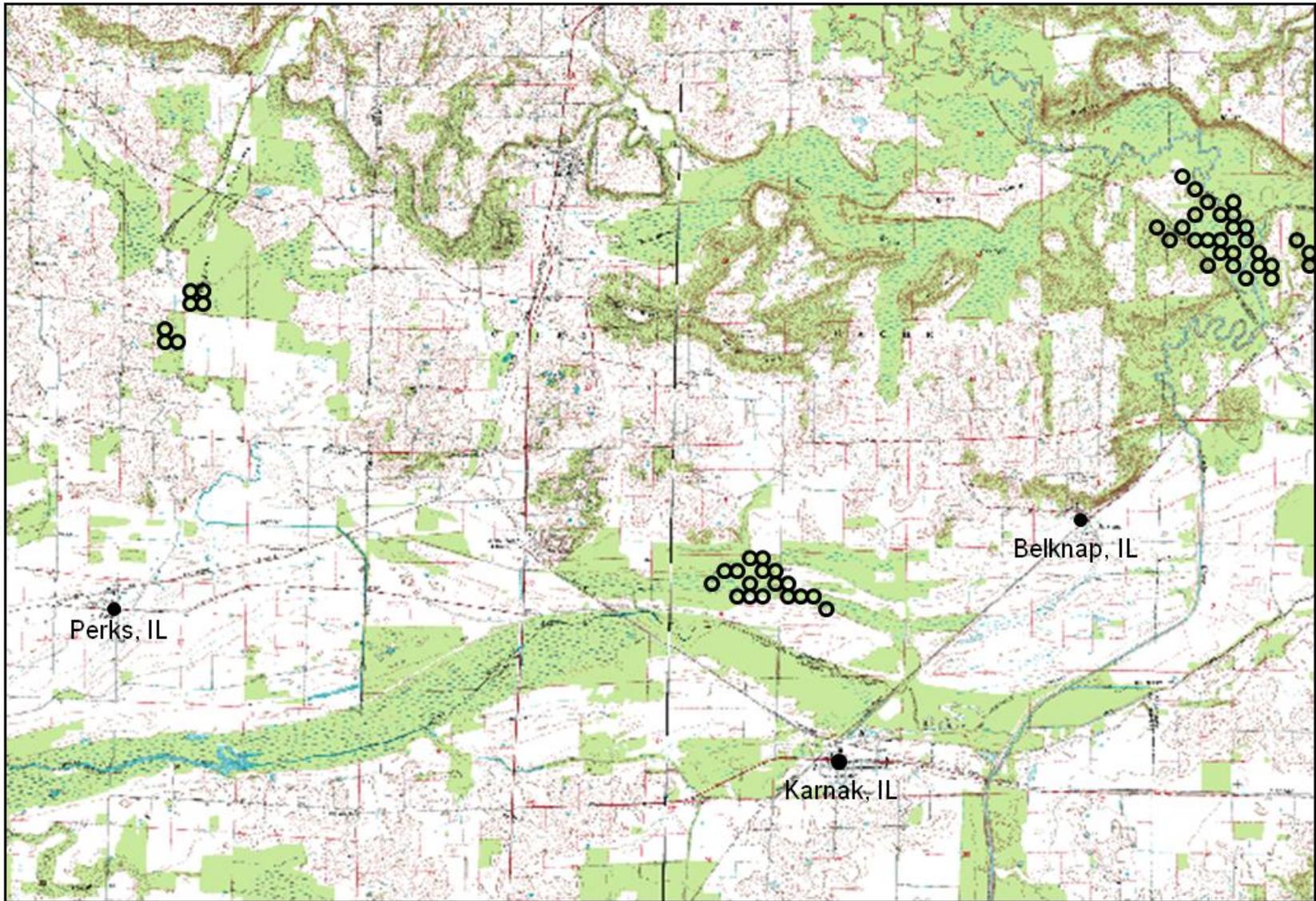


Figure 2

