

## Revisiting the Range and Habitat of the Ivorybill

Recent searchers' understanding of the range and habitat of the Ivory-billed Woodpecker are shaped by research conducted when the species was in severe decline and its habitat was shrinking. Evidence from literature, historical accounts, museum collections, and archaeology suggest the Ivorybill's range was, at one time, much wider.

*By Mark A. Michaels, Research Associate*

In pre-contact and early colonial times and into the 19th century, Ivory-billed Woodpeckers inhabited a more varied and expansive range than most people realize. The range probably reached from the southern tip of Florida to central Ohio, with the 40th parallel as the approximate northern limit, westward to St. Louis and perhaps along the Missouri River. The western limit of the range appears to have been somewhere around the 96th or 97th Meridian, in the southwest, and likely somewhat farther east at the northwestern edge, if unproven historic reports from the Kansas City area are valid. Outside of coastal areas, distribution appears to have followed riparian corridors to its outer limits, and there are no records from elevations of over 1000 feet.

Most people with an interest in the Ivorybill have internalized a set of beliefs about the home range of the species what constitutes "suitable" habitat. To a large extent these beliefs treat the Singer Tract as a model – a vast tract of "virgin" bottomland forest dominated by oaks and sweet gums, with abundant, moss-draped cypress for atmosphere (although Ivorybills seem to have avoided cypress in the Singer Tract). But, the roots of this belief go back even farther, to Audubon.

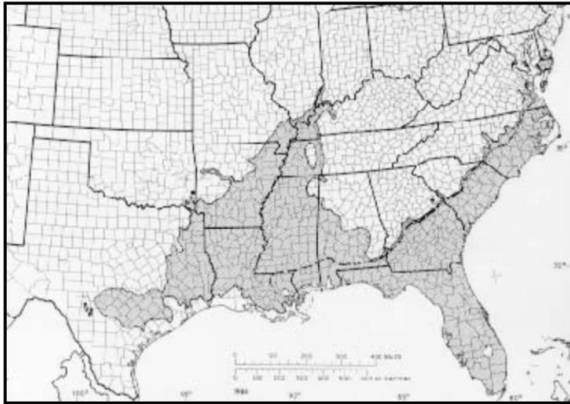
In all likelihood, the Ivory-billed Woodpecker's range was considerably more extensive than is recognized by the general public and broader than has been represented in much of the literature, both popular and scientific. Archaeological evidence, specimens in collections, and historical accounts point to a wider range.

In this series, we'll explore the evidence for the Ivorybill's range beyond the southeast United States.

### Examining The Roots of Our Understanding of the Ivorybill's Range

The habitat description in Stephen A. Shunk's *Peterson Reference Guide to Woodpeckers of North America* clearly expresses some of these beliefs, which have influenced the overwhelming majority of modern search efforts and which are embedded in the minds of most searchers (Project Principalis included) to the point of being a default:

*Virgin bottomland forest almost always below 100 ft. (30 m) elevation. May also have occurred in uplands but by 1900 restricted to areas downstream of pine-bald cypress interface. Requires large tracts of contiguous forest with very large-diameter trees and adequate dead and dying trees to provide forage and nest sites.*



- The native range of baldcypress. The broken line indicates the northern limit of the variety nutans, pondcypress.

The *Guide*, which draws on an [1891 article by Edwin Hasbrouck](#) for the 100 foot elevation, goes on to list three different habitat types described by James Tanner in his study. The habitat types identified are: sweet gum-oak dominated forests in the southeast (with species of oak varying depending on location) outside of Florida; river swamps in Florida dominated by cypress, black gum, and green ash; and creek swamps in Florida characterized by cypress, red maple, laurel oak, black gum and cabbage palmetto, with feeding in adjacent pine woods.

This is not to criticize the *Guide* or its author – I recommend the book highly and the overall treatment of the Ivorybill is thorough and evenhanded. The quote excerpted here is intended to point out the pervasiveness of these ideas about habitat requirements, ideas that Tanner reinforced, especially in later years. They’re so pervasive in part because the myth of the “virgin forest” has shaped Ivorybill lore since well before Hasbrouck and has influenced almost all habitat assessments since Tanner.

Audubon, with his romantic, indeed gothic, language is the father of the cypress myth.

*I wish, kind reader, it were in my power to present to your mind’s eye the favourite resort of the Ivory-billed Woodpecker. Would that I could describe the extent of those deep morasses, overshadowed by millions of gigantic dark cypresses, spreading their sturdy moss-covered branches, as if to admonish intruding man to pause and reflect on the many difficulties which he must encounter, should he persist in venturing farther into their almost inaccessible recesses, extending for miles before him, where he should be interrupted by huge projecting branches, here and there the massy trunk of a fallen and decaying tree, and thousands of creeping and twining plants of numberless species! Would that I could represent to you the dangerous nature of the ground, its oozing, spongy, and miry disposition, although covered with a beautiful but treacherous carpeting, composed of the richest mosses, flags, and water-lilies, no sooner receiving the pressure of the foot than it yields and endangers the very life of the adventurer, whilst here and there, as he approaches an opening, that proves merely a lake of black muddy water, his ear is assailed by the dismal croaking of innumerable frogs, the hissing of serpents, or the bellowing of alligators! Would that I could give you an idea of the sultry pestiferous atmosphere that nearly suffocates the intruder during the meridian*

*heat of our dogdays, in those gloomy and horrible swamps! But the attempt to picture these scenes would be vain. Nothing short of ocular demonstration can impress any adequate idea of them.*

Hasbrouck (1891) perpetuated the emphasis on cypress and very low-lying locations, as seen in this excerpt:

On the map all that area bounded by the heavy black line represents the region as a whole in which the Ivory-bill has been observed, the part in shade represents an attempt to outline the present distribution, based on the records for the last ten years and the information received from various sources, while the single isolated spots in black show the localities of comparatively recent capture. A careful examination of recent records shows that *Campephilus principalis* is now confined to the low swamp country along the coast. This area, for the most part below one hundred feet in elevation, is characterized by dense forests of bald cypress (*Taxodium distichum*) in strong contrast to the pine barrens of the uplands. It will be convenient, therefore, to con-

sider the hundred foot contour as the line marking in general the boundary between the cypress swamps and the pine barrens, and consequently the boundary of the present distribution of the Ivory-billed Woodpecker.

As before stated, the species is confined almost entirely to country below the hundred foot line, but there are a few extralimital records that are worth considering; these are the Mississippi Valley records for Newport, Arkansas, (elevation from one hundred to five hundred feet above the sea), and Fayette and Kansas City, Missouri, (altitude six hundred and fifty and seven hundred and fifty feet respectively) which are explained by the fact that in this vast river basin the slope is so gradual that the cypress swamps in which the bird delights extend farther into the interior of the country.

The truth is that Ivorybills have been found in more diverse habitat types than most have believed. It's worth bearing in mind that Tanner himself asserted that at the time he was studying the species, in the 1930s, "...at present, the only suitable habitat for Ivorybills is in tracts or areas of virgin timber", a narrow, almost lawyerly, and largely conjectural conclusion – one not entirely supported by fact. Ivorybills bred in at least one Singer Tract area (Mack's Bayou) that was predominantly regrowth. Tanner became more rigid about habitat requirements in later years, dismissing John Dennis's 1971 Texas recording because a Pine Warbler was captured on the tape.



IUCN range map based on Tanner, including locations of selected post-Singer Tract reports

Similarly, what the historic range as delineated by Tanner in 1942 and as reflected in almost all popular treatments of the species is considerably too narrow. Jackson (2005) makes this clear, and subsequent work by Leese has shed additional light on the historic range. Tanner accepted additional records from outside these confines in an unpublished 1989 update to his monograph.

A map drawn by Hasbrouck in the 1890s, showing both the original range and what Hasbrouck believed to be the limits at the time, includes more of the eastern Plains and the Missouri River Valley.



Hasbrouck's Ivory-billed Woodpecker Range Map (1890)

It is very difficult to assess records even when there's a paper trail. An Ivorybill specimen in a collection in Pennsylvania has a tag suggesting it was collected on Michigan's Upper Peninsula in 1885. While it's possible that tags accidentally switched at some point, there's nothing to show that they were. (Schreffler, Schreffler, and Leese, 2019). The challenge is that there's no purely objective standard for evaluation of historic (and pre-contact) records, even when it comes to specimens. In many cases, location information for

specimens is non-existent or ambiguous. For example, one specimen in Cornell's collection dating to 1896 is listed as coming from the "Florida Keys." "Key" in this context more likely refers to an island of forest surrounded by the Everglades than to the islands offshore.

The more surprising of these reports are unsupported by physical evidence. These come from the Eastern Shore of Maryland, Swedesboro, New Jersey, and Pennsylvania. Most date to the 18th century, a time when Ivorybills were reported to have fed on trees girdled for clearing. The most interesting of these come from [Peter Kalm](#), a Swedish naturalist and student of Linnaeus. They have been discussed in several articles by Benjamin E. Leese, who has also written about early records from Ohio, Indiana, and Kentucky (for which the case is stronger).

One record that is compelling does not include a specimen; it's from the [1820 Long Expedition](#), the first scientific exploration of the American West.

## CHAPTER II.

OSAGE ORANGE.— BIRDS.— FALLS OF THE CANADIAN.— GREEN ARGILLACEOUS SANDSTONE.— NORTHERN AND SOUTHERN TRIBUTARIES OF THE CANADIAN.— COTTONWOOD.— ARRIVAL AT THE ARKANSAS.— CANE BRAKES.— CHEROKEES.— BELLE POINT.

SEPTEMBER 5th. The region we were now traversing is one of great fertility, and we had daily occasion to regret that our visit to it had not been made earlier in the season. Many unknown plants were observed, but their flowering season having passed, the fruit of many of them have ripened and fallen, we were deprived of the means of ascertaining the name and place of such as had been heretofore described, and of describing such as were new. We had, however, the satisfaction to recognize some interesting productions, among which we may enumerate a very beautiful species of bignonia, and the bow-wood or osage orange. [2] The rocky hills abound in trees of a small size, and the cedars are sometimes so numerous, as to give their peculiar and gloomy colouring to the landscape. We listened as we rode forward to the note of a bird, new to some of us, and bearing a singular resemblance to the noise of a child's toy trumpet; this we soon found to be the cry of the great ivory-billed wood-pecker (*picus principalis*), the largest of the North American species, and confined to the warmer parts. The *picus pileatus* we had seen on the 25th of August, more than one hundred miles above, and this with the *picus erythrocephalus* were now common. Turkeys were very numerous. The paroquet, chuck-wills-widow, wood-robin, mocking bird, and many other small birds, filled the woods with life and music.

*Excerpt from the Long Expedition*

Even if one opts to reject this record for lack of physical evidence, there are several others from approximately the same longitude that do involve specimens, and some are from the 20th century.

The U.S. Fish and Wildlife Service Recovery Plan for the Ivory-billed Woodpecker suggests that there are two records from west of Tulsa, a specimen was “probably” collected by S. W. Woodhouse along the Cimarron River, Pawnee County in 1849. Per Jackson, the specimen was sent to the Philadelphia Academy of Natural Sciences, which has four specimens without location information in its collection. The second is from House Creek in Pawnee County, also Woodhouse 1849, and also reportedly sent to the Philadelphia Academy but not found there.

There are several Plains records from Texas. A specimen currently in the Dallas Museum was collected in 1900 on Bois d'Arc Island, just southeast of Dallas, elevation 400'. There were

The Ivorybill's call is described, and Pileated Woodpecker is distinguished and described as common in the area. These facts lend credibility to the report, as does the fact that [Thomas Say](#) was the expedition's naturalist. While Say is best known as an entomologist, the expedition produced the first descriptions of a number of bird species, and an entire genus of flycatchers was named in his honor.

The location of this record is approximately south of Tulsa on the Canadian River, near the 96th Meridian. This is well into the eastern Great Plains. It is also well beyond the range of the bald cypress. The relatively narrow floodplain would have been dominated by cottonwoods and willows, as it is to this day. This image, circa 1920s, shows “Standing Rock,” a geological feature now flooded that was discovered by the expedition a day after the Ivorybill encounter. It should add a visceral sense of the area's appearance to supplement the description.



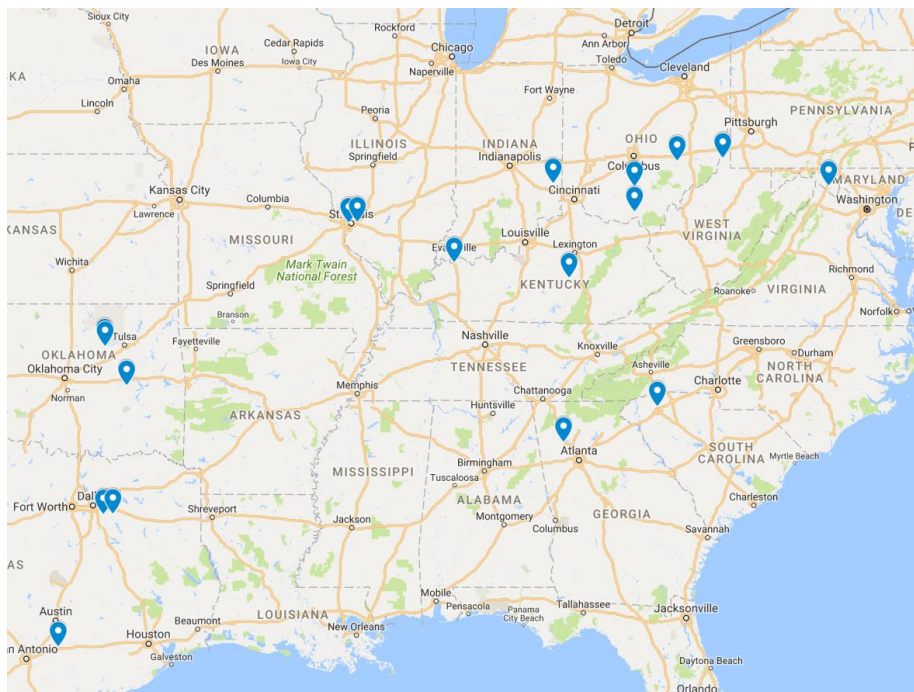
multiple reports from the area through 1910, and an additional specimen may have been collected in 1918. A bird was reportedly “caught in a trap” in nearby Kaufman County in 1927 and examined by an R.E. Huck but not preserved. An additional Texas record, from farther south but west of the 96th Meridian, comes from New Braunfels County, south of Austin and east of San Antonio. There were multiple reports around 1900, with a collection reported but no specimen preserved.

Although only one record from the eastern Plains can be attached with certainty to a currently existing museum specimen, there’s proof that Ivory-billed Woodpeckers were found in this region as recently as 1900 and considerable circumstantial evidence for their presence along riparian corridors on the plains of Texas, and possibly Oklahoma, into the 20th century. The habitat involved is markedly different from what so many have believed Ivorybills require. This is not to suggest that Ivorybills persist at the western edges of their historic range, but as will be discussed below, I think their ability to exploit these relatively narrow willow- and cottonwood-dominated floodplains can help explain how the species could have persisted into the 21st century.

## Exploring the Limits of the Ivorybill’s Range

Historical records of sightings and collected specimens demonstrate that the Ivory-billed Woodpecker’s reach extended far beyond what is today considered its range.

A [couple of maps](#) may be useful for additional information about forest, bioregion, and habitat types and may help with visualization along with my [map of records](#) from unexpected habitats.



Extralimital records, like these below, tell a different story about the Ivorybill's past.

- **Reedy River, South Carolina:** Nest with eggs reportedly collected in 1896 and later lost. The location is in the Piedmont, south of Greenville, at an elevation of approximately 900'. The Reedy flows into the Salad, which flows into the Congaree. This report is listed in the Recovery Plan because it was accepted by Sprunt as "definitive" but is considered highly questionable.
- **Etowah Mounds, Georgia:** Pre-contact site, elevation approximately 700'. Presumably not trade goods "but requires further discussion" per the Recovery Plan. The Etowah River is at the northern end of the Alabama River watershed.
- **Between Martinsburg, West Virginia and Winchester, Virginia:** Specimen reportedly collected by Wilson ca. 1810. Elevation at Winchester is 725' and at Martinsburg is 453'. This would appear to be in the Potomac watershed. The claim is based on 20th century speculation and is unsupported by evidence. (Leese and Michaels, in press.)
- **Moundsville, West Virginia:** Two lower mandibles found in a pre-contact (early Common Era, 0-200) midden (trash heap). Potentially trade goods. Elevation 696'. The location is on the Ohio River.
- **Philo, Ohio:** Near the Muskingum River. Tarsometatarsus found in pre-contact midden, dates from ca. 1100-1500. Elevation 735'.
- **Scioto County, Ohio:** Same as above. Elevation of the site is 1050', but the nearby Scioto River is lower. The site is about 10 miles from the Ohio River, and the elevation at the confluence is 533'.
- **Ross County, Ohio:** Same as above. Also on the Scioto River but farther upstream. Elevation 863'
- **Near Troy, Ohio:** Near the Miami River, March 1804 sight record by Gerard Hopkins, a Quaker envoy to the Miami and Potawatomi. The report includes a description, ". . . resembling the red headed woodcock of Maryland, except that its head is black and its bill ivory." (Leese 2001). Omitted from the map because it doesn't involve a specimen, but included here because it adds weight to the archaeological records.
- **Franklin County, Indiana:** Report of a specimen, 1869, now lost. Elevation at least 490'. Probably along the Whitewater River, an Ohio tributary. There are a number of early reports from Indiana, but no other reported specimens and no archaeological records. In light of Audubon's collection at Henderson, KY (just across the Ohio River) as well as the Ohio records, it seems likely that Ivorybills were present in parts of Indiana into the 19th century.

- **Henderson, Kentucky:** Female specimen collected by Audubon in July 1810 and used as a model for his first painting of the species. Elevation 400'. This record does not appear in the Recovery Plan or Jackson, and it seems to have been overlooked by researchers. Audubon's own notation describes the location as "Red Banks", on the Ohio River at the northernmost limit of the cypress-tupelo association, well upstream from the confluence with the Mississippi. Article by R. Haven Wiley in *Kentucky Warbler*, May 1970.
- **Stanford, Kentucky:** Pair reported, with one specimen collected by a Colonel Fleming, 1790. Record accepted by Tanner in 1989. Elevation 942'. The Dix River, which flows into the Kentucky and thence the Ohio, is nearby.
- **Cahokia Mounds, Illinois:** East of the confluence of the Mississippi and the Missouri, 1500s or earlier, tarsometatarsus. Elevation 490'.
- **Forest Park, Missouri or Vicinity:** West of the confluence of the Mississippi and Missouri. Specimen collected 1896 and in the collection of the Colorado Museum of Natural History. Elevation approximately 500'.

With regard to Missouri and the Missouri River watershed, Hasbrouck accepted reports from Fayette and Kansas City, and given the overall picture, this does not seem implausible. In addition, there were persistent reports from the vicinity of Lake of the Ozarks, in the Missouri River watershed, until the end of the 1940s; Tanner received information about Missouri reports from local Audubon Society officers but apparently disregarded it. There is no way to assess the validity of these old, anecdotal claims and no evidence to support them, but given this perspective on the historic range, they may be somewhat less far-fetched than it seems at first glance.

There are a number of records from Florida and South Carolina involving offshore islands. While most if not all of these offshore islands would have been covered in old-growth forest at the time of collection, reaching them would have required crossing expanses of open water or marsh.

In South Carolina, there were multiple reports from barrier islands into the 1880s. A specimen collected in 1879 or 1880 is now lost. Hoxie, writing in 1918, reported that Ivorybills were generally "unpersecuted or harmed by man" and that they had opportunistically fed on the barrier islands, following hurricanes, but disappeared when the food supply was exhausted.

My knowledge about Florida and conditions there is limited, but it seems clear that Ivorybills lived and bred in a variety of habitats. Florida is also the largest single source of specimens and probably had the largest Ivorybill population in the country. What may also be relevant is their apparent use of mangrove forests, including potentially some 1-2 miles away from the mainland, especially in the Everglades region. As with barrier islands, use of this habitat may have involved crossing some open water between mainland forests (e.g., Big Cypress, associated forested sloughs, and open pine woods, leading to the Gulf of Mexico) and



mangrove forests, both along the coastline and in the area referred to as the Ten Thousand Islands, extending south to where Tanner relayed reports during the 1930s from Shark and Lostman's Rivers within what is now Everglades National Park.

To end this tour of 'unexpected' habitats and 'extralimital' records, let's jump north and west by a thousand miles or so and consider records from Arkansas/Missouri and Virginia.

The Arkansas/Missouri records are from George Featherstonhaugh who explored the area in the 1830s and published his account in 1844 as [Excursion Through the Slave States from Washington on the Potomac to the Frontier of Mexico; with Sketches of Popular Manners and Geological Notices](#). Featherstonhaugh reported seeing Ivorybills in two different locations – one from a bottomland area above the confluence of the Ouachita and Caddo Rivers, in the vicinity of present day Arkadelphia, AR. This passage is from [Volume 2](#):

This place is the site of an ancient village of the Caddo Indians; a large mound with trees growing on it, and other indications of their residence, still exist there; and a sweet sequestered situation it must have been to them, for the river contains good fish, the country abounds in game, and the sandstone, with its pines, is here exchanged for a loose soil of the greatest fertility, and deciduous trees peculiar to these latitudes. On sallying out, after our good cheer, we were exceedingly pleased with the scene around us; the sun was shining brilliantly, flocks of parroquets were wheeling and screaming around, and the trumpet tone of the ivory-billed woodpecker was frequently heard.

On examining the bed of the Caddo, I found it consisted of tertiary limestone, exactly the same as that I had seen at Little Rock, and procured some good specimens of turritella and other fossils. The Caddo empties into the Washita, two miles below Barkman's, and about four miles farther down I was informed there were some salt wells from which he annually makes a good deal of salt.

The second location appears in [Volume 1](#) and is more interesting for the purposes of this discussion, since it involves fire-damaged upland forest, likely oak-dominated, with hickory and perhaps some shortleaf pine. It's not clear whether the site is in present day Arkansas or present-day Missouri. Either way, it appears to be on the edge of the Ozark Plateau where it

meets the Mississippi Alluvial Plain. As an aside, Featherstonhaugh seems to have had an eye for detail and a dry sense of humor:

We soon rose again to the table-land, and got upon our old ground, the calcareo-siliceous rock : it was a fine open country, and very extensive ; and the trees were so far asunder from each other that we could have imagined ourselves travelling through some park. Here we saw the first ivory-billed woodpeckers (*Picus principalis*), a beautiful bird, not found farther north than this part of the country. About 10 A.M. we came up with a sorry-looking horse, with a saddle on his back, grazing without a rider ; and two miles farther found a man, with a gun by his side, bleeding, and lying apparently senseless on the ground. At first we thought he had fractured his skull by a fall from his horse, and began to consider what we could do for him ; but we soon found that he was beastly drunk, and had probably fallen from his horse because he was unable to keep his seat. We therefore left him to get sober, as probably his horse and himself were accustomed to freaks of this sort. Towards noon

we were evidently advancing to a part of the country which was on fire, and soon became enveloped in a dense and distressing smoke. Our eyes became so sore that it was very difficult to drive, and the horse suffered as well as ourselves. Many of the dead trees had been burnt so near to the ground, that they had fallen in various places across the path, which obliged us to wind about as well as we could amongst the tall trees on fire—that were here rather too thick for our safety—under constant apprehension that some of them would fall upon us. The severe nervous headache I got during this morning's drive was almost insupportable ; the smoke was black and dense, and filled our eyes and our nostrils.

Whether the birds were resident in this area or were merely feeding opportunistically in the fire-damaged tableland, the habitat involved bears no resemblance to the Spanish Moss festooned, swamp forest stereotype.

Thomas Jefferson included the Ivorybill on his list of Virginia birds found in [Notes on the State of Virginia](#) (1785). While some authors have suggested that Jefferson was merely following Catesby, it has also been argued that Jefferson's list was "[a product of his personal observations](#)". If this is true, Jefferson's observation would not have been from the Great Dismal Swamp (where Pearson thought Ivorybills might be present in the early 20th century), since Jefferson never went south of [Norfolk](#).

Thomas Nuttall, writing in the 1830s, described the Ivorybill as being "seldom seen to the north of Virginia and rarely in that state." In [The History of Ornithology in Virginia](#) (2003), Johnston dismisses Nuttall's assertion but also points to a much earlier and unambiguous record from an upland site, one that seems to have been otherwise overlooked.

The record is from a Native American midden dating to the early Woodland period, ca. 300 CE (AD). The site, [Daugherty's Cave](#), was used for millennia. It's in the western part of the state, far from the coastal plain, at an elevation of approximately 2000'. The context suggests that the remains were not trade goods, and Johnston deems it to be "the only known record of this bird from Virginia."

I'm struck by the fact that if the Ivorybill had gone extinct before 1700, and we only had the scant archaeological record to go on, we'd imagine it to be a bird associated with upland forests. On a more serious note and perhaps one more relevant to the discussion that will follow, I wonder whether the appearance of Ivorybill remains in Appalachian middens around 1800 years ago is related to the spread of maize agriculture and tree kills associated with this new farming technology.

## **A Multitude of Factors for Ivorybill Decline... and Persistence**

For contrast, I've updated the [map](#) I created showing most of the records discussed in this series.

This is not to suggest that reports from outside this "historic" range should be taken seriously today. The map is a fairly accurate reflection of the reality post-Civil War. The more important questions are why the range started to shrink, probably during the 18th century, and what this more complex analysis of potential habitat types might imply for the species' survival. That will be the subject of the next and final installment.

While it may border on heretical to say so, I think there's a plausible argument that the Ivorybill's range prior to around 1800 extended as far north as the mid-Atlantic states (New Jersey and Pennsylvania on the Eastern Seaboard) and as far north as central Ohio west of the Appalachians. I'm inclined to think this is likely based on a number of accounts including: Peter [Kalm](#) (a student of Linnaeus who reported the species was present in New Jersey and Pennsylvania in the 18th century), Jefferson (1780s), Nuttall (1840s) who included Virginia in the range, and Gerard Hopkins, a Quaker from Maryland traveling to Indiana to meet with the Miami and Potawatomi Nations. Hopkins described a female Ivorybill at Piqua, Ohio (north of Dayton, elevation 873') in 1804 (Leese, 2010.)

At minimum, one of the Ohio archaeological finds dates to the 15th or 16th century, so there is strong reason to think that the Ivorybill's range extended that far north at the time of contact. North American Native populations began to decline after Columbus's arrival, and De Soto's expedition, 1539-1542, led to the collapse of the Mississippian culture. (De Soto also introduced the hogs that plague the southern forests to this day.) As a consequence, countless acres of formerly agricultural lands throughout the eastern United States were reforested and remained so into the 18th and 19th centuries. There's little reason to think that the Ivorybill's range would have contracted at a time when the total acreage of potential habitat was increasing.

I'm reminded that tree girdling may have been an important factor. The only counterargument to the suggestion about the increase in total acreage after De Soto is that Native American agricultural activity declined drastically during that period, so that while habitat acreage increased, habitat quality may not have. Tree girdling and intentional burning likely played an important role in creating good conditions for Ivorybills and could conceivably have led to range

expansion during the Mississippian period and again temporarily during the first couple of hundred years of European settlement.

Ivory-billed Woodpecker use of girdled trees was noted by several early observers – notably Audubon, Gosse, and Scott (in Florida, later). While researching this aspect, I came across an interesting account from 1840s Central Louisiana, apparently just south of Alexandria. I'm not aware of this account having found its way into Ivorybill literature:

duroy roads and swamps that the county Longford horses, said to be web-footed, might be introduced with great advantage. Once under weigh, however, they proceeded very well, with the exception of the mule, which kicked incessantly from the time of starting, until we reached the first corduroy road, when the logs, turning round at every step, obliged him to place his fore-feet so carefully, that he was effectually prevented from elevating his hinder ones; and his rider, taking advantage of such an opportunity, gave him so sound a drubbing that he condescended to forget his tricks, and turned out a most useful animal during the rest of the journey.

The first day's route lay through "the Bush." Large plantations of cotton were

growing among dead and blanched timbers, killed by the process of "girdling," *i. e.* cutting a deep notch round the tree, of sufficient depth to check the upward flow of the sap, when the consequent destruction of the foliage sufficiently secures the admission of light and air to the cotton, which flourishes amidst these gigantic skeletons, that remain standing until destroyed by fire, storm, or age. Amidst these trees, the hammering of the "ivory-billed" and "pilliated woodpecker," the most noble of their tribe, was incessant, and their splendid scarlet and carmine crests gleamed in the sunshine.

Wilson, writing of the former, says: "His manners have a dignity in them superior to the common herd of woodpeckers. Trees,

These excerpts are from [\*Echoes from the Backwoods; or, Scenes of Transatlantic Life\*](#), Captain R.G.A. Levinge (1849).

With this as background, I'd like to propose an alternative explanation (or more accurately an alternative group of explanations) for the Ivorybill's decline. If you think, as I do, that the Ivorybill has persisted, this may help explain how the species survived and may even provide some hope for its future, even in this era of mass, anthropogenic extinction.

When it comes to the decline and possible extinction, there has been a tendency to look for one or two causes. The [IUCN Species Account](#) gives the following reasons:

*Logging and clearance for agriculture are responsible for the dramatic decline in numbers and range. These factors are likely to threaten any remaining population. Hunting has also been implicated in the rapid population decline, and it has been proposed that this was the primary cause of its decline, with habitat destruction playing a secondary role, but this theory is contentious (Snyder 2007, Hill 2008, M. Lammertink in litt. 2012).*

Tanner emphasized the importance of logging during the post-Civil War era, although several of his data points seem to suggest that Ivorybills were disappearing prior to the most active logging dates. He also stated that the Ivorybill's disappearance "coincided at least roughly with a time of active or rapidly increasing logging." Elsewhere in the monograph, he focused on food supply, and I suspect that this, rather than logging per se was a more important factor in the Ivorybill's decline.

That's not to say logging was unimportant; it clearly played a major role. To expand briefly on the point Bill Pulliam raised: by the late 19th century, the more adaptable Pileated Woodpecker, had been extirpated in many parts of its range, and many expected it to "go the way of the Ivorybill." That didn't happen, and Pileateds returned to or became more common in many areas as farming gave way to suburban development and forested acreage increased as a result. I'd suggest that for the Ivorybill, habitat degradation, rather than habitat loss, was what initiated the decline, with extensive logging and then hunting accelerating an already existing trend.

In other words, a number of additional anthropogenic factors likely played a role in the Ivorybill's decline and dwindling range, especially outside of Florida, where hunting and collecting likely had much greater impacts than elsewhere. [Hasbrouck](#), writing in the 1890s, contrasted the lack of collecting in Louisiana, Arkansas, Missouri, and Tennessee with what was transpiring in Florida at the time. And it's important to remember that Florida, which retained "frontier" characteristics far longer than other parts of the eastern United States, was ground zero for the killing and collecting of birds – for commercial and ostensibly ornithological purposes. Ivorybills appear to have been more common in Florida than elsewhere by the second half of the 19th century, but it also seems probable that they were far more heavily persecuted there than anywhere else.

I'm hypothesizing that the shrinking distribution was correlated with settlement patterns in the northeastern part of that range and that by the middle of the 19th-century, east of the Mississippi, it had dwindled to the now familiar outlines, such as those shown on the IUCN range map.

The situation west of the Mississippi is somewhat more ambiguous. A specimen was collected at Forest Park, Missouri (near Saint Louis) in 1886, and there are records from west of the map in Texas dating to the early 20th century. Nevertheless, the general trend toward a shrinking range, which was frequently described in the 19th century literature, is clear.

European settlement brought about numerous changes in the land even before wholesale clearing of forests began.

As mentioned briefly in the discussion of tree girdling, Native Americans used fire for agricultural and wildlife management purposes, something that was likely beneficial for Ivorybills. As Native Americans were exterminated, pushed out of their homelands, or confined to small reservations, and as European settlers tried to control or eliminate fires, a significant factor contributing to tree mortality was likely reduced, dramatically.

Fulton's invention of a commercially viable steamboat in 1807 revolutionized commerce, drastically accelerating the clearing of logjams from many watersheds in eastern North America. It's fair to say that "widespread removal of instream wood for steamboat routes, timber rafts, and flood control was equally significant in decreasing floodplain sedimentation and river complexity, and in causing a fundamental, extensive, and intensive change in forested river corridors throughout the United States." ([Wohl](#), 2014.) As with changes in fire regimes, this clearing of logjams likely led to a decline in the number of stressed and dying trees along the riparian corridors that seem to have been so important for the Ivorybill.

Perhaps equally if not more important in my view is the extirpation of the beaver. It is almost impossible to overstate the role of the beaver in shaping ecosystems throughout North America, a subject that is addressed in engaging detail in Frances Backhouse's [Once They Were Hats](#). Beavers help create conditions that are good for woodpeckers by stressing and killing trees, through foraging and by changing hydrology. I have never tried to quantify it, but many, perhaps most, medium- to large-sized sweet gums in our search area show signs of beaver damage, and many others have been killed or severely weakened by beaver-caused flooding.

While beavers are not native to peninsular Florida, the Ivorybill's dwindling range elsewhere roughly tracks their decline; with extirpation starting in the northeast, moving west, and then south. (Southern beaver pelts were less valuable.) By 1900, beavers had disappeared from most of the southeastern US, and in Tanner's day, a very small population persisted in the Florida Parishes of eastern Louisiana. Reintroductions began in the 1950s, and beavers are now considered a pest animal in Louisiana. It's worth pointing out that the introduced beaver population in Tierra del Fuego appears to be benefitting the native [Magellanic Woodpecker](#) (Soto et al. 2012).

The resurgence of the beaver throughout the southeastern US is almost certainly producing substantially improved habitat conditions in many places. While the old-growth forests may be virtually gone, it's not inconceivable that Ivorybill food sources are considerably more abundant now than they were in Tanner's day, and if the species survived, conditions may actually be more favorable than they were in the 1930s and '40s. It's also worth pointing out that the southeastern United States is one of the few places in the world where [forest cover](#) has increased substantially in the 21st century.

It should be clear to readers of this series that the Ivory-billed Woodpecker inhabited a larger range and was able to exist in more varied habitats than most publications on the species suggest. This has implications for searchers and for what is deemed to be suitable habitat. For example, the trail cam images from the old Project Coyote (now Project Principalis) search area were obtained near the edge of a bean field, and the putative Ivorybill roost holes were in willows. Since Ivorybills in the western part of their range seem to have lived in willow- and cottonwood-dominated riparian corridors, fast growing, short-lived willows might have played an important role in the species' survival in other areas too, although willow-dominated habitat would be dismissed as unsuitable under conventional standards of habitat appropriateness.

It seems to me that even a slightly higher degree of adaptability would increase both the chances of survival and the likelihood that surviving populations might be overlooked due to preconceptions about habitat “suitability;” this was doubtless one of the factors that led officials to dismiss the landowner in our old search area. Now that beavers are again abundant in the southeast, habitat that might otherwise have been deemed “unsuitable” may now be able to support Ivorybills, even if the forest itself is not very old. While I don’t envision a recovery along the lines of what’s happened to the Pileated Woodpecker since my youth (when seeing my first one was a thrill as much for its scarcity as its beauty), I think it’s possible that Ivorybill numbers have been increasing gradually and modestly over the past few decades. There was, of course, fairly intensive searching from around 2000-2010, but it may be that the more numerous sightings from this period and afterwards are due to more than just the increased effort.

\*The remains found in Native American middens were unlikely to have been trade goods; ivorybill parts seem to have been a valuable commodity for ceremonial use west of the Mississippi but not east of it, and in several cases, the remains found were tarsometatarsi (lower leg bones found in birds), which would be consistent with use as food:

*There is strong physical evidence of ritual value for woodpecker scalps and bills from the upper Midwest and Plains . . . Remains of the Ivory-billed Woodpecker can be found in sacred bundles, on pipe stems, on amulets, and with burials among the Native Americans of the region. The evidence comes from the western Great Lakes and the Plains; no evidence of a particular use of Ivory-billed Woodpeckers has yet been uncovered from the eastern area of the Great Lakes (Ohio, Indiana, and Michigan). (Leese, 2006.)*

Leese also points out in several of his publications that there’s no evidence that Ivorybill parts other than scalps and bills had any trade value.

A number of these midden records were accepted by Tanner in his unpublished 1989 update.