

Supplemental Materials accompanying:

Evidence Suggesting that Ivory-billed Woodpeckers Exist in Florida

Geoffrey E. Hill^{1*}, Daniel J. Mennill^{2*}, Brian W. Rolek¹, Tyler L. Hicks^{1,3}, & Kyle A. Swiston²

¹ Department of Biological Sciences, Auburn University, Auburn, USA,

² Department of Biological Sciences, University of Windsor, Windsor, Canada

³ Current address: Department of Biology, Western State College, Gunnison, USA

* To whom correspondence should be addressed. E-mail: ghill@acesag.auburn.edu and dmennill@uwindsor.ca

Contents of Supplementary Materials:

Tables S1-S3

Figure S1

Transcribed field notes containing Figures S2-S5

Accompanying Audio Files:

Putative double knock recordings:

DK 2005 12 25 camera series.wav (Appendix 2)

DK 2006 01 05 1647h.wav (Appendix 3)

DK 2006 01 07 1142h.wav (Appendix 4)

DK 2006 02 06 1553h.wav (Appendix 5)

DK 2006 02 24 1633h.wav (Appendix 6)

Putative *kent* call recordings:

Kent 2006 02 09 1339h.wav (Appendix 7)

Kent 2006 03 14 1525h.wav (Appendix 8)

Kent 2006 03 15 0850h.wav (Appendix 9)

Kent 2006 03 15 1007h.wav (Appendix 10)

Pale-billed woodpecker double knocks from Costa Rica:

PBWO DK 2006 05 12 Costa Rica.wav (Appendix 11)

Table S1. Summary of observations of Ivory-billed Woodpeckers near the Choctawhatchee River, Florida

Observer	Date	Time	Distance to bird	Circumstances	Traits observed
BWR	5/21/05	7:30	50 m	Naked eye; fleeing bird	Large black woodpecker with white trailing edge on upper and under wing
TLH*	5/27/05	9:00	70 m	Binoculars; side view, then clear dorsal view	Loon-like flight; stiff wingbeats; white trailing edge on underwing; white trailing edge on upper wing; white lines running from neck down back on each side dorsal surface; head (crest), back, rump, tail, and neck black
BWR	7/31/05	10:30	15 m	Naked eye; overhead silhouette	Large woodpecker; stiff wingbeats; long neck/bill, long tail, long wings; no color
BWR	7/31/05	11:00	15 m	Naked eye; overhead silhouette	Two large woodpeckers, one trailing other by 1 or 2 sec; on both: long wings; long neck/bill, long tail, black and white on wings
TLH*	12/24/05	15:30	50 m	Naked eye; head-on view, then banking left	Duck-like flight; underside of wings with white trailing edge and wing lining; black line running down center of underwing spreading to cover primaries
BWR	12/27/05	10:37	30-40 m	Naked eye; fleeing bird	White secondaries, large black woodpecker
GEH	1/5/06	6:38	15 m	Naked eye; overhead silhouette	Fast, straight, loon-like flight; big woodpecker with long relatively narrow wings, long head/neck, long tail
GEH	1/21/06	9:55	12 m to 130 m	Naked eye; flying directly away	Powerful straight-line flight; from 2 m above water to 30 m in steady rise; large black woodpecker with bright white trailing edge on dorsal wing; double knock heard
BWR	1/25/06	14:54	100 m	Binoculars; fleeing bird	White secondaries, large black woodpecker; 2 double knocks heard
BWR	2/1/06	8:51	60 m	Naked eye and binoculars (blurry); 2 birds just spooked off tree, clear underside view and side view	2 large woodpeckers coming off tree; clear view of underside of both birds wings; long white wings with black line extending down center and widening toward wing tip; deep wingbeats as they hovered; shallow beats with direct flight once moving, flashing white; long necks
BWR	2/2/06	16:12	50 m	Binoculars; low from tree, fleeing	Low fast flight; white secondaries; large; long, slender wings and long neck
BWR	2/26/06	14:52	100 m	Naked eye; far away, fleeing	Large woodpecker; white secondaries
BWR & KAS	4/27/06	16:30	60-80 m	Naked eye; flying across creek in front of canoe, poor lighting	Shape only; large bird, long wings, fast direct flight, duck-like; shallow beats
BWR	5/19/06	16:30	10 -15 m	Naked eye; flying across channel and swooping up to land on trunk of tree but not seen on tree	Large black woodpecker with broad white trailing edge to wing; landing on side of tree trunk as a woodpecker

* Detailed notes for these two encounters are provided below.

Table S2. Summary of detections of sounds consistent with Ivory-billed Woodpeckers near the Choctawhatchee River, Florida

Observer	Date	Time	What was heard
GEH	5/21/05	8:45	double knock
TLH, BWR	5/22/05	9:00	<i>kent</i> call
Leon Hicks	12/21/05	9:00	<i>kent</i> call
TLH	12/22/05	8:15	5 <i>kent</i> calls
TLH, BWR	12/23/05	10:30	double knock
TLH	12/24/05	12:00	double knock
TLH, BWR	12/25/05	7:30	9 double knocks
TLH, BWR	12/26/05	16:30	double knock
Chet Gresham	1/5/06	9:10	double knock
TLH	1/13/06	16:30	2 <i>kent</i> calls
BWR	1/13/06	16:30	<i>kent</i> call
BWR	1/20/06	9:08	15-20 double knocks
BWR	1/20/06	11:30	1 double knock
GEH	1/21/06	9:57	double knock
BWR	1/23/06	1:30	6 double knocks
BWR	1/25/06	14:54	2 double knocks
KAS	1/27/06	10:45	1 double knock
GEH	2/4/06	14:55	4 double knocks
BWR	2/7/06	12:07	12 <i>kent</i> calls
KAS	2/8/06	7:10-7:35	50 <i>kent</i> calls
BWR, KAS	2/8/06	11:15	20 <i>kent</i> calls
BWR	2/19/06	15:45-16:15	45 double knocks
GEH	2/24/06	17:00	4 <i>kent</i> calls
GEH	3/3/06	8:30	12 <i>kent</i> calls
GEH, David Carr	3/3/06	17:22	<i>kent</i> call, double knock
David Carr	3/4/06	6:34	double knock
BWR	3/8/06	6:30-7:15	8-10 <i>kent</i> calls
KAS	3/8/06	6:30-7:15	5-8 <i>kent</i> calls
BWR	3/9/06	17:19	5 <i>kent</i> calls
BWR	3/12/06	15:30	2 <i>kents</i>
BWR	3/17/06	14:52	2 double knocks
TLH, BWR	3/19/06	15:55	10 double knocks (THL heard 4)
TLH	3/19/06	16:33	10 double knocks
BWR	3/20/06	12:30	3 double knocks
TLH	3/21/06	08:30	<i>kents</i>
TLH, BWR	3/24/06	15:45	4 <i>kents</i> (TLH heard 1 double knock)
KAS	3/29/06	8:30	10 double knocks
BWR	4/1/06	17:10	1 double knock
BWR	4/7/06	14:55	5 double knocks
BWR	4/14/06	10:00	1 double knock
BWR	4/24/06	17:00	2 double knocks

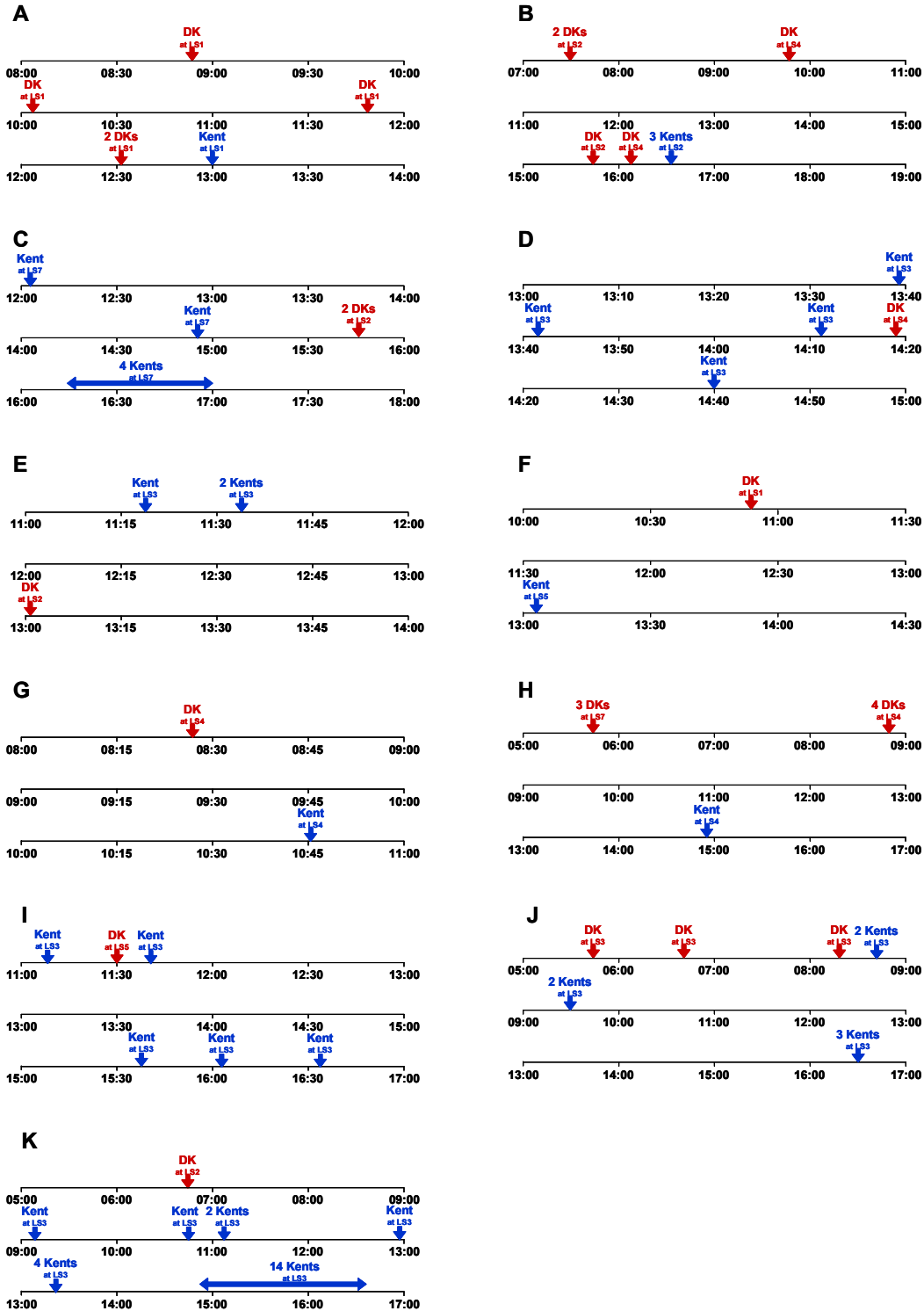


Fig. S1. Time lines showing chronology of recording of putative double knocks (DKs) and putative *kent* calls and the listening stations at which these were recorded in 2006. (A) January 12. (B) January 22. (C) February 6. (D) February 9. (E) February 10. (F) March 2. (G) March 13. (H) March 20. (I) March 25. (J) March 26. (K) April 10. When multiple listening stations were involved these were separated by approximately 500 m.

Table S3. List of putative Ivory-billed Woodpecker *kent* calls and double knocks recorded near the Choctawhatchee River, Florida.

Recording	Date	Time	Recording	Date	Time	Recording	Date	Time
9 Double Knocks*†	2005 12 25	7:30	Kent	2006 03 14	15:25	3 Kent calls	2006 04 04	10:43
Double Knock	2006 01 05	16:47	Kent	2006 03 14	17:42	Kent	2006 04 04	11:07
Double Knock	2006 01 07	11:42	Kent	2006 03 14	17:46	2 Kent calls	2006 04 04	11:17
Kent	2006 01 08	13:53	Kent	2006 03 14	17:47	Kent	2006 04 04	11:27
Double Knock	2006 01 10	7:34	Kent	2006 03 15	8:16	Kent	2006 04 04	14:08
Double Knock	2006 01 11	15:54	3 Kent calls	2006 03 15	8:50	Kent	2006 04 04	14:10
Double Knock	2006 01 12	8:50	Kent	2006 03 15	9:24	Kent	2006 04 04	14:10
Double Knock	2006 01 12	10:03	Kent	2006 03 15	9:29	Kent	2006 04 04	14:26
Double Knock	2006 01 12	11:47	Kent	2006 03 15	9:48	2 Kent calls	2006 04 04	15:18
2 Double Knocks	2006 01 12	12:33	Kent	2006 03 15	9:57	Double Knock	2006 04 07	15:37
Kent	2006 01 12	13:00	Kent	2006 03 15	10:02	Kent	2006 04 09	12:12
Double Knock	2006 01 13	14:59	4 Kent calls	2006 03 15	10:07	Kent	2006 04 09	12:19
Double Knock	2006 01 16	9:03	Kent	2006 03 15	10:53	Kent	2006 04 09	12:36
Double Knock	2006 01 19	6:25	Kent	2006 03 15	11:01	Kent	2006 04 09	13:46
Double Knock	2006 01 19	8:47	Kent	2006 03 16	16:26	Kent	2006 04 09	14:21
3 Double Knocks†	2006 01 20	9:27	Kent	2006 03 17	14:17	Kent	2006 04 09	14:22
Double Knock	2006 01 20	9:57	Kent	2006 03 17	15:08	Kent	2006 04 09	15:46
4 Double Knocks	2006 01 20	16:17	3 Kent calls	2006 03 18	7:32	2 Kent calls	2006 04 09	15:47
2 Double Knocks	2006 01 20	17:07	Kent	2006 03 18	7:39	Kent	2006 04 09	15:57
Double Knock	2006 01 21	14:19	Kent	2006 03 18	7:44	Kent	2006 04 09	16:24
Double Knock	2006 01 21	15:45	Kent	2006 03 18	7:45	Kent	2006 04 09	16:25
2 Double Knocks	2006 01 22	7:26	2 Kent calls	2006 03 18	7:51	Kent	2006 04 09	16:35
Double Knock	2006 01 22	9:46	Kent	2006 03 18	7:53	Kent	2006 04 09	16:39
Double Knock	2006 01 22	15:45	2 Kent calls	2006 03 18	8:23	Kent	2006 04 09	16:47
Double Knock	2006 01 22	16:13	Kent	2006 03 18	8:27	2 Kent calls	2006 04 09	16:50
3 Kent calls	2006 01 22	16:38	Kent	2006 03 18	8:42	Kent	2006 04 09	16:53
Double Knock	2006 01 27	15:14	Kent	2006 03 18	8:43	Kent	2006 04 09	16:57
Double Knock	2006 01 27	16:43	Kent	2006 03 18	9:23	Kent	2006 04 09	17:42
Double Knock	2006 01 30	16:46	2 Kent calls	2006 03 18	9:41	Double Knock	2006 04 10	6:46
Double Knock	2006 01 31	10:33	Kent	2006 03 18	9:57	Kent	2006 04 10	9:10
Double Knock	2006 01 31	10:41	Kent	2006 03 18	10:18	Kent	2006 04 10	10:41
Double Knock	2006 01 31	16:14	Kent	2006 03 18	10:22	Kent	2006 04 10	11:04
Double Knock	2006 01 31	16:54	Kent	2006 03 18	10:24	Kent	2006 04 10	11:04
Double Knock	2006 02 03	14:56	Kent	2006 03 18	10:27	Kent	2006 04 10	12:56
Kent	2006 02 06	12:05	3 Kent calls	2006 03 18	11:24	Kent	2006 04 10	13:12
Kent	2006 02 06	14:52	Kent	2006 03 18	11:25	3 Kent calls	2006 04 10	13:21
Double Knock	2006 02 06	15:43	Kent	2006 03 18	11:37	2 Kent calls	2006 04 10	14:58
Double Knock	2006 02 06	15:53	2 Double Knocks	2006 03 20	5:42	Kent	2006 04 10	15:10
Kent	2006 02 06	16:16	Double Knock	2006 03 20	5:42	Kent	2006 04 10	15:31
Kent	2006 02 06	16:41	2 Double Knocks	2006 03 20	8:52	Kent	2006 04 10	16:09
Kent	2006 02 06	16:53	Double Knock	2006 03 20	8:54	2 Kent calls	2006 04 10	16:17
Kent	2006 02 06	16:58	Double Knock	2006 03 20	8:54	3 Kent calls	2006 04 10	16:28
5 Kent calls*	2006 02 07	12:07	Kent	2006 03 20	14:56	Kent	2006 04 10	16:35
Kent	2006 02 08	9:00	Kent	2006 03 21	16:01	Kent	2006 04 10	16:37
Kent	2006 02 08	9:32	Kent	2006 03 21	17:00	2 Kent calls	2006 04 11	8:56
2 Kent calls	2006 02 08	11:59	3 Kent calls	2006 03 22	7:04	Kent	2006 04 11	10:37
2 Kent calls	2006 02 08	12:13	Kent	2006 03 22	7:18	Kent	2006 04 11	10:37
Kent	2006 02 09	13:39	Kent	2006 03 22	7:57	Kent	2006 04 11	10:51
Kent	2006 02 09	13:42	Kent	2006 03 22	7:58	Kent	2006 04 11	10:51

Kent	2006 02 09	14:12	Kent	2006 03 22	7:59	Kent	2006 04 11	10:51
Double Knock	2006 02 09	14:18	Kent	2006 03 22	8:27	2 Kent calls	2006 04 11	10:52
Kent	2006 02 09	14:40	Kent	2006 03 22	8:36	Kent	2006 04 11	10:53
Kent	2006 02 10	11:20	Kent	2006 03 22	8:42	Kent	2006 04 11	10:55
2 Kent calls	2006 02 10	11:34	Kent	2006 03 22	8:57	2 Kent calls	2006 04 11	10:57
Double Knock	2006 02 10	13:02	Kent	2006 03 22	9:13	Kent	2006 04 11	15:27
Double Knock	2006 02 17	13:39	Kent	2006 03 22	9:14	Double Knock	2006 04 18	6:52
Double Knock	2006 02 21	15:45	3 Kent calls	2006 03 22	9:33	Double Knock	2007 01 21	6:22
Double Knock	2006 02 21	15:45	2 Kent calls	2006 03 22	9:34	Double Knock	2007 01 21	9:16
Double Knock	2006 02 24	9:30	Kent	2006 03 22	9:34	2 Double Knocks	2007 01 21	9:25
Double Knock	2006 02 24	14:32	Kent	2006 03 22	10:13	Double Knock	2007 02 03	15:07
Double Knock	2006 02 24	16:33	Kent	2006 03 22	10:16	Kent	2007 03 25	11:44
2 Double Knocks	2006 02 25	6:20	Kent	2006 03 22	10:18	Double Knock	2007 03 26	6:48
Double Knock	2006 02 27	15:39	Kent	2006 03 22	10:51	Kent	2007 04 14	12:42
Double Knock	2006 02 28	7:09	Kent	2006 03 22	10:53	Double Knock	2008 02 03	16:06
Double Knock	2006 02 28	8:55	Kent	2006 03 22	10:57	Kent	2008 03 25	11:08
4 Kent calls	2006 03 01	15:04	Kent	2006 03 22	10:59	Kent	2008 03 25	15:39
Double Knock	2006 03 02	10:51	2 Kent calls	2006 03 22	11:30	Double Knock	2008 03 26	8:20
Kent	2006 03 02	13:06	Double Knock	2006 03 23	9:30	2 Kent calls	2008 04 10	14:57
Double Knock	2006 03 03	8:04	Double Knock	2006 03 23	9:31	Double Knock	2009 02 03	17:20
Double Knock	2006 03 04	6:41	Kent	2006 03 24	13:31	Double Knock	2009 03 25	11:30
Double Knock	2006 03 08	12:30	Kent	2006 03 24	13:32	Kent	2009 03 25	16:07
Double Knock	2006 03 09	8:03	Kent	2006 03 24	15:10	2 Kent calls	2009 03 26	8:40
Double Knock	2006 03 12	6:58	Kent	2006 03 24	15:29	Kent	2010 03 25	16:34
Double Knock	2006 03 12	6:58	Kent	2006 03 24	15:39	Kent	2010 03 26	9:27
Double Knock	2006 03 12	6:59	Kent	2006 03 24	16:13	Kent	2011 03 26	9:28
Double Knock	2006 03 12	7:06	Kent	2006 03 24	16:36	Kent	2012 03 26	9:33
Double Knock	2006 03 12	7:06	Double Knock	2006 03 26	5:46	Kent	2014 03 26	16:30
Double knock	2006 03 13	8:24	Kent	2006 03 28	14:52	Kent	2016 03 26	16:30
Kent	2006 03 13	10:46	Double Knock	2006 03 30	15:05	Kent	2017 03 26	16:36
Kent	2006 03 14	11:52	Double Knock	2006 04 01	7:46			
Kent	2006 03 14	13:39	Double Knock	2006 04 02	12:32			

* Recording made with hand-held videocamera (all other recordings made with automated listening stations)

† Recording showed evidence of more than one individual

All sound files are available for download as an online supporting information or from www.uwindsor.ca/dmennill

All supporting sound files are normalized to the same amplitude using the maximize feature of SyrinxPC

Transcribed Field Notes

Written descriptions from the two of the most detailed sightings, by Tyler L. Hicks

Sighting 1: 27 May 2005

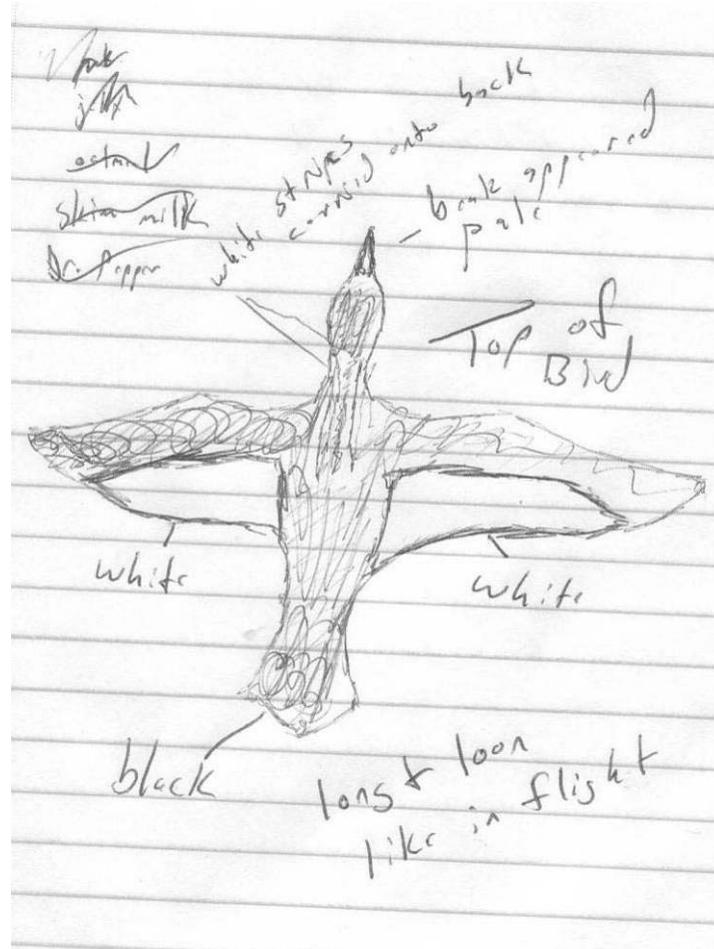


Fig. S2. Field sketch made on May 27, 2005 by Tyler L. Hicks.

At approximately 9:47 AM while sitting to north of [LOCATION WITHHELD] I was observing a Red-eyed Vireo feeding in the sub-canopy to the east of my position. Out of the corner of my eye I caught a large bird flying to my right. I turned and observed a large black and white woodpecker flying quickly in loon-like fashion with stiff wing beats and a direct flight to the north of me (Fig. S5). The bird banked to the northwest and climbed through the canopy cover affording binocular views before disappearing through the canopy vegetation (Fig. S6). In flight observed from behind the bird was largely black with large white wing patches on the trailing edge of the wing. The wing beat was deep and more direct than smaller woodpecker species. In flight the wings flashed white on both the upstroke and down stroke.

On the final down stroke the bird climbed through canopy affording a better view of the bird dorsally. The bird appeared long (almost loon-like) in flight. The large white wing patches were clearly visible and the white lines running from the neck down the flank were visible as well. The bird's head, back, rump, tail, and neck were clearly all black. I also believe I caught glimpse of the pale Ivory bill. Due to the size and diagnostic field marks observed there is no doubt in my mind that this bird was a female Ivory-billed Woodpecker.

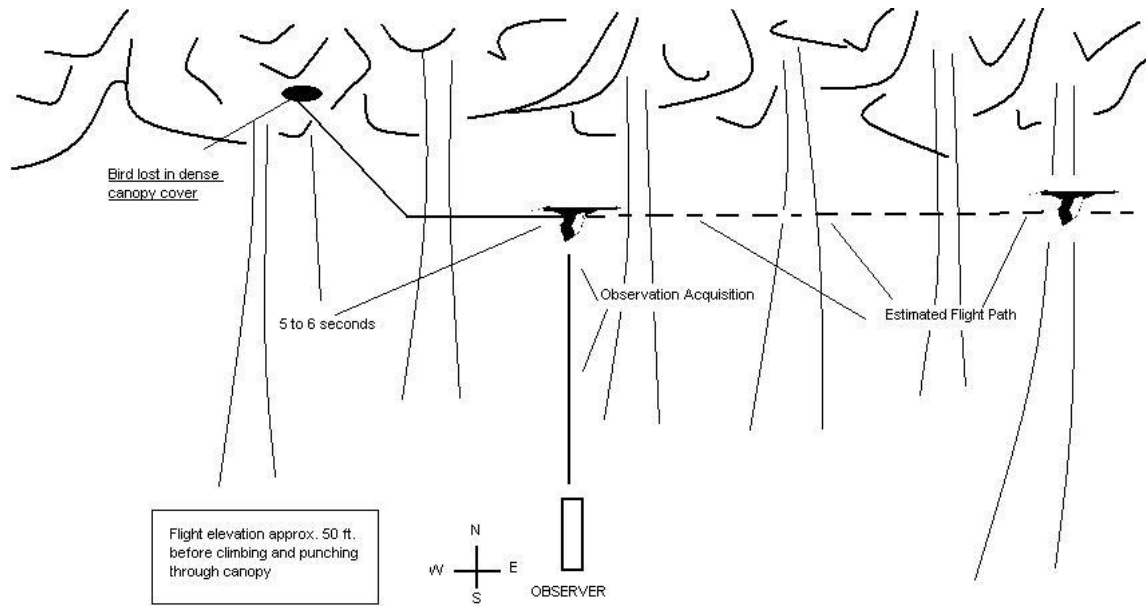


Fig. S3. Circumstances of 27 May 2005 sighting.

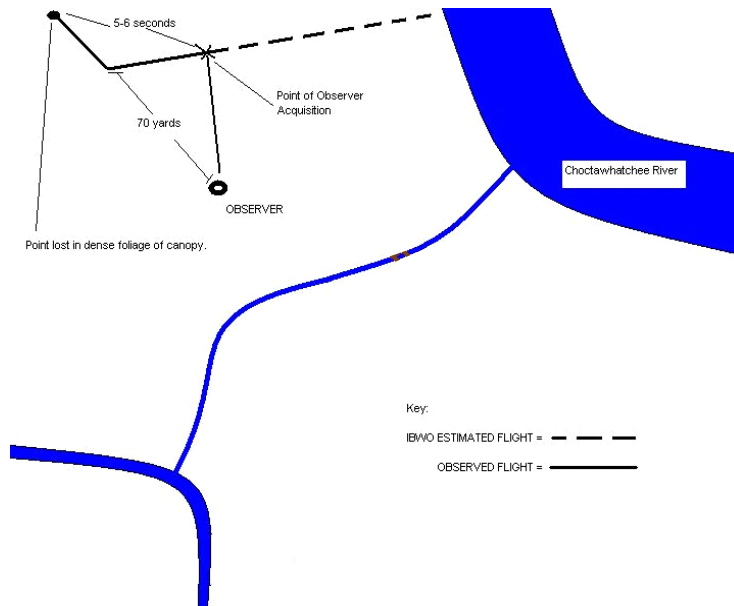


Fig. S4. Overview of position of bird and observer.

Sighting 2: 24 December 2005

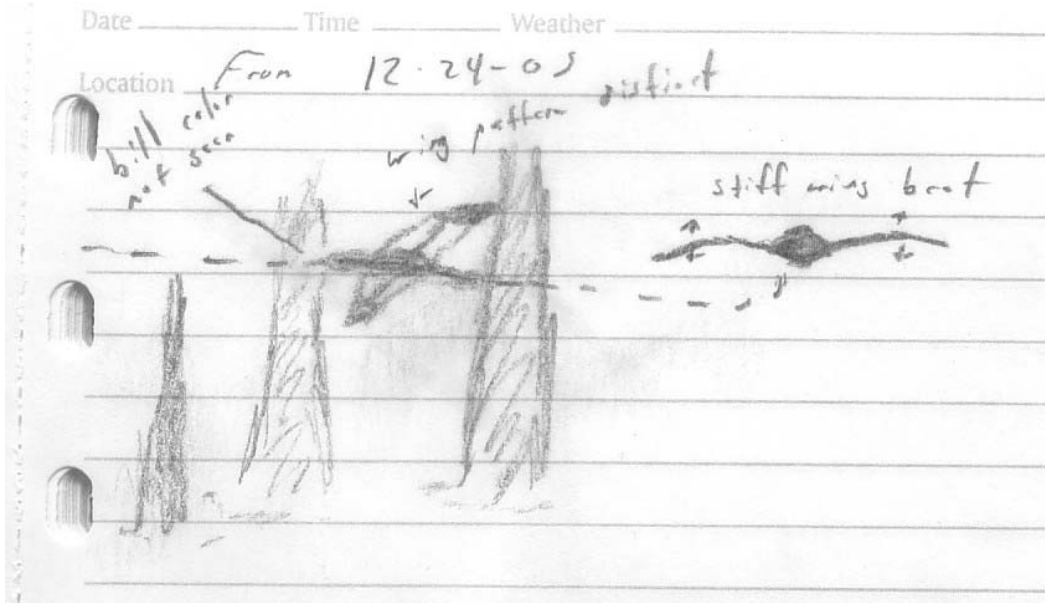


Fig. S5. Sketch made on 12-24-05 by Tyler L. Hicks.

While paddling “Hill’s Swamp” at approximately 3:30 PM I observed in good light an IBWO flying from the south and banking east at about 50 yards. The bird was flying just below the main canopy of Hill’s Swamp initially following the creek channel before banking east into forests of No-Name Hammock. Initially the identification of the bird was a mystery to me as it approached from the south. Through the trees the bird seemed like dark-colored dabbling duck in size and flight. As the bird approached nearly 50 yards away it banked sharply as it had obviously detected my presence. At this moment I observed the underwing of the bird in clear view. The underside of the wing had a trailing edge of white and the underwing linings were white as well. A black line running down the center of the underwing and spreading to cover the outer primaries divided this largely white underwing. The bird quickly moved east into an area of dense forest that had been damaged by a tornado. Although the view was brief and without binoculars I feel the bird could be nothing else but an IBWO. However no bill color was observed and at 50 yards one would expect to detect a pale Ivory bill. In addition no red coloration was observed leading me to believe the bird was a female.