

Data Report
2010-2011 Ornate Box Turtle (*Terrapene ornata*) Telemetry Project
Ayers Sand Prairie and Thomson-Fulton Sand Prairie
Nature Preserves
Carroll and Whiteside counties, IL



Ornate Box Turtle (*Terrapene ornata*), a.k.a. Ayers Male B11/15

Photo by: Ed Anderson

Report prepared by: Ed Anderson
Illinois Department Natural Resources; 3159 Crim Dr., Savanna, IL 61074

John W. Zimmerman, Ph.D.
Ashford University; 400 North Bluff Road; Clinton, IA 52732

Erika Fisk
Ashford University; 400 North Bluff Road; Clinton, IA 52732

Michael Handley
Ashford University; 400 North Bluff Road; Clinton, IA 52732

Introduction

Specimens of ornate box turtles (*Terrapene ornata*) were hand-captured and examined at Thomson-Fulton Sand Prairie Nature Preserve (TFSP) in Whiteside County and Ayers Sand Prairie Nature Preserve (ASP) in Carroll County to obtain natural history information, e.g., population size, sex ratios, age, and growth patterns. In addition, trained 'turtle dogs' were used on a limited basis (1 day per preserve) to locate and collect specimens. Turtles of suitable size at each preserve were fitted with transmitters provided by the United State Fish & Wildlife Service (USFWS) for tracking by radio telemetry. Tracking of turtles provided additional information on habitat use, home range, survival, and brumation sites.

The ornate box turtle was listed as an Illinois threatened species in October 2009. The Illinois Wildlife Action Plan (IDNR 2005) listed the ornate box turtle as one of the species in greatest need of conservation.

TFSP and ASP are nature preserves owned by the Illinois Department of Natural Resources (IDNR). TFSP is a 212-acre grassland that contains dry sand prairie, sand dune, and blowout communities, much of which is recovering from past grazing. ASP is a 109-acre grassland that contains dry sand prairie, sand dune, and blowout communities.

Objectives of Project:

- To determine the general population size and viability of the ornate box turtle populations at TFSP and ASP by comparing capture and recapture data based on specimens marked at ASP in 1988-9 by Randy Nyboer and in 1999 by Collin Smith.
- To determine the general home range and habitat use by ornate box turtles at TFSP and ASP.

Methods and Procedures:

On 19 May 2010, a group of six IDNR and FWS staff and volunteers assisted the turtle dogs (Photo 1 in Appendix 1) and their handler with searches for ornate box turtles at TFSP from approximately 0900-1100 and 1800-2000 hrs. On 20 May, a group of seven IDNR and USFWS staff and volunteers assisted the turtle dogs and their handler with searches for ornate box turtles at ASP from approximately 0900-1700 hrs. Capture and recapture data were recorded. Additional data, e.g., identification number, sex, capture date, carapace length and width, weight, plastron length, and shell depth, were recorded using a standardized data form.

Ages of turtles were determined by examination and counting of growth rings on an abdominal scute. Weight was determined by a digital scale. Unmarked turtles were marked using an established code by notching the marginal scutes with a file (Cagle 1942). All turtles were released at their respective capture locations.

Turtles outfitted with radio transmitters (Photo 2 in Appendix 1) were monitored on an approximate weekly basis from 20 May 2010 until 27 October 2011. Additional monitoring was

conducted as time permitted. Telemetry locations were recorded via a hand-held GPS unit (Garmin Etrex Legend or GPSmap76) and mapped.

All field notes were transcribed into Microsoft Word for the IDNR (Appendix 2). Turtle locations were compiled into Microsoft Excel and the longitudinal and latitudinal coordinates were provided on a flash drive for future use.

Results:

Thomson-Fulton Sand Prairie Nature Preserve

At TFSP in 2010, a total of 10 ornate box turtles were captured (Table 1), including 5 males, 4 females, and 1 juvenile. Average weights were: males – 256.6 gm, females – 323.0 gm, and juveniles – 104.0 gm. Seven turtles, 3 males and 4 females, were fitted with transmitters for telemetry monitoring (Fig. 1). Turtles fitted with transmitters were released by 0900 hrs on 20 May. All other turtles were processed and released at the point and time of capture on 19 May.

The estimated summer home range of 7 turtles at TFSP varied from 0.15 to 3.45 hectares (0.36 to 8.51 acres) with an average of 0.95 hectare (2.35 acres)(Table 2, Figs. 2-5). Male home ranges estimates averaged 1.59 hectares (3.93 acres), whereas female home range estimates averaged 0.31 hectare (0.75 acre).

In 2011, there was a continuation of monitoring of marked turtles at both locations. Locations of turtles with transmitters were recorded using a hand-held GPS unit and mapped. Locations of each turtle can be found in Figs. 8 to 22.

At TFSP, there were no new ornate box turtles collected in 2010 or 2011. One turtle, Male A11, was believed to have been killed by a predator in July 2010. Its empty shell was found along a mammal trail adjacent to Potter's Marsh on the west edge of the preserve (Fig. 3, Photo 3 in Appendix 1). Two additional unmarked female turtles were observed in 2010, but were not identified due to mating activity with Male B5. Matings were observed on 25 May and 2 August (Fig. 1).

On 10 June 2011, probable movements by females for nesting were observed. Female B13/B13 had moved from her normal summer range back to her brumation area (Figs. 2 and 13). The female may have been in the process of laying eggs when observed (Photo 4 in Appendix 1). Females C15/A13 and B3/B1 made similar long moves (Figs. 9 and 10, respectively); however, these moves were not to their previously used brumation areas. Female C15/A13 moved to an area northeast (Figs. 2 and 9) and Female B3/B1 (Figs. 2 and 10) moved to an area southeast of their respective normal summer ranges. The three turtles had moved back to their respective summer range by the following week.

Through the use of radio telemetry, brumation (overwintering) sites and dates were identified (Table 3, Figs. 6a and 6b). At TFSP, approximate brumation dates ranged from 20 September to 12 October. All of the turtles exhibited site fidelity in returning to their respective brumation site. Habitat at brumation sites varied from sparsely vegetated slopes (Photo 5 in

Appendix 1) to the densely vegetated road shoulder used by Male A9/A5 (Photo 6 in Appendix 1).

Ayers Sand Prairie Nature Preserve

At ASP in 2010, a total of 70 ornate box turtles were captured (Table 4), including 32 males, 24 females, and 14 juveniles. Sixteen turtles, including 10 males and 6 females, were recaptures. Recaptures included turtles marked in 1988 (6 turtles), 1999 (9 turtles), and one unknown. Average weights were: males - 269.3 gm, females - 249.1 gm, and juveniles - 54.5 gm. Nine turtles, 4 males and 5 females, were fitted with transmitters for telemetry monitoring. The first 35 turtles were processed and released by 1600 hrs. The remaining 35 turtles, including those fitted with transmitters, were released by 1000 hrs on 21 May. No turtles were held for more than 24 hours.

At ASP in 2011, incidental to the telemetry monitoring work, a total of 12 previously unmarked ornate box turtles, including 7 males and 5 females, were captured and marked (Table 5). Newly marked turtles were 12 years of age or older. An additional six turtles were recaptures, including one turtle that was captured during each previous survey, i.e., 1988, 1999, and 2010. One additional unmarked male was observed in 2011, but was not identified due to mating activity with Female C7/C3 on 10 May.

Male B11/15 (front cover), was observed to utilize the adjacent grassy field strip north of the preserve (Photo 7 in Appendix 1) on numerous occasions, i.e., 25 June, 23 July, and 13 August in 2010 and May 26 and June 24 in 2011. Additionally, prior to removal of the transmitter, this turtle was observed in the grassy field mating with Female L1,2 on 4 May 2012 (Photo 8 in Appendix 1).

A probable movement for nesting was observed on 10 June 2011 when Female B11 had moved from her normal summer range back to her brumation area (Figs. 7a, 7b, and Fig. 18). The turtle had moved back to her summer range by the following week. In 2011, two ornate box turtle nests were observed to have been predated (Photos 9 and 10 in Appendix 1).

Through the use of radio telemetry, brumation (overwintering) sites and dates were identified (Table 6, Figs. 7a and 7b). At ASP, approximate brumation dates ranged from 20 September to 27 October. All of the turtles, except Male A15/B7, exhibited site fidelity in returning to their respective brumation site. In 2010, Male A15/B7 brumated near C7 (Fig. 7a). In 2011, Male A15/B7 moved southwest to a new brumation site near Male B3 (Fig. 7b). Habitat at brumation sites varied from moderately to sparsely vegetated slopes (Photo 11 in Appendix 1) to relatively dense vegetated sites, e.g., aromatic sumac (*Rhus aromatic*) patch (Photo 12 in Appendix 1).

Discussion:

The purpose of this report was to determine the general population size and viability of the ornate box turtle populations at TFSP and ASP. This research was conducted in conjunction with corresponding research by the USFWS Upper Mississippi River Refuge staff at nearby Thomson Sand Prairie in Carroll County and the Lost Mound Unit in Jo Daviess County

(Refsnider et al. 2012). The USFWS, IDNR, and students of Ashford University have been able to expand the knowledge on the ornate box turtle at these sites and all of northwestern Illinois. The use of 'turtle dogs' to locate turtles on both ASP and TFSP confirmed the significantly higher density as documented at Ayers Sand Prairie (R. Nyboer and C. Smith., 1988 and 1999 unpublished data, respectively).

Transmitters for tracking by radio telemetry enabled the IDNR to gather useful data that provided more detailed information on the home ranges of the ornate box turtle. Adult male and female turtles exhibited high site fidelity to annual home ranges and previously used brumation sites. Refsnider et al. 2012, reported similar findings at Thomson Sand Prairie.

According to *the American Midland Naturalist*, "studies of home range in box turtles are important for not only knowledge of basic ecology, but also for making management and conservation decisions" (Bernstein et.al.). The data collected from TFSP and ASP gives a larger picture of the behavior of the ornate box turtle from late spring until brumation in the fall. This knowledge, detailed in field notes, and the coordinates logged from 2010 to 2011 can be especially vital in determining home range based on sex or age.

Upon gathering data using telemetry tracking, it could be inferred that male ornate box turtles had a slightly larger home range than that of female box turtles. This theory proves to be true at TFSP in 2010 where the male home ranges estimates averaged 1.59 hectares (3.93 acres), whereas female home range estimates averaged 0.31 hectare (0.75 acre). Using the data found at both the TFSP and ASP one could compare the results to a similar study done in Johnson County, Iowa. Researchers in Johnson County also found male annual home ranges proved to be larger than the annual home range of female ornate box turtles (Bernstein et.al.). However, Refsnider et al. 2012 noted adult males and females did not differ significantly in home range size.

The research conducted in northwestern Illinois, along with additional similar research in Johnson County, Iowa, further solidify ornate box turtle behavior (Bernstein et.al.). What sets the ASP and TFSP research and the corresponding research by the USFWS at Thomson Sand Prairie and the Lost Mound Unit apart from the counterpart is the extensive data collection of habitat during telemetry tracking. This data provides the researcher with knowledge of suitable living conditions which enables conservation of the ornate box turtle to be possible.

The data does provide information useful for preserve design to protect the species. At ASP, acquisition of additional land, particularly northeast of the preserve, would provide additional habitat which is currently being utilized by the species and reduce impacts from agricultural activities. At TFSP, acquisition of the pine grove north of the preserve and subsequent restoration to sand prairie would reduce fragmentation, reduce habitat for some mammalian predators, and reconnect TFSP with the USFWS-owned Thomson Sand Prairie.

Much data have been collected during the research conducted at ASP and TFSP. This data can be used for a wide range of research involving the ornate box turtle's habitat, population size, viability, and home range. Further analyses of this data could be conducted to gain knowledge of home range based on age.

Acknowledgements:

John Rucker (turtle dog handler), Ed Anderson (IDNR), staff (Jeramie Strickland, Charles Tucker, Jeff Hensal, and Rhoni Hartsock) from the Upper Mississippi River National Wildlife and Fish Refuge, Savanna District (USFWS), Dorian Patkus (volunteer), and Karen Anderson (volunteer) assisted with searches using the turtle dogs and corresponding data collection. Ed Anderson, Michael Handley (Ashford University), Erika Fisk (Ashford University), Dorian Patkus (volunteer), and Jeramie Strickland and Charles Tucker from the USFWS) all helped with subsequent field work, data collection, and data entry. Funding for the project was provided by the IDNR, USFWS, and the Illinois Wildlife Preservation Fund. A special thank you goes to Ed Britton (Refuge Manager) and the USFWS who provided the use of a receiver and all transmitters for the project, and also Jeramie Strickland for his assistance and guidance throughout the project.

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Table 1. Age, measurements, and identification numbers of ornate box turtles captured at Thomson-Fulton Sand Prairie Nature Preserve on 19 May 2010.

Thomson-Fulton Sand Prairie Nature Preserve 2010								
Ornate Box Turtle Measurements								
Age (yr)	Weight (gm)	Straight Carapace Length(mm)	Straight Carapace Width (mm)	Plastron Length (mm)	Plastron Width (mm)	Curved Carapace Length (mm)	Curved Carapace Width (mm)	Notching I.D. Number
Juveniles								
8	104	71	65	75	51	81	91	L1, 2 R2, 9
Males								
11+	224	97	85	97	59	118	114	L1, 2 R2, 8
12	240	100	87	95	n.a.	n.a.	n.a.	L11
13								
14								
14+	281	104	93	107	64	122	140	L1, 2 R2, 3
15								
15+	333	106	100	107	68	123	132	L9 R9
16								
16+	205	96	84	101	65	114	121	L1, 2 R1, 12
Ave.	256.6	100.6	89.8	101.4	64.0	119.3	126.8	
Females								
14+	292	100	90	104	68	125	136	L1, 2 R2,10
15	308	106	95	108	65	128	137	L1, 2 R3,8
16								
17								
17+	320	112	93	103	68	120	130	L1, 2 R2, 11
18								
19								
20								
20+	372	114	102	113	71	135	n.a.	L1, 2 R2, 12
Ave.	323.0	108.0	95.0	107.0	68.0	127.0	134.3	

Table 2. Home ranges of ornate box turtles monitored at Thomson-Fulton Sand Prairie Nature Preserve in 2010.

Turtle	Summer Home Range (hectares)	Summer Home Range (acres)	Total Home Range (hectares)	Total Home Range (acres)
Males				
A9	0.19	0.47	3.16	7.80
A11*	1.13	2.80		
B5	3.45	8.51	3.45	8.51
Average	1.59	3.93	3.31	8.16
Females				
B3	0.70	1.73	1.66	4.09
B13	0.15	0.36	1.44	3.55
C13	0.15	0.36	3.90	9.63
C15	0.23	0.56	0.57	1.40
Average	0.31	0.75	1.89	4.67

*Turtle A11 was found dead on August 8 and believed to have been dead on July 13, 2010.

Note: Summer home range includes observations through August. Total home range includes observations through October, including summer home range.

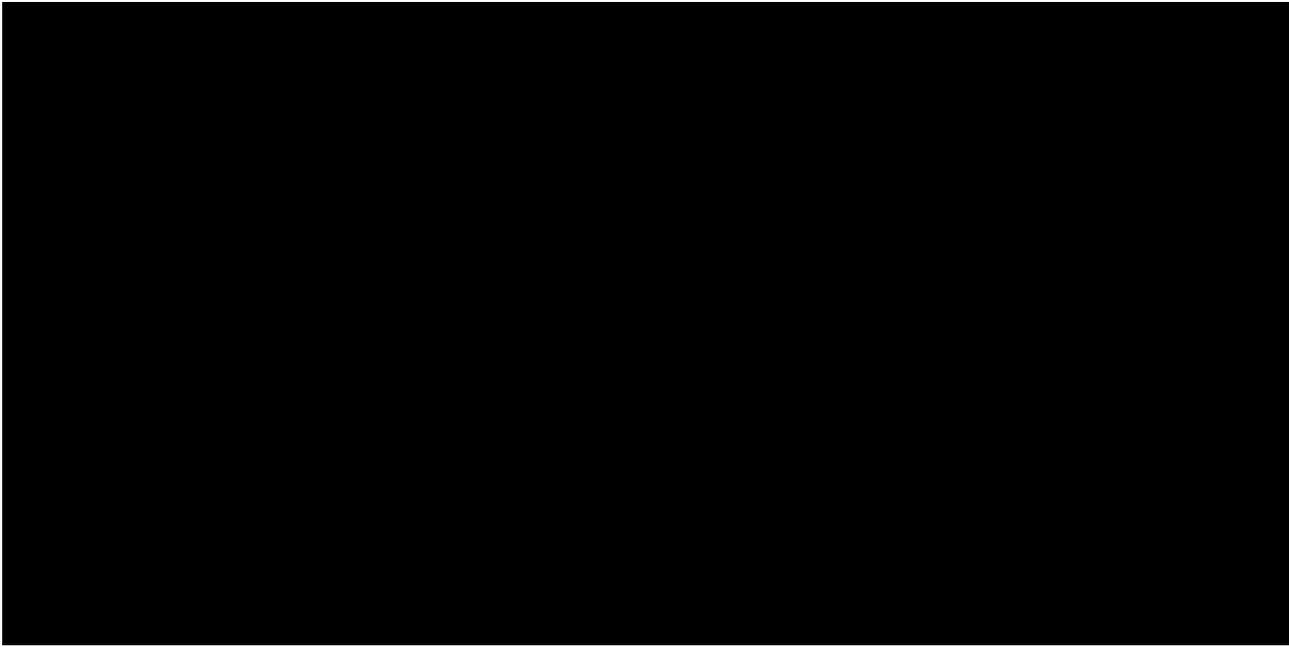


Table 4. Age, measurements, and identification numbers of ornate box turtles captured at Ayers Sand Prairie Nature Preserve, Carroll County, IL on 20 May 2010.

Ayers Sand Prairie Nature Preserve 2010								
MALE Ornate Box Turtle Measurements								
Age	Weight (gm)	Straight Carapace Length (mm)	Straight Carapace Width (mm)	Plastron Length (mm)	Plastron Width (mm)	Curved Carapace Length (mm)	Curved Carapace Width (mm)	Notching I.D. Number
10								
11								
12								
12+*	283	106	95	106	79	124	132	L2, 9 R8
13*								
14								
14+	275	103	91	107	74	125	134	L1, 2, 11
*	266	106	83	103	70	124	131	L8 R9
15	351	115	99	114	66	131	139	L8, 10 R1
15+	227	98	85	101	64	111	115	L12 R3
	194	96	81	95	58	114	114	L8, 9, R3
	303	106	98	110	67	121	126	L8, 9 R2
*	316	119	98	113	71	133	127	L2, 11, 12
	231	98	89	97	64	112	120	L1, 2, 9
	295	109	94	108	75	125	131	L1, 2, 8
16*	275	103	92	104	66	127	129	R12
16+	274	106	98	107	70	123	129	no #?
*	265	107	90	103	75	123	136	L10, 11
*	276	106	86	108	72	120	134	R10
17								
17+	240	101	83	100	69	117	128	L1, 2 R1
18								
18+	220	101	89	101	65	115	119	L8, 9 12
	257	103	87	101	65	122	125	L1, 2 R2
19	288	104	93	107	77	118	131	L8, 10 R8
19+	263	102	94	108	61	116	122	no #?
*	277	107	91	109	74	121	134	L2, 8 R10
20	272	109	94	107	64	120	128	no #?
20+	280	111	96	108	64	127	132	L11, 12
*	251	101	96	104	64	115	122	L9 R8
	282	109	91	108	75	129	136	L3 R3
	275	103	88	103	70	115	131	L8, 10 R3
	263	103	93	104	67	119	128	L1, 2 R10
21								
21+	262	98	94	98	64	118	132	L11, R2
*	300	110	98	108	72	126	127	R9, 10
22+	296	109	95	108	68	126	135	no #?
old*	no wgt.	105	96	106	64	118	125	L2, 8 R11

old*	303	110	90	109	72	123	132	R11
No Age	228	104	91	100	63	121	125	L8, 10 R9
No Age	244	102	86	104	65	114	116	L8, 10 R2
Ave.	269.8	105.2	91.6	105.1	68.3	121.0	128.0	
* = recapture, i.e., turtle was captured and marked in 1988 and/or 1999								
green = transmitter attached to turtle in 2010								

Ayers Sand Prairie Nature Preserve 2010								
FEMALE Ornate Box Turtle Measurements								
Age	Weight (gm)	Straight Carapace Length(mm)	Straight Carapace Width (mm)	Plastron Length (mm)	Plastron Width (mm)	Curved Carapace Length (mm)	Curved Carapace Width(mm)	Notching I.D. Number
10	113	81	70	81	54	94	100	L8, 10, 12
11								
12	130	82	72	88	54	94	98	L8, 9 R11
	132	84	74	83	57	100	105	no #?
12+	235	100	80	100	67	117	120	L8, 10, 12
13	313	107	91	110	70	121	133	L1 R11
13+	159	87	80	89	58	114	106	L8, 9, 11
	130	81	73	84	57	96	96	L8, 9 R1
14	152	86	78	87	106	87	54	L8, 9 R12
14+	202	91	82	97	58	105	115	no #?
	281	102	85	107	70	118	130	no #?
15	195	92	83	97	63	110	115	L11 R1
15+	306	104	94	107	70	120	140	no #?
	299	102	89	104	70	120	124	L8, 9 R8
*	297	106	91	109	69	121	138	L1 R12
	263	98	86	100	66	114	121	L1, 2, 12
16								
16+*	322	111	87	103	75	126	159	L9 R10
17*	336	108	93	109	72	125	137	L2, 9 R3
17	276	102	99	104	68	121	127	L10 R12
18								
18+	312	110	92	115	74	136	133	L12 R8, 10
19								
20								
20+	290	110	96	105	70	127	127	L8, 11 R2
old	294	105	91	110	67	121	130	L8, 9, 10

old*	305	108	90	106	68	126	135	L2 R9
old	353	108	91	114	73	123	141	L1, 2, 10
Ave.	247.6	98.5	85.5	100.4	67.7	114.6	121.0	

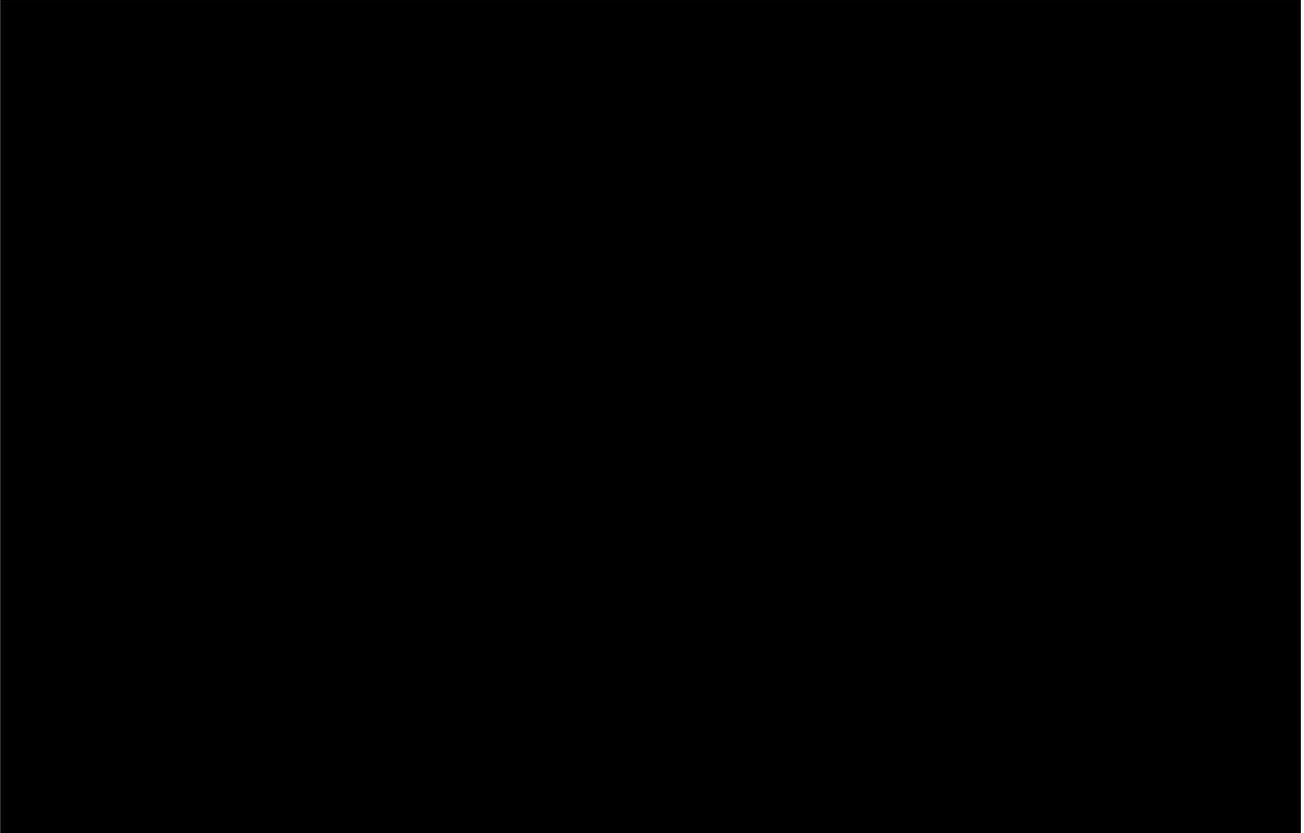
*= recapture, i.e., turtle was captured and marked in 1988 and/or 1999

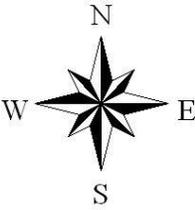
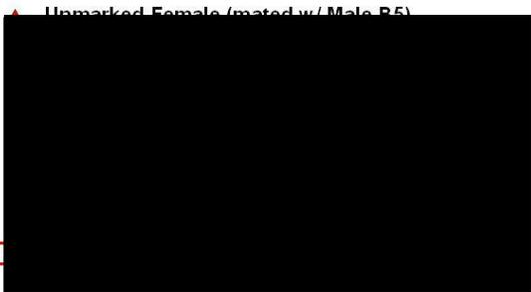
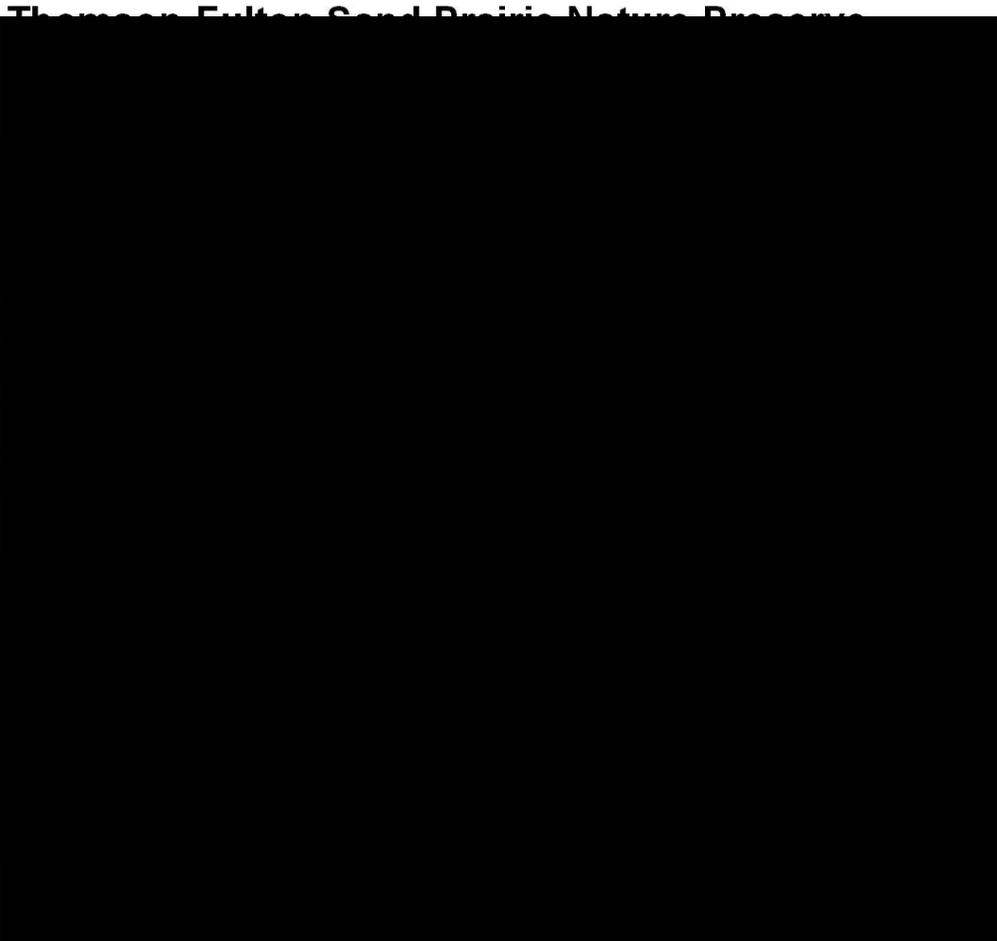
green = transmitter attached to turtle in 2010

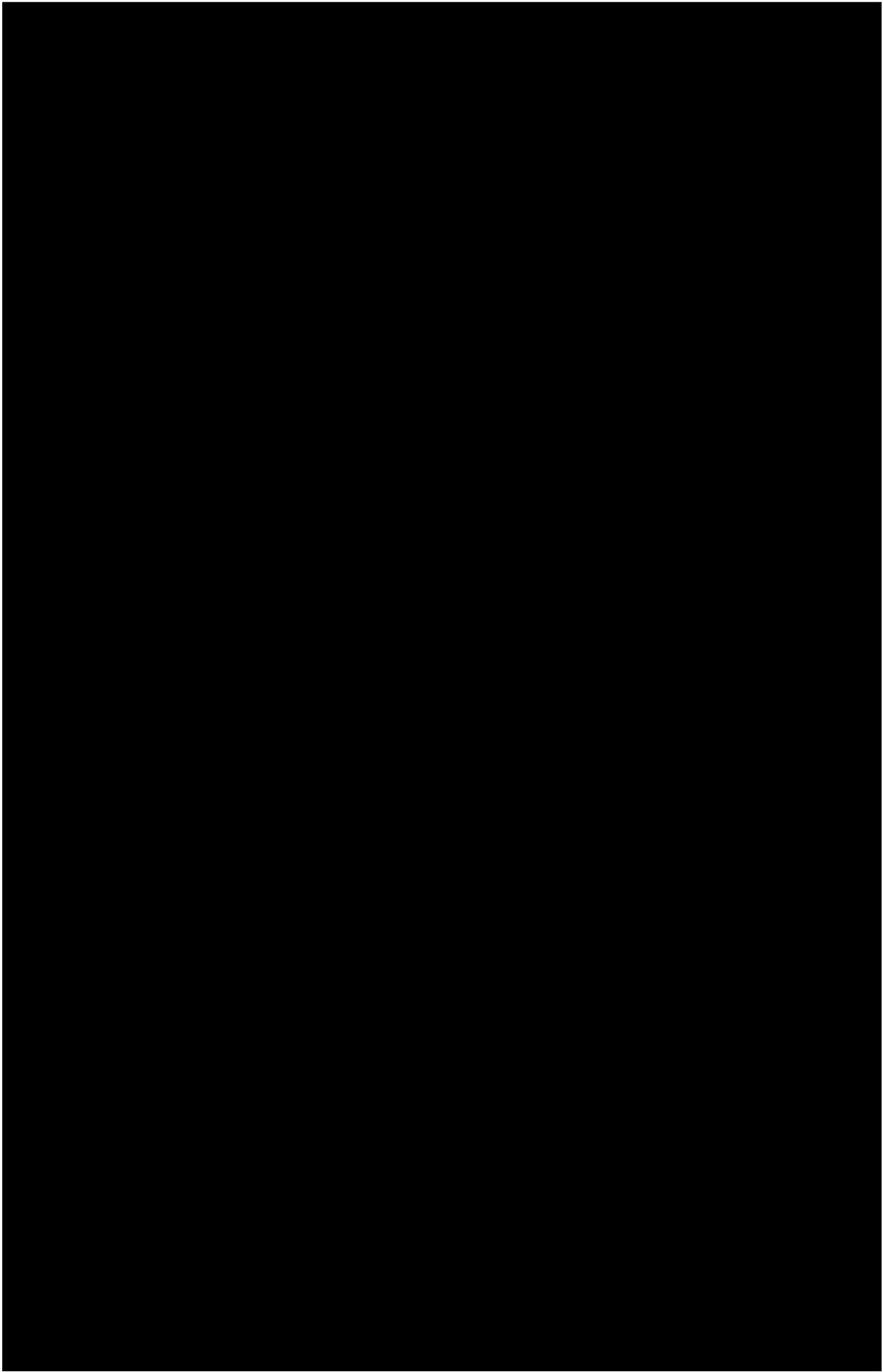
Ayers Sand Prairie Nature Preserve 2010								
JUVENILE Ornate Box Turtle Measurements								
Age (yr)	Weight (gm)	Straight Carapace Length(mm)	Straight Carapace Width(mm)	Plastron Length (mm)	Plastron Width (mm)	Curved Carapace Length(mm)	Curved Carapace Width(mm)	Notching I.D. Number
1								
1+	15	40	39	39	39	51	51	no #
2	16	44	38	42	30	49	48	L10 R1
2+	14	38	39	39	38	50	48	L12 R10
3	24	51	45	50	35	59	60	L1, 2 R8
	25	49	47	48	34	56	59	L1, 8, 10
4	29	54	49	54	35	62	67	L11 R10
5	60	65	59	67	46	77	78	L11 R9
6								
7	92	75	68	80	52	85	89	L8, 9 R9
	88	74	64	76	54	86	94	L8, 11 R1
	64	66	58	66	51	76	80	L1, 2 R3
7+	80	74	64	76	55	86	91	L8, 11 R3
	74	67	56	64	50	80	84	L3, R3
8								
8+	62	66	60	69	49	78	78	L10, R11
9	120	82	72	83	55	96	100	L8, 9 R10
Ave.	54.5	60.4	54.1	60.9	44.5	70.8	73.4	

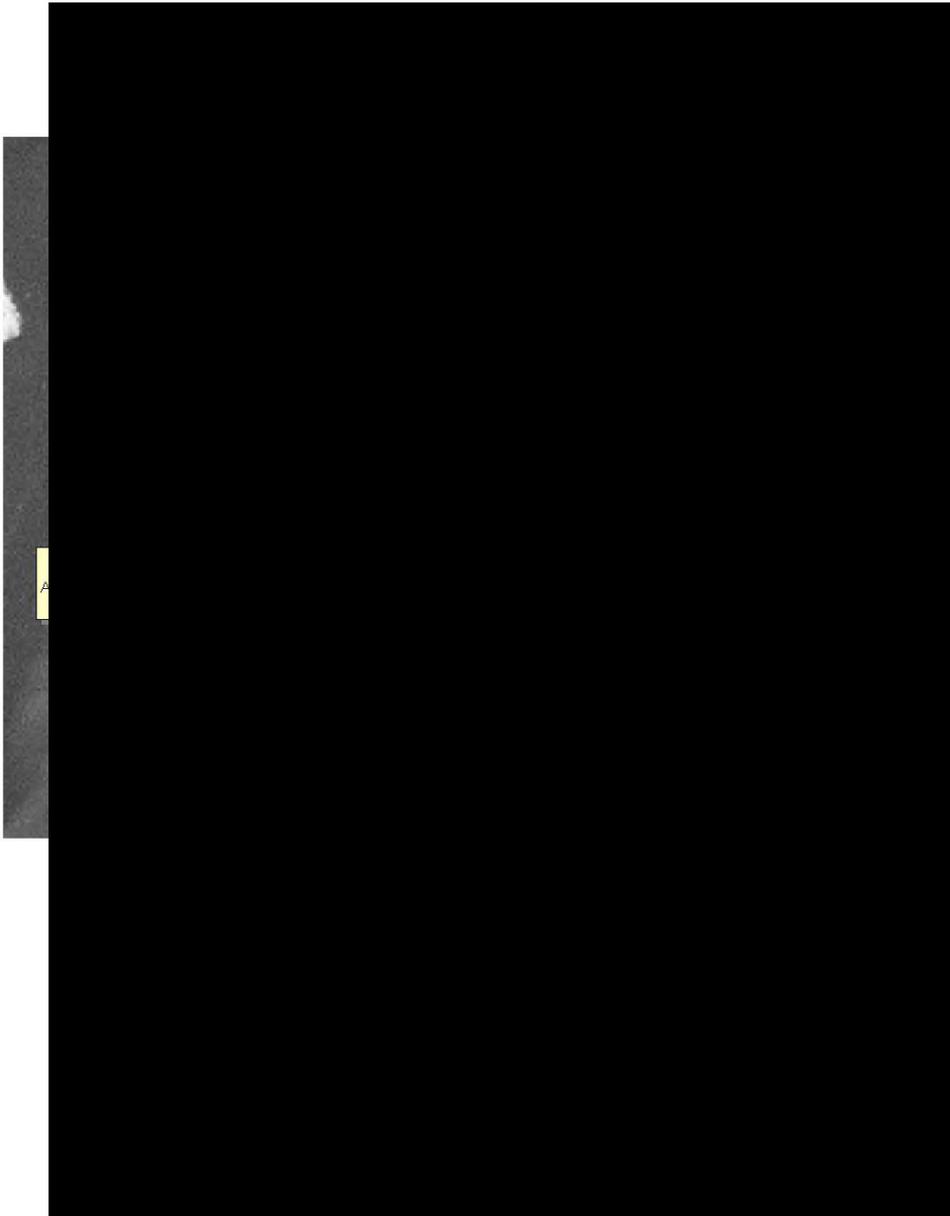
Table 5. Age, measurements, and identification numbers of previously unmarked ornate box turtles captured at Ayers Sand Prairie Nature Preserve in 2011.

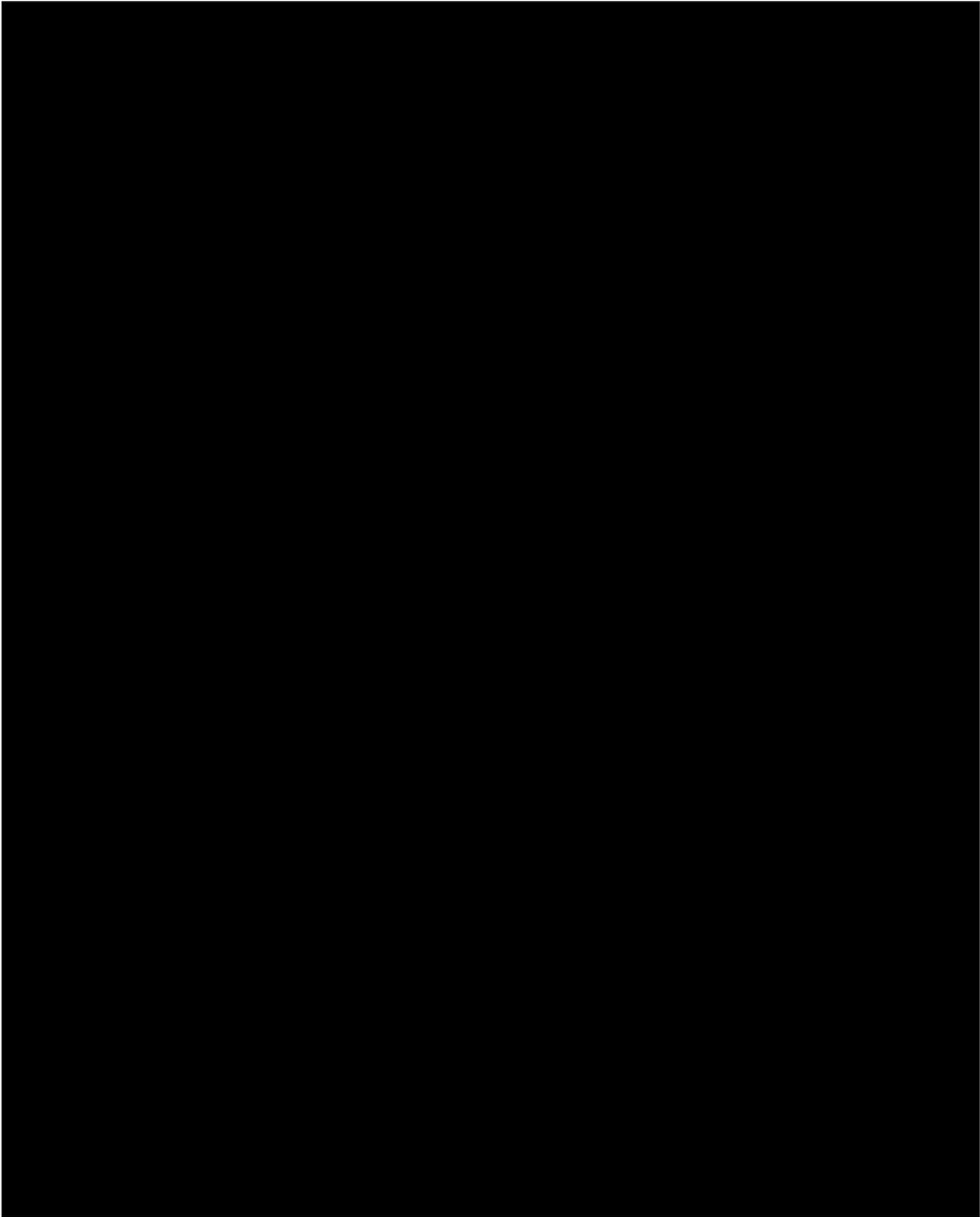
Ayers Sand Prairie Nature Preserve 2011								
Ornate Box Turtle Measurements								
Age (yr)	Weight (gm)	Straight Carapace Length(mm)	Straight Carapace Width (mm)	Plastron Length (mm)	Plastron Width (mm)	Curved Carapace Length(mm)	Curved Carapace Width (mm)	Notching I.D. Number
Males								
12	224	99	90	100	n.a.	n.a.	n.a.	L12
	302	111	100	105	n.a.	n.a.	n.a.	L12 R1
12+	273	110	94	110	n.a.	n.a.	n.a.	L11 R8
13	297	104	95	104	n.a.	n.a.	n.a.	L1,3, 10
14+	244	98	95	98	n.a.	n.a.	n.a.	L1, 3, 8
15	318	107	92	107	n.a.	n.a.	n.a.	L1, 3, 11
16+	286	105	89	104	n.a.	n.a.	n.a.	L1, 3, 12, 13
Ave.	277.7	104.9	93.6	104.0	n.a.	n.a.	n.a.	
Females								
12+	209	97	85	n.a.	n.a.	n.a.	n.a.	L11
14+	308	105	97	105	n.a.	n.a.	n.a.	L1, 2
15	n.a.	114	100	n.a.	n.a.	n.a.		R11
16	330	114	90	110	n.a.	n.a.	n.a.	L11 R3
old	300	109	94	103	n.a.	n.a.	n.a.	L1, 3, 9
Ave.	286.8	107.8	93.2	106.0	n.a.	n.a.	n.a.	









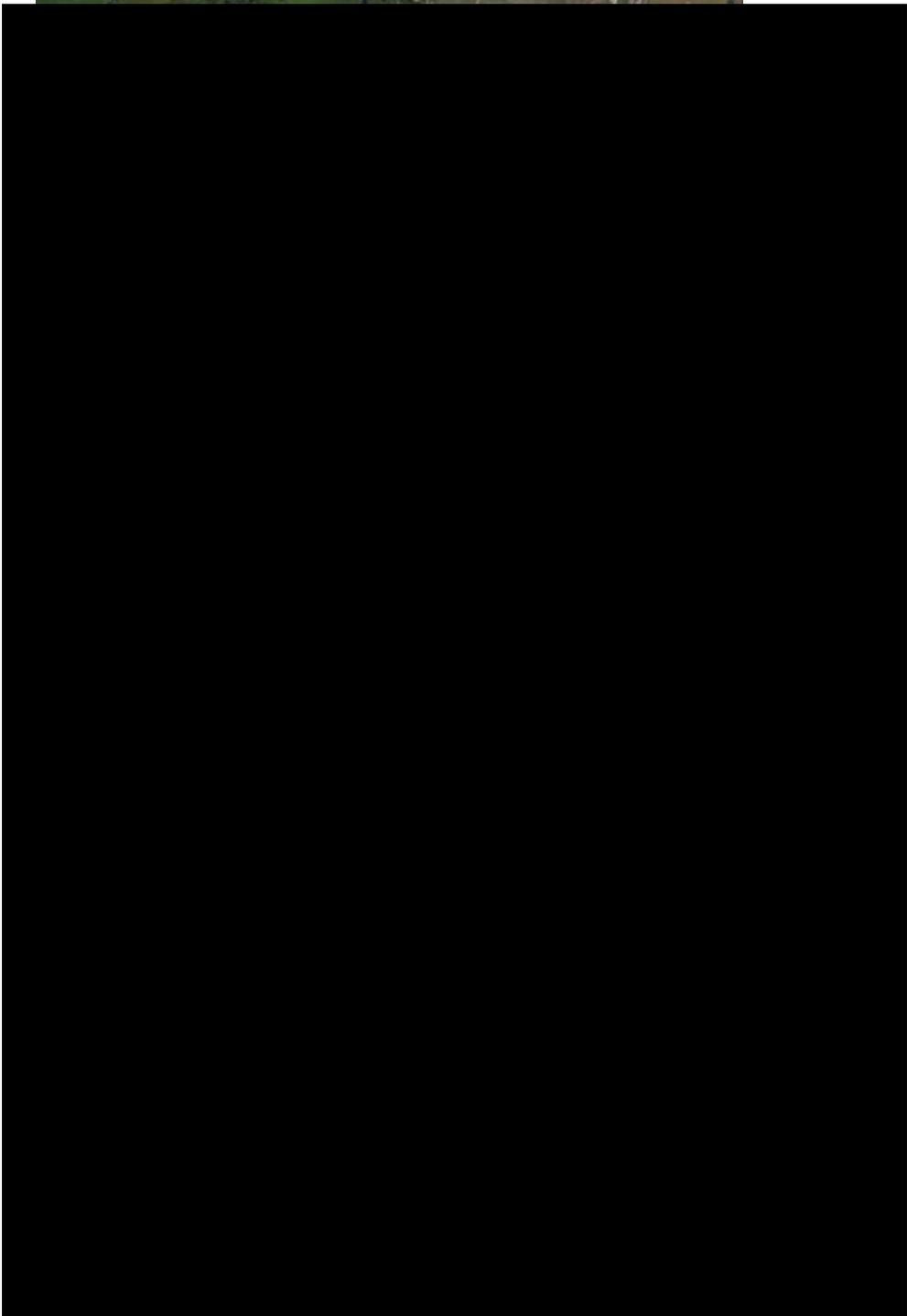


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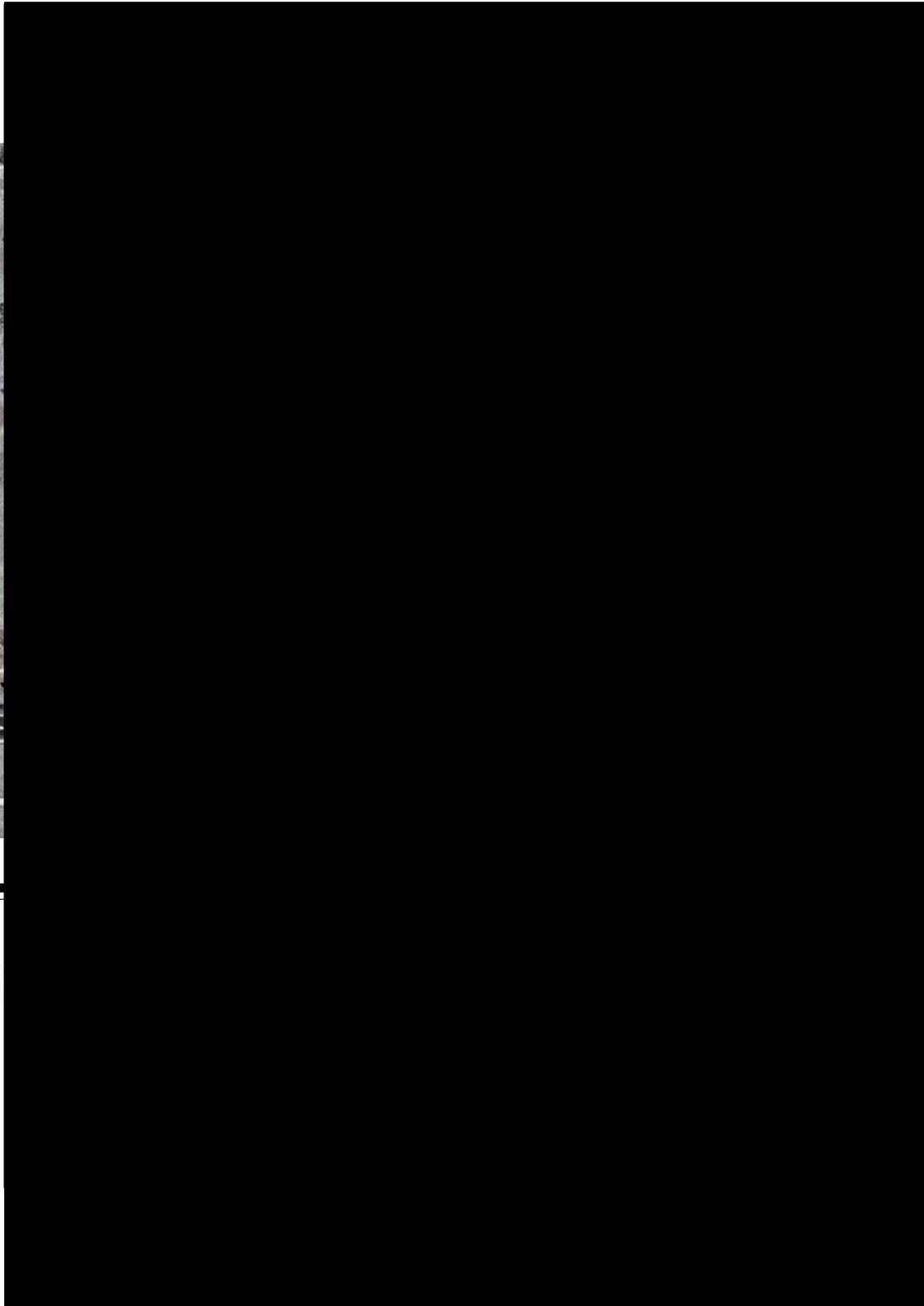
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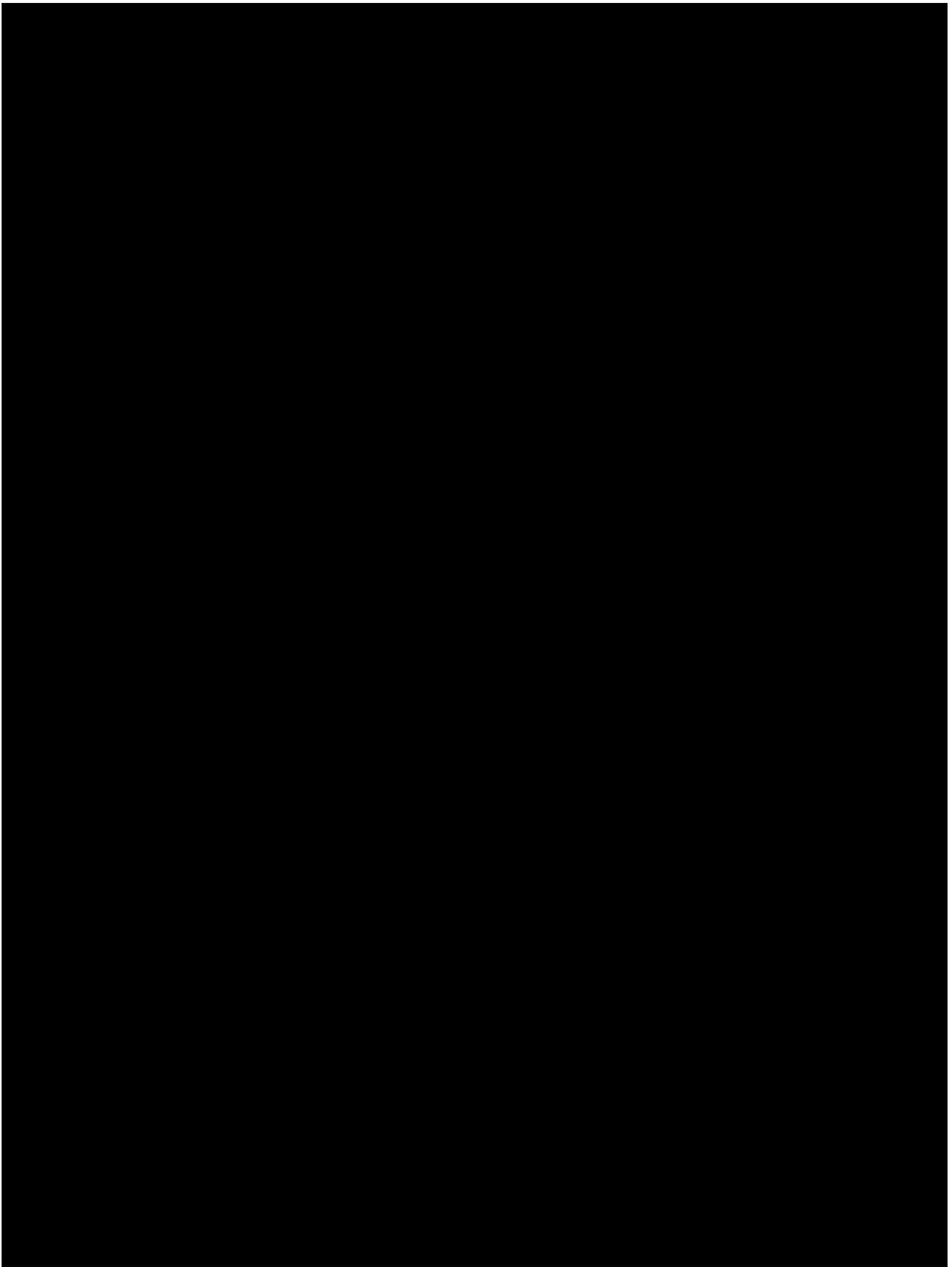


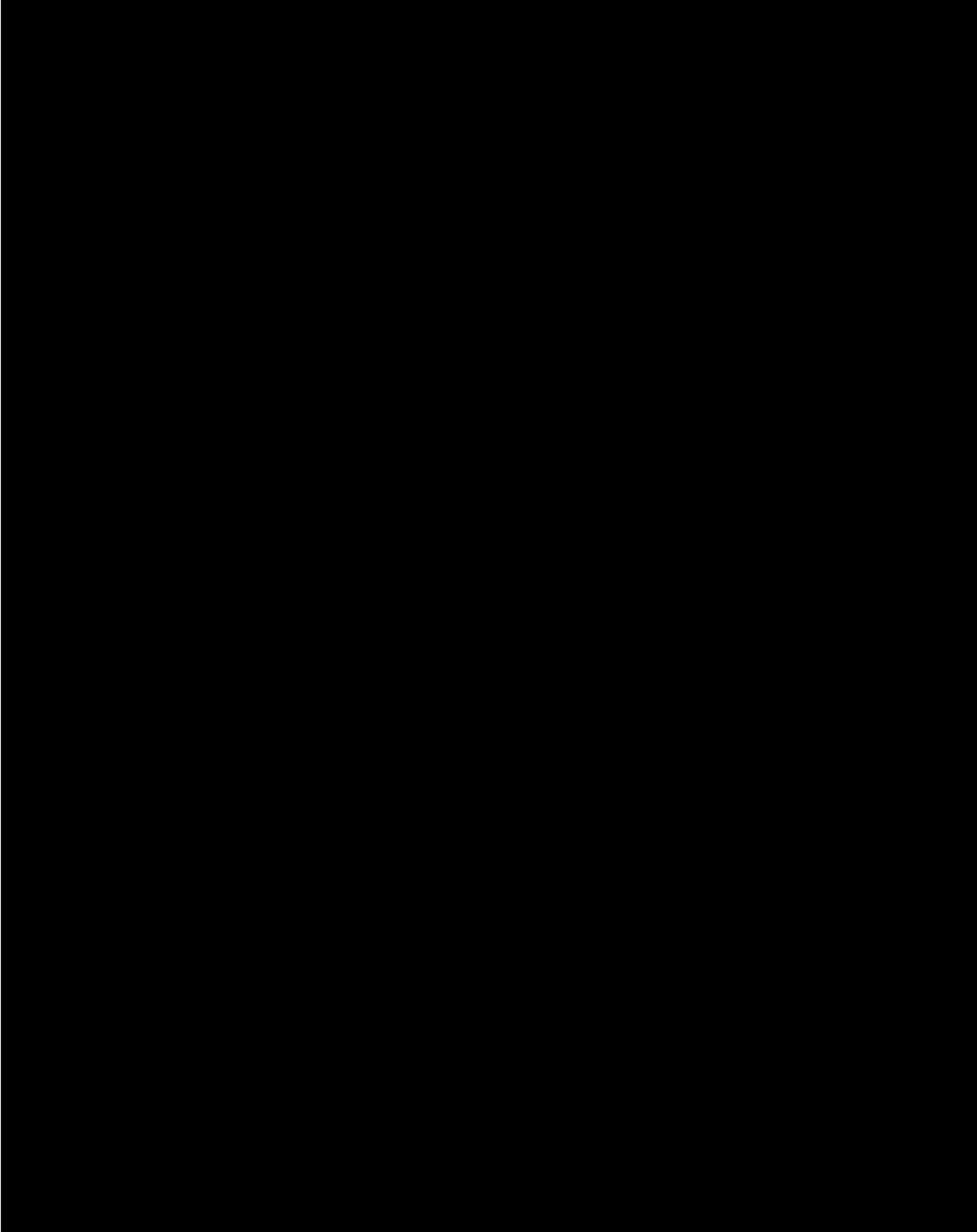
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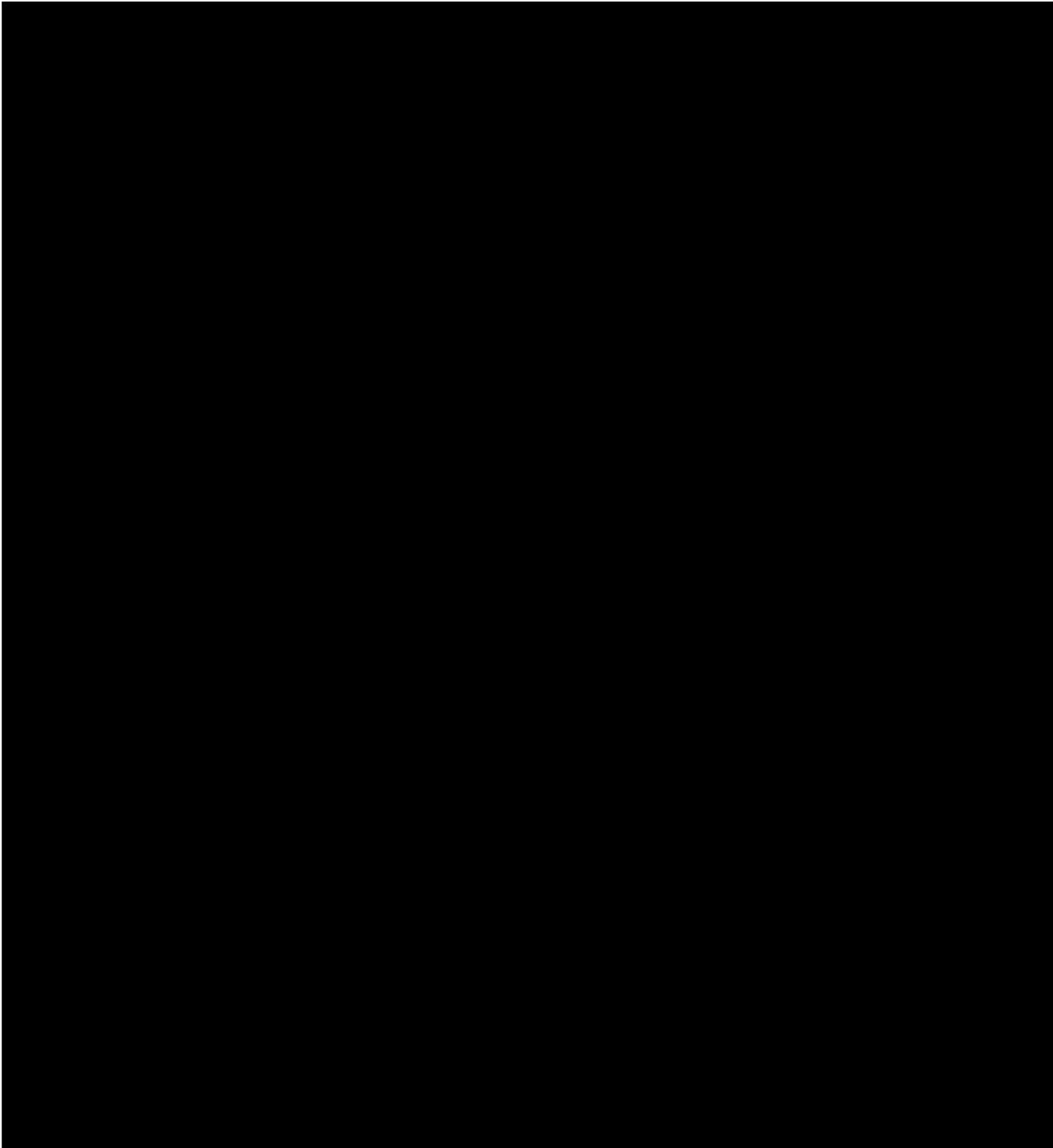


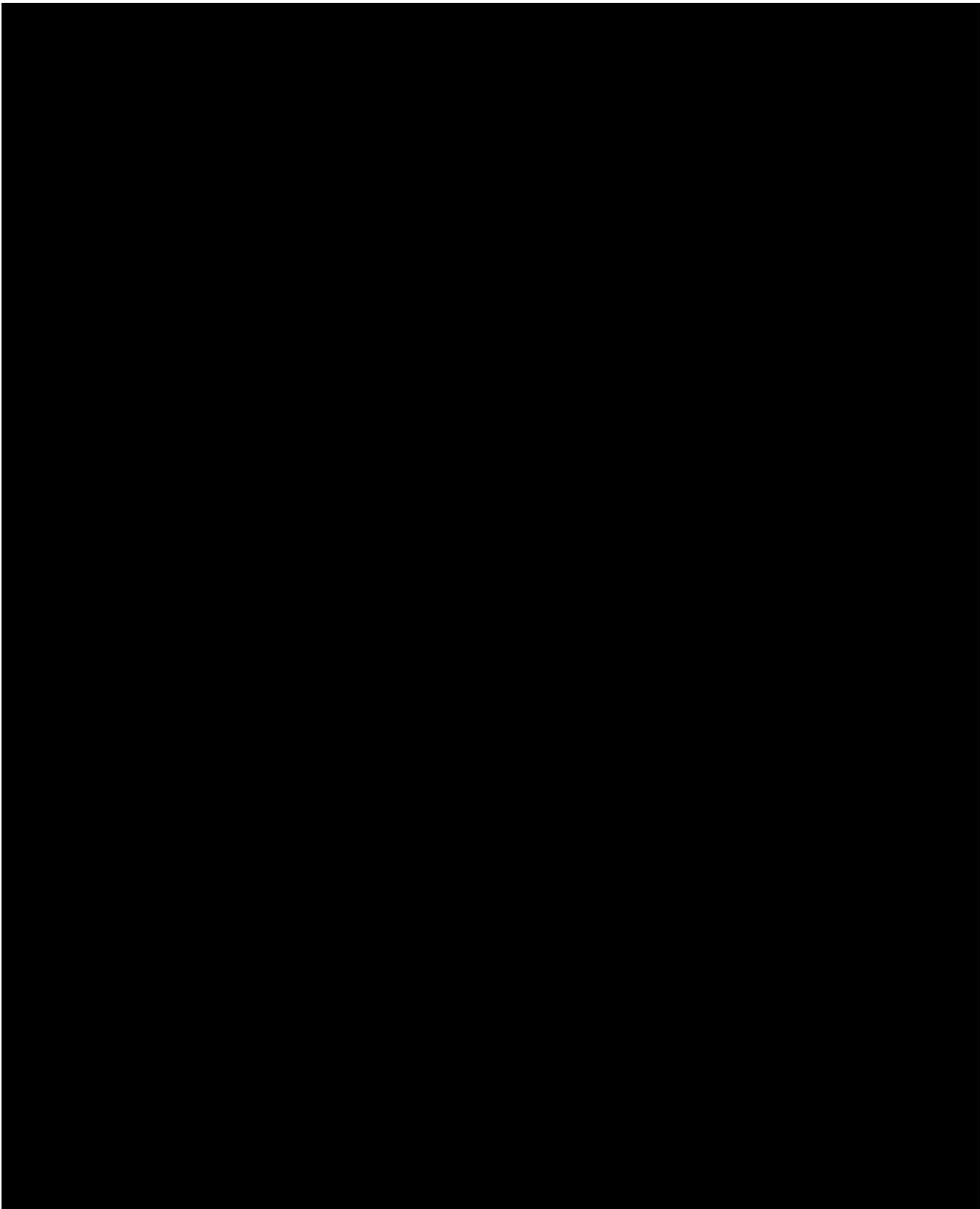
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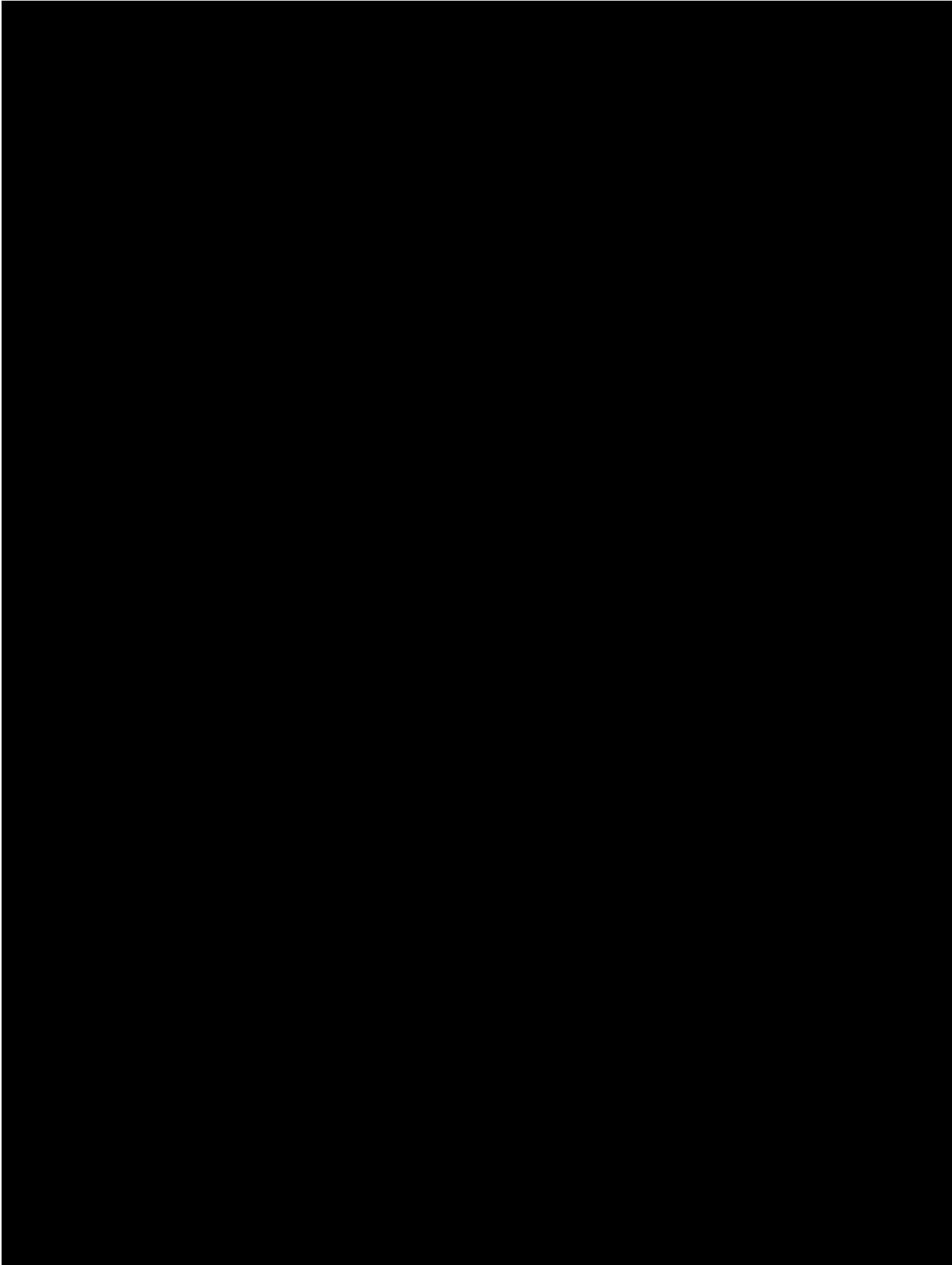
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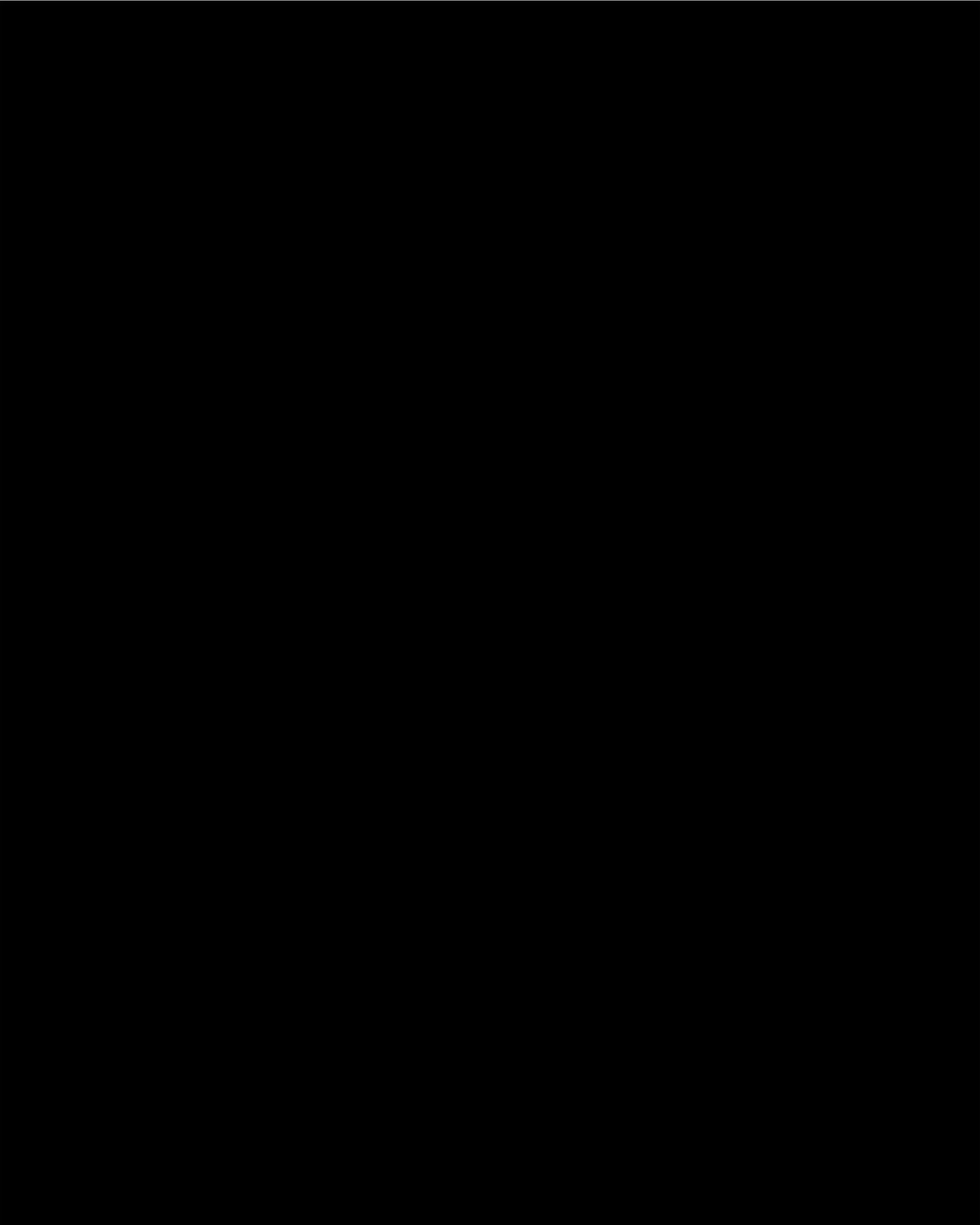


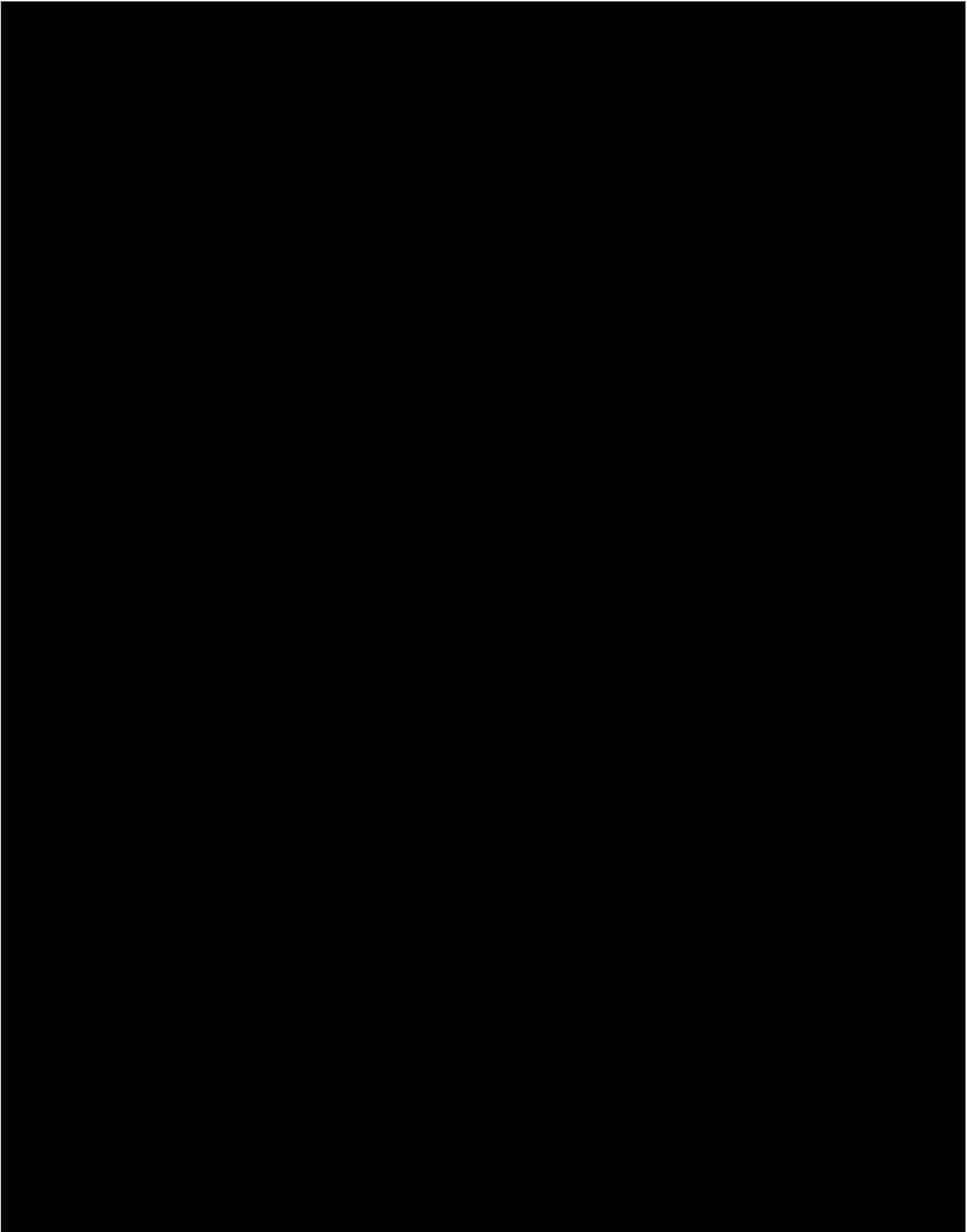


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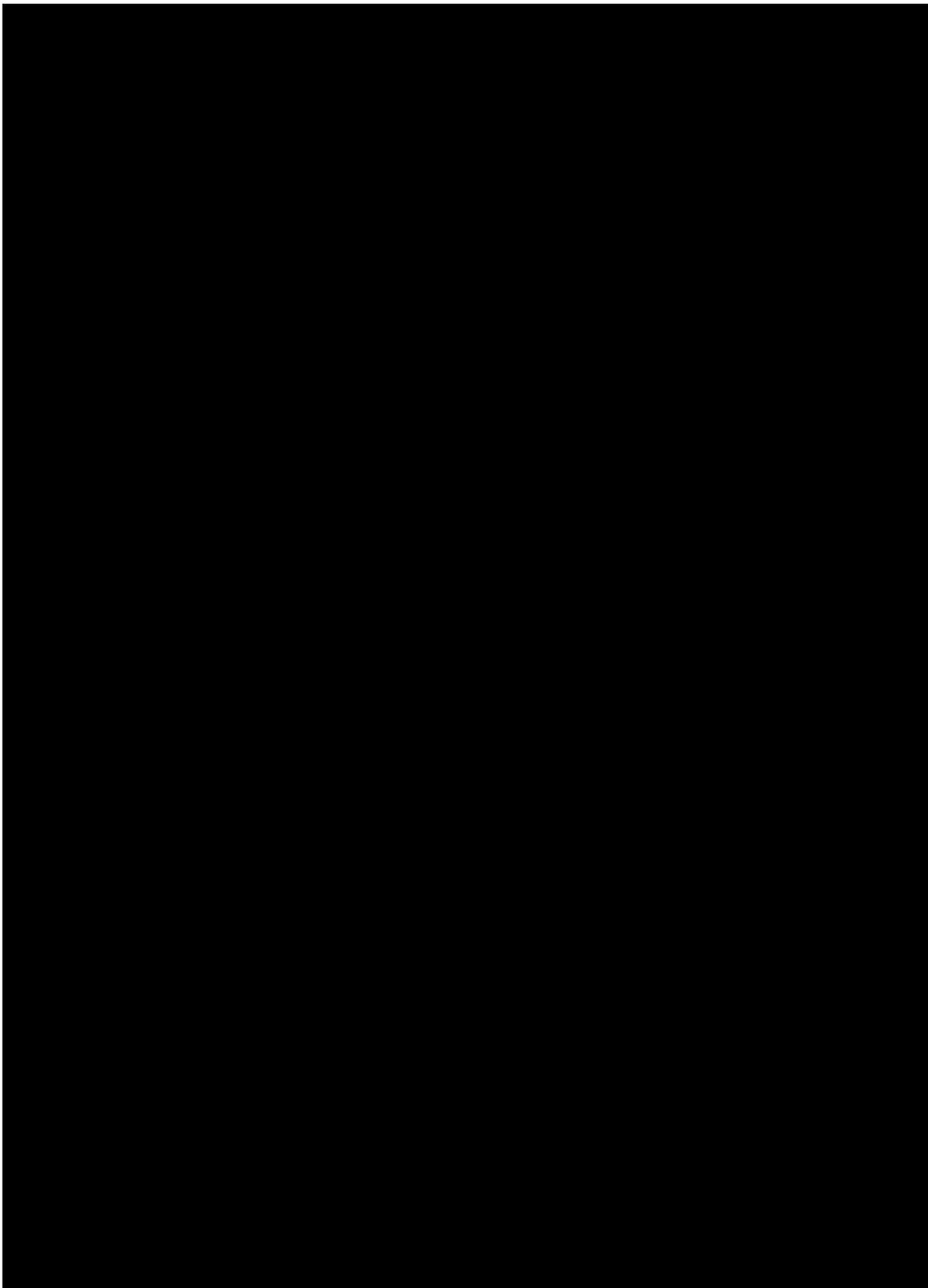
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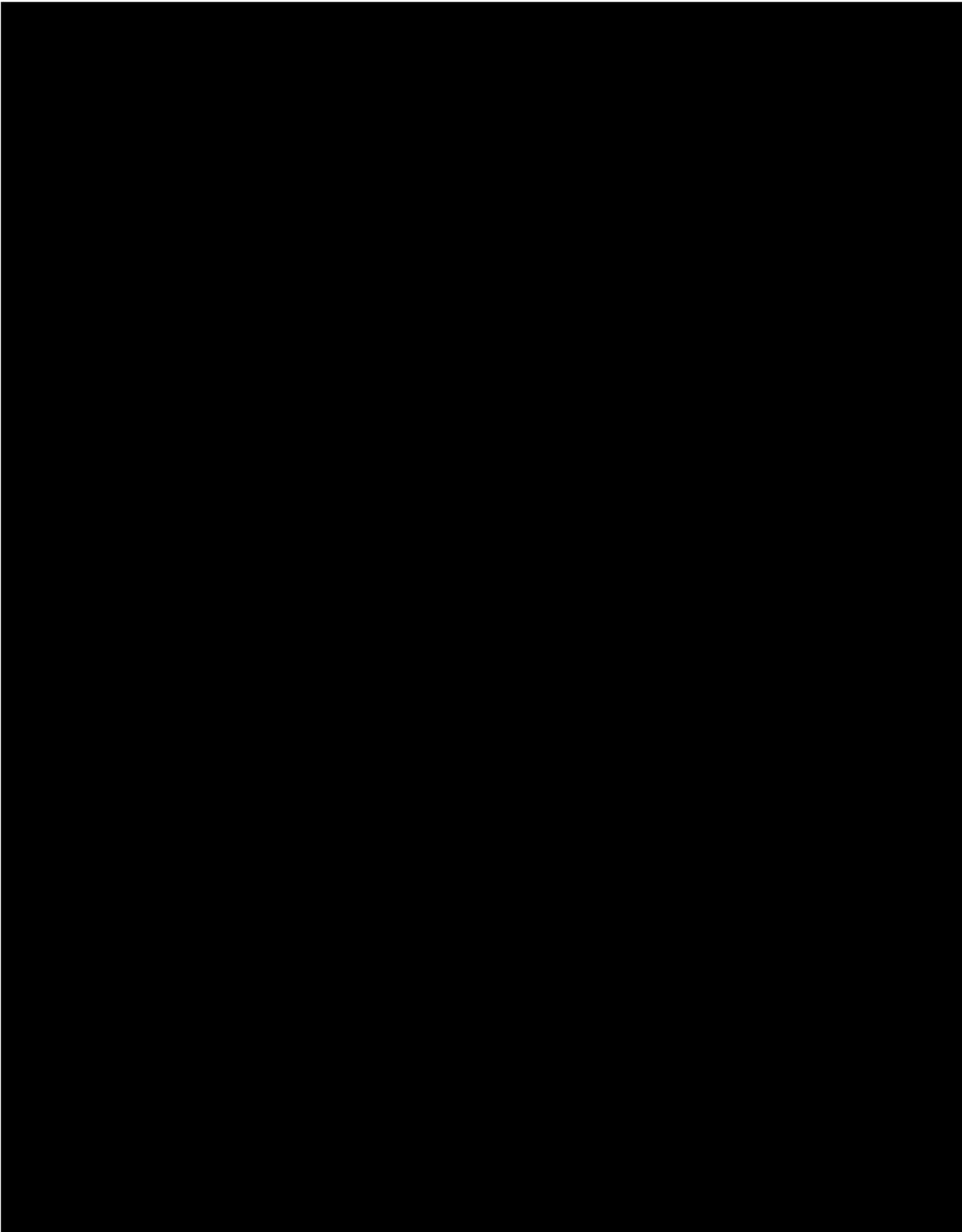


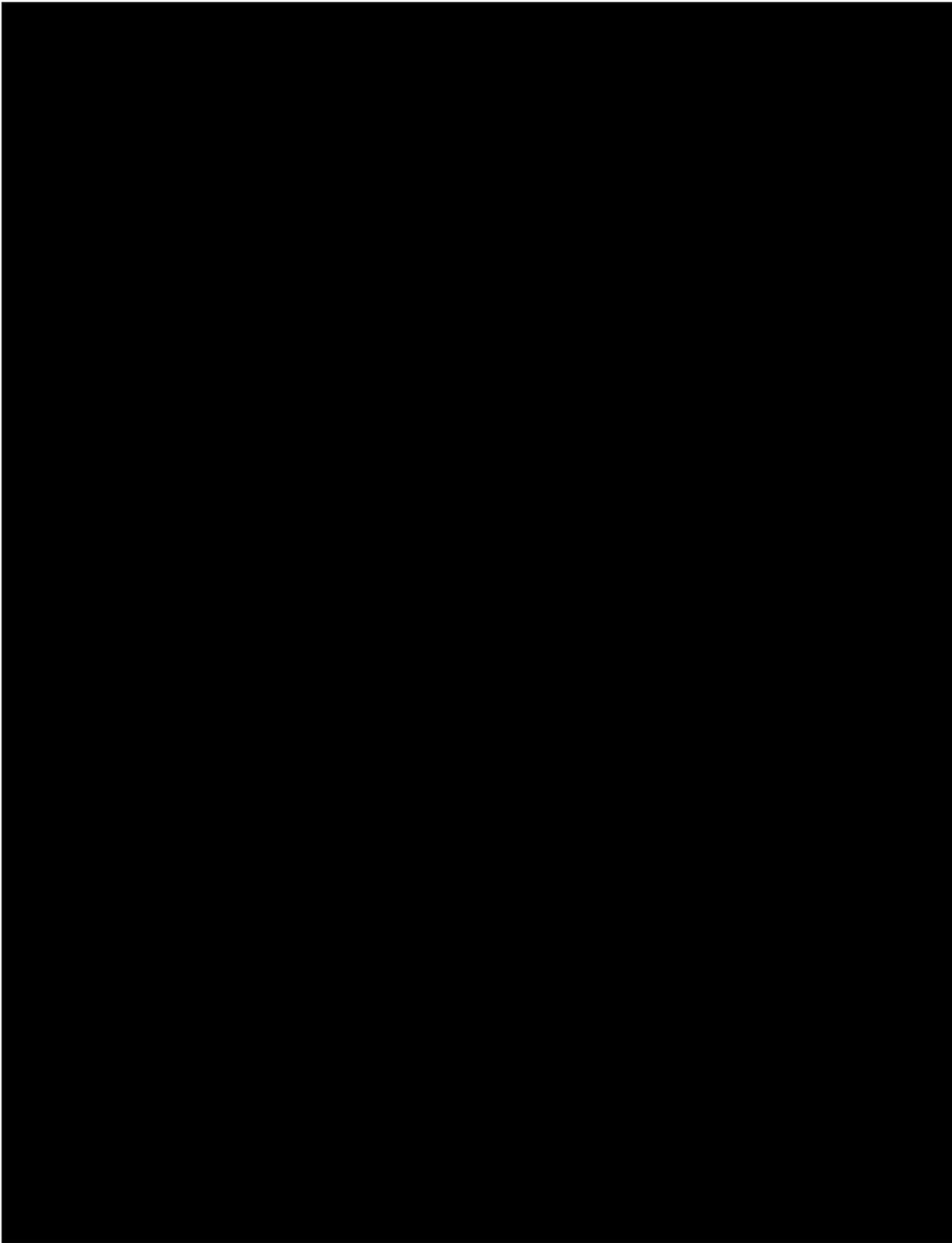


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Appendix 1

**Photographs of Ornate Box Turtle Telemetry Project at
Thomson-Fulton Sand Prairie Nature Preserve and
Ayers Sand Prairie Nature Preserve,
Whiteside County, IL. 2010-2011**

Photo 1. Turtle dog (Sparky) with ornate box turtle captured at Ayers Sand Prairie Nature Preserve, Carroll County, IL on 20 May 2010.



Photo 2. Ornate box turtle (Female B13) at Thomson-Fulton Sand Prairie Nature Preserve, Whiteside County, IL, June 2011. Note transmitter and shell identification notches.



Photo 3. Site where the empty shell of ornate box turtle Male A11 was found along a mammal trail adjacent to Potter's Marsh on the west side of Thomson-Fulton Sand Prairie Nature Preserve, Whiteside County, IL; July 2010.



Photo 4. Female ornate box turtle (Female B13) possibly laying eggs at Thomson-Fulton Sand Prairie Nature Preserve, Whiteside County, IL on 10 June 2011.



Photo 5. Sparely vegetated slope used as brumation site (white flag) by ornate box turtle (Female C13/B9) at Thomson-Fulton Sand Prairie Nature Preserve, Whiteside County, IL in 2010-2011.



Photo 6. Densely vegetated road shoulder used as brumation site (white flag) by ornate box turtle (Male A9/A5) at Thomson-Fulton Sand Prairie Nature Preserve, Whiteside County, IL in 2010-2011.



Photo 7. Grassy field edge utilized by Male B11/15 and other ornate box turtles at northeast edge of Ayers Sand Prairie Nature Preserve, Carroll County, IL in 2010-2011.



Photo 8. Ornate box turtle Male B11/15 mating with Female L1,2 in grassy field edge at northeast edge of Ayers Sand Prairie Nature Preserve, Carroll County, IL on 4 May 2012.



Photo 9. Ornate box turtle nest which had been predated at Ayers Sand Prairie Nature Preserve, Carroll County, IL; 15 June 2011.



Photo 10. Ornate box turtle nest which had been predated at Ayers Sand Prairie Nature Preserve, Carroll County, IL; 28 June 2011.



Photo 11. Moderately to sparsely vegetated sites used as brumation sites (three red flags) by ornate box turtles (A7, A13/C1, B1/B11, and B7/A15) at Ayers Sand Prairie Nature Preserve, Carroll County, IL in 2010-2011. Encroaching woody vegetation (foreground) was cleared by IDNR and INPC staff.

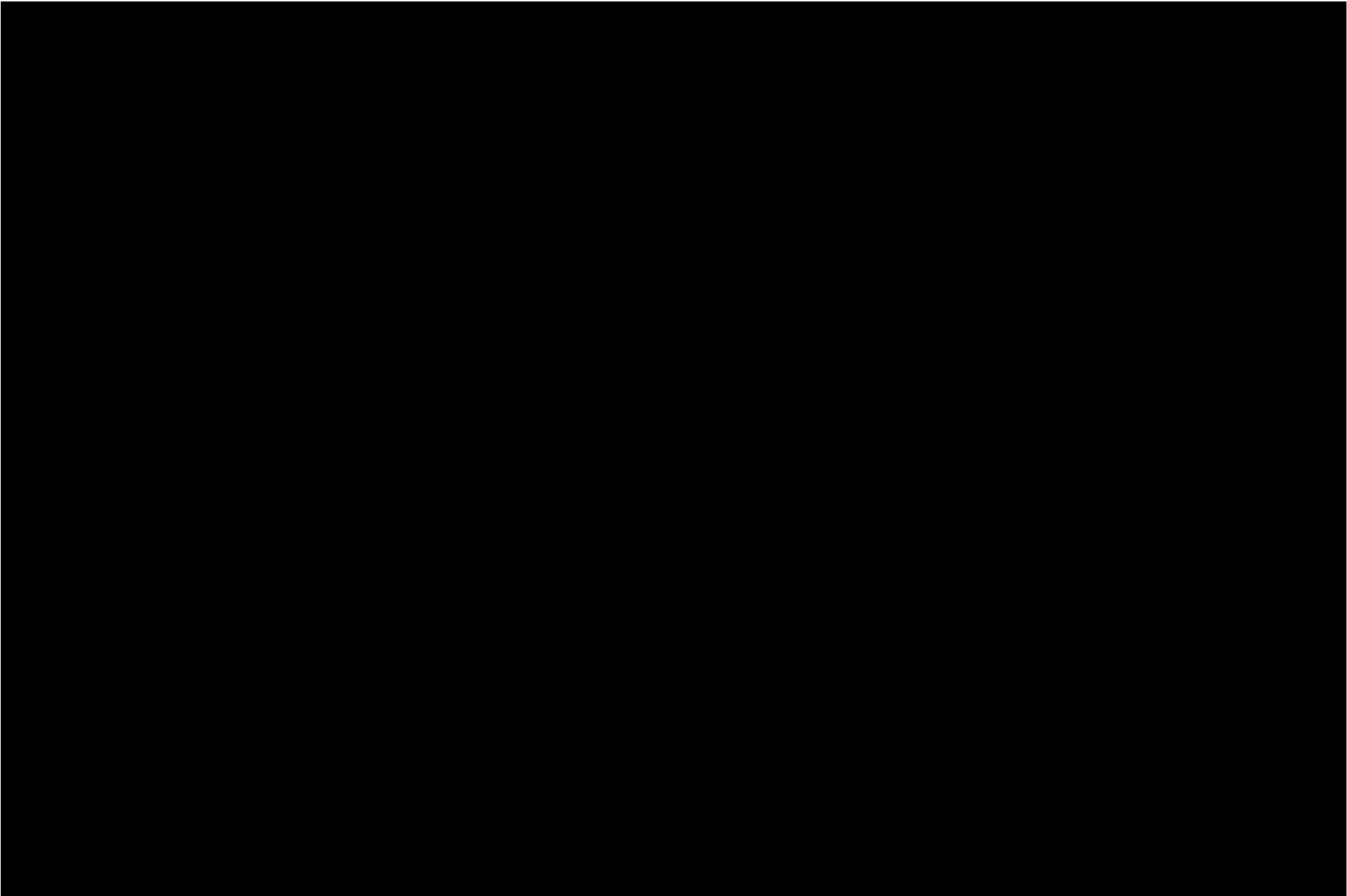


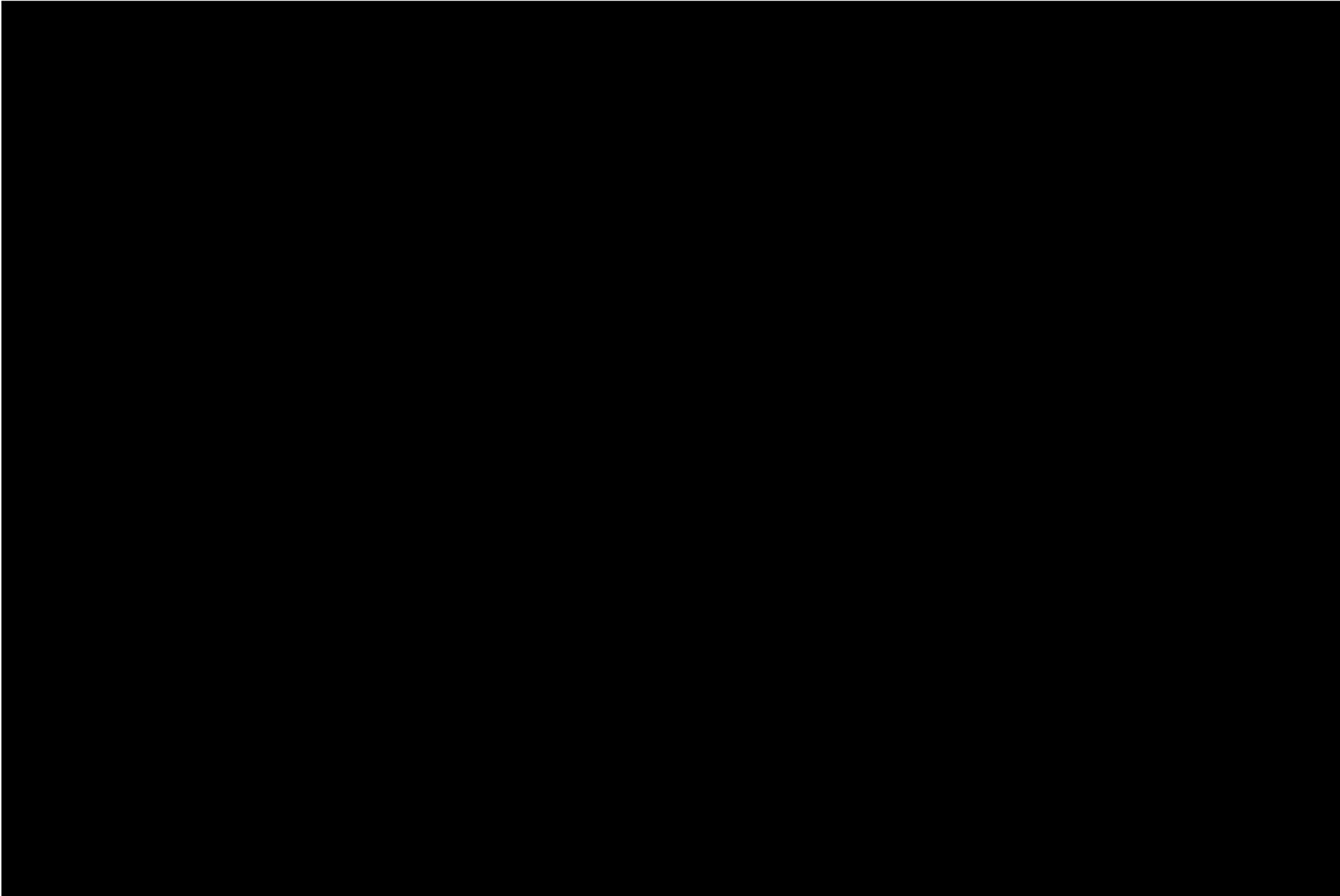
Photo 12. Dense aromatic sumac patch used as brumation sites (red flag) by ornate box turtles (A15/B7 and C7C3) at Ayers Sand Prairie Nature Preserve, Carroll County, IL in 2010-2011.

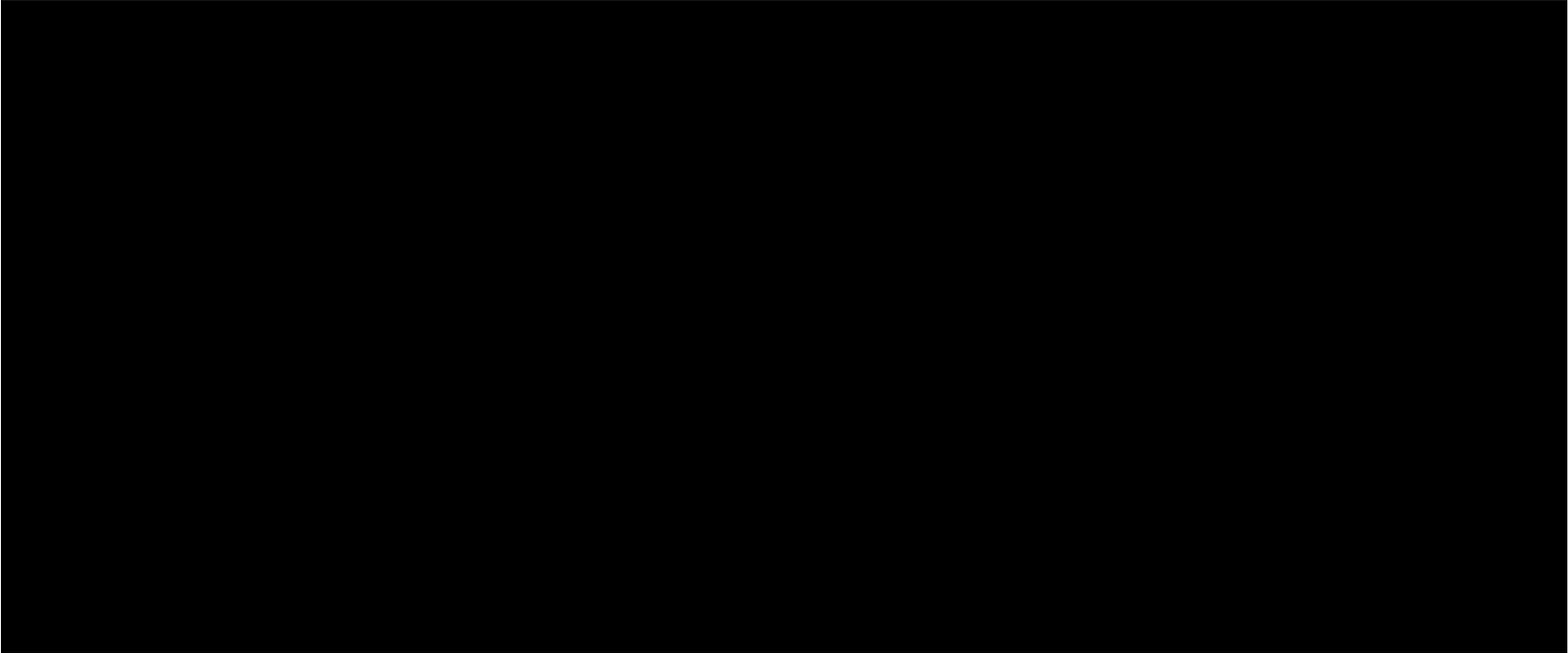


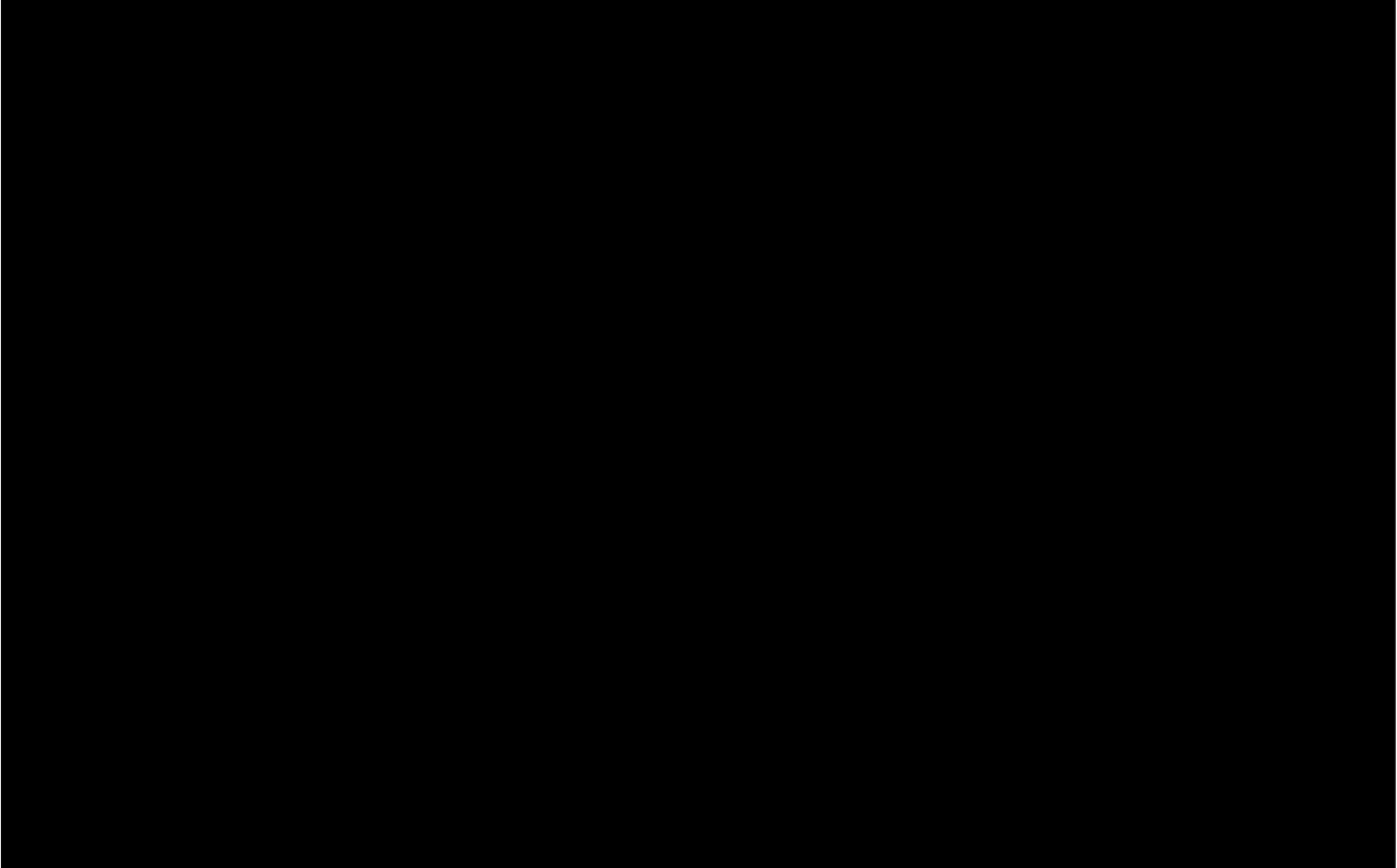
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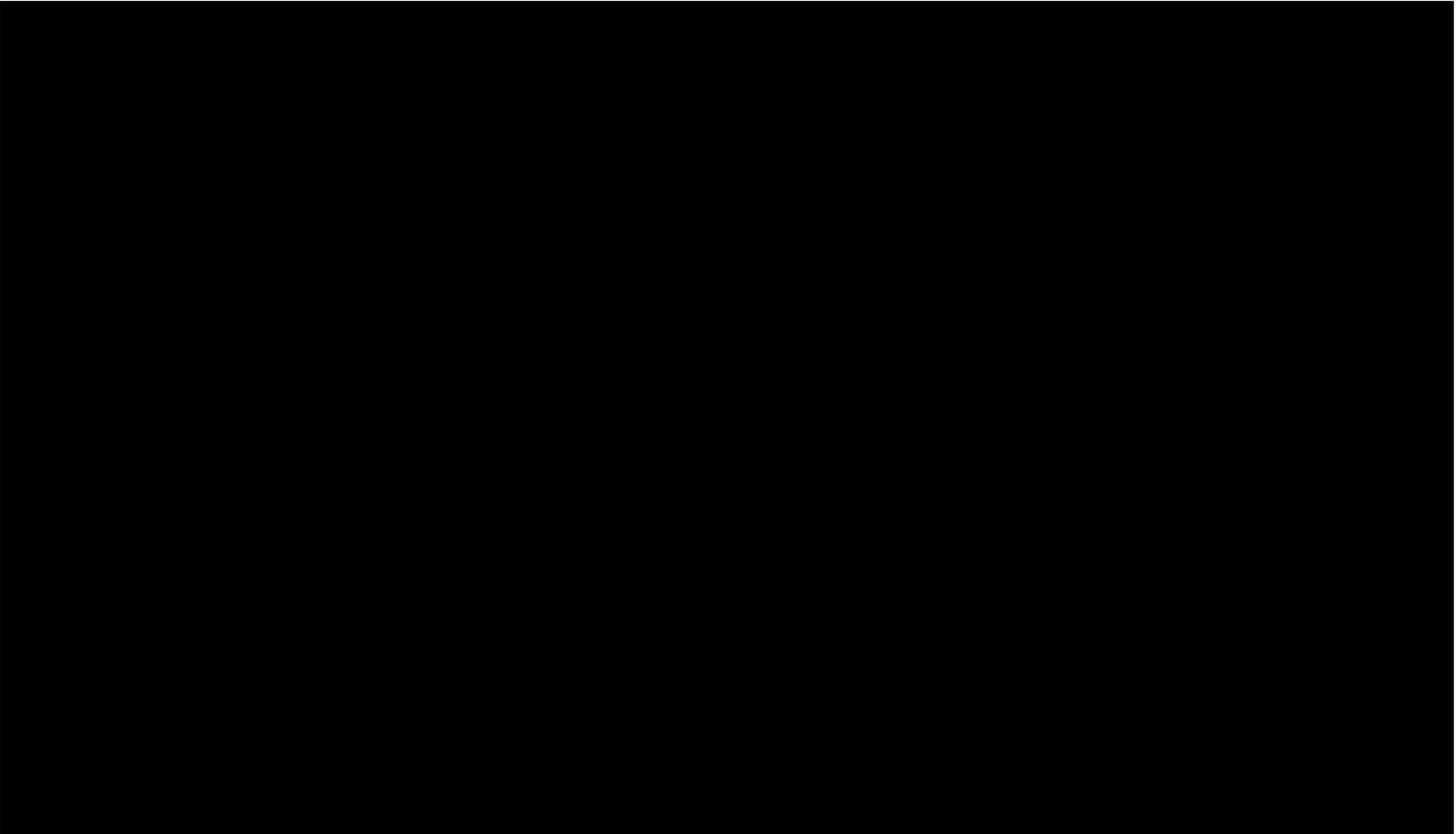
**Data Sheets for Ornate Box Turtles monitored at
Thomson-Fulton Sand Prairie Nature Preserve and
Ayers Sand Prairie Nature Preserve,
Whiteside County, IL. 2010-2011**

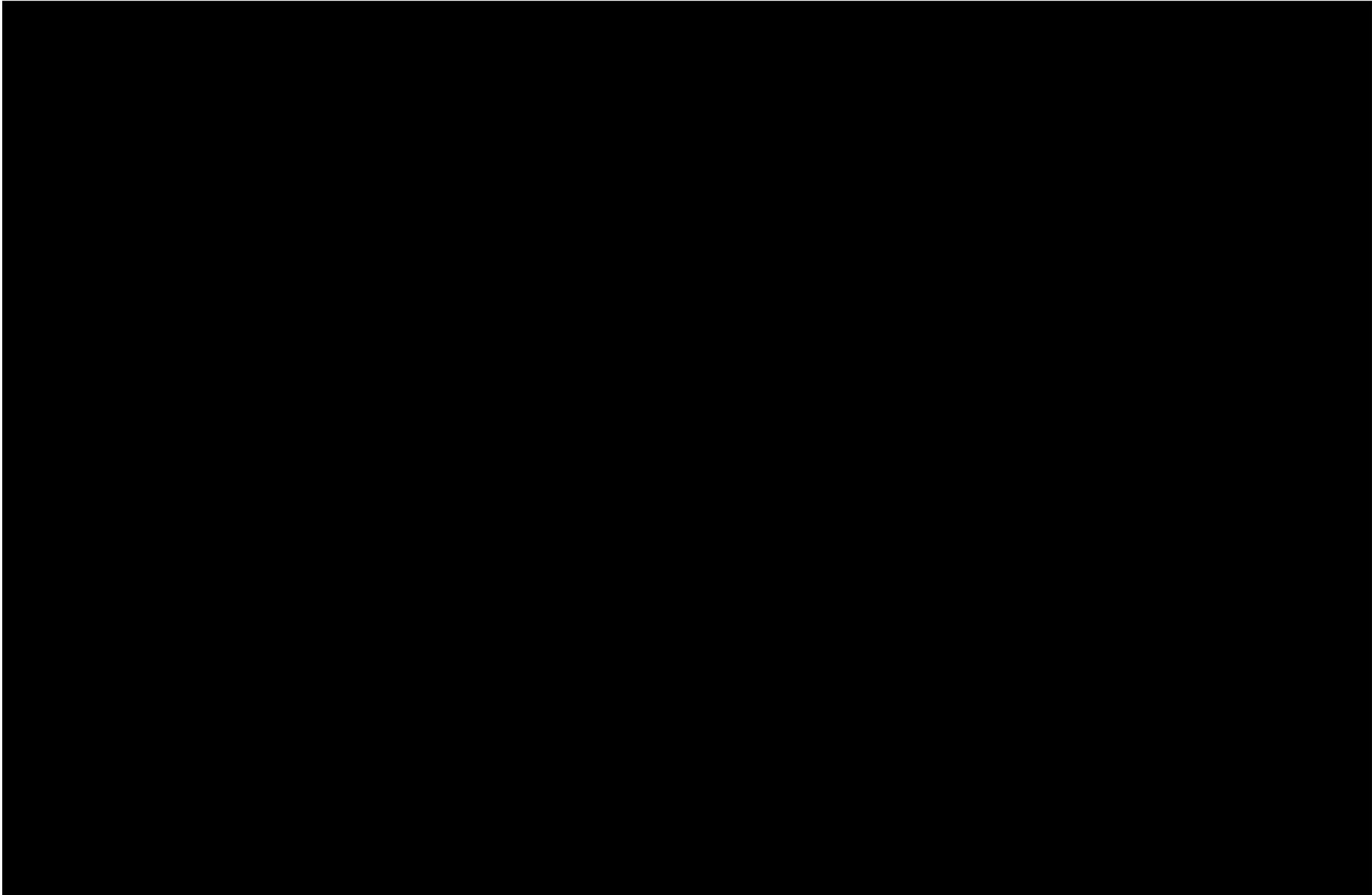


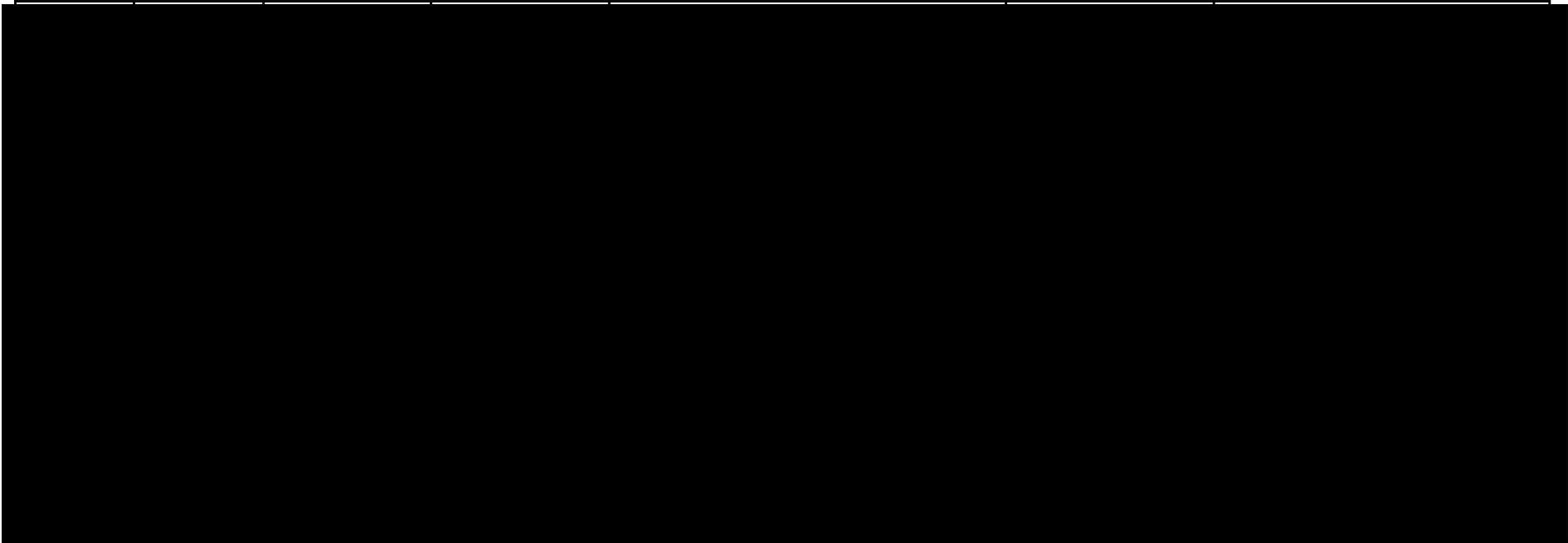


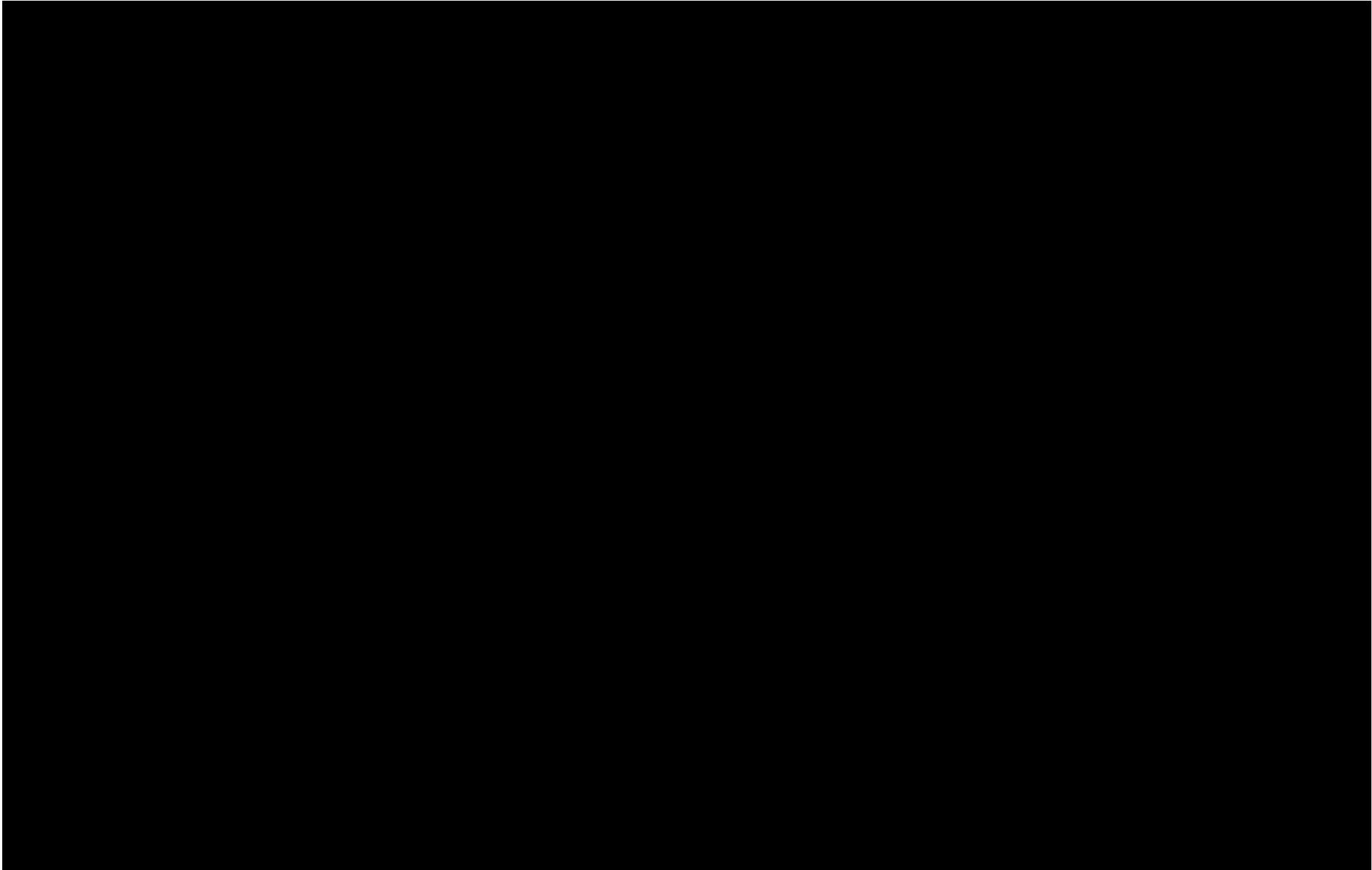






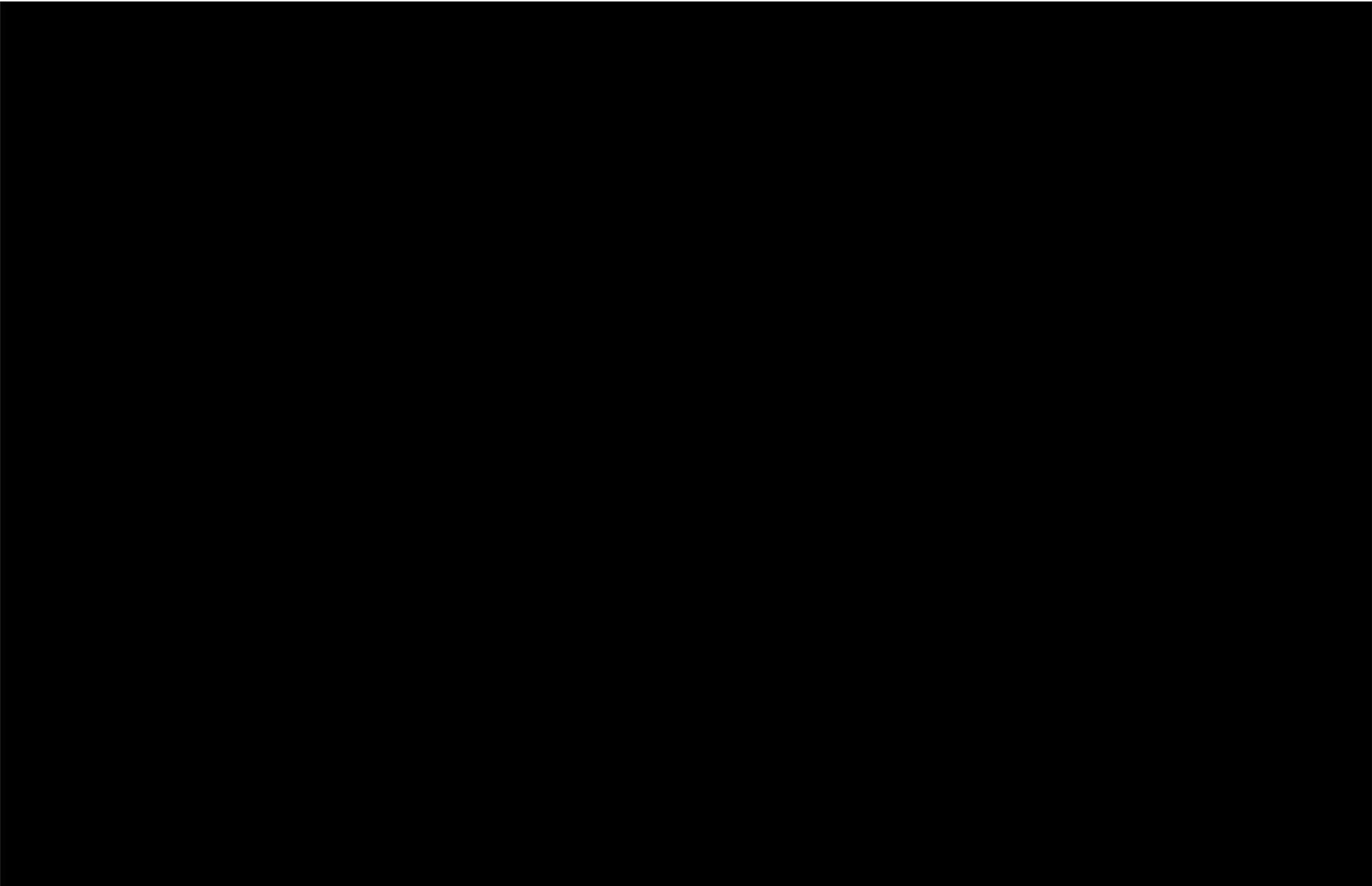


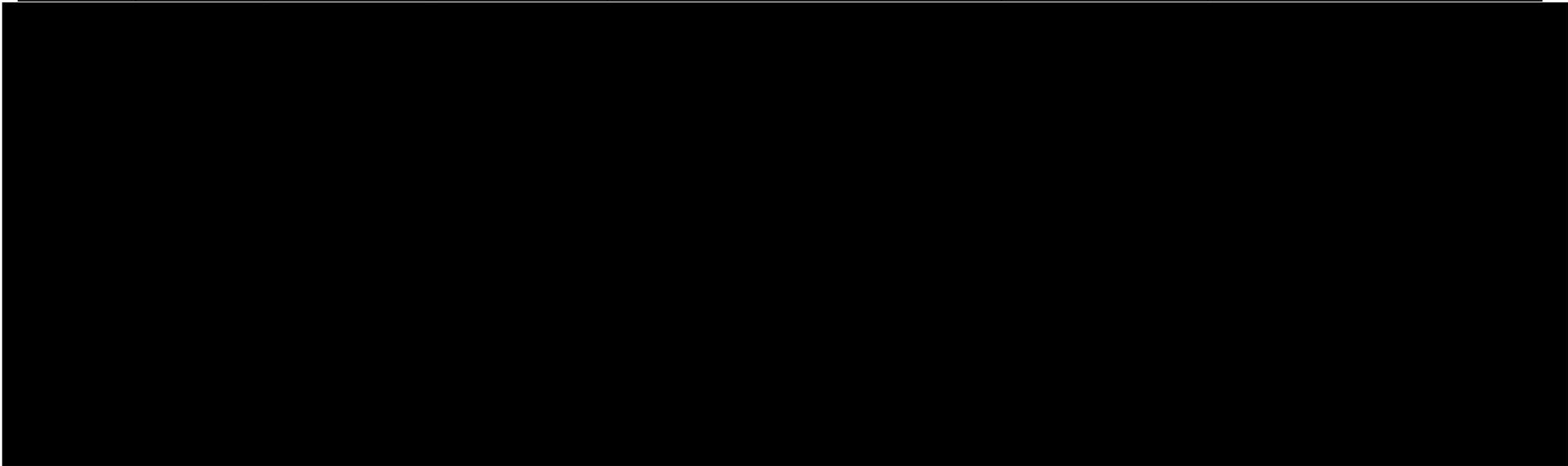














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