



# Results of a Three-year Survey of Forest Owls in Michigan

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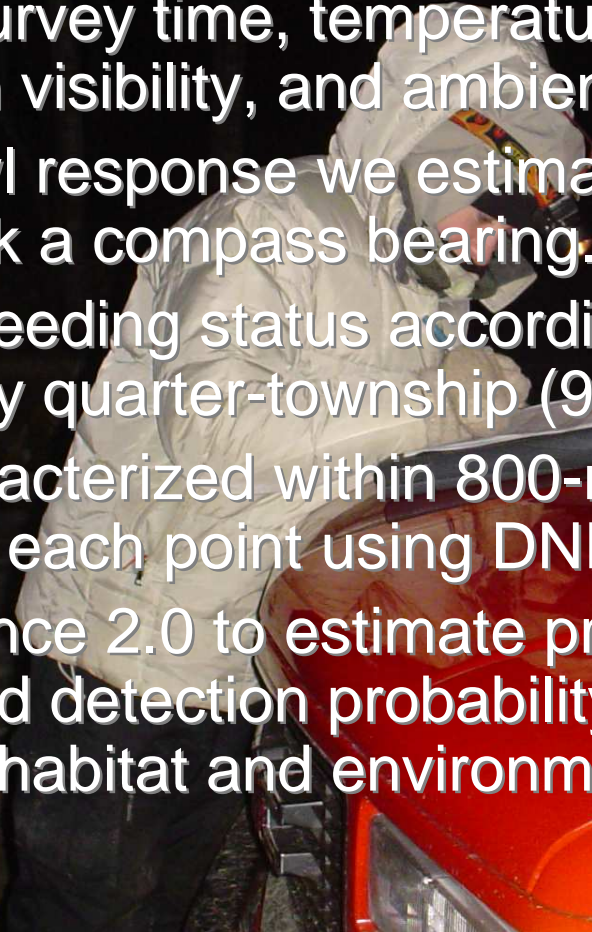


# Objectives

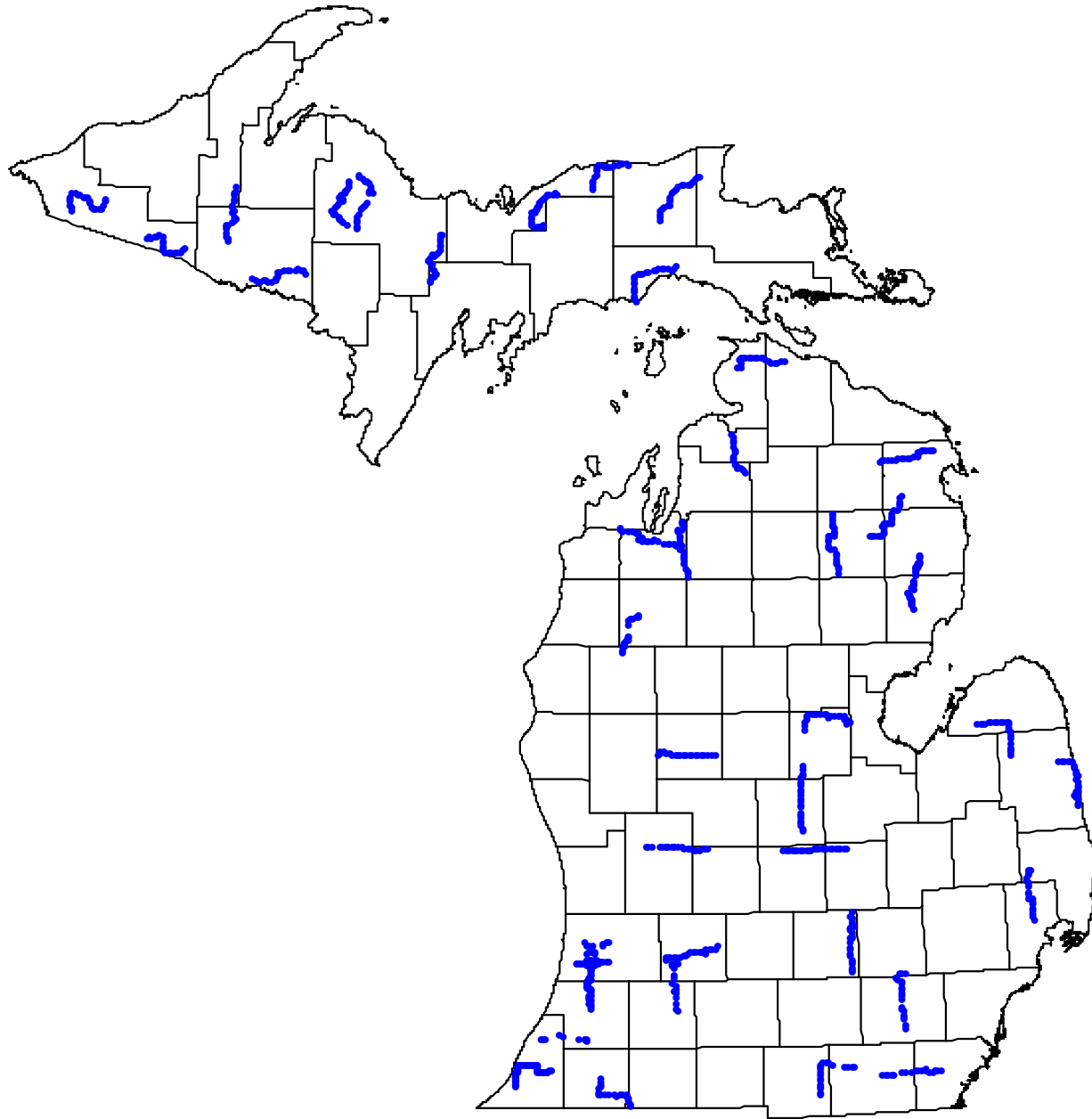
- Gather improved data for the Michigan Breeding Bird Atlas II Project.
- Collect baseline data for future monitoring.
- Evaluate the efficacy of these surveys in finding breeding owls.
- Investigate factors that might influence owl presence and detectability at a site.

# Methods

- Point counts were conducted at night from roads along randomly selected Breeding Bird Survey routes.
- Three or four surveys at each point per season.
- Recorded survey time, temperature, wind speed, cloud cover, moon visibility, and ambient noise level.
- For each owl response we estimated the distance to the bird and took a compass bearing.
- Assigned breeding status according to MBBA II guidelines by quarter-township (9-section) survey block.
- Habitat characterized within 800-meter radius surrounding each point using DNR IFMAP data.
- Used Presence 2.0 to estimate proportion of sites occupied and detection probability, and also evaluate influence of habitat and environment on these estimates.



# Survey Route Locations

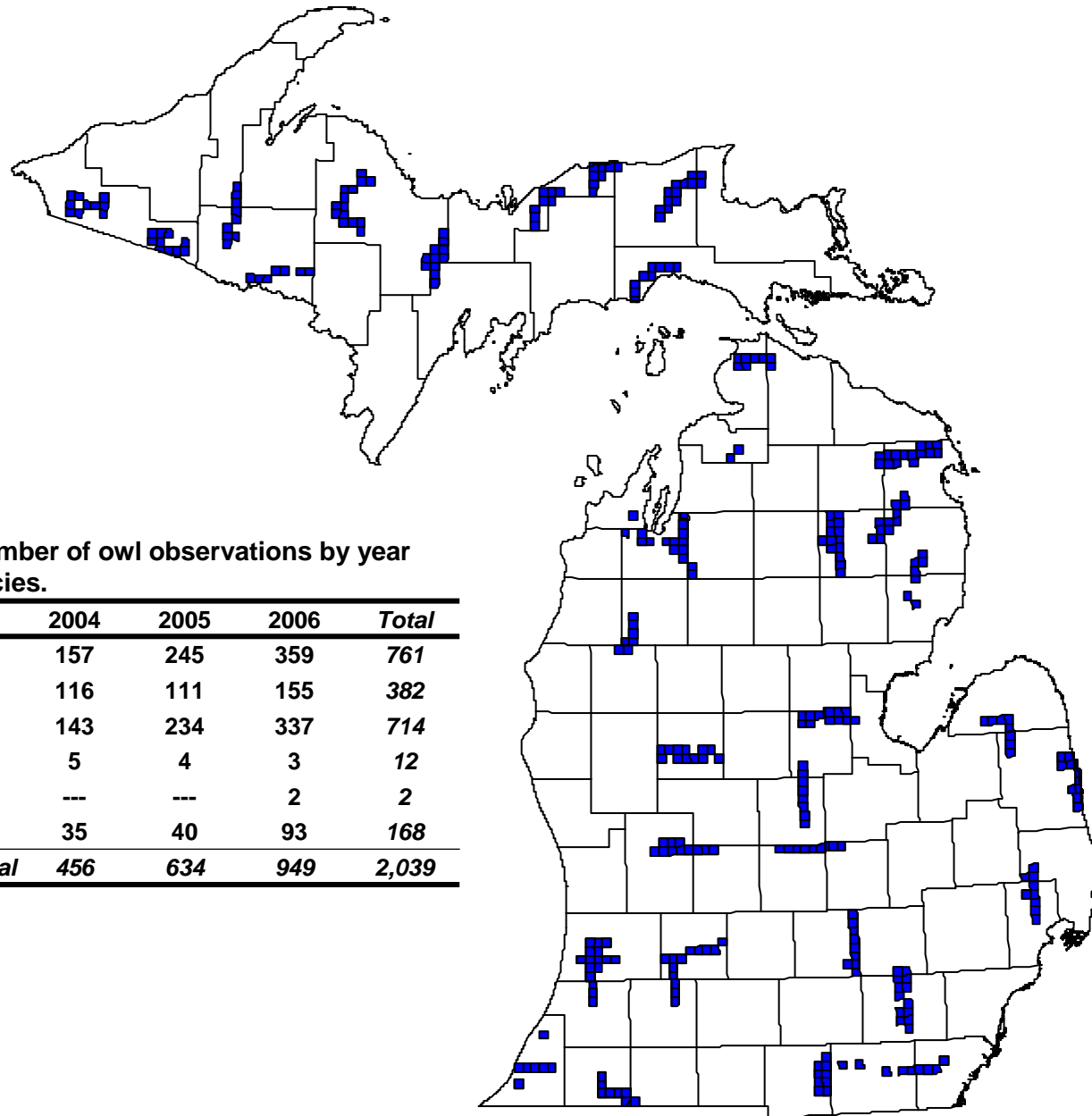


# Results: Survey Effort

No. points counts conducted by year, zone, and survey period.

Species	Zone	Survey 1	Survey 2	Survey 3	Survey 4	Total
2004	SLP	108	150	147	---	405
	NLP	101	101	105	---	307
	UP	114	114	114	---	342
	<i>Subtotal</i>	323	365	366	---	1,054
2005	SLP	169	167	167	162	665
	NLP	---	105	104	102	311
	UP	---	106	105	106	317
	<i>Subtotal</i>	169	378	376	370	1,293
2006	SLP	159	159	159	157	634
	NLP	---	110	109	110	329
	UP	---	105	103	88	296
	<i>Subtotal</i>	159	374	371	355	1,259
<i>Total</i>		651	1,117	1,113	725	3,606

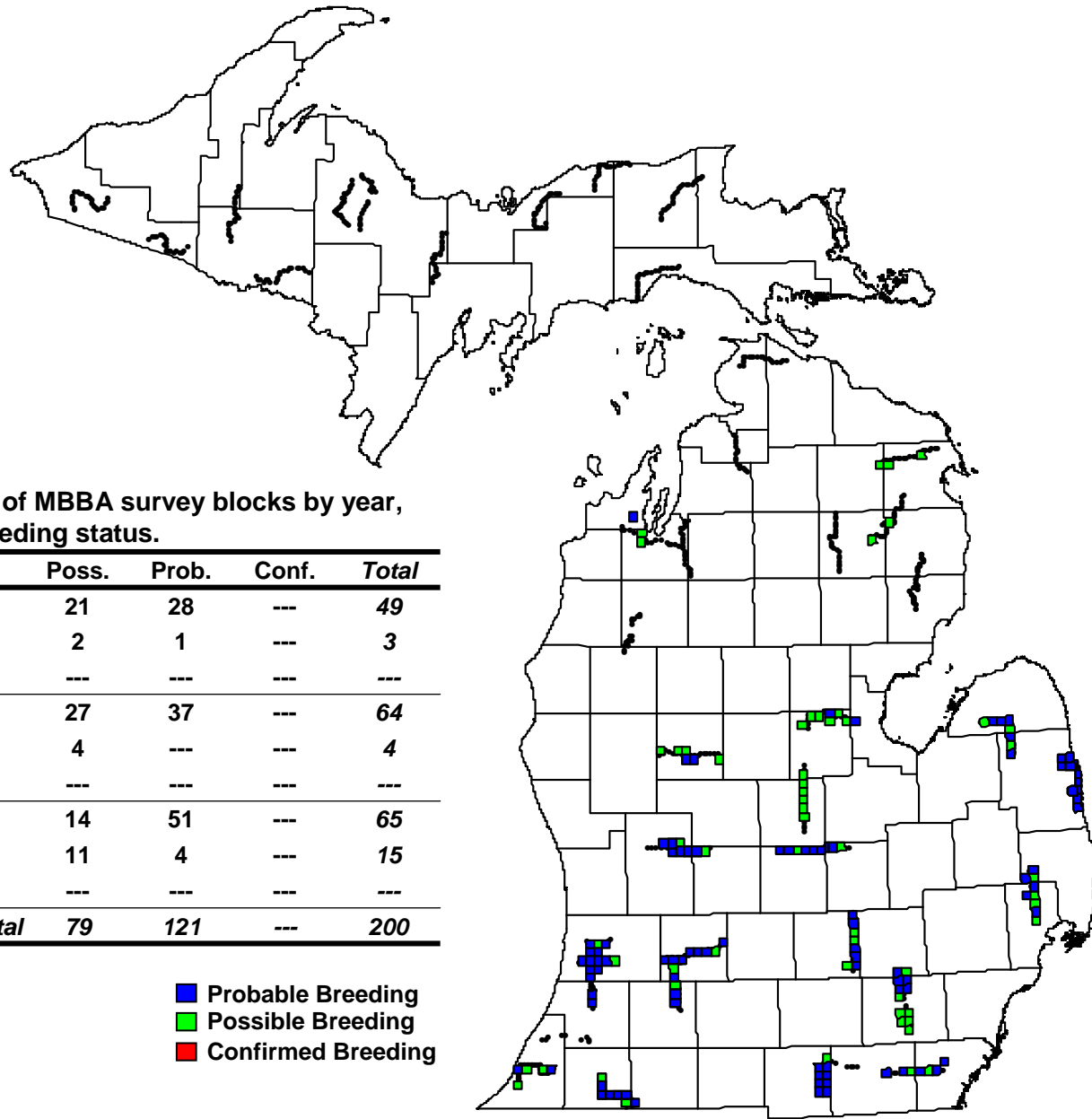
# Results: Total Owl Observations



Total Number of owl observations by year and species.

Species	2004	2005	2006	Total
EASO	157	245	359	761
GHOW	116	111	155	382
BDOW	143	234	337	714
LEOW	5	4	3	12
BOOR	---	---	2	2
NSWO	35	40	93	168
<i>Total</i>	<i>456</i>	<i>634</i>	<i>949</i>	<i>2,039</i>

# Results: Eastern Screech-Owl

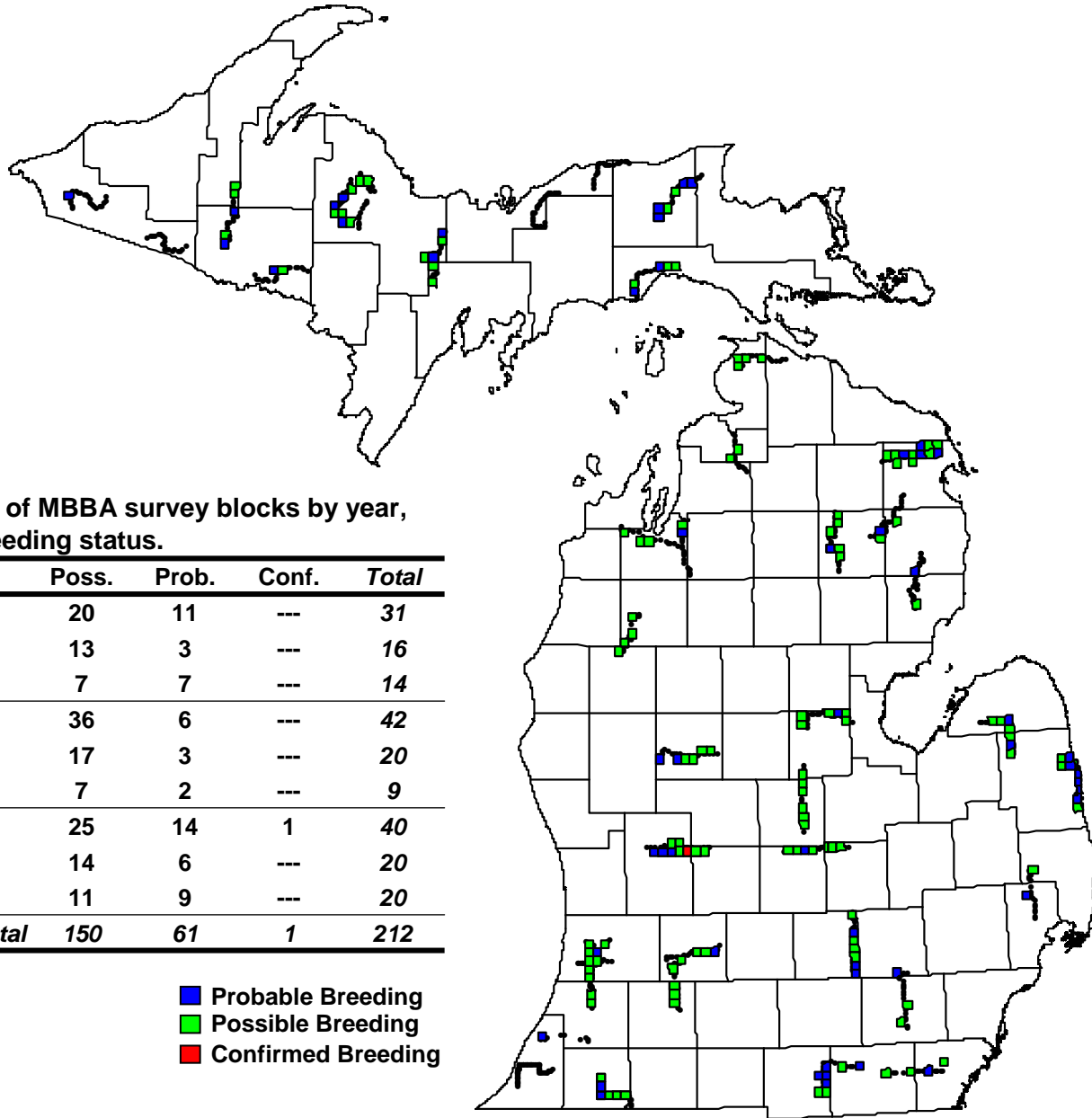


Total number of MBBA survey blocks by year, zone, and breeding status.

Year	Zone	Poss.	Prob.	Conf.	Total
2004	SLP	21	28	---	49
	NLP	2	1	---	3
	UP	---	---	---	---
2005	SLP	27	37	---	64
	NLP	4	---	---	4
	UP	---	---	---	---
2006	SLP	14	51	---	65
	NLP	11	4	---	15
	UP	---	---	---	---
<b>Total</b>		<b>79</b>	<b>121</b>	<b>---</b>	<b>200</b>

- Probable Breeding
- Possible Breeding
- Confirmed Breeding

# Results: Great Horned Owl



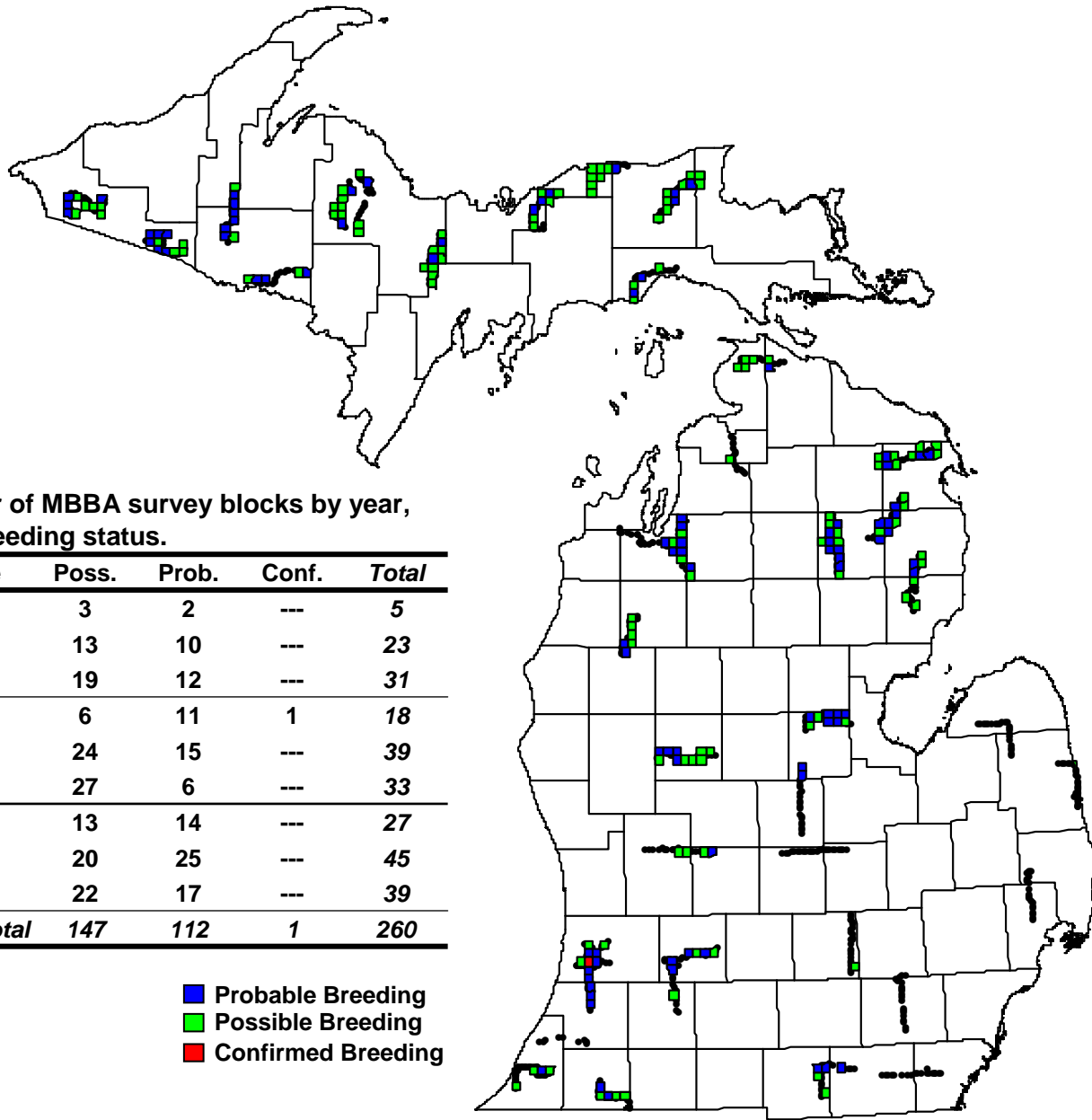
Total number of MBBA survey blocks by year, zone, and breeding status.

Year	Zone	Poss.	Prob.	Conf.	Total
2004	SLP	20	11	---	31
	NLP	13	3	---	16
	UP	7	7	---	14
2005	SLP	36	6	---	42
	NLP	17	3	---	20
	UP	7	2	---	9
2006	SLP	25	14	1	40
	NLP	14	6	---	20
	UP	11	9	---	20
<b>Total</b>		<b>150</b>	<b>61</b>	<b>1</b>	<b>212</b>

■ Probable Breeding  
■ Possible Breeding  
■ Confirmed Breeding



# Results: Barred Owl

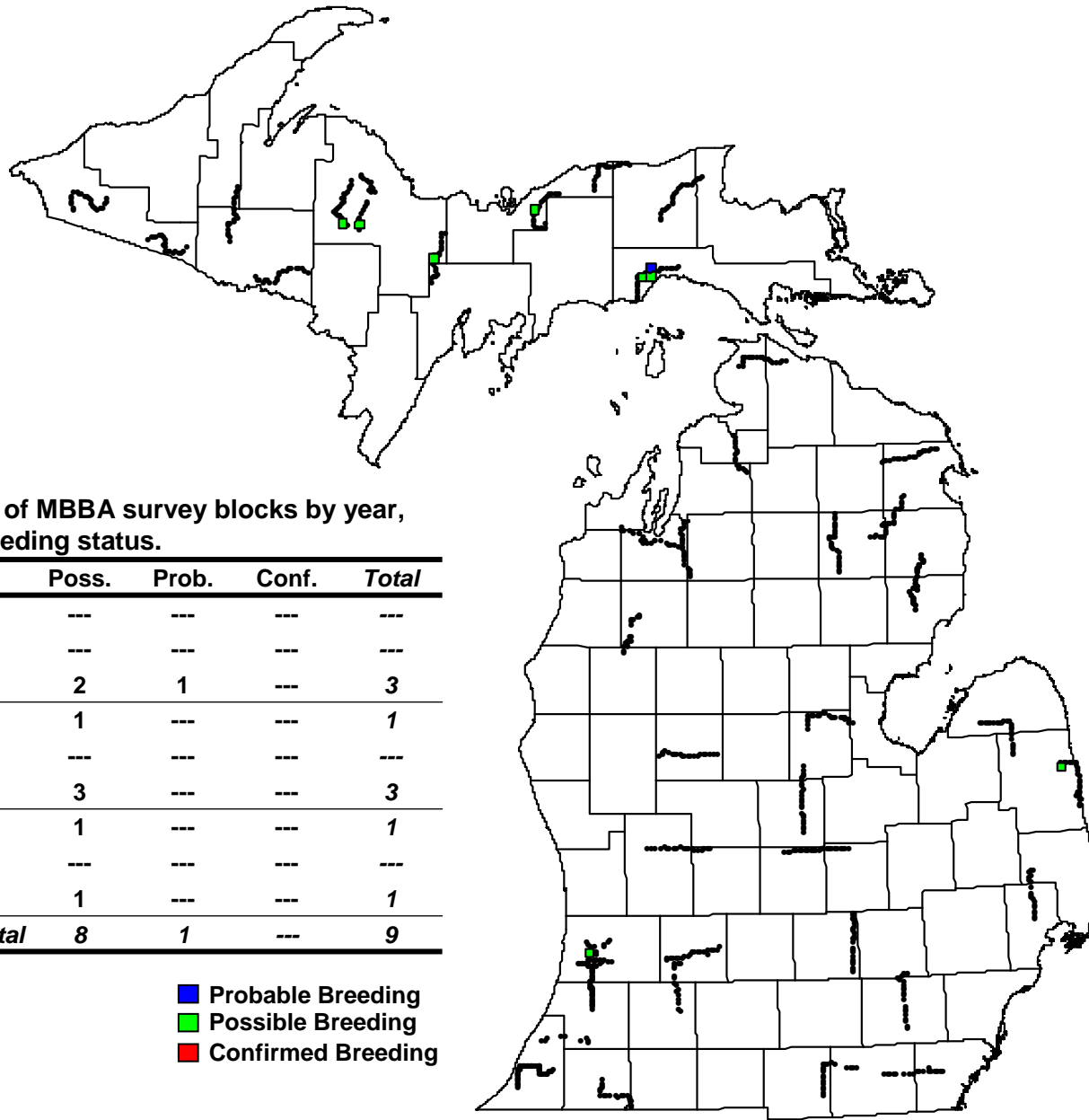


Total number of MBBA survey blocks by year, zone, and breeding status.

Year	Zone	Poss.	Prob.	Conf.	Total
2004	SLP	3	2	---	5
	NLP	13	10	---	23
	UP	19	12	---	31
2005	SLP	6	11	1	18
	NLP	24	15	---	39
	UP	27	6	---	33
2006	SLP	13	14	---	27
	NLP	20	25	---	45
	UP	22	17	---	39
<b>Total</b>		<b>147</b>	<b>112</b>	<b>1</b>	<b>260</b>

■ Probable Breeding  
■ Possible Breeding  
■ Confirmed Breeding

# Results: Long-eared Owl

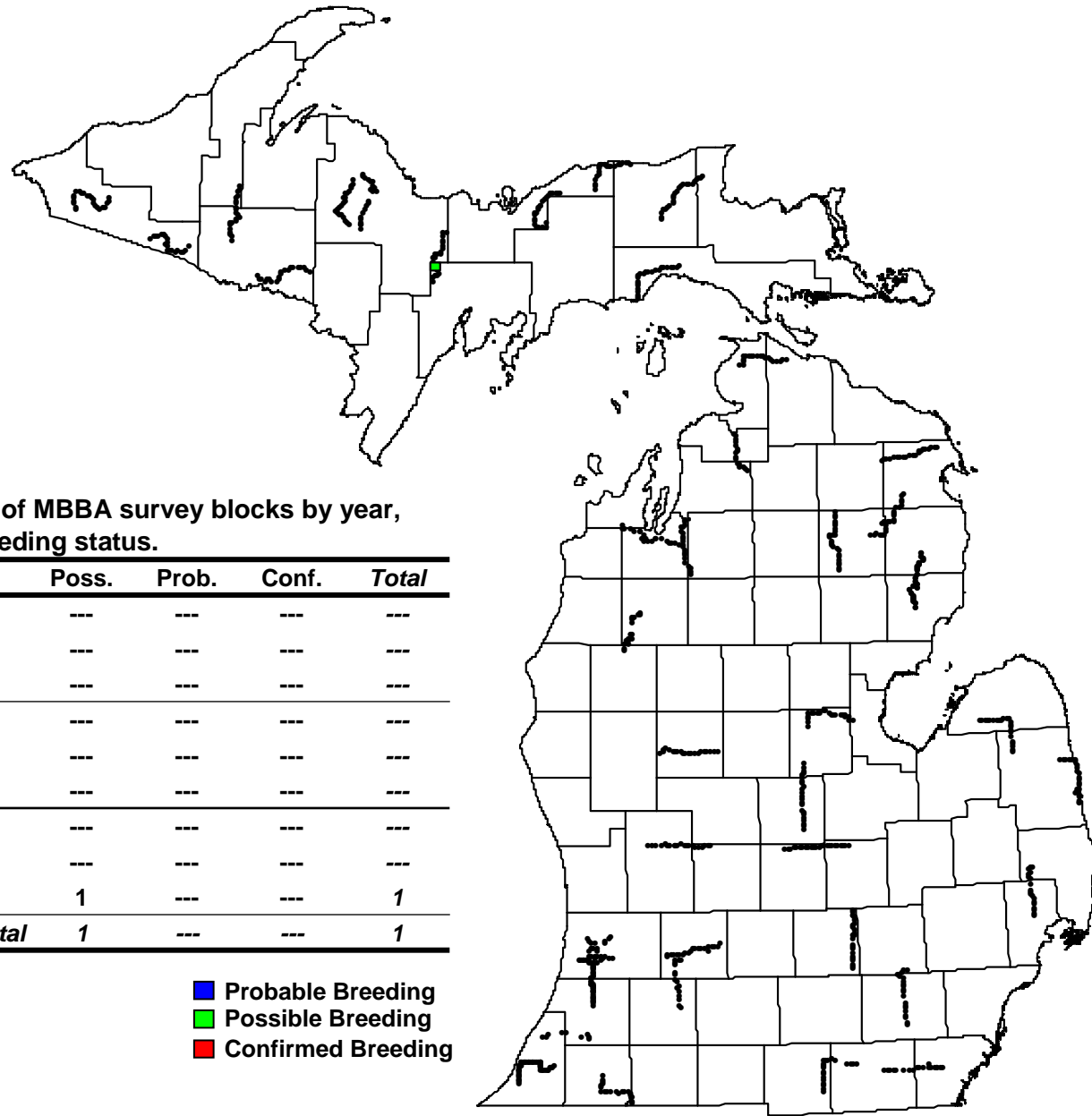


Total number of MBBA survey blocks by year, zone, and breeding status.

Year	Zone	Poss.	Prob.	Conf.	Total
2004	SLP	---	---	---	---
	NLP	---	---	---	---
	UP	2	1	---	3
2005	SLP	1	---	---	1
	NLP	---	---	---	---
	UP	3	---	---	3
2006	SLP	1	---	---	1
	NLP	---	---	---	---
	UP	1	---	---	1
<b>Total</b>		<b>8</b>	<b>1</b>	<b>---</b>	<b>9</b>

- Probable Breeding
- Possible Breeding
- Confirmed Breeding

# Results: Boreal Owl

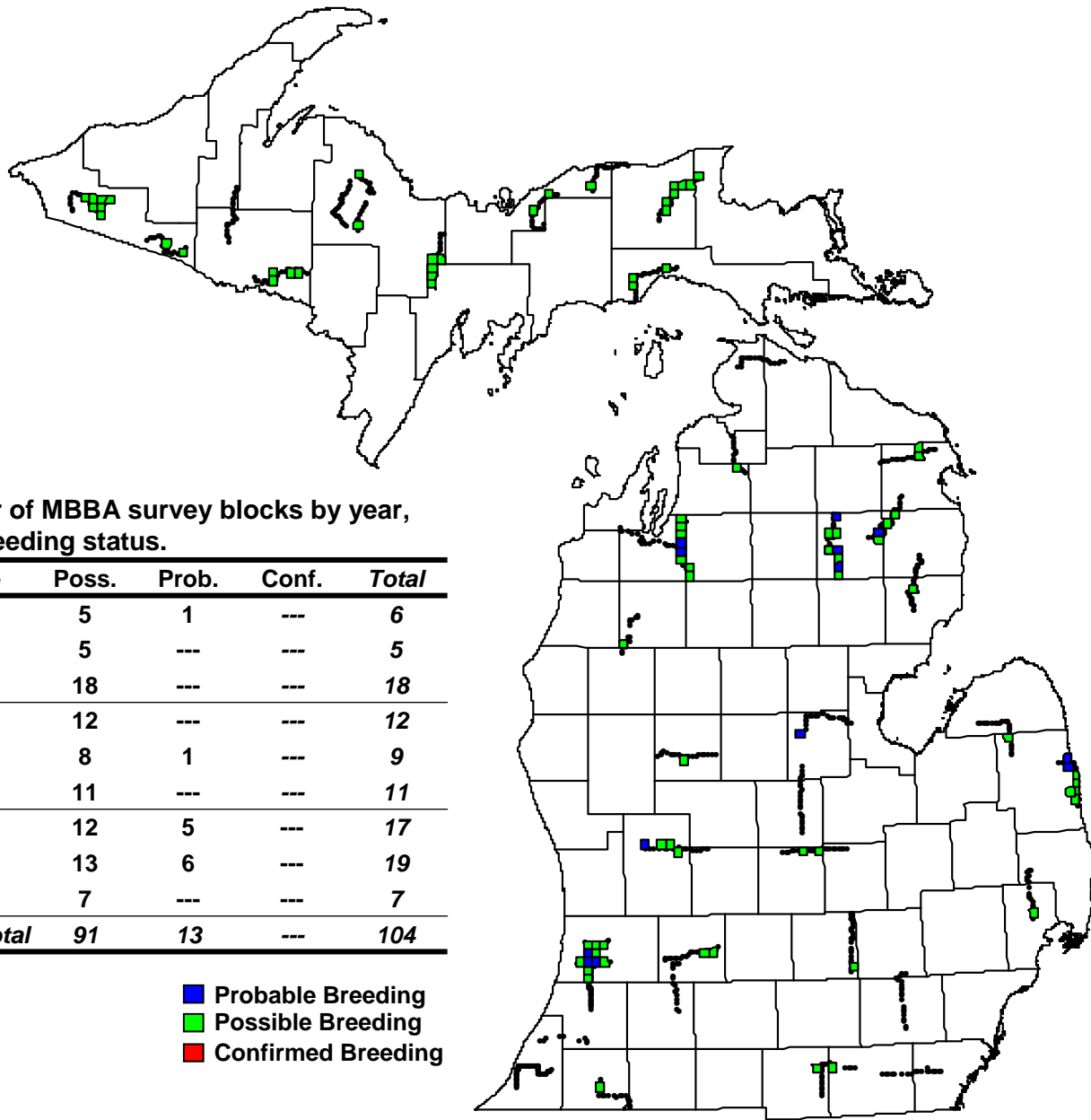


Total number of MBBA survey blocks by year, zone, and breeding status.

Year	Zone	Poss.	Prob.	Conf.	Total
2004	SLP	---	---	---	---
	NLP	---	---	---	---
	UP	---	---	---	---
2005	SLP	---	---	---	---
	NLP	---	---	---	---
	UP	---	---	---	---
2006	SLP	---	---	---	---
	NLP	---	---	---	---
	UP	1	---	---	1
<i>Total</i>		<i>1</i>	---	---	<i>1</i>

- Probable Breeding
- Possible Breeding
- Confirmed Breeding

# Results: Northern Saw-whet Owl



# Results: Site Occupancy and Detection Probability

Species	Year	Site Occupancy (SE)		Mean Probability of Detection by Survey (SE)				No. Surveys Needed
		Observed	Estimated	Survey 1	Survey 2	Survey 3	Survey 4	
EASO	2004	0.58	0.74 (0.09)	0.42 (0.07)	0.58 (0.06)	0.32 (0.06)	---	2 – 4
	2005	0.62	0.69 (0.04)	0.52 (0.06)	0.52 (0.06)	0.37 (0.05)	0.32 (0.05)	
	2006	0.77	0.82 (0.05)	0.48 (0.05)	0.48 (0.05)	0.42 (0.05)	0.58 (0.05)	
GHOW	2004	0.21	0.62 (0.10)	0.10 (0.03)	0.20 (0.03)	0.13 (0.03)	---	7 – 31
	2005	0.18	0.89 (0.10)	---	0.10 (0.02)	0.06 (0.02)	0.05 (0.01)	
	2006	0.27	0.87 (0.09)	---	0.13 (0.02)	0.13 (0.02)	0.13 (0.02)	
BDOW	2004	0.22	0.35 (0.06)	0.12 (0.04)	0.28 (0.06)	0.39 (0.07)	---	2 – 13
	2005	0.33	0.50 (0.05)	---	0.13 (0.03)	0.35 (0.05)	0.42 (0.05)	
	2006	0.47	0.65 (0.05)	---	0.17 (0.03)	0.30 (0.04)	0.57 (0.05)	

# Results: Site Occupancy and Detection Probability

Species	Year	Proportion of Sites Occupied <sup>1</sup>									Detection Probability <sup>2</sup>					
		UR	AG	HU	DF	CF	MF	WT	WA	BA	Wind	Noise	Time	Temp	Cloud	Moon
EASO	2004		+		-	-	-				-					
	2005										-					
	2006		+	+	-	-	-				-		+			
GHOW	2004	-	+	+	-	-	-		-	-	-					
	2005															
	2006		+	+		-	-		-	-	-					
BDOW	2004		-	-		+	+					-				
	2005		-	-	+	+			-	-		-				
	2006	-	-	-	+	+	+				-					

<sup>1</sup>UR = urban, AG = tilled agricultural, HU = herbaceous upland (e.g. grassland, forage crops), DF = deciduous forest, CF = coniferous forest, MF = mixed forest, WT = non-forested wetland, WA = water, and BA = bare/sparsely vegetated.

<sup>2</sup>Wind = wind speed (kmph), Noise = noise level (rank scale of 1 – 4), Time = time period (evening, middle of night, early morning), Temp = temperature (°C), Cloud = % cloud cover, Moon = moon visibility (not visible, partially visible, completely visible).

# Summary

- Wind speed seemed most important in limiting detection of EASO and GHOW.
- Both noise level and wind appeared to reduce probability of detecting BDOW.
- No consistent trend in EASO detection probability by survey period.
- Probability of detection consistently low for GHOW.
- BDOW detection probabilities highest during the last two survey periods.
- More survey effort needed for BDOW and GHOW if goal is high confidence in determination of absence.

# Acknowledgements

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