Wildlife Responses to a Resident a Family: A Three-Year Camera Census on Restored Prairie–Savanna (2024–2026)

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Abstract
A steward-conducted trail-camera census on a restored prairie–savanna complex in Washburn County, Wisconsin, labeled every frame from ten cameras at nine fixed stations for 2024, 2025 and January–June 2026 (11,820 frames; 11,135 estimated wildlife individuals; 1,027 frames of the resident family). White-tailed deer (Odocoileus virginianus) made up 67–83% of wildlife individuals in each year. Estimated individuals were nearly identical in the two complete years (4,743 and 4,792) while camera effort rose, so detections per unit effort fell (111.7 to 82.8 per 100 frames). A rise in mesocarnivores between 2024 and 2025 (6.6% to 11.1% of individuals, led by coyote) did not persist into spring 2026 (4.9%), and is interpreted as a single-year pulse. Daily activity separated the community into diurnal (wild turkey, people), crepuscular (deer) and nocturnal (coyote, raccoon) groups; the coefficient of overlap with people ranged from 0.20 (raccoon) to 0.74 (turkey). A response index — the median return interval to a camera after a human detection divided by the species' own baseline interval of return — placed deer at no measurable delay (0.99) and identified wild turkey as the one species that shares the family's hours and still delays (1.89 at overlap 0.74) after a person passed by. The apparent wariness of raccoon (1.63) and coyote (1.27) coincided with low overlap with humans and is interpreted as temporal separation. In relation to white-tailed deer separated by sex, does returned near their own rhythm after people (1.08) and after predators (0.95), while bucks delayed (2.24 and 2.18; Mann–Whitney $P < 0.001$; bootstrap gap intervals excluding zero), at matched temporal overlap. The buck delay was similar in 2024 and 2025 compared to coyote, black bear, bobcat and the large-canid class, and it relaxed inside the May–June fawning window (bucks 1.07 after people, 1.01 after predators) while does were unchanged. In spring 2026 does delayed after people (March–June index 1.70; bucks 1.48 on a thin sample). This delay centered in March–April and June rather than in the May fawning peak, in the spring when there was the most foot traffic and extensive brushing; it is reported as a lead. Frames containing the family's children overlapped the carnivore guild in proportion to each carnivore's diurnality (bobcat 0.53, black bear 0.50, coyote 0.29, raccoon 0.21), and no more than adults' frames did. Gray wolves were detected twice in three years; the regional wolf record is reported in companion preprints. On this home ground, the tolerance of people commonly attributed to deer belongs largely to the does.

Keywords: camera trapping; white-tailed deer; human disturbance; temporal overlap; sexual segregation; site fidelity; landscape of fear; prairie–savanna restoration; private-land stewardship; Wisconsin

1. Introduction
Camera traps are now a standard instrument for measuring how wildlife respond to people, and the questions asked with them have widened from occupancy and abundance to activity timing, temporal

niche partitioning and the behavioral cost of human presence (Burton et al. 2015; Frey et al. 2017; Gaynor et al. 2018; Larson et al. 2016). Most of that work is done by visiting observers on public or protected land, with human activity measured as a covariate. The record analysed here differs in two ways. The people in it are a single resident family whose presence is continuous, known to the animals over decades, and recorded on the same cameras as the wildlife; and the census is a full-frame one, in which every image is labeled and the household's passes are kept in the record as events in their own right.

The home ground is an approximately 100-ha complex of restored tallgrass prairie, oak and pine savanna and woodland on a bench above the Namekagon River in Washburn County, northwestern Wisconsin, under family stewardship and active restoration for half a century. Ten trail cameras at nine fixed stations have been maintained year-round across prairie and woodland since 2024, at trail junctions and along the loops the family walks and works. Three questions were explored in the three-year record. First, what is the composition and seasonal rhythm of the wildlife community, and did the changes seen between 2024 and 2025 persist? Second, which species avoid the family, once genuine avoidance is separated from the simple fact of keeping different hours? Third, is the deer's much-noted tolerance of people a property of the herd, or of one sex, and does it change with the reproductive calendar?

Three companion preprints from the same record and its regional extensions are already deposited and are cited rather than repeated here. The machine-noise result — that deer return times sort by the continuity of a machine's sound rather than its fuel — is reported in full in Vraniak (2026a). The wolf–deer relationship, which the home ground cannot resolve because wolves are too rare on it, is reported from the Washburn County, five-county and statewide Snapshot Wisconsin extracts in Vraniak (2026b, c, d), respectively. Those papers cite the home ground for its tolerant baseline. The present paper is the local record on which that baseline rests.

Sex differences in how ungulates manage risk are expected on theory and documented in the field. The sexual-segregation literature (Main et al. 1996; Ruckstuhl & Neuhaus 2002; Bowyer 2004; Main 2008) predicts that females favor safer ground at a cost to forage and that males accept riskier ground for growth and mating, and that males are the more mobile, displacement-prone sex outside the rut. Camera and observational studies of white-tailed deer report sex- and age-structured vigilance in response to hunting, hiking and coyotes (Lashley et al. 2014; Schuttler et al. 2017; Gulsby et al. 2018; Olson & Van Deelen 2024; Muthersbaugh et al. 2025). Much of that work finds does the more vigilant sex. The measure used here is different: it records whether and how soon an animal returns to a site after a person or predator has passed, a displacement currency rather than a vigilance currency, and it is the currency in which the segregation models predict bucks to be the wary sex.

2. Methods

2.1 Study site

The study ground is a privately stewarded complex of restored tallgrass prairie, oak and pine savanna with interspersed woodland, wetland and pond features, through which flows the Namekagon River and bordered by Hay and Spring Creeks, in Washburn County, Wisconsin. Trail cameras (GardePro A3 and A3S; Browning BTC-5, BTC-5P, BTC-5HDX and BTC-7EHP5U) were maintained year-round at fixed stations in prairie and woodland settings, at trail junctions and along the loops used by the family for walking, restoration work and travel by electric utility cart, gas

mower and gas ATV. The camera network was expanded between 2024 and 2025 and named stations were added, which is the principal reason the 2025 record carries more frames.

2.2 Full-frame census and labeling

Every frame from 1 January 2024 through 28 June 2026 was uploaded by the author, reviewed and labeled: species (or person, empty, indeterminate), age/sex or activity class, a burst-collapsed estimate of distinct individuals, day/night, and the stamped temperature; each frame was joined to its timestamp, hour, habitat and camera model. Labels from the two annual schemes were harmonized through one crosswalk (squirrel classes unified; cottontail classes merged; minor bird classes pooled; the 2025 'Unknown' class mapped to indeterminate). The ambiguous large-canid label ('coyote or gray wolf') was carried as coyote in community totals and kept separate in the canid analyses. Thirty-one phone-album re-exports were identified as non-camera artifacts and excluded. The labeled record holds 4,248 frames for 2024, 5,787 for 2025 and 1,785 for January–June 2026 (11,820 in all), of which 10,446 carry wildlife and 1,027 carry people. Any frame flagged as possibly containing a child was counted in totals and used only for the hour-of-day analysis in §3.10; children are never identified or described. Black-bear frames were flagged for separate handling in the same way.

2.3 Effort, independent detections and composition

Consecutive frames of the same species at the same camera within 30 minutes were collapsed to one independent detection (Burton et al. 2015; Sollmann et al. 2013), and all activity, interval and response measures were built from these. Survey effort is summarized as frame count and as camera-model-months (distinct model × calendar-month combinations with at least one frame). Relative abundance is reported as estimated individuals and as individuals per 100 frames, which normalizes for the growing effort. Composition is reported as each taxon's share of estimated wildlife individuals, which is less sensitive to effort than raw counts. The mesocarnivore guild comprises coyote, bobcat, red fox, raccoon and fisher.

2.4 Activity timing and temporal overlap

Daily activity was described as the share of a species' independent detections in each hour of the day; night was defined as 20:00–05:59 for the descriptive night share. Temporal overlap between two actors was computed as the intersection of their hourly frame-share histograms (the sum over hours of the smaller of the two shares), a discrete analogue of the coefficient of overlap Δ of Ridout & Linkie (2009); it ranges from 0 (no shared hours) to 1 (identical clocks). Overlap with people separates genuine avoidance from two actors simply keeping different hours (Frey et al. 2017; Gaynor et al. 2018). Seasonal shifts in the deer's clock were examined by season (spring March–May, summer June–August, fall September–November, winter December–February).

2.5 The response index

For each species, the baseline between-visit interval is the median gap between consecutive independent detections at the same camera model, pooled across cameras, with gaps longer than seven days excluded. The return-after-trigger interval is the median time from an independent trigger detection (a person; a predator) to the next independent detection of the species at the same camera, again capped at seven days. The response index is the return interval divided by the baseline: a value near 1 means no measurable delay, a value above 1 a delayed return. Because the index is normalized to each actor's own baseline, it absorbs much of the difference between a wide-ranging and a site-faithful animal, though not all of it (§4.2). Triggers were the family's passes (all

modes pooled; by machine class in Vraniak 2026a) and detections of coyote, black bear, bobcat, the wolf-inclusive large-canid class, and all predators pooled.

2.6 Sex and season

Deer were assigned to sex conservatively from the free-text labels: buck only where the label implies antlers or a male, doe only where it implies an antlerless female; fawns were held separate and mixed or unreadable frames were excluded rather than forced. The response index, baseline and overlap were computed separately for bucks and does against each trigger, pooled across the three years and by year. Buck and doe return intervals were compared with a two-sided Mann–Whitney U test, and a bootstrap of 1,500 resamples placed a 95% interval on the buck-minus-doe index gap. The fawning window was defined as May–June, when does in this region are tied to hidden fawns; the calendar was split into that window and the rest of the year. A wider March–June window, used in the earlier spring comparisons, is reported as a sensitivity check.

2.7 Children and the carnivore guild; reproducibility

Frames flagged as containing a child were separated from adult-only people frames, and each group's hourly histogram was overlapped with that of each carnivore (coyote, black bear, bobcat, raccoon, and the large-canid class), by year and pooled. All computations were run in Python on one harmonized pipeline retained with the labeled frame table; the pipeline reproduced the values in the deposited machine-noise paper (Vraniak 2026a) to the digit, and a few values differ slightly from the June and July annual reports, which were computed before the years were harmonized.

3. Results

3.1 Effort and detections

The three years are not equal-effort snapshots (Table 1). The 2025 network produced 5,787 frames against 4,248 in 2024 (+36%), from 53 camera-model-months against 47, and recorded nearly twice as many frames of people (520 against 284). The estimated number of wildlife individuals was nevertheless almost identical in the two complete years (4,743 and 4,792), so the detection rate per unit effort fell from 111.7 to 82.8 individuals per 100 frames. The apparent rise in animal photographs between the years reflects greater monitoring intensity; the number of animals detected did not rise. The half-year 2026 record (1,785 frames, 27 camera-model-months) ran at 89.6 individuals per 100 frames.

Table 1. Survey effort and detections by year (2026 = January–June).

Measure	2024	2025	2026 (Jan–Jun)	Pooled
Camera frames	4,248	5,787	1,785	11,820
Camera-model-months	47	53	27	127
Wildlife frames	3,847	5,084	1,515	10,446
People frames	284	520	223	1,027
Independent people detections	185	329	156	670
Estimated wildlife individuals	4,743	4,792	1,600	11,135
Wildlife individuals per 100 frames	111.7	82.8	89.6	94.2
Independent deer detections	1,960	2,559	980	5,499
Species recorded	18	14	12	18

3.2 Community composition and the 2025 mesocarnivore pulse

White-tailed deer dominated in every year, and their share of wildlife individuals rose from 67.3% in 2024 to 73.1% in 2025 and 82.6% in the first half of 2026 (Table 2; Figure 1). Around the deer, the clearest movement between 2024 and 2025 was a rise in the mesocarnivore guild from 6.6% to 11.1% of individuals, led by coyote (173 to 381 individual detectionss) and bobcat (37 to 73), set against declines in wild turkey (739 to 475) and black bear (249 to 190). The third spring did not carry the mesocarnivore rise forward. Compared on the April–June window, where all three years can be set side by side, the guild's share went from 5.5% (2024) to 11.1% (2025) and back to 4.9% (2026); coyote individuals ran 47, 143 and 35 across the three springs, while camera effort rose (12, 15 and 18 camera-model-months). Bobcat was the one mesocarnivore whose spring numbers remained stable (6, 13 and 10 individuals). The 2024–2025 rise is therefore interpreted as a single-year coyote pulse rather than a trend. Two apparent changes are labeling artifacts: the 2024 'Other mammal' class had no 2025 counterpart, and the 2024 canid record was labeled conservatively (141 frames as 'coyote or gray wolf' against 21 as coyote), so the 2024 coyote count rests largely on ambiguous frames carried as coyote.

Table 2. Community composition by year: estimated individuals (share of wildlife individuals) · independent detections. 2026 = January–June.

Species	2024	2025	2026 (Jan–Jun)
White-tailed deer	3193 (67.3%) · 1960	3501 (73.1%) · 2559	1322 (82.6%) · 980
Wild turkey	739 (15.6%) · 266	475 (9.9%) · 299	75 (4.7%) · 59
Black bear	249 (5.2%) · 111	190 (4.0%) · 156	75 (4.7%) · 52
Coyote	173 (3.6%) · 115	381 (8.0%) · 337	50 (3.1%) · 45
Bobcat	37 (0.8%) · 30	73 (1.5%) · 68	11 (0.7%) · 11
Raccoon	77 (1.6%) · 50	67 (1.4%) · 56	23 (1.4%) · 23
Gray squirrel	94 (2.0%) · 81	42 (0.9%) · 40	14 (0.9%) · 12
Cottontail rabbit	31 (0.7%) · 29	22 (0.5%) · 23	10 (0.6%) · 10
Red fox	17 (0.4%) · 16	8 (0.2%) · 6	1 (0.1%) · 1
Fisher	10 (0.2%) · 9	2 (0.0%) · 2	2 (0.1%) · 2
Striped skunk	18 (0.4%) · 14	0	0
Porcupine	17 (0.4%) · 13	6 (0.1%) · 6	0

Figure 1. Community composition by year, 2024–2026

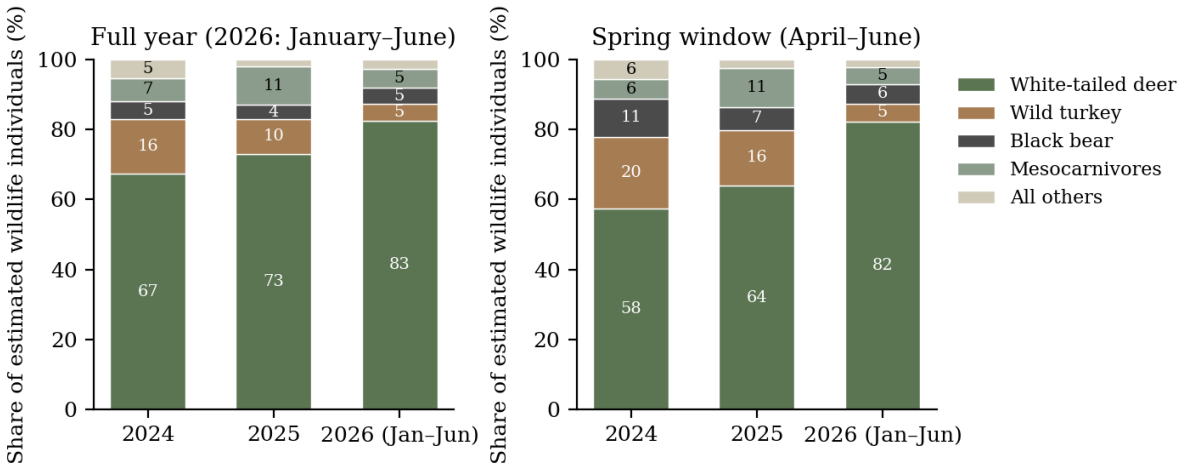

Figure 1. Community composition by year as each group's share of estimated wildlife individuals: full year (left; 2026 = January–June) and the April–June spring window (right). The 2025 mesocarnivore share does not persist into 2026.

3.3 Seasonal activity

Both complete years followed the same arc — a midwinter low, a spring climb, a summer plateau and an early-autumn peak (Figure 2). The autumn peak was higher in 2025 (810 and 798 individuals in September and October, against 623 and 604 in 2024), consistent with that year's heavier effort in those months. Within the spring, deer built toward June in every year (April–June deer individuals 192 · 222 · 417 in 2024; 308 · 353 · 354 in 2025; 154 · 343 · 599 in 2026), and June 2026 was the largest single spring month in the record. The first black bear of the year appeared within a three-day window in each year — 9 April 2024, 12 April 2025 and 11 April 2026.

Figure 2. Monthly wildlife activity by year

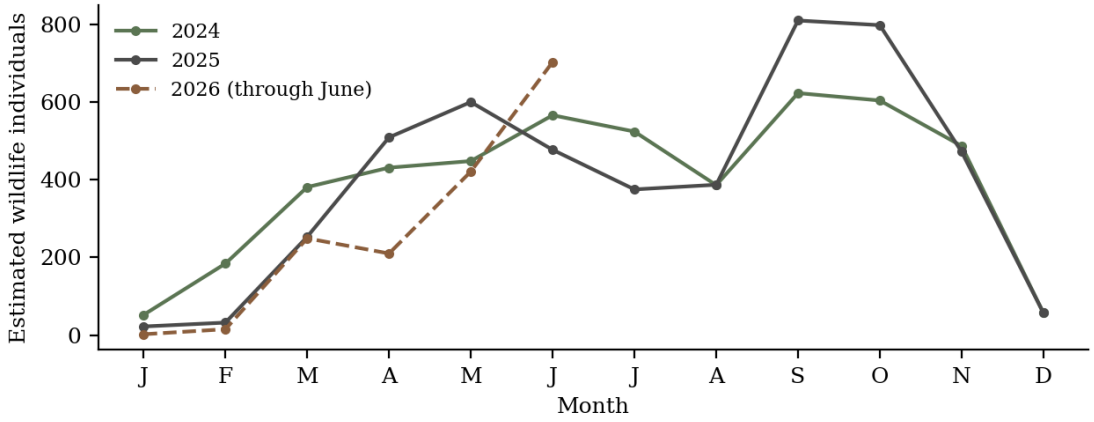

Figure 2. Monthly wildlife activity (estimated individuals) by year; 2026 is shown through June.

3.4 Daily activity and temporal overlap

Pooling the three years gave stable activity clocks (Figure 3). People were strongly diurnal (peak 09:00; 10% of independent detections at night). Wild turkey was diurnal (10% at night; peak 11:00). White-tailed deer were crepuscular, with dawn and dusk peaks and 38% of detections at night. Black bear straddled day and night (52% at night; peak 20:00). Coyote and raccoon were nocturnal (77% and 83% at night; peak 04:00 for both), and bobcat was active through the day and evening (37% at night). Across all wildlife frames, 62% fell in the daytime hours.

The overlap matrix (Table 3) orders the community against the family's timing of activity: turkey 0.74, bobcat 0.56, black bear 0.47, deer 0.45, coyote 0.27, raccoon 0.20. Among the animals, deer overlapped bear and bobcat most (0.74 each) and raccoon and coyote least (0.54, 0.59); coyote and raccoon shared the night with each other (0.78). The deer's timing moved with the season: the share of deer detections at night was 34% in spring and 34% in summer but 44% in fall, and the deer's overlap with people was lowest in fall (0.32) and highest in summer (0.54).

Figure 3. Daily activity by hour, independent detections pooled 2024–2026 (shaded = 20:00–05:59)

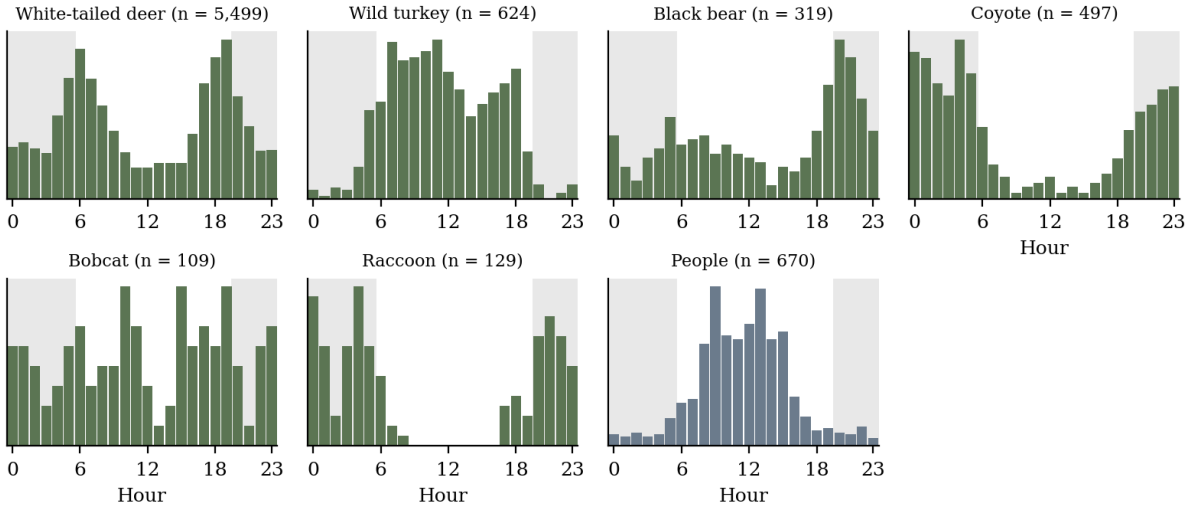

Figure 3. Daily activity by hour for the six focal species and people: share of independent detections in each hour, pooled 2024–2026 (shaded = 20:00–05:59).

Table 3. Temporal overlap between actors (intersection of hourly frame-share histograms), pooled 2024–2026.

Actor	Deer	Turkey	Bear	Coyote	Bobcat	Raccoon	People
White-tailed deer	—	0.60	0.74	0.59	0.74	0.54	0.45
Wild turkey	0.60	—	0.54	0.31	0.62	0.25	0.74
Black bear	0.74	0.54	—	0.62	0.75	0.60	0.47
Coyote	0.59	0.31	0.62	—	0.59	0.78	0.27
Bobcat	0.74	0.62	0.75	0.59	—	0.54	0.56
Raccoon	0.54	0.25	0.60	0.78	0.54	—	0.20
People	0.45	0.74	0.47	0.27	0.56	0.20	—

3.5 Response to people: avoidance or different hours

On the pooled record (Table 4; Figure 4), wild turkey showed the largest lengthening of return interval after a person (index 1.89: median return 45.9 h against a baseline of 24.26 h; n = 305), followed by raccoon (1.63), coyote (1.27) and black bear (1.25); deer (0.99) and bobcat (0.98) sat on the no-effect line. Pairing each index with the species' overlap with people separates two mechanisms. Raccoon and coyote post sizable indices but share little of the family's clock (overlap 0.2 and 0.27), so most of their apparent wariness is day–night separation. Wild turkey is the decisive case: it shares 74% of the family's active hours and still takes nearly twice its normal interval to return, which marks it as the community's one unambiguous human-avoider in all three years (year indices 1.36, 1.96, 1.28). Deer overlapped people substantially (0.45) and returned on schedule (year indices 0.86, 1.03, 1.16). The sex split in §3.6 divides that whole-herd figure.

Table 4. Response index and temporal overlap with people, pooled 2024–2026, with the index by year. Index = median return after a person ÷ median baseline interval; n = return intervals behind the pooled index.

Species	Baseline (h)	Return after people (h)	Index (pooled)	Overlap with people	n	Index 2024	Index 2025	Index 2026
White-tailed deer	8.61	8.56	0.99	0.45	638	0.86	1.03	1.16
Wild turkey	24.26	45.9	1.89	0.74	305	1.36	1.96	1.28
Black bear	44.01	55.19	1.25	0.47	269	1.04	1.94	1.09
Coyote	43.47	55.18	1.27	0.27	333	0.99	1.17	0.85
Bobcat	53.64	52.35	0.98	0.56	114	1.35	0.87	0.97
Raccoon	50.53	82.59	1.63	0.2	141	0.9	2.5	1.17

Figure 4. Response index against overlap with people, pooled 2024–2026

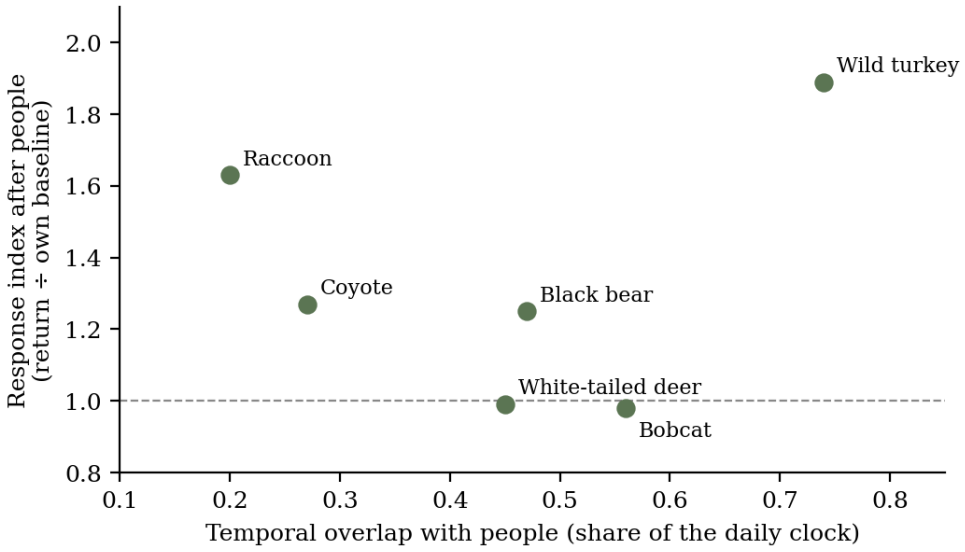

Figure 4. Response index after people against temporal overlap with people, pooled 2024–2026. Upper right (shares the family's hours and still delays) indicates avoidance; upper left indicates temporal separation. Dashed line: no measurable delay.

3.6 Sex-structured response: bucks delay, does do not

Splitting the deer by sex shows that the herd's tolerance of people belongs largely to the does (Table 5; Figure 5). Pooled across the three years, does returned to a camera on or slightly behind their own rhythm after a person (index 1.08; median return 11.7 h against a baseline of 10.79 h), while bucks took more than twice their own interval (2.24; 33.1 h against 14.77 h). The difference in return intervals is significant (Mann–Whitney $P < 0.001$) and the bootstrap interval on the buck-minus-doe gap excludes zero [0.59, 1.57]. The two sexes shared almost the same hours with people (overlap 0.39 for bucks, 0.46 for does), so the gap is a delay in return, not a difference of clocks. The same asymmetry appeared against predators: pooled predators 2.18 against 0.95 (gap interval [0.88, 1.68]), coyote 1.87 against 0.84, the large-canid class 1.92 against 1.05, black bear 2.83 against 0.89, bobcat 2.03 against 0.91 — all with $P < 0.001$ and with matched, high overlap for both sexes (0.7–0.8).

Table 5. Buck and doe response index by trigger, pooled 2024–2026. P = Mann–Whitney test that buck and doe return intervals differ; CI = bootstrap 95% interval on the buck-minus-doe index gap (computed for three triggers); n = buck / doe return intervals.

Trigger	Buck	Doe	Buck baseline (h)	Doe baseline (h)	Buck / doe overlap	P	Gap 95% CI	n buck / doe
People	2.24	1.08	14.77	10.79	0.39 / 0.46	<0.001	[0.59, 1.57]	353 / 618
Predators (pooled)	2.18	0.95	14.77	10.79	0.8 / 0.7	<0.001	[0.88, 1.68]	562 / 877
Coyote	1.87	0.84	14.77	10.79	0.68 / 0.57	<0.001	[0.48, 1.49]	238 / 358
Large canid (incl. wolf)	1.92	1.05	14.77	10.79	0.68 / 0.57	<0.001	[0.61, 1.4]	296 / 471
Black bear	2.83	0.89	14.77	10.79	0.75 / 0.73	<0.001	[1.19, 2.75]	203 / 315
Bobcat	2.03	0.91	14.77	10.79	0.75 / 0.72	<0.001	[0.28, 1.78]	68 / 98

Figure 5. Buck and doe response index by trigger, pooled 2024–2026

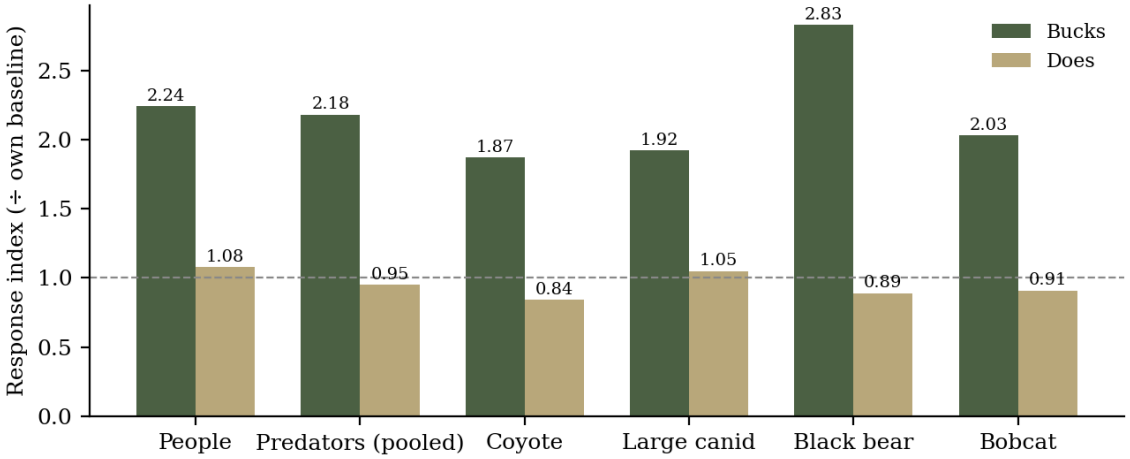

Figure 5. Buck and doe response index by trigger, pooled 2024–2026. Dashed line: no measurable delay.

The asymmetry held in both complete years and against every trigger (Table 6; Figure 6): after people, bucks 2.41 against does 0.99 in 2024 and 2.21 against 0.97 in 2025, each year's gap interval excluding zero; after pooled predators, 2.86 against 1.14 and 2.04 against 0.86. The half-year 2026 record is smaller and fawning-weighted: identifiable bucks were few (34 buck frames against 1,010 doe frames; 31 independent buck returns after people), the direction against predators held (1.92 against 0.8), and the people-trigger comparison did not separate the sexes in the usual direction (§3.7).

Table 6. Buck / doe response index by trigger and year, with the Mann–Whitney P for each year. n = independent buck returns after the trigger.

Trigger	2024	2025	2026 (Jan–Jun)	P (2024 / 2025 / 2026)	n buck (2024 / 2025 / 2026)
People	2.41 / 0.99	2.21 / 0.97	1.48 / 1.7	<0.001 / <0.001 / 0.002	105 / 217 / 31
Predators (pooled)	2.86 / 1.14	2.04 / 0.86	1.92 / 0.8	<0.001 / <0.001 / <0.001	128 / 403 / 31
Coyote	3.86 / 1.23	1.81 / 0.85	2.82 / 1.08	0.013 / <0.001 / 0.028	10 / 223 / 5
Large canid (incl. wolf)	2.66 / 1.16	1.89 / 0.86	2.82 / 1.41	<0.001 / <0.001 / 0.033	55 / 236 / 5
Black bear	3.74 / 0.94	2.3 / 0.92	1.86 / 0.7	<0.001 / <0.001 / <0.001	60 / 123 / 20
Bobcat	2.12 / 1.33	1.6 / 0.86	3.71 / 0.47	0.059 / 0.002 / 0.004	15 / 47 / 6

Figure 6. Buck and doe response index by year (n = independent buck returns)

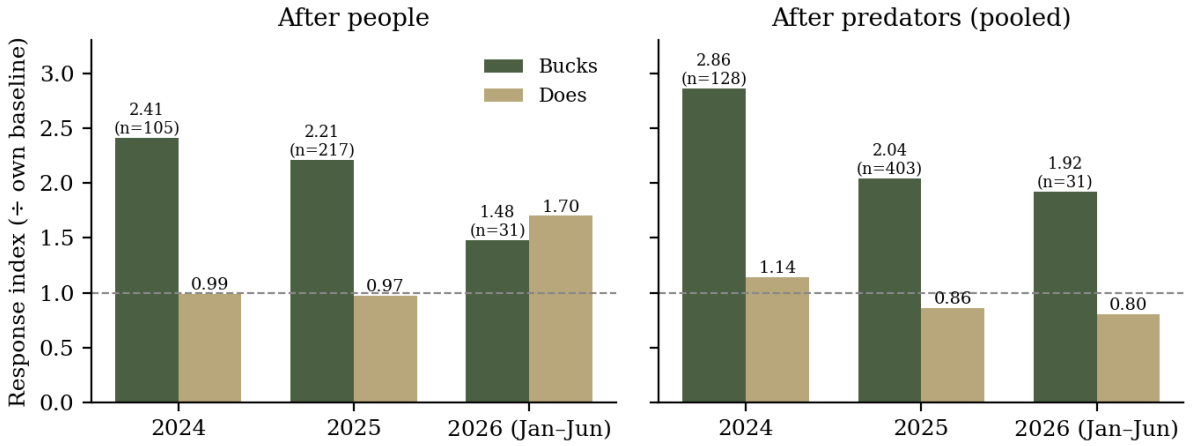

Figure 6. Buck and doe response index by year after people (left) and after pooled predators (right); n = independent buck returns.

3.7 Season: the fawning window, and the spring of 2026

Splitting the calendar at the May–June fawning window shows when the buck delay is carried (Table 7; Figure 7). Outside the window, pooled across the three years, bucks delayed after people (1.79) and after predators (2.01) while does did not (1.07 and 1.01); both gap intervals exclude zero. Inside the window the sexes converged, and they did so because the bucks became doe-like: bucks 1.07 after people and 1.01 after predators, does 1.05 and 0.89, with both gap intervals spanning zero. The wider March–June window gives the same picture (bucks 1.61 outside against 1.05 inside after people; does 0.97 and 1.19). The buck delay is therefore concentrated in the months of rut, hunting and antler regrowth, and it relaxed when bucks were least driven by that cycle.

One spring stands apart. Over March–June, does after people ran 0.89 in 2024 and 0.89 in 2025 but 1.7 in 2026 (n = 129; bucks 1.48 on 31 returns), the only spring in which the does' return after people rose clearly above their own rhythm and above the bucks'. Resolved by month, the 2026 doe delay was carried by March–April (1.68; n = 52; median return 30.5 h against a baseline of 18.2 h) and by June (1.46; n = 36), and was absent in May (0.92); over the May–June window alone it was 1.14, close to 2025's 1.16 (Table 7). The does' return after predators in the same months stayed near 1.0. Three facts keep this a lead rather than a result. The delay does not sit inside the fawning window, so

the vulnerability of does with hidden fawns is at most part of the explanation. The kind of human presence changed: 2026 carried the most foot traffic and extensive brushing of the three springs (all-deer index after people on foot 1.37, against 0.92 in 2025), and the machine-noise study shows that how people move matters to the deer (Vraniak 2026a). And the per-year spring samples are small: the 2026 March–June buck-minus-doe interval spans zero ([-1.36, 1.33]). A fourth spring, with human presence held constant by mode, would separate a doe effect from a walking effect.

Table 7. Buck / doe response index inside and outside the May–June fawning window, with the March–June window by year as a sensitivity check (n = buck / doe return intervals; CI = bootstrap 95% interval on the buck-minus-doe gap).

Period	People: buck / doe	n	Gap CI	Predators: buck / doe	n	Gap CI
Rest of year (outside May–June), pooled 2024–2026	1.79 / 1.07	265 / 434	[0.23, 1.34]	2.01 / 1.01	375 / 564	[0.65, 1.38]
May–June, pooled 2024–2026	1.07 / 1.05	85 / 182	[-0.54, 0.44]	1.01 / 0.89	178 / 296	[-0.3, 0.58]
May–June 2024	0.9 / 0.7	15 / 39	[-0.53, 0.69]	1.01 / 0.87	18 / 62	[-0.72, 1.23]
May–June 2025	0.84 / 1.16	49 / 67	[-1.08, 0.55]	0.63 / 0.86	129 / 154	[-0.53, 0.43]
May–June 2026	1.25 / 1.14	21 / 76	[-1.19, 1.36]	1.92 / 0.76	31 / 80	[0.1, 3.38]
March–June 2024	0.92 / 0.89	21 / 71	[-0.93, 0.64]	1.43 / 1.25	27 / 104	[-0.95, 1.22]
March–June 2025	0.86 / 0.89	59 / 123	[-0.52, 0.62]	0.65 / 0.72	151 / 232	[-0.34, 0.57]
March–June 2026	1.48 / 1.7	31 / 129	[-1.36, 1.33]	1.92 / 0.8	31 / 102	[0.08, 3.41]

Figure 7. Response index inside and outside the May–June fawning window, pooled 2024–2026

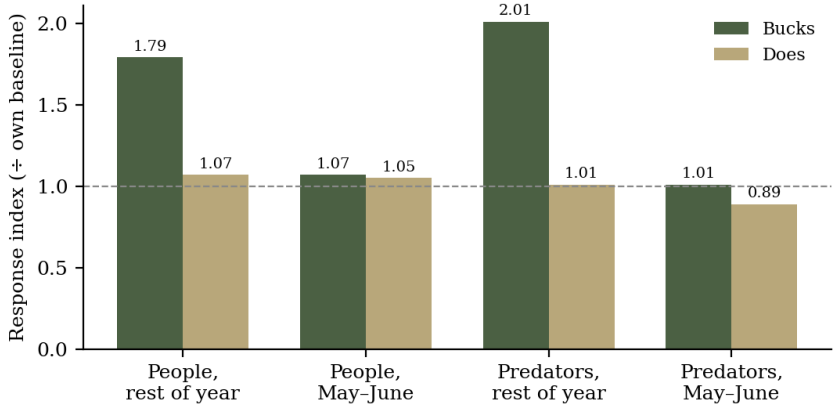

Figure 7. Buck and doe response index inside and outside the May–June fawning window, pooled 2024–2026.

3.8 How people travel

The family's passes were on foot, on a silent electric utility cart, behind a gas mower, or on a gas ATV, all in daylight. The full result is deposited separately (Vraniak 2026a): deer return times sorted by the continuity of the machine's sound, not by its fuel — on the pooled record the return ratio was 1.02 after people on foot, 0.83 after the electric cart, 0.73 after the gas mower and 1.64 after the gas ATV (continuous machines against the ATV, Mann–Whitney P = 0.0022; does alone 0.85, 0.84 and

1.66, P = 0.0005). Two points are added here. First, bucks delayed after every mode (1.87, 2.28, 2.66, 2.88) and did not distinguish among them (continuous against ATV, P = 0.3768), so the sound-continuity discrimination is the does'. Second, the contrast replicated within the March–June window in both coded springs (Table 8): the ATV drew the longest return in 2025 (1.45) and 2026 (2.1), the cart and mower the shortest.

Table 8. Deer return ratio by mode of travel within the March–June window, 2025 and 2026 (all deer; n = return intervals).

Spring	On foot	Electric cart	Gas mower	Gas ATV	Continuous vs ATV, P
2025	0.93 (40)	0.72 (48)	0.58 (21)	1.45 (14)	0.1445
2026	1.37 (80)	0.71 (30)	0.63 (16)	2.1 (23)	0.0747

3.9 Use of prairie and woodland

In every year the woodland was the animals' ground and the prairie carried most of the family's traffic (Table 9). The prairie's human share of frames rose from 8.6% in 2024 to 9.5% in 2025 and 16.7% in the first half of 2026 as foot and cart traffic grew, while the woodland ran 3.4%, 6.8% and 8.8%. Species richness was similar in the two habitats. The separation between the family and the wildlife is partial in space and much sharper in time of day (§3.4).

Table 9. Use of prairie and woodland by year.

Year · habitat	Wildlife frames	People frames	Human share of frames (%)	Species recorded	Deer individuals
2024 · Prairie	2,382	232	8.6	18	2,099
2024 · Woodland	1,393	50	3.4	16	1,039
2025 · Prairie	3,103	337	9.5	14	2,220
2025 · Woodland	1,714	130	6.8	14	1,106
2026 · Prairie	686	141	16.7	13	567
2026 · Woodland	812	81	8.8	10	740

3.10 Children and the carnivore guild

Frames containing the family's children (166 of 1,027 people frames; 14% in the evening or night hours) fell on the same trails the carnivores used. Their hours overlapped each carnivore's in proportion to that carnivore's diurnality (Table 10; Figure 8): bobcat 0.53 (night share 37%), black bear 0.5 (52%), coyote 0.29 (77%) and raccoon 0.21 (83%). The children's overlap with each carnivore was no greater than the adults' (0.55, 0.46, 0.27, 0.2), and the ordering repeated in each year. The children and the carnivores used the same trails at different hours.

Table 10. Temporal overlap of children's and adults' frames with each carnivore, by year and pooled.

Carnivore	Night share (pooled)	2024: children / adults	2025: children / adults	2026: children / adults	Pooled: children / adults
Bobcat	37%	0.38 / 0.46	0.45 / 0.46	0.42 / 0.41	0.53 / 0.55
Black bear	52%	0.42 / 0.51	0.42 / 0.37	0.31 / 0.44	0.5 / 0.46
Coyote	77%	0.28 / 0.31	0.26 / 0.2	0.24 / 0.27	0.29 / 0.27
Raccoon	83%	0.21 / 0.22	0.19 / 0.13	0.04 / 0.13	0.21 / 0.2

Figure 8. Children, adults and the carnivore guild, pooled 2024–2026

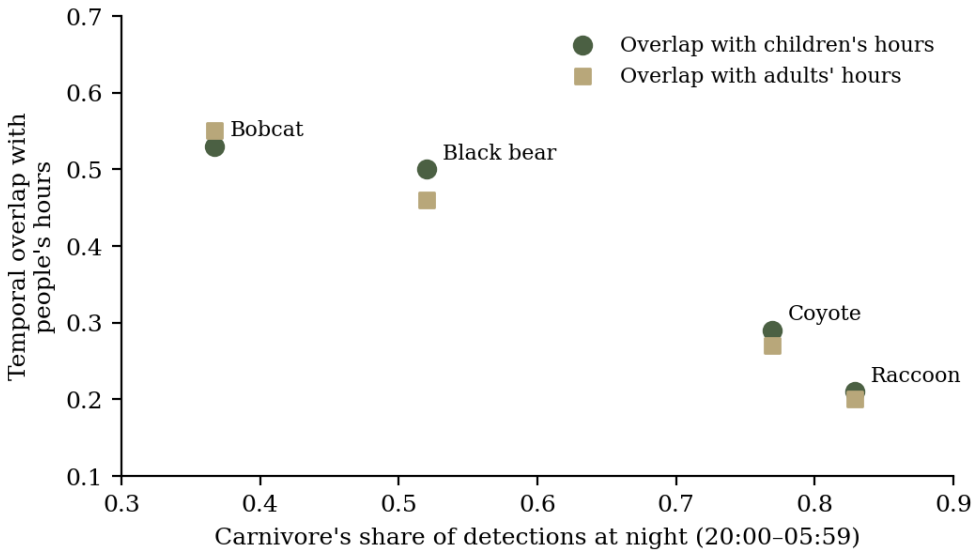

Figure 8. Temporal overlap of children's and adults' hours with each carnivore, against the carnivore's share of detections at night, pooled 2024–2026.

3.11 Wolves on the home ground

Gray wolves were confirmed on the home cameras twice in three years (two independent detections, both in 2024; none confirmed in 2025 or 2026), with a further 98 independent detections in 2024 and 21 in 2025–2026 labeled only as 'coyote or gray wolf'. The wolf movement cannot be resolved on this ground with such low numbers. The wolf-inclusive large-canid class showed the same buck-greater-than-doe asymmetry as the other predators (Table 5). The wolf–deer relationship at county, five-county and statewide scale, and the placement of this home ground against those baselines, are reported in Vraniak (2026b, c, d).

4. Discussion

4.1 What three years settle

Three years of one full-frame census settle three things that one or two years could not. The wildlife community of the restored ground is deer-dominated and, once effort is held constant, was no larger in 2025 than in 2024; the 2025 mesocarnivore rise was a one-year coyote pulse, bounded further by the conservative canid labeling of 2024. The family's presence is avoided by one species, the wild turkey, which shares the family's daylight and still holds back; the apparent wariness of the nocturnal carnivores is a difference of hours, and the deer, taken as a herd, return on schedule. And that herd-level tolerance to this resident family is a doe phenomenon: bucks delay their return after people and after every predator tested, by roughly twice their own rhythm, at matched overlap, in both complete years and pooled.

4.2 Two mechanisms, and the currency of the measure

The finding reconciles with the vigilance literature once the antipredator currency is specified. Vigilance studies measure what an animal does while it stays — scanning, reduced feeding — and often find does the more vigilant sex (Lashley et al. 2014; Olson & Van Deelen 2024). The index used here measures whether and how soon an animal returns to a site. A doe can be the more vigilant sex and the one that holds its ground; a buck can be the less vigilant sex and the one that vacates. That is what the sexual-segregation and reproductive-strategy models predict once mobility and site fidelity are brought in (Main et al. 1996; Ruckstuhl & Neuhaus 2002; Bowyer 2004; Main 2008; Gulsby et al. 2018).

Two non-exclusive mechanisms fit the buck delay. The first is a fright response: bucks, more solitary and less tied to a fixed patch outside the rut, treat a disturbed site as worth leaving. The second is movement ecology: a buck's wider ranging and lower site fidelity lengthen its return to the same camera for reasons unconnected to alarm. The index is normalized to each sex's own baseline, which absorbs much of that difference; the consistency of the gap across three years, people and four predator classes is hard to explain by ranging alone; and the fawning-window convergence, in which bucks become doe-like when they are least driven by the rut-and-ranging cycle, is itself evidence that the buck delay tracks the male calendar. Same-camera return data cannot separate the two mechanisms fully. The next step is individual or at least seasonal resolution: a rut-season buck contrast, movement covariates where any repeat-individual data exist, and a fourth fawning season with human presence held constant by mode.

4.3 The home ground against its county and region

The whole-herd index of 0.99 on this family’s home ground is the tolerant end of a gradient measured on the same instrument at wider scales: Snapshot Wisconsin deer in Washburn County returned 1.42× their baseline after a person, deer in the five surrounding counties 1.83×, and the same regional deer 2.24× after a wolf (Vraniak 2026b). The home ground differs from the county deer's surroundings chiefly in fifty years of known, quiet human presence. The turkey's avoidance of people, the sex structure of the deer's response, and the does' sensitivity to the continuity of a machine's sound (Vraniak 2026a) are the parts of that tolerance the local record can resolve and the regional record cannot.

4.4 Limitations

This is relative abundance and return timing at a single restored site with a single primary observer, not occupancy or density. The camera model stands in for the physical station in the independence rule, which risks pseudoreplication where several cameras share a model (Hurlbert 1984), and named stations exist for only part of the record. Three years is a short series in which one strong or weak year — the 2025 coyotes, the sparse 2026 bucks — can change a finding, and 2026 is a half-year weighted toward the fawning season. The 2024 and 2025 labeling schemes differ in the rarer categories and in the canid labels, and a few comparisons are partly artifacts of method. The response index cannot by itself separate a frightened animal from a ranging one on the same camera. The overlap coefficient is computed on frames rather than on independent detections, so a lingering animal weights its hour more heavily. A fourth and fifth year of the census would address these limitations directly.

Data availability

The labeled frame table, the harmonized pipeline and the results tables are held by the author and available on reasonable request. Exact locations of sensitive species are withheld.

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Author contributions and disclosure

D.A.V. conceived the study, directed all analyses, and is responsible for the content of this manuscript. Analysis code (Python) was used and all methods, statistics, results, and interpretations were specified, verified, and approved by the author, and the final text was reviewed and edited by the author.

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