

Traditional Ecological Relationship

Family sharing an abundant home within nature requires recurring mutual adaptation rather than the extraction of knowledge by passing visitors

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The path to finding and sustaining a life worth living is not through an ever finer application of knowledge, but in the recursive adaptation to relationship.

(That is: the road to finding and keeping a good life is not knowing more and more; it is living in relationship — going round again and again, and changing each time.)

Abstract

1. Relationship, not knowledge, is the unit for understanding people within nature; family is the fundamental form holding what is of value about life in a place — the residue and repository of a relationship kept across generations from the inside. Ecological science accumulates a wealth of knowledge from the outside; a family in relationship with nature is concerned with surviving, sustaining and sharing an abundant surplus with its community, which is health. I call this *traditional ecological relationship (TER)*, distinct from traditional ecological knowledge (TEK), an institutional construct that refines knowledge like a ratchet.

23 A family's relationship with nature is a loop that spirals, each pass altering what the last met,
24 by season and by generation in one place.

25 2. I track four such circles: four hundred years of Indigenous, Métis and émigré family
26 binding to particular ecotones; fifty-one years of residence on 250 acres of ancestral-guided
27 prairie and savanna restoration on a protected river in Wisconsin; a half-century of turtle nest
28 protection raising annual hatchling emergence from fewer than fifty to many hundreds; and
29 white-tailed deer response to our machines, to wolves and smaller predators — relationships
30 with a family that have produced nearly a dozen new findings.

31 3. Camera records from this home ground, compared with a statewide archive of 7,791,771
32 detections on 5,371 cameras, show that avoidance of people across the state ranks by how
33 each species is hunted — and that on our family ground five decades of reliably harmless
34 human presence have not merely reduced the deer's avoidance but reversed it.

35 4. Residence in a home is a method with declarable properties and liabilities; an animal's
36 response to co-inhabiting people is a two-way ledger, written in part by the animal, rather than
37 a disturbance coefficient; and the family is the smallest social form holding a record long
38 enough for the loop of life shared in one place to become visible.

39 5. What is at stake is whose voice is permitted to describe a home: the family that lives in it,
40 or the researchers and managers who visit it. Information is not knowledge; knowledge is not
41 wisdom; and an idea (TEK) is not a relationship (TER).

42 **Keywords:** camera trapping; *Glyptemys insculpta*; human–wildlife coexistence; Indigenous
43 and local knowledge; long-term records; *Odocoileus virginianus*; relational values; traditional
44 ecological relationship

45

46 **1. Refusing integration of traditional ecological knowledge and Western science**

47 Traditionally, long ago we migrated across vast distances, and then later we moved in
48 smaller circles, seasonally, until finally there was nowhere to go that there was not someone
49 already there. We built structures, but an institution or a house is not a home, and a family, the
50 most fundamental form of our living, lives alongside the plant and animal life who share that
51 home. This shared home ground has visitors — trappers, loggers and miners, and the agency,
52 scholarly and managerial explorers who come to study or manage it — and many come to
53 extract from the land, and from us, what is valuable to them. A family forming, sustaining and
54 sharing an abundant home within nature (health) requires recurring mutual adaptation with the
55 living beings who inhabit the home with us, rather than the extracting of pleasure, possession
56 or knowledge (wealth) by a passing visitor, which diminishes that healthy, diverse abundance
57 of mutual relationship. Over millennia my ancestors learned this, and set the primacy of
58 relationship into their dances, songs, stories and prayers. That primacy, held in the manner of
59 my family's ancestral ways of knowing, is not the institutional construct called traditional
60 ecological knowledge.

61 It may not come as a surprise, then, that I am not going to make the expected move
62 and seek to integrate traditional ecological knowledge with Western science — not because
63 the two bodies of knowledge cannot inform each other, but because knowledge is the wrong
64 unit to be joining.

65 When a discipline sets out to integrate two knowledges, it has already decided that
66 what a people or family holds about a place is a content: propositions about phenology, fire or

67 fish that can be extracted from the people who hold them, validated against an instrument, and
68 folded into the larger body of literature. The people become a source; the place, a study site.
69 And the thing that actually produced and held the knowing — a family living in one spot
70 called home across generations — drops out of the account entirely, because it is not a
71 proposition, is not validated, and is not accorded a voice.

72 In contrast to adjustment in relationship, knowledge refinement is a structure like a
73 ratchet. It accumulates in one direction, each increment locked behind the last, and what it is
74 applied to — in this case the family in the relationship with the land — cannot revise it. That
75 is the source of its enormous power, and I have spent many decades using its instruments. On
76 the other hand, relationship is a loop: each pass is altered by what the previous pass
77 encountered, and the adaptation is the whole of the meaning. You cannot fold a loop into a
78 ratchet without straightening it, and integration is the straightening. The integrated product is
79 always a knowledge with the people taken out because the people were the part that looped
80 and changed. This is why the integration is so easily accomplished: the TEK of the
81 institutions and the science of the institutions are the same kind of thing, both knowledge
82 structures, both ratchets, and the folding disturbs nothing that matters to either. Hierarchy
83 theory taught me long ago that nothing is understood at one level alone: the mechanism lies
84 below, the meaning above, and the acting between (Allen & Starr 1982). Two knowledges lie
85 on one level; joining them widens a surface without deepening it. What produces abundance,
86 in a river as in a life, is layering of different kinds, and this essay's three layers are living on a
87 home ground, reading it, and deciding what the next pass will be.

88 The field's own audits concede as much: 87% of climate research drawing on
89 Indigenous knowledge was found to be extractive, the communities engaged as sources rather

than partners (David-Chavez & Gavin 2018); reviewers of science education conclude that “TEK” as an institutional category is itself an appropriation, Indigenous knowledges modified to fit a conventional Western frame (Kim, Asghar & Jordan 2017); and the most recent survey traces the arc — elitism, recognition, preservation, implementation, exploitation — and names its final stage, equity, as not yet realized (Werdel et al. 2024). Todd (2016) watched the academy’s ‘ontological turn’ do the same with Indigenous relational thought — take up the ideas, and leave the thinkers, their politics and their relations uncited. The straightening is not an accident of bad manners. It is what a ratchet does to a loop.

What I describe instead is a relationship that is prior and that lasts: it comes before the study, produces the study, and remains after the study is finished. I call it *traditional ecological relationship*. My ancestral family has practiced it for millennia (Vraniak 2026e), and my current family for fifty-one years on two hundred and fifty acres through which the Namekagon River runs for a mile, in the Northwest Sands of northern Wisconsin (Fig. 1). In the last decade we have also studied it more deeply, with our own eyes and ears, and with the tools of science: trail cameras, acoustic recorders, and a statewide citizen-science archive. The camera did not create it. The cameras and microphones let my family read it more clearly.

The method beneath the essay can be voiced in four movements, because it is the loop lived as a life. First, listen back: to what and to whom the ancestors listened, and why — ecological genealogy. Second, restore: bring the land back toward those key relationships, so that they live now. Third, listen again, with whatever instrument will serve, to how the restoration is going for the land and for the people, and to what the plants and animals are saying. Fourth, share: hand the learning on, to the guests who walk the ground and the readers who cannot — and what is shared becomes what another family’s children will one day listen

113 back to. The four movements require no institution, no grant and no permission — only a
114 home ground, a memory, an instrument, and a door held open. What they lack is a voice.

115

116 **2. Three questions at the threshold — home, space, time and openness**

117 When the National Park Service staff and the conservancy people and the naturalists
118 came to see how this landscape along the river had been and was continuing to be formed, I
119 began with three questions I ask of anyone who comes here.

120 *Whose home is this? What kind of guest are you going to be here? What kind of host will you*
121 *be to your own guests, when they come to you in your home?*

122 They sound like porch talk. They are in fact the whole apparatus.

123 To answer the first, please know that a house is a structure; a home is a relationship —
124 not a thing bought or found standing finished, but something one does, and keeps doing, upon
125 a particular patch of ground and the lives gathered on it, until it becomes a homeland to its
126 many inhabitants. I once put the same thing another way, in a letter written at two in the
127 morning to my wife's grandfather, whose wife of seventy years had just died: home is located
128 in the heart that is shared with another heart, which in turn receives, accepts, welcomes and
129 embraces other nearby hearts that are searching for home. The two definitions are one.

130 Answering the second question is to distinguish a guest from a visitor. The visitor
131 spectates and leaves. A guest is received into what is genuinely someone's home — here, a
132 home to a few people and to more than two hundred kinds of prairie and savanna plants, over
133 two hundred kinds of birds, and a hundred kinds of wild animals. The purpose of welcoming a

134 guest is not to entertain but to send him back to his home able to do on his own ground what
135 he saw done hospitably here.

136 The third question names a discipline that neither dominates nor devours: the art of
137 leaving a space open, so that others may enter it and leave it without disturbance.

138 There are two opposite ways to wrong a space that has been kept open. The first is to
139 fill it so completely that no other may enter — our actions, our machines, our very words and
140 ideas filling a place until no other presence is allowed. The second failure, reached for
141 precisely to cure the first, is to empty a space by consuming what is in it — logging, mining,
142 water drawn off for data centers. Emptying a space is no more a relationship than over-filling
143 it. Arnold (2025) arrives at the same third way from the weeds of one river, the Shoalhaven:
144 management moved from control to ‘relational repair’, the plants read as teachers rather than
145 removed as threats.

146 Between the rushing in that over-fills and the consuming that empties there is a third
147 way, and it is the most difficult: a space kept open, entered briefly, intermittently, beheld from
148 the margins. It is what the land is forever trying to do — to open spaces and their edges, and
149 extend the time they stay open, so that they may be entered rhythmically: the plant people and
150 the four-leggeds and the wingeds dance into the space provided, weave together for a season,
151 then break off and leave, so that new dancers may enter.

152 Hold this sense of rhythm and following. It is going to come back as a number.



Figure 1. The home ground described here: 250 acres on the Namekagon River, Springbrook, Washburn County, Wisconsin — restored prairie and savanna, Hay Creek and a second spring-fed creek, the pond complex, and the wooden wood-turtle nest protection structure. Under restoration since 1975.

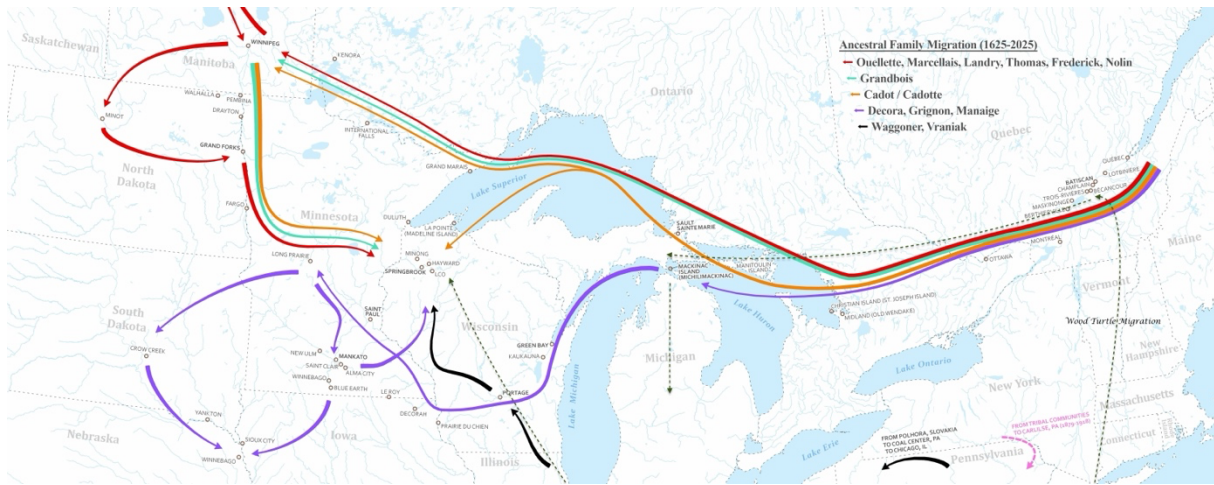
3. Circling and homing: recursion, not repetition

Relationship has a shape, and the shape is a loop.

Wood turtles reached this river before we did. Following the glacial retreat, the species recolonized the north, migrating up the east coast and by two inland routes that met again across the land bridge between Michigan's peninsulas — the likely source of that state's north-south genetic split (Willoughby et al. 2013; Amato et al. 2008).

Where the northern route meets the St. Lawrence, the river is a barrier with only a few viable crossings for turtles, and the one that matters to this account is at Trois-Rivières. My

own ancestors lived there for generations and came down that same river and made the passage west, six times over four centuries, before a seventh return settled the family permanently here (Vraniak 2026e) — and Trois-Rivières is where our Wendat-Huron ancestor Jeanne Otrihoandet’s daughter, Catherine Annenontha, lived and died. The turtles arrived long before we did (Fig. 2).



172

Figure 2. Two arrivals on one river: the wood turtle’s postglacial recolonization of the upper Midwest — the east-coast dispersal corridor and the two inland routes meeting again at the Straits of Mackinac (after Willoughby et al. 2013; Amato et al. 2008) — and the family’s passages west, 1625–2025 (Vraniak 2026e). The St. Lawrence crossing at Trois-Rivières is the author’s reading of the range. Map by Cole Sutton, adapted.

Here along a river in northern Wisconsin where turtle and family have both long settled, each season the females make a smaller loop out from the river and back to the same sand bank, and lay eggs where they were laid — the natal ground not remembered but carried, folded inside the body, drawing her back after a dozen years and more of wandering and maturing.

This is an exact claim, easy to mistake for decoration. I am not borrowing the turtle as a metaphor for the family; I am saying that homing is one behaviour with several substrates —

186 written in the turtle's body as nest-site fidelity, in the deer's year as a round of feeding,
187 bedding, mating, birthing circles, in a family as story, language, a place name, the path home
188 a child carries out of a boarding school even after the path has been cut. The mechanism
189 differs; the shape does not. And the shape is a spiral, not a circle: you never return to the same
190 thing, because the ground and the people and you yourself have all changed.

191 What makes it a spiral is that the return is adaptive, and a mechanism can be tested
192 where an image cannot. Repetition comes back to the same place and does the same thing.
193 Recursion comes back carrying what the last return produced, and does something different in
194 consequence. A turtle climbing a bank that has been flooded, dug out by a badger, re-sanded,
195 fenced and roofed since she last climbed it is not repeating herself. She has survived,
196 sustained reproduction, fostered generations as the consistent term in a loop whose other
197 terms did not hold still.

198 This matters in terms of method. If homing is a shared shape rather than a poetic
199 transfer, then a family's return to a ground is data about that ground, and a fifty-one-year
200 residence is not background to a study but part of its design.

201 In the 2026 season, between 25 May and 13 June, we logged 171 sightings of nesting
202 turtles across five species on that bank: 143 wood turtle, 10 painted, 10 snapping, 6 softshell,
203 and 2 Blanding's. These were sightings, not nests: females remain at a nesting area for a mean
204 of 3.3 days (Walde et al. 2007), so the wood turtle figure corresponds to some forty-three
205 individuals — exactly the kind of distinction a resident makes and a visitor cannot, for it took
206 years of watching one bank to learn what our own count was counting. When the protection
207 work began, fewer than fifty hatchlings were emerging in a year; recent years have run to
208 many hundreds, upwards of five hundred in a season (Vraniak et al. 2026g, 2026h).

209 The loop looks like an adaptive sequence of care, failure, observation, adaptation, and
210 care again. In 1975 I began restoring prairie, savanna, and the river and stream wetlands.
211 Twenty years later we added sand to a bank the turtles had long used, because it was thinning.
212 Raccoons and skunks were emptying the nests, so a solar fence was installed in 2015, part of a
213 four-state effort; a wooden structure substituted in 2018 whose only opening a turtle could
214 pass; doubled in 2020; a second structure installed at the far creek in 2022, then small cages
215 placed over nests outside it; then we recorded every nest and every emergence, because we
216 could no longer hold all the details of the seasons in memory; and then — because such a
217 close and intimate record shows you what you were not looking for — the badgers, the floods,
218 the mice, each sending the loop around again (Vraniak et al. 2017; Vraniak 2026f). Set those
219 in order and the mechanism shows itself: every protection built the next failure. The fence
220 concentrated the nests, and the badger came under it. A new structure kept the raccoons out
221 and sheltered the roots and the mice within. The predictable emergence that protection created
222 fed the hawk on the red pine day after day and, in the fourth week, the wasps appeared. And
223 on 28 August, before sunrise, a deer mouse crossed the frame carrying a hatchling away — a
224 seventh. The seven first records this bank has yielded are not just seven scientific discoveries.
225 They are one loop turned seven times, and each turn was opened by the act of care before it.
226 Our bank sits inside the region where adult wood turtles were radio-tracked in those same
227 years (Lapin et al. 2019), and protected communal nesting habitat, which is what we built, is
228 among the measures since modelled for the species' population viability (Bougie et al. 2022).

229 As a family we contributed — and published — seven new understandings about wood
230 turtles that science did not have. Yet the more important outcome was adjustment in what we

231 did. The loop's output is not only a more refined understanding of *Glyptemys insculpta*. It is
232 more turtles.

233 Notice the order of operations, because it is the argument of this essay in miniature. The
234 relationship came first — a family living on a bank where turtles nested. The intervention
235 came second, and it was ordinary care, not research: add to the sand bank. The study came
236 third, because the care generated questions the care could not answer. And the publications
237 came fourth, because guests asked for them, and because our own curiosity had by then
238 outrun what living alone could answer.

239 **A loop nobody intended**

240 The loop does not require anyone to intend it, and the clearest case in the literature is a
241 place where the people were removed. At Chernobyl, people built a machine to power homes,
242 and its failure made a home uninhabitable — both failures in one motion: a space over-filled
243 by human works, then emptied by the consuming of what it held. The people left, and within a
244 generation the animals were back — elk, roe and red deer, wild boar, wolves at several times
245 the abundance of comparable reserves, with no population-level suppression by radiation
246 (Deryabina et al. 2015). Then the people returned as observers, and the commonest mammals
247 sorted themselves by habitat and the abandoned settlements, with little regard for the
248 contamination gradient (Webster et al. 2016).

249 Then the loop turned again, in the worst way. In February 2022 the zone was occupied
250 for thirty-five days, and cameras deployed to study a recovering fauna recorded a war instead:
251 deer and foxes reduced their nocturnal activity against prediction, roe deer detections fell

252 during heavy military activity, wild boar and raccoon dog pulled back from the settlements
253 while fox and lynx moved toward them (Kudrenko et al. 2026).

254 Read whole, that is a recursion in which the human term keeps changing and the
255 animals adapt to each version of it: builders, then absence, then observers, then soldiers.
256 Chernobyl's animals have the place; what they do not have is anyone to be at home with, and
257 the record shows it. You would not know what our numbers meant about relationship at home
258 without knowing theirs, where no one was at home.

259

260 **4. What an instrument is, when a resident family holds it**

261 The trail camera has been our eye for more than three decades. Since 2023 the Merlin
262 application, listening through a phone, has identified 239 species of birds on this ground, 196
263 of them also caught by the long lens of my camera. This summer an acoustic recorder (Song
264 Meter) became our second ear: ninety-four recordings, forty-seven continuous hours across
265 two nights and two days, 3,135 detections of 36 species.

266 I make a claim about instruments that the literature has not made clear enough,
267 because the field mostly deploys instruments on ground where nobody lives: an instrument
268 used by a resident on his own ground is a different instrument from the same device used by a
269 visitor on someone else's — not better, different, with different powers and different
270 liabilities, and the difference should be stated rather than ignored. Liboiron (2021) has made
271 the general case — that every research method carries land relations, and that a science
272 accountable to the place it works in is possible; what follows is that case at the scale of one
273 household and its cameras.

274 The powers are concrete. Because we live here, we do not sample; we census — every
275 frame labelled, wildlife and people alike. Because we live here, the human passes on the
276 record are our passes, on our own routes, at hours we control, so a comparison that would
277 elsewhere be hopelessly confounded becomes clean. Because we live here, a design can hold
278 steady for years, decades, rather than a field season. And because we live here, the observer is
279 a known individual to the observed — in most studies a contaminant, and here the very
280 variable of interest.

281 The liabilities are equally concrete, and I state them because the design depends on
282 stating them: the steward is the instrument, and the steward is not blind; there is no control
283 ground; anything found here is a case, and its claim on the wider world has to be earned by
284 putting it next to a wider record — which is exactly what the next section of this essay does.

285

286 **5. What the seeing revealed**

287 Here are four findings, in the order we found them.

288 **The home is partitioned in time before it is partitioned in space.** Pooled across
289 three years (D. A. Vraniak, unpublished data), the residents of this ground occupy different
290 hours: the coyote's peaks and the deer's and the bear's and the turkey's and ours interleave
291 rather than coincide. Nobody arranged this. It is the rhythm the land was described as keeping
292 in Section 2, and the camera renders it as a curve. The rooms of a shared home are hours as
293 much as they are acres.

294 **It is the sputter, not the fuel.** We travel the same trails on foot, on a silent battery-

295 electric utility vehicle, and behind two gas engines that differ in acoustic character: a mower

296 with a steady, even tone, working every trail evenly, and an all-terrain vehicle that comes in

297 suddenly, sporadically, and leaves as suddenly — all vehicle use confined to daylight.

298 Measuring how long deer wait to return to a site after a pass, against their own usual interval

299 of return: on foot 1.02×, electric cart 0.83×, steady gas mower 0.73×, intermittent gas ATV

300 1.64× (Fig. 3). Pooled by sound rather than fuel, does return at 0.85× after the continuous

301 machines and at 1.66× after the intermittent one ($P = 0.0005$ for does, 0.0022 for all deer;

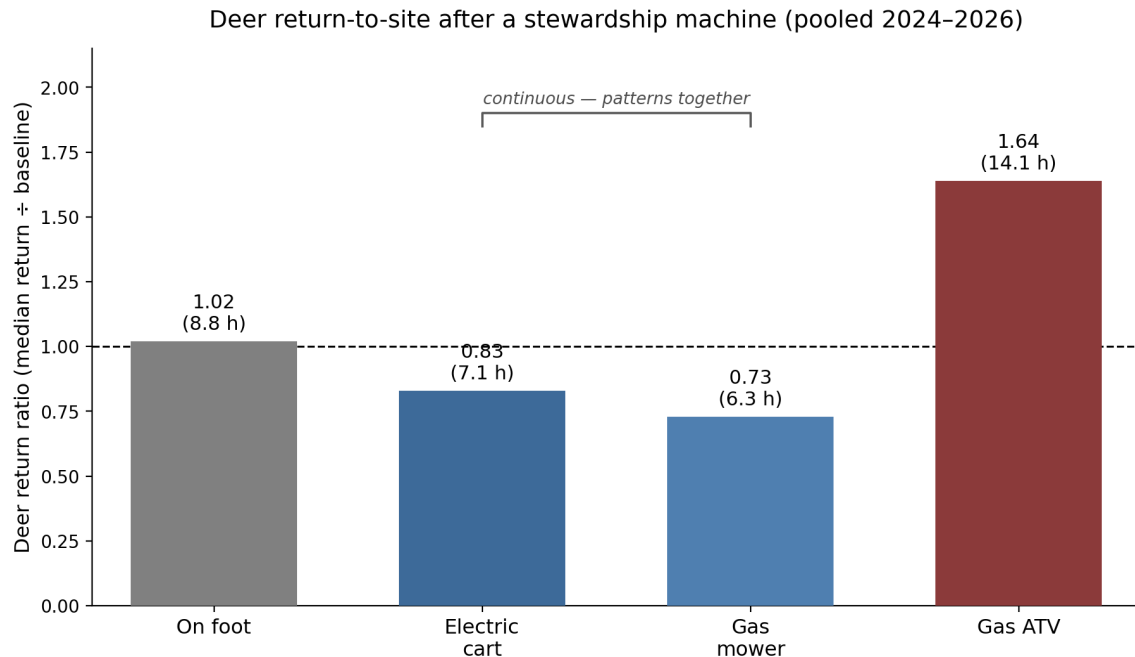
302 Vraniak 2026a, Figure 2). The electric-versus-gas contrast everyone expects is not the

303 operative variable: predictable, continuous sound permits habituation; irregular, start-and-stop

304 sound resists it and keeps loudly signalling novelty. A steady drone can be lived beside. A

305 sputter cannot.

306



Continuous machines (electric cart, steady mower) vs the intermittent gas ATV: $p = 0.0005$ (does), 0.0022 (all deer)

Figure 3. It is the sputter, not the fuel. White-tailed deer return-to-site ratio (median return ÷ the deer's own baseline interval) after a human pass, resolved by machine, pooled 2024–2026, on one stewarded ground. Continuous-sound machines draw a faster-than-normal return; the intermittent gasoline ATV nearly doubles the wait.

Statewide, in contrast, avoidance of people is ordered by how each species is hunted.

Wisconsin's citizen-science camera network — 7,791,771 detections on 5,371 cameras, 2018 to 2025 (Vraniak 2026b) — is large enough to ask six species the same question with the same instrument: how much longer than its own usual interval does each wait to return after a person passes? Every species delayed (all $P < 10^{-22}$). The sizes ranked (Fig. 4): wild turkey 5.03×, black bear 3.91×, coyote 2.50×, gray wolf 2.42×, white-tailed deer 1.86×, bobcat 1.85×.

That ranking tracks neither body size nor diet nor taxonomy; it tracks persecution — the turkey called and stalked, the bear baited and hounded, the bobcat taken only by limited permit, the wolf hunted legally only in scattered episodes, and illegally, mid-pack. Where a

species cannot avoid us in place it avoids us in time: the strictly diurnal turkey overlaps human hours almost completely (83%) yet carries the largest delay of any species, while the mammals hold 25–47% overlap and shift further into the night where traffic is heavy (Gaynor et al. 2018; D. A. Vraniak, unpublished data).

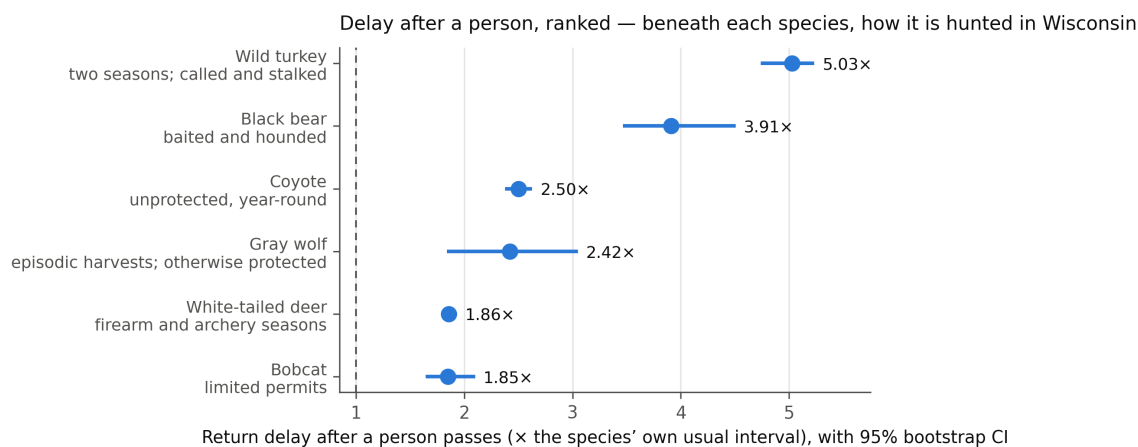


Figure 4. Delay after a person passes, ranked, for the six species abundant enough to measure in the statewide camera record (7,791,771 detections, 5,371 cameras, Wisconsin 2018–2025), with the form each species’ hunting takes in this state written beneath it. The ranking follows persecution, not body size, diet, or taxonomy.

Read plainly, this is a ledger of how each animal has learned to read us. They are not responding to the human form. They are responding to a human history, accurately.

And on one ground, the ledger runs the other way. The deer’s delay after people is the most uniform value in the entire state record: 1.82× to 1.92× in every habitat zone, north to south, forest to farmland. Yet on this landscape the same measure, after our continuous machines, runs 0.85× for the does and 0.73× to 0.83× for all deer together (Vraniak 2026a, 2026b; Fig. 5). That is at or below the deer’s ordinary interval — and below the 1.53× that deer delay even after a wild turkey, the reference for a passage with no danger in it whatsoever. After the quiet electric cart, deer come back to a site *faster* than they normally

342 would. Does discriminate between our machines; bucks avoid every machine without
343 distinction, as bucks avoid everything (D. A. Vraniak, unpublished data).

344 I must be careful about what this does and does not show. It is one property; it cannot
345 establish that stewardship generally produces this. What it does establish is that the statewide
346 number is not a constant of the species: the deer's avoidance of people is a reading of a
347 relationship, and where the relationship has been reliably harmless for fifty years, the
348 avoidance is not merely reduced. It is absent, and then it inverts.

349 There is a second thing in that number. A doe who discriminates between the electric
350 cart and the gasoline ATV is running a loop of her own, and closing it on us: each pass adds
351 to what she experiences of us, and her next response is adapted to it. Five decades of our
352 adaptation to her — trails routed, machine hours held to daylight, machines chosen and then
353 chosen again — have been met the entire time by her adaptations to us. The $0.85\times$ is not
354 tolerance granted from one side; it is where two recursions met and settled. This is the finding
355 the statewide archive cannot produce at any sample size: the archive contains no tagged case
356 in which the same people have been the other term in the loop for fifty-one years.

357

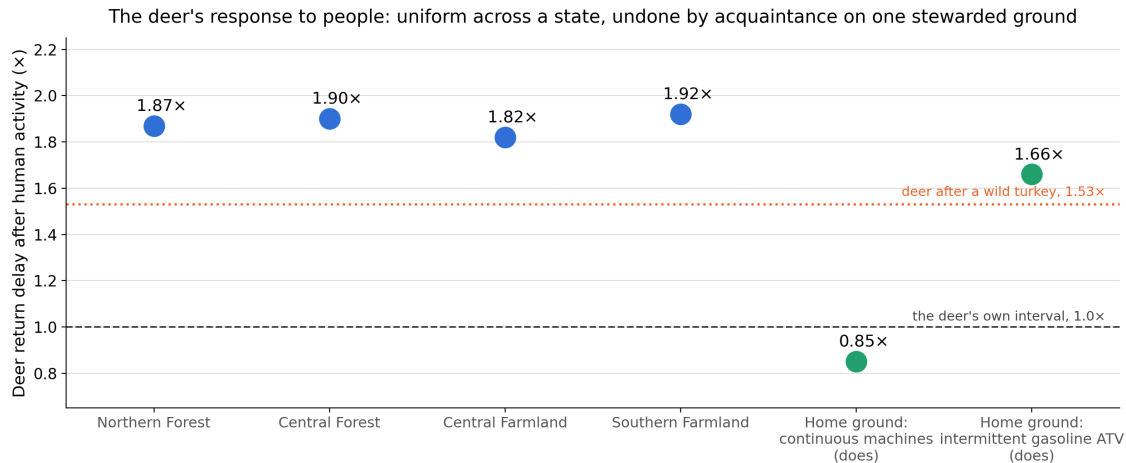


Figure 5. The deer's delay after people is the most uniform value in the state record — 1.82x to 1.92x in every habitat zone (Vraniak 2026b). On one ground stewarded by a single family for five decades, does return at 0.85x after the family's continuous machines — at or below their ordinary interval (dashed line) and below the 1.53x (dotted line) that deer delay even after a wild turkey — and at 1.66x after the intermittent gasoline ATV, still short of the statewide value (Vraniak 2026a).

One more finding cuts the other way. In February 2021, licensed hunters killed 218 wolves in this state in under three days, against a quota of 119 — with the unreported killing that followed delisting, an estimated 27–33% of the state's wolves gone within the year (Treves et al. 2021). Across the state, the fraction of encounters in which a wolf arrives after a deer rose with the harvest — from 0.63 in the two clean years before to 0.83 in the two after (Fisher's exact $P = 0.0019$), 0.87 in the harvest year and 0.91 the year after — and subsided to pre-harvest levels by 2024, while coyote, bear and turkey, mapped through the same windows, did not move (Fig. 6; Vraniak 2026b, 2026c, 2026d). Removing the wolf did not simply subtract a predator; it rearranged who follows whom, and when — and by 2024 the order of passage had settled back, the loop absorbing the blow and closing again.

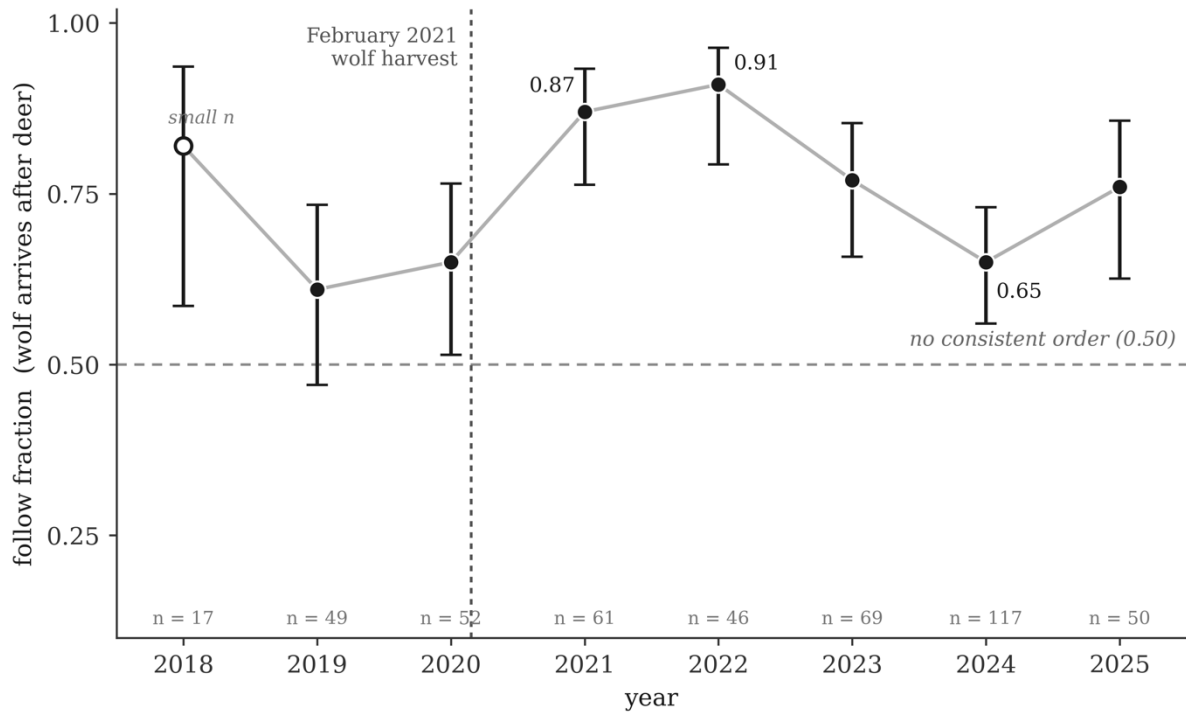


Figure 6. The loop turned by a harvest: the fraction of wolf–deer encounters in which the wolf arrives after the deer, by year, with 95% intervals, against the no-order value of 0.50. The February 2021 harvest is marked. Following rises with the harvest, peaks the year after it (0.91 in 2022), and returns to pre-harvest levels by 2024; coyote, black bear and wild turkey, run through the same windows, do not move (adapted from Vraniak 2026b, Figure 1). Data: statewide Snapshot Wisconsin extract, 7,791,771 detections on 5,371 cameras, 2018–2025.

6. Abundant health, not extracted wealth

Underneath the studies is a disposition, and it can be stated in four words. *Caring* — the relationship is a form of care, not of use. *Abundant* — oriented toward health kept within a place rather than wealth pulled out of it. *Persistent* — sustained across a long time, the only scale at which any of this becomes visible. *Shared* — bent always toward a home held in common with wild beings and with other people.

The four words have a source, and it is not the studies. Before I owned a camera I knelt in warm soil beside my grandmother, setting in young plants and covering their roots; I

392 was too young to know the word grace, and what I learned was comfort, which is where care
393 begins (Vraniak 2004, pp. 1-3). Of her own childhood in a government boarding school for
394 Indian children she never spoke; I learned of it after she was gone. Behind her stand six sets
395 of grandmother, mother and daughter across four centuries — Wendat, Anishinaabe,
396 Menominee, Hočąk, Dakota, Cree and Nakoda — who through war, removal and famine kept
397 four relationships at once, with the land that fed them, with their children, with one another,
398 and with the Sacred, and who taught their Métis sons and grandsons at their side: corn in an
399 oak savanna, whitefish and wild rice along the alvars, bison put up to last across the great
400 prairied plains (Vraniak 2026e). The disposition in this essay is theirs. I have only measured
401 it. LaPier (2017) has a name for the visitors who came to the Blackfeet reservation to write its
402 people down — storytakers — and sets beside them the storytellers who lived there and knew
403 the plants.

404 The wider record says the same of the grandmothers, on both sides of my descent.
405 Among the Ojibwe the rice harvest and the sugar bush were the women's, the women
406 managed the planting and harvesting of the corn, pumpkins and squash, and what they made
407 was 'essential not only in family life but also in trade and gift exchanges among families,
408 bands, and tribal groups' (Buffalohead 1983, pp. 238–239; Densmore 1929, pp. 122, 128).
409 Among the Métis, *lii michin*, the medicines, 'passed on from mother to daughter, grandmother
410 to granddaughter, auntie to niece' — and went unrecorded when the courts came to define
411 Métis rights by hunting and fishing (Kermoal 2016). The ledgers of majority families hold the
412 same pattern. A Midwestern farm diary for 26 September 1926 records swiss chard, six
413 cabbages, a pail of onions, six squash and eight peppers exchanged for parsley and green
414 tomatoes, among other things — one entry in a neighboring economy in which, as a letter of

415 the 1930s put it, ‘eggs, cream and chickens’ were ‘the women’s share of farm and small town
416 money’ (Neth 1995, pp. 41, 61; Jellison 1993, p. 76). In the Austrian Tyrol the 196 farm
417 gardens surveyed were the farm wife’s charge, the grandmother at work in the garden with
418 her grandchildren, the produce ‘bartered or given away to family and neighbors’ (Vogl-
419 Lukasser & Vogl 2004, pp. 112–114). In the Catalan Pyrenees the seed exchange runs through
420 the women, who are named as a source 1.7 times as often as the men, ‘because the men spent
421 much of their time outside the house in charge of the cattle’ (Calvet-Mir et al. 2012); in the
422 Bolivian Amazon the exchange of medicinal plants runs mostly within each sex, and the
423 women keep more of the plants (Díaz-Reviriego et al. 2016). And the few studies that asked
424 who teaches a child the plants, and when, answer alike: within the family, mostly the mothers
425 and grandmothers, between the ages of two and seven, in the dooryard garden — the fathers
426 teaching the boys the rest (Ruddle & Chesterfield 1977, pp. 33, 126–127; Hewlett & Cavalli-
427 Sforza 1986; Eyssartier et al. 2008).

428 None of this is a law of nature, and I do not offer it as one: the men of my line trapped
429 the beaver and shot the buffalo (Fig. 7), and the men of this household check the bank at
430 dawn. It is a pattern of residence — in this community, historically, the men went away and
431 contended, and the women stayed put and interacted (Vraniak 2008) — and the animals of
432 this ground keep the same pattern. Female white-tailed deer are highly philopatric, a daughter
433 remaining near her mother for life (Porter et al. 1991); on this ground it is the does who
434 discriminate between our machines and bring the fawns into the daylight, while the bucks
435 range and avoid everything. The turtle who carries the natal bank in her body is the female.
436 So, in this family, was the disposition carried. My wife Christina traded tomatoes, wild berry
437 jams, zucchinis and hot peppers with the other gardeners this September,

438 The distinction between abundant health and extracted wealth is the practical core of
 439 the whole frame, and it is not only about land. I gathered the seeds of native grasses and
 440 flowers and sowed them on burned ground; I opened prairie and oak and red-pine savanna
 441 with fire, as my Wendat-Huron ancestors burned oak savanna to plant corn, beans and squash.
 442 What makes a practice ancestral is not that it is old, and not that it is Indigenous
 443 genealogically or in the abstract, but that it was a family practice which promoted shared
 444 abundant health rather than extracted and hoarded wealth. Some old practices meet that
 445 criterion; some do not — the beaver trapped to the last lodge and the bison hunted to the last
 446 herd were taken by old ways too, and by hands that included my ancestors' (Fig. 7). The test
 447 is not the provenance of a technique but the direction of its yield.

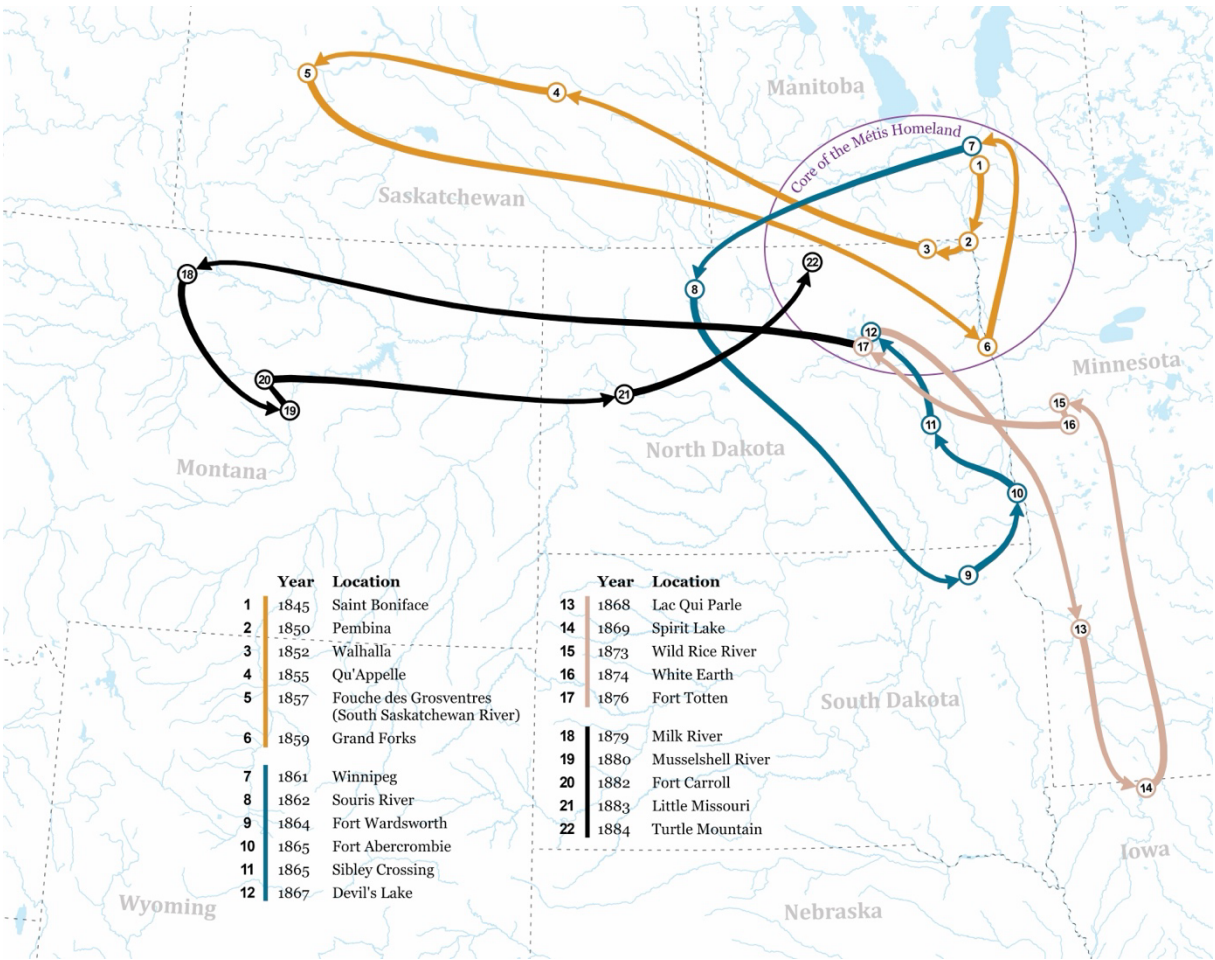


Figure 7. The looping life-path of CheWum Davis, husband of my ancestor's sister, 1845–1884: twenty-two stations from Saint Boniface to Turtle Mountain as he trapped the last beaver, 'shot the last buffalo', and settled in one place with nowhere else to go. Map by Cole Sutton, from *Secret of the Raven* (Vraniak, in preparation).

My European strands faced the same test at the same kind of gate of choice. Every lineage I descend from — Wendat, Menominee, Anishinaabe, Cree, Hočąk, Dakota, Nakoda, Métis, and equally the French, the Irish and the Slovak — learned to survive on its ground, then to sustain, then to sustain with surplus; and surplus opens the liminal choice: extract it as wealth, or invest it back into the abundance that produced it. Slovak ore came to out-value the wheat; Ireland's forest-edge cattle economy was confiscated down to a single potato crop; France's northern vineyards turned scarcity into wealthy status. The gate belongs to no one people, and neither does the better choice. A third answer fails slowest and hurts most: to spend the whole of the surplus on others, until the ground of one's own survival gives way beneath the giving. There is a fourth, and the record of my own lines holds it: the surplus can be taken into a hierarchy that manages it. In the same decades in which my Wendat ancestors were baptized, the missionaries of New France worked to make the husbands rule over wives who, the Jesuit Le Jeune complained, had 'great power' (Leacock 1978; Anderson 1991), and in the Great Lakes missions that followed, 'as men grew more receptive to introduced practices and values ... women stood only to lose status and autonomy' (Devens 1992, pp. 4–5). The choice that keeps a family on its ground is a partition — part of the surplus to surviving, part to sustaining the relationships survival depends on, part outward into the family, the community and the wider world — all three at once. Tradition, on this reading, is the record of which way a family kept choosing, and how well it kept the three in proportion; a *traditional ecological relationship* is what accumulates when, surplus after surplus,

473 generation after generation, the partition holds the gift of renewed abundance for the next
474 ones.

475

476 **7. The family as the unit of witness**

477 There are, at present, two authorized speakers about land: the scholar inside an
478 institution, and the literary artist, each licensed to voice one thing at a time — the sociology,
479 or the land, or the sacred. The family lives all three as one, and so falls between both grids:
480 there is almost no space for a family, as a unit, to voice its own relationship, not copyrighted
481 or owned, but lived.

482 I raise it here not as a grievance but as a methodological problem, because the missing
483 speaker, the missing voice, is also the missing instrument.

484 The gate has keepers, and the field has audited them. When twelve published papers
485 from leading psychology departments were resubmitted to the journals that had printed them,
486 under invented names and an invented institute, three of thirty-eight editors and reviewers
487 noticed, and of the nine that went out for review eight were rejected, in many cases for
488 ‘serious methodological flaws’ (Peters & Ceci 1982). Reviewers who can see who wrote a
489 paper are more likely than blinded reviewers of the same paper to recommend it when the
490 author is famous or the affiliation a top university or a top company — by odds of 1.63, 1.58
491 and 2.10 (Tomkins et al. 2017); one finance paper was rejected by 23% of its reviewers when
492 a Nobel laureate’s name stood alone on it, by 48% when no name did, and by 65% when only
493 the unknown co-author’s did (Huber et al. 2022). The editors of the Journal of Applied
494 Ecology report that nearly 80% of their submissions and more than 88% of what they publish

495 come from North America, Europe and Oceania (Nuñez et al. 2019; Pettorelli et al. 2021), and
496 a paper written in a second language is rejected for its English two and a half times as often as
497 a native speaker's (Amano et al. 2023).

498 None of those audits concerns a family, and that is the finding: the currencies the gate
499 is shown to accept — a name, an affiliation, a region, a language, and since 2016 a registered
500 identifier for the submitting author (Wiley 2016) — are held by the institutional speaker, and
501 the household holds none of them; it holds the relationship and the record. Philosophy has a
502 name for the transaction: a credibility deficit assigned to a speaker for what she is rather than
503 for what she says (Fricker 2007, pp. 1, 4). The deficit is charged to the science. When the
504 Chernobyl cloud crossed the Cumbrian fells in 1986, the ministry's scientists carried a model
505 of caesium built on alkaline clay soils to hills of acid peat, promised the sheep farmers a
506 three-week ban that became indefinite, and fenced the experimental plots the farmers said
507 would fail, which were quietly abandoned; the farmers 'had expressed valid and useful
508 specialist knowledge for the conduct and development of science, but this was ignored'
509 (Wynne 1992, pp. 286–287). And the ground the gate cannot hear from is most of the ground.
510 About 60% of the United States is privately owned (Bigelow & Borchers 2017), as is 70% of
511 Wisconsin's forest (USDA Forest Service 2022), and two-thirds of the species the federal
512 government lists as threatened or endangered have habitat on private land (U.S. Fish and
513 Wildlife Service 2023). The households on that ground are the largest body of resident
514 observers there is, and the one the venues are least built to receive.

515 The field's reviews confirm the vacancy in their own coding schemes. The water-
516 security scoping review sorts its sixty-one studies by community, region and multi-region; the
517 family appears nowhere as a unit of knowing (Cueva-Orjuela et al. 2026). The wildlife

518 profession names its carriers as elders, communities, Tribal Nations and the profession itself
519 (Werdel et al. 2024). And intergenerational transfer — defined everywhere as knowledge
520 “handed down through generations by cultural transmission” (Berkes 2018) and mourned in
521 every review — is rarely studied as a practice. ‘Most ethnographers, if they discuss childhood
522 at all, have little to say about how traditional knowledge of specific skills is transmitted’
523 (Ruddle 1993, p. 17), and the few who have asked who teaches whom, at what age, over
524 which plant (Ruddle & Chesterfield 1977; Eyssartier et al. 2008) asked it of a community in a
525 season of fieldwork, not of one family across its generations. The unit that does the handing
526 down is precisely the unit the literature does not see — the family. This family’s record can
527 say more, because it kept the names: for four centuries the one who handed it down was most
528 often a grandmother and her matrilineal sisters, and what she handed down was a relationship
529 with a particular plant or animal in its season — corn, whitefish, wild rice, bison (Vraniak
530 2026e). The claim is about ages and seasons, and this home ground can test it, because the
531 land sets the syllabus and the calendar names the animal — and two of the observers, my sons
532 Daybreak and Arendaki, are ten and eight.

533 One more absence is worth naming. Nearly every knowledge the reviews honor lives
534 on an edge — sea ice at freeze-up and breakup, forest islands in savanna, the sacred spring,
535 the fishery closed and opened at the river’s mouth (Nepal 2024; Cueva-Orjuela et al. 2026) —
536 and the ecotone and its seasonal transitions, where these knowledges visibly concentrate, go
537 unnamed in every review. A family that stays learns its edges first and deepest, because the
538 edge is where a home’s residents meet, and the meeting is the relationship.

539 Consider what a family can do that a project cannot. It can hold a design steady for
540 five decades, across the death of the person who started it. It can produce the multi-decade

541 behavioural baseline the discipline says it wants and almost never has, because grants run
542 three years and graduate students leave. It can make the observer a known individual to the
543 observed for long enough that the acquaintance itself becomes measurable — the finding in
544 Section 5 that no amount of statewide data could produce. And it can raise its own successors
545 into the method, which is the only succession plan a fifty-year record has.

546 The claims in that inventory have a ledger. Table 1 lists the six institutional
547 collaborations this one family ground has hosted, with the work each shared and the way each
548 engagement ended. The endings are various in detail and identical in kind: a grant closes, a
549 policy shifts, a position changes, a career moves on. Every partnership was welcome and most
550 were productive; the observation is structural: the institution's units of time are the funding
551 cycle and the career, and neither is as long as the questions. The family's units are the lifetime
552 and the body, and the method is paid in them. Residence has no institutional replicate not only
553 because no grant runs fifty years, but because of what it costs and who pays: the sleep given
554 to dawn checks at the bank; the rash on my wife's arms from clearing the roots inside the
555 structure; the hours taken from two boys by a father at a keyboard — the seasons when the
556 partition slipped, and our record says so, beside the findings those seasons produced. The
557 right-hand column of Table 1 does not vary. And Table 2 lists what has been learned from this
558 ground for the first time — findings the resourced engagements did not produce, because their
559 required input was not money but years in relationship: on one or a few visits, a researcher
560 has no opportunity to see the wasps at seven in the morning. Table 2's right-hand column
561 does not vary either.

562 *Table 1. Six institutional collaborations on one family ground, the work shared, and how each*
563 *institutional term ended.*

Partner	Years on this ground	Work shared	How the institutional term ended	The family term
National Park Service, St. Croix National Scenic Riverway (fire ecology program)	≈15 years	Six prescribed burns on the shared unit; vegetation monitoring 2007–2024; transect surveys at five sites along the river	Burning of non-NPS lands ended by policy and funding (2026, “for the foreseeable future”); the transect at this site — alone of the five — discontinued after the family declined a late-season burn that would have threatened turtles and ground-nesting birds	The family: resident before, during, and after; the work continues.
Wisconsin Department of Natural Resources	2014–2026	Two years of wood-turtle research within a four-state, three-year study; ten years of nest-protection collaboration	The grant ended; researchers moved to new positions and interests	The family: resident before, during, and after; the work continues.
USDA Natural Resources Conservation Service	2024–2026	Native forb and tree plantings	Continues only as long as the funding does	The family: resident before, during, and after; the work continues.
U.S. Fish and Wildlife Service	2024	Brush management	Funding ended; the agency staff member changed positions	The family: resident before, during, and after; the work continues.
Northland College with WI DNR Bureau of Natural Heritage Conservation	One season (2024)	Franklin’s ground squirrel translocation	No institutional follow-up; the family monitored the animals and reported the results	The family: resident before, during, and after; the work continues.

University researchers (UW–Madison, U. of Minnesota, Luther College)	One visit	Longitudinal fire × lake-pollen study of the Northwest Sands lakes	The grant ended and university careers moved on	The family: resident before, during, and after; the work continues.
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564

565 *Table 2. Findings first documented from this ground by the resident family, the input each*
566 *required, and the external funding behind it. The input in every row is the one no grant can*
567 *purchase.*

Finding first documented from this ground	The input it required	External funding
Seven first records of wood turtle biology — nest predation by the American badger; embryo survival after multi-day nest flooding; egg predation by the prairie deer mouse; egg damage and hatchling entanglement by roots inside the protection structures; predation on emerging hatchlings by the broad-winged hawk; yellow jackets feeding on a hatchling; and a deer mouse carrying a hatchling away before dawn (Vraniak et al. 2017; Vraniak 2026f; Vraniak et al. 2026g, 2026h)	Fifty years at one nesting bank	None.
First published record of yellow jackets (<i>Vespula</i> sp.) feeding on a hatchling turtle, the sixth of the seven — the wasps at the margin of the emergence, converting even the season’s dead into the food web (Vraniak et al. 2026h)	A morning at the bank in the emergence’s fourth week — 43 minutes of sustained watching, on one of fifty-one such Augusts	None.
A half-century communal nesting aggregation of the wood turtle, with annual hatchling emergence raised from fewer than fifty to upwards of five hundred (Vraniak et al. 2026g, 2026h)	Fifty-one years of protection, and the record of every nest and emergence	None.
Sound continuity, not fuel type, predicts deer response to stewardship machines	A three-year steward-conducted census laid on a	None.

— the sputter, not the fuel (Vraniak 2026a)	fifty-year baseline of the same trails, the same hours, the same people	
Inversion of the deer’s avoidance of people on long-stewarded ground — return at or below baseline (0.85×), against the most uniform value in the state record (Vraniak 2026a, 2026b)	Fifty-one years as the known term in the loop	None.
Statewide, avoidance of people ranks by each species’ persecution; the wolf-follow pulse after the 2021 harvest rose and subsided by 2024 (Vraniak 2026b, 2026c, 2026d)	A resident’s question, put to the state’s archive of 7,791,771 detections	None — the archive itself gratefully provided by the WI DNR.
Franklin’s ground squirrel translocation outcomes, monitored and reported after the institutional season ended	The two years after the grant	None.

568

569 And the family’s own record says the binding runs deeper than one household’s habit. Trace
570 the line back and the same kind of family keeps finding the same kind of ground: the Wendat
571 villages on the oak-savanna river edges, the Sault where the upper and lower lakes meet along
572 the alvars, La Pointe at the lake-and-island edge, the Red River country where parkland,
573 prairie and boreal forest touch — and now this ridge above the Namekagon, where prairie,
574 savanna, wetland and pine woodland are restored to one another by hand. Fourteen
575 generations, the same kind of ground. A mixed-descent family survives best where one world
576 meets another; it marries across the edge and raises its children on the next one. The family is,
577 by its very form, an ecotone. The restoration, then, is not a landscaping preference: it is the
578 household making by hand the kind of edge its people were shaped by and can no longer find
579 whole — each keystone planted in its trail loop by name in the language of the line that knew
580 it (Table 3). The edge conveys a family across a landscape; the keeping of it is what the
581 family conveys across the generations (Vraniak 2026e).

582 Table 3. The ancestral scaffold of the restoration: four trail loops and the gardens, each
 583 assigned to a line of the family, with the ecotone stations along each loop and the plant and
 584 animal relationships being restored in that line's name (Vraniak 2026e).

Loop	Lines of the family, and the keystone relationship	Ecotone stations along the loop	Being restored in that line's name
East loop	Huron in the oak savanna (corn), and the Burnt-Stump People (<i>Chicot</i>)	Seasonally flooded creek (Hay) basin, dry-mesic prairie; upland mixed deciduous, pine and coniferous forest; upland white and red pine and hemlock forest; lowland hardwood swamp (black ash); dry prairie (upland bracken grassland, pine barrens, sand prairie)	Chicot; American chestnut, bur oak, hemlock, cedar and butternut; Kirtland's warbler
North loop	Ottawa, Ojibwe and Menominee along the rivers and lakes (whitefish, wild rice), and the Half-burned People (<i>wissakode-ikwe/inni, aayaabtawzid</i>)	Seasonally flooded fresh meadow, mesic prairie, coniferous and tamarack swamp; spring-fed pond with upland prairie; spring-fed pond with shrub-carr and alder thicket; spring-fed pond with small islands; dry prairie	Wild rice; maple (sap); blueberries, raspberries, blackberries; brook trout; wood turtle
South loop	Hočąk and Dakota in the pine barrens and oak savannas (herbs, roots and tubers), and the Half-burnt, Mixed-blood People (<i>bois brûlé, washecho 'hoska</i>)	Open oak savanna, upland prairie with wet swales; pine-oak savanna; oak barrens, brush prairie (hazelnut); seasonally flooded Namekagon river basin (Canada bluejoint); Namekagon River flood plain, alder and shrub-carr thickets	Wapato; tinpsila (prairie turnip); high-bush cranberry; hazelnuts; chokecherries; bobolink and meadowlark
West loop	Nakoda, Cree and Métis on the plains and prairies (bison), and the Men Partially Burned (<i>âpihtawikosisân, wisahkotewan niniwak</i>)	Bracken grassland; oak woodland; red pine savanna; surrogate grasslands; springs and spring runs, hard and soft, coolwater and coldwater streams	Saskatoon berries; pemmican; Franklin's ground squirrel
Horticultural gardens and fields	French, Scots-Irish and Slovak (wine, potatoes, bread)	—	Grapes and plums; Irish, Coast Salish and Four Corners potatoes; einkorn, emmer and spelt wheat

585 The unit is not confined to one family, and it is not confined to this ground. Jean
 586 Lieppert Polfus took her doctorate on the caribou of the Sahtú by moving with her husband
 587 and children to the Sahtú communities themselves, and her collaborators named the work in
 588 their own language: *leg'hágots'enetę*, learning together (Polfus et al. 2016; see also Polfus et
 589 al. 2014). Her hands drew the animals in *Kədə Nit'q Benats'adí — Remember the Promise*,

590 the Sahtú elders' telling of the promise the Dene and the animals made to each other (Harnum
591 & Simmons 2014). That book is a people's record of a relationship, written for the children
592 who will keep it next; she could draw it truly because her family lived inside the household it
593 describes.

594 Twenty miles from this ground, out of Cable, Adrian Wydeven has spent four decades
595 in the middle of the wolf range he monitored for the state — the biologist who followed the
596 wolf's return to Wisconsin from a handful of animals to a recovered population, and who did
597 it as a resident: snow-tracking, howl surveys and winter counts run from a home set inside the
598 home of the animal (Wydeven et al. 2009).

599 Nearer still: Christian W. Cold, a wildlife educator for the state's bureau through his
600 working life, at Ladysmith on the Flambeau, showed me both modes in a single afternoon in
601 August 2026 as we trained master naturalists: first the institution's — the population statuses,
602 the prescriptions, the ratchet turning as it is built to turn — and then, slides set aside, the owl
603 he shares his home with, and the room changed because the mode had changed. A falconer for
604 more than fifty years, a bander of birds for twenty-eight: relationship does not merely
605 surround his house. It lives in it.

606 Jean with the caribou people of the Sahtú; Adrian among the wolves of the
607 Chequamegon; Christian with the owl at his hearth on the Flambeau; this family on the
608 Namekagon. None of us commutes to our relationship. Where the discipline's default is the
609 visit — the field season, the deployment, the extraction — this small company of families has
610 made the opposite wager: that you cannot read a relationship you decline to live in, and that
611 the home is not a bias to be corrected but the instrument itself.

612 And the company is wider than its biologists and naturalists: Paul and Louise
613 Dauphinais, whose Oak Lake Gitigewin — *gitigewin*, gardening, heart, head and hands to the
614 earth — has tended one farm, one family and one community in the Turtle Mountains over a
615 lifetime; Andi Wittwer, keeping the same faith as a local historian of families in the
616 Namekagon country; Jon Greendeer, teaching the young how the clothing of the deer and the
617 bison becomes the garment of our relationships with one another; Nick Vander Puy and Jean
618 Day, set courageously against the extraction that takes lives and land — Jean gone ahead,
619 buried in only a blanket, her casket given, by her own last choice, to someone in her Hočąk
620 community who could not afford one; and Scott Pitta, whose teachers, the birch of the canoe
621 and the snakes on their sticks, inform a long career of teaching the institutions of conservation
622 to do what their name promises. Each has a teacher: an animal, a tree, a landscape. Each will
623 be known, in seven generations, as an ancestor, even if not named in the literature of science.

624 There is one more thing this company shares. Each of us went through an institution
625 — the university, the bureau — and none of us settled there. I know that estate from the
626 inside: the academy keeps its wealth the way Section 6 says wealth is kept, as prestige and as
627 proprietary knowledge. I spent a decade inside earning and using its instruments and I do not
628 disparage the estate; I only decline to live in it. It is in living the relationships that lessons are
629 learned — and earned. A discipline that cannot cite the family will keep asking for long-term
630 data while defunding the only social form capable of producing it.

631

632 **8. What this asks of the field**

633 Finally, I offer three modest propositions.

634 First, treat residence as a method, with declared standards: a design with statable
635 properties — full-frame census rather than sample, the steward's own passes as the treatment,
636 the steward declared as instrument rather than hidden, every confound named. And one
637 standard borrowed from the ratchet and used inside the loop: each widening of the record —
638 our own eleven thousand frames, then one county, then five counties, then 7,791,771
639 detections across a whole state — was required to reproduce the narrower record's results to
640 the digit before it was allowed to say anything new. Residence buys duration, control of the
641 human variable, and acquaintance; it costs replication and blindness. Both halves belong in
642 the methods section. So does a third: what the method costs the residents.

643 Second, read the animal's response to us as a measure of the relationship, not only of
644 disturbance. The literature treats human presence as a stressor whose magnitude is to be
645 estimated — one direction of a two-way ledger. The turkey's $5.03\times$ and the deer's $1.86\times$ are
646 not measures of how loud we are; they are measures of what we have done, read back to us by
647 the animals with considerable accuracy. Once the number is a reading of a relationship, an
648 unusual value stops being noise: a ground where deer return faster than baseline is not a
649 measurement error. It is information about fifty-one years.

650 Third, make room for the family- and community-held record. Long private records —
651 on farms, on reserves, on family ground — are mostly unpublished, uncited, and
652 uninheritable, because the venues that would receive them require an institutional affiliation
653 and a disciplinary frame that admits only one of the things the record actually holds. The loss
654 is not primarily to the families. It is to the science, which is short of exactly the thing those
655 records contain. The agencies have the same room to make, and Table 1 says what it would
656 cost them: nothing they are not already spending. A partnership designed to outlast its grant

657 — the record kept by the family, the question held open by both — gives an agency the one
658 thing its own units of time cannot buy. The invitation has been issued from the other side as
659 well: the Eastern Maar authors of Pascoe et al. (2024), whose health, they write, ‘is linked to
660 that of our Country’, end their paper by asking the scientists and the agencies to come and
661 care for it with them; and those who have built such collaborations name three conditions —
662 relationships, Country, and an honest accounting of power (Rawluk et al. 2023). A family on
663 its own ground brings the first two ready-made; Table 1 is the accounting of the third.

664 The shortage shows in the field’s own tallies: of the evaluation frameworks the water-
665 security review could find that incorporate Indigenous knowledge, fourteen are conceptual,
666 eight implemented, six validated (Cueva-Orjuela et al. 2026) — the frameworks multiply
667 while the ground goes untested. A family-held record is implementation and validation by its
668 nature: its frame is tested every season by the beings it describes. One standard should come
669 with that room, because it is what separates a living archive from a record: an archive is worth
670 what it changes. Accumulation is not understanding; a ledger kept, read, and acted upon in no
671 way differently is simply more content. The test of a long archive is not its length but whether
672 the next pass across the ground was altered by it. By that test, the valuable part of our own file
673 is not the counts, and not the fifty-one years. It is the five occasions on which the record made
674 us do something we would not otherwise have done and the wildlife benefited: the roof after
675 the raccoons, the doubling of nest protection, the second structure at the far creek, the small
676 cages, the machine hours held to daylight.

677

678 **9. The bank, and the boys**

679 The turtle climbs a bank her mother climbed, and her mother's mother before that, and
680 lays where she was laid. She does not remember the place. She carries it. The doe walks her
681 circles; the ravens cross my path each dawn on their traverse while I walk mine in reverse,
682 and we call to each other, and the young one I once lifted off the asphalt, now an adult, still
683 veers close, and three generations after her know me through her. My family came down the
684 same river the turtles crossed, six times over four centuries, and then a seventh time stayed.
685 None of that is knowledge. It is relationship, and it was here — thick, particular, fifty years
686 deep — before we systematically applied a single camera or microphone.

687 What the cameras gave us was not the relationship. It was the ability to read it: to see
688 that we had, without intending it or knowing it, arrived at an arrangement with our roommates
689 that did not disturb them; that the deer and the fawns had come to join us in daylight; that a
690 doe will return to a place faster after our quiet cart than she would have had nothing passed at
691 all. We could not have found that only by living here, nor by studying somewhere else. It took
692 both, in that order.

693 That order is the whole of what I am proposing. Not traditional ecological knowledge
694 merged into Western science, but a relationship with the life of a shared home, held long
695 enough to be worth reading, and then read — by the people who live there, with whatever
696 instrument will serve — and shared with anyone willing to go home and do the same on their
697 own ground. A sharing of home is one place kept open by all its residents, entered by turns,
698 each life reading the others and adapting its next pass to what the last pass met, until there
699 settles an arrangement that no single side authored and each side can live beside. And the

700 title's term can then be said just as plainly: a *traditional ecological relationship* is that sharing
701 of home kept long enough to be handed on — the loop between a family and the life of one
702 place, maintained across generations until, like the turtle's bank, the return is carried rather
703 than remembered. Tradition is nothing more, and nothing less, than a relationship that has
704 outlived its first keepers.

705 What makes such a relationship rare is not any one of its parts. My wife's
706 grandparents kept three of them — with the land that fed them, with the Sacred, and with one
707 another as one heart — through seventy years of marriage, and kept all three in one place, the
708 place they had called home for close to a century. When she died, I wrote to him that this was
709 the part so few find: that the beauty and truth of a full life are not somewhere else, to be
710 travelled to, but where one has always been. He has since followed her. What I told him I
711 would carry, I have put here. And my sons, their great-grandsons, are the sixth generation of
712 her family to plant potatoes in Springbrook. Their children will be the seventh.

713 The path is not an ever finer application of knowledge. It is the recursive adaptation to
714 relationship, and all it asks is that somebody stay long enough for the loop to close.

715 This week I put a question to my sons at breakfast: if you live in the water all the time,
716 what do you become? A fish. In the air, a bird; in one kind of book, one kind of reader. The
717 question has a second half, and it is the one this essay has been answering: what does a place
718 become because you lived in it? This ground became a bank where hundreds of hatchlings
719 emerge and a trail where a doe returns faster than if nothing had passed at all; and it made two
720 boys who get up at half past five to check the water sheltering the minnows they caught from
721 the creek. What you live in makes you; what lives in you makes the place. The 0.85× is that
722 sentence as a number. The heart carries it forward.

723 The instruments will keep multiplying. We have an eye now, and have added an ear.
724 What will not change is that somebody will live there, and go out, and choose. Living,
725 reading, choosing — three layers of different kinds, and the abundance is made of all three.

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735 manuscript. Observations and nest protection were conducted by the author’s family on
736 private land. Wood turtle handling and radio-telemetry (2014–2015) were carried out by the
737 Wisconsin DNR and collaborators as part of the four-state Upper Midwest Riverine Turtle
738 Habitat Improvement project (Competitive State Wildlife Grant no. F14AP00041); sampling
739 and handling methods were approved by the Animal Care and Use Committee of the
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750 DNR under its Animal Care and Use Committee approval no. 14_Lapin_01, within the four-
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752 Wildlife Grant no. F14AP00041). Nest protection on the author's land is conducted in
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755 *Data availability statement.* The statewide analyses use the Snapshot Wisconsin camera-trap
756 archive, provided under data-sharing agreement by the Wisconsin Department of Natural
757 Resources Office of Applied Science; the extract cannot be redistributed by the author, and
758 requests should be directed to the WDNR. Derived per-year encounter tables and home-
759 ground detection summaries sufficient to reproduce the figures will be deposited in a public
760 repository on acceptance. The home-ground camera census and the nesting-bank record are
761 held by the author and available on reasonable request. Wood turtle nesting-bank coordinates
762 are withheld owing to the conservation status of *Glyptemys insculpta*.

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