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, and the family is the fundamental form holding what is of value about life in a place — the residue of a relationship kept across generations from the inside. Ecological science accumulates 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 as a ratchet does. A family's

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

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

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

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

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

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

1. Refusing integration of traditional ecological knowledge and Western science

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

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

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

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

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

The field's own audits concede as much: 87% of climate research drawing on 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

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

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

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

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

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

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

Answering the second question is to distinguish a guest from a visitor. The visitor spectates and leaves. A guest is received into what is genuinely someone's home — here, a home to a few people and to more than two hundred kinds of plants, over two hundred kinds of birds, and a hundred kinds of wild animals. The purpose of welcoming a guest is not to

entertain but to send him back to his home able to do on his own ground what he saw done hospitably here.

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

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

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

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).

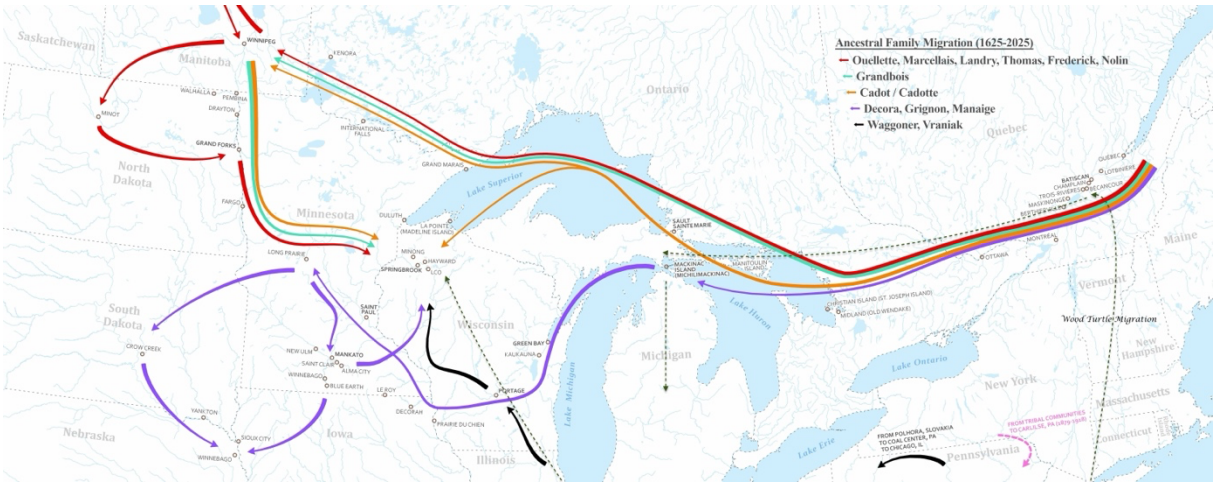

Figure 2. Two arrivals on one river: the wood turtle's postglacial recolonization of the upper Midwest — the east-coast dispersal corridor and the two inland routes meeting again at the Straits of Mackinac (after Willoughby et al. 2013; Amato et al. 2008) — and the family's passages west, 1625–2025 (Vraniak 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 —

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

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

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

The loop looks like an adaptive sequence of care, failure, observation, adaptation, and care again. In 1975 I began restoring prairie, savanna, and the river and stream wetlands. Twenty years later we added sand to a bank the turtles had long used, because it was thinning. Raccoons and skunks were emptying the nests, so a solar fence went up in 2015, part of a four-state effort; a wooden structure whose only opening a turtle could pass replaced it in 2018, was doubled in 2020, and was joined by a second at the far creek in 2022, with small cages over nests outside them; then we recorded every nest and every emergence; and then — because such a close and intimate record shows you what you were not looking for — the

badgers, the floods, the mice, each sending the loop around again (Vraniak et al. 2017; Vraniak 2026f). Set those in order and the mechanism shows itself: every protection built the next failure. The fence concentrated the nests, and the badger came under it. A new structure kept the raccoons out and sheltered the roots and the mice within. The predictable abundance emergence that protection created fed the hawk on the red pine day after day and, in the fourth week, the wasps appeared. And on 28 August, before sunrise, a deer mouse crossed the frame carrying a hatchling away — a seventh. The seven first records this bank has yielded are not just seven scientific discoveries. They are one loop turned seven times, and each turn was opened by the act of care before it. Our bank sits inside the region where adult wood turtles were radio-tracked in those years (Lapin et al. 2019), and protected communal nesting habitat is among the measures since modelled for the species' viability (Bougie et al. 2022).

As a family we contributed — and published — seven new understandings about wood turtles that science did not have. Yet the more important outcome was adjustment in what we did. The loop's output is not only a more refined understanding of *Glyptemys insculpta*. It is more turtles.

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

A loop nobody intended

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

Then the loop turned again, in the worst way. In February 2022 the zone was occupied for thirty-five days, and cameras deployed to study a recovering fauna recorded a war instead: deer and foxes reduced their nocturnal activity against prediction, roe deer detections fell during heavy military activity, wild boar and raccoon dog pulled back from the settlements while fox and lynx moved toward them (Kudrenko et al. 2026).

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

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

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

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

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

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

5. What the seeing revealed

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

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

It is the sputter, not the fuel. We travel the same trails on foot, on a silent battery-electric utility vehicle, and behind two gas engines that differ in acoustic character: a mower with a steady, even tone, working every trail evenly, and an all-terrain vehicle that comes in suddenly, sporadically, and leaves as suddenly — all vehicle use confined to daylight. Measuring how long deer wait to return to a site after a pass, against their own usual interval of return: on foot 1.02×, electric cart 0.83×, steady gas mower 0.73×, intermittent gas ATV 1.64× (Fig. 3). Pooled by sound rather than fuel, does return at 0.85× after the continuous machines and at 1.66× after the intermittent one ($P = 0.0005$ for does, 0.0022 for all deer; Vraniak 2026a, Figure 2). The electric-versus-gas contrast everyone expects is not the

operative variable: predictable, continuous sound permits habituation; irregular, start-and-stop sound resists it and keeps loudly signalling novelty. A steady drone can be lived beside. A sputter cannot.

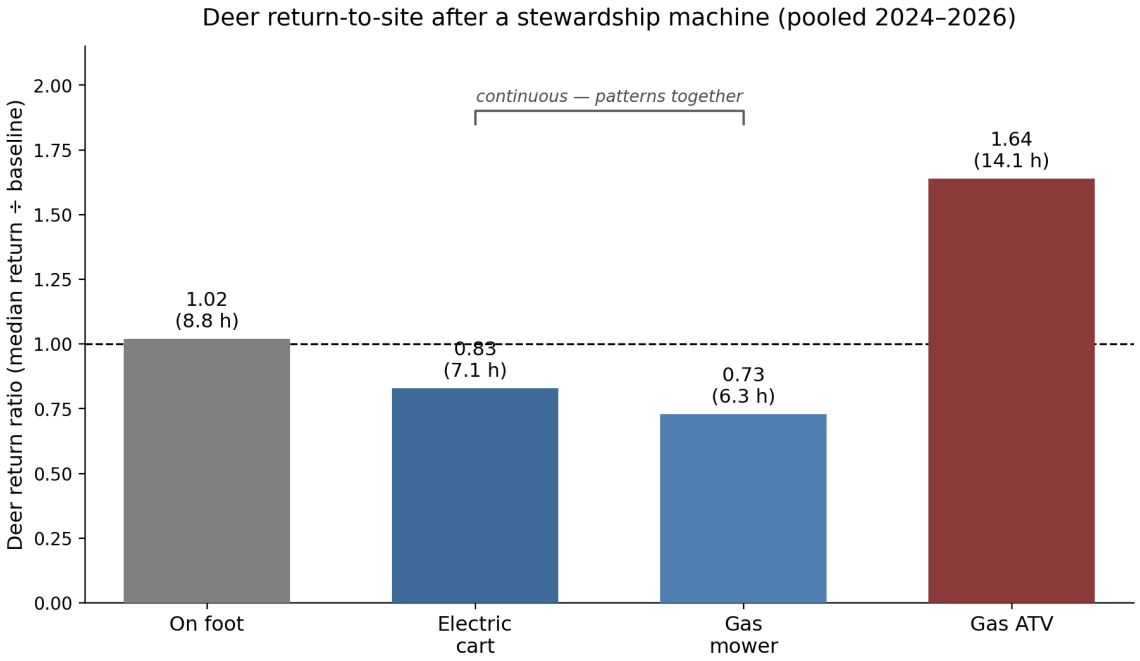

Figure 3. It is the sputter, not the fuel. White-tailed deer return-to-site ratio (median return ÷ the deer's own baseline interval) after a human pass, resolved by machine, pooled 2024–2026, on one stewarded ground. Continuous-sound machines draw a faster-than-normal return; the intermittent gasoline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

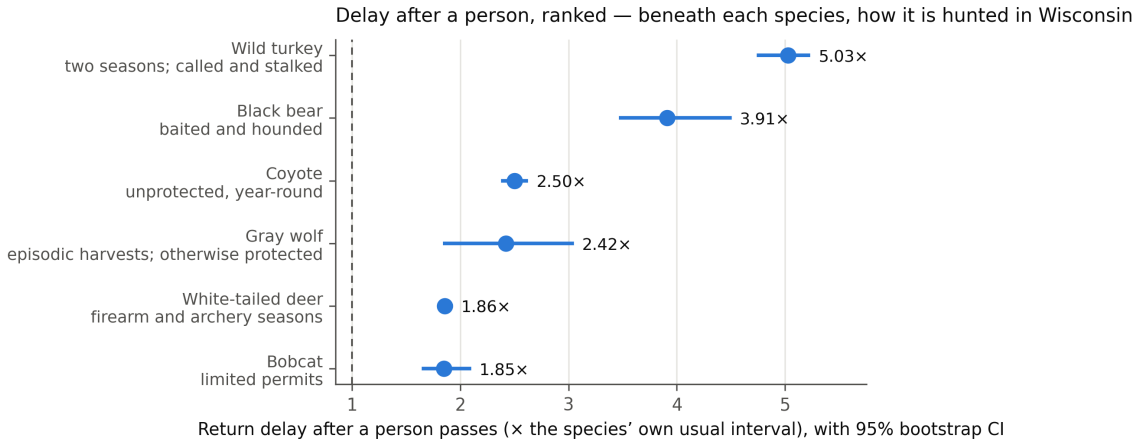

Figure 4. Delay after a person passes, ranked, for the six species abundant enough to measure in the statewide camera record (7,791,771 detections, 5,371 cameras, Wisconsin 2018–2025), with the form each species' hunting takes in this state written beneath it. The ranking follows persecution, not body 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 property 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 would. Does discriminate between our machines; bucks avoid every machine without distinction, as bucks avoid everything (D. A. Vraniak, unpublished data).

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

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

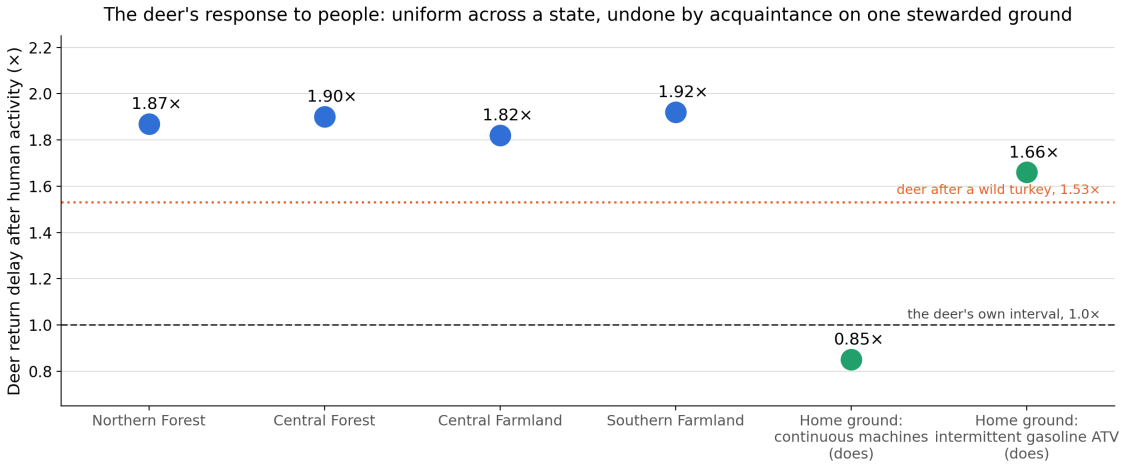

Figure 5. The deer's delay after people is the most uniform value in the state record — 1.82× to 1.92× in every habitat zone (Vraniak 2026b). On one ground stewarded by a single family for five decades, does return at 0.85× after the family's continuous machines — at or below their ordinary interval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

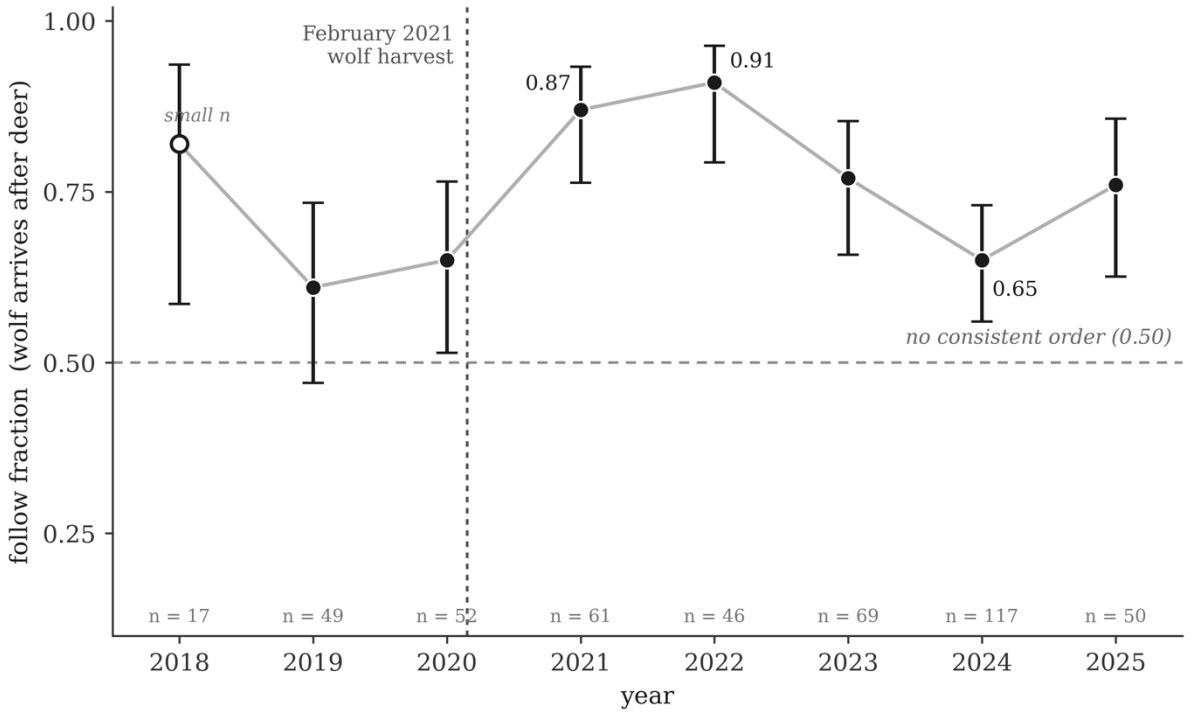

Figure 6. The loop turned by a harvest: the fraction of wolf–deer encounters in which the wolf arrives after the deer, by year, with 95% intervals, against the no-order value of 0.50. The February 2021 harvest is marked. Following rises with the harvest, peaks the year after it (0.91 in 2022), and returns 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

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

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

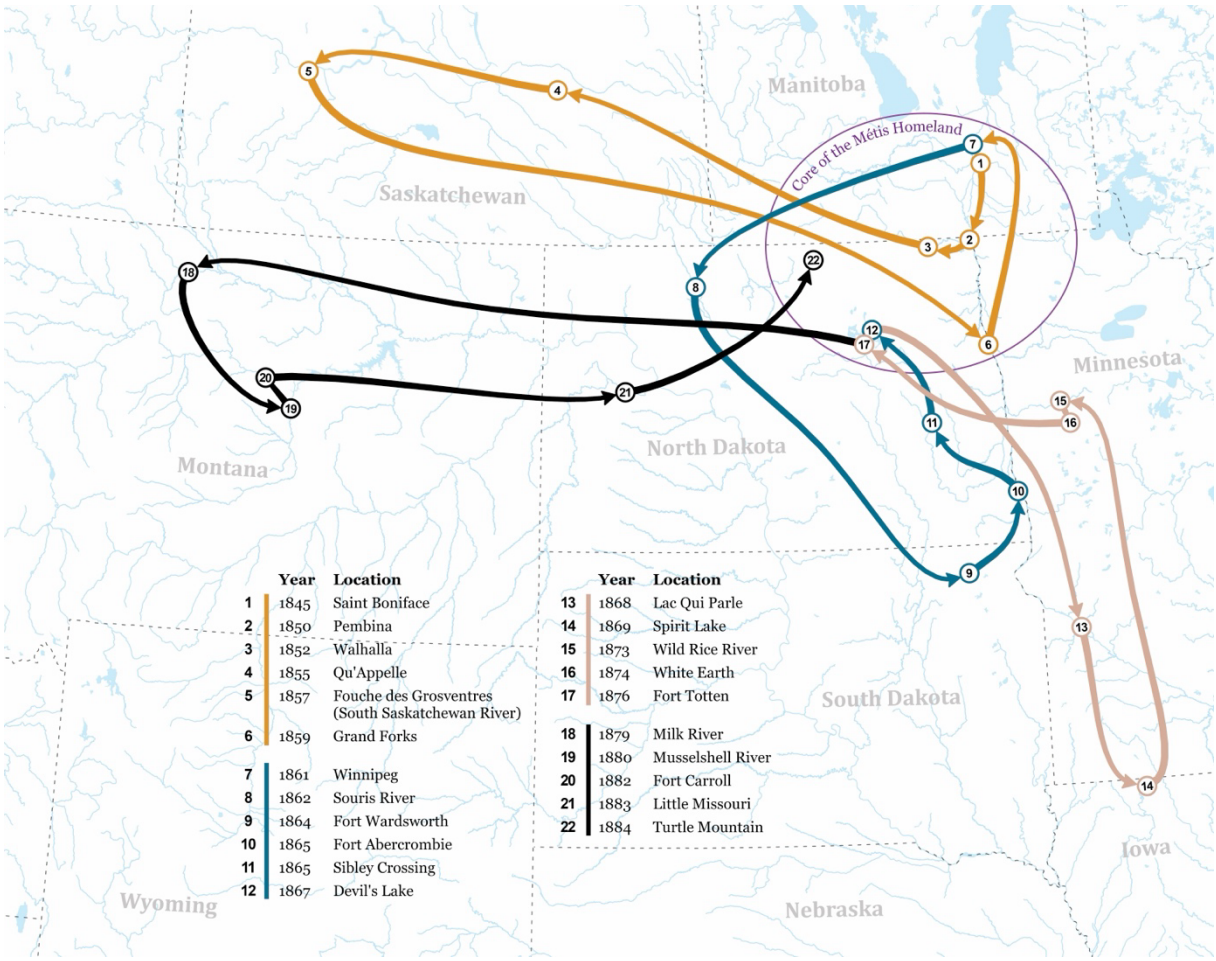

Figure 7. The looping life-path of CheWum Davis, husband of my ancestor's sister, 1845–1884: twenty-two stations from Saint Boniface to Turtle Mountain as he trapped the last beaver, 'shot the last buffalo', and settled in one place with nowhere else to go. Map by Cole Sutton, from *Secret of the Raven*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

My European strands faced the same test at the same kind of gate. 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. 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, generation after generation, the partition holds the gift of renewed abundance for the next.

7. The family as the unit of witness

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

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

The field's reviews confirm the vacancy in their own coding schemes. The water-security scoping review sorts its sixty-one studies by community, region and multi-region; the family appears nowhere as a unit of knowing (Cueva-Orjuela et al. 2026). The wildlife profession names its carriers as elders, communities, Tribal Nations and the profession itself (Werdel et al. 2024). And intergenerational transfer — defined everywhere as knowledge

“handed down through generations by cultural transmission” (Berkes 2018) and mourned in every review — is nowhere studied as a practice: no one asks who teaches whom, at what age, over which animal, in which season. The unit that does the handing down is precisely the unit the literature does not see — the family. This family’s record can say more, because it kept the names: for four centuries the one who handed it down was most often a grandmother and her matrilineal sisters, and what she handed down was a relationship with a particular plant or animal in its season — corn, whitefish, wild rice, bison (Vraniak 2026e). The claim is about ages and seasons, and this home ground can test it, because the land sets the syllabus and the calendar names the animal — and two of the observers, my sons Daybreak and Arendaki, are ten and eight.

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

Consider what a family can do that a project cannot. It can hold a design steady for five decades, across the death of the person who started it. It can produce the multi-decade behavioural baseline the discipline says it wants and almost never has, because grants run three years and graduate students leave. It can make the observer a known individual to the observed for long enough that the acquaintance itself becomes measurable — the finding in Section 5 that no amount of statewide data could produce. And it can raise its own successors into the method, which is the only succession plan a fifty-year record has.

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

Table 1. Six institutional collaborations on one family ground, the work shared, and how each 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	≈15 years	Six prescribed burns on the shared unit; vegetation monitoring 2007–2024; transect	Burning of non-NPS lands ended by policy and funding (2026, "for the foreseeable future"); the transect at this site — alone of the five —	The family: resident before, during, and after; the

Riverway (fire ecology program)		surveys at five sites along the river	discontinued after the family declined a late-season burn that would have threatened turtles and ground-nesting birds	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.

Table 2. Findings first documented from this ground by the resident family, the input each required, and the external funding behind it. The input in every row is the one no grant can 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 (Vespula 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 — the sputter, not the fuel (Vraniak 2026a)	A three-year steward-conducted census laid on a fifty-year baseline of the same trails, the same hours, the same people	None.
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	A resident's question, put to the state's archive of 7,791,771 detections	None — the archive itself gratefully

and subsided by 2024 (Vraniak 2026b, 2026c, 2026d)		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.

483

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

497 *Table 3. The ancestral scaffold of the restoration: four trail loops and the gardens, each*
498 *assigned to a line of the family, with the ecotone stations along each loop and the plant and*
499 *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 (*Chicot*)	Seasonally flooded creek (Hay) basin, dry-mesic prairie; upland mixed deciduous, pine and coniferous forest; upland white and red pine and	Chicot; American chestnut, bur oak, hemlock, cedar and

Loop	Lines of the family, and the keystone relationship	Ecotone stations along the loop	Being restored in that line's name
		hemlock forest; lowland hardwood swamp (black ash); dry prairie (upland bracken grassland, pine barrens, sand prairie)	butternut; Kirtland's warbler
North loop	Ottawa, Ojibwe and Menominee along the rivers and lakes (whitefish, wild rice), and the Half-burned People (*wissakode-ikwe/inni*, *aayaabtawzid*)	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 (*bois brûlé*, *washecho'hoska*)	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 (*âpihtawikosisân*, *wisahkotewan niniwak*)	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

The unit is not confined to one family, and it is not confined to this ground. Jean Lieppert Polfus took her doctorate on the caribou of the Sahtú by moving with her husband and children to the Sahtú communities themselves, and her collaborators named the work in their own language: *łeghágots'enetę*, learning together (Polfus et al. 2016; see also Polfus et al. 2014). Her hands drew the animals in *Kədə Nıt'ǫ Benats'adí — Remember the Promise*, the Sahtú elders' telling of the promise the Dene and the animals made to each other (Harnum & Simmons 2014). That book is a people's record of a relationship, written for the children who will keep it next; she could draw it truly because her family lived inside the household it describes.

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

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

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

Each of us went through an institution — the university, the bureau — and none of us settled there. I spent a decade inside earning and using its instruments, and I do not disparage the estate; I only decline to live in it. A discipline that cannot cite the family will keep asking for long-term data while defunding the only social form capable of producing it.

8. What this asks of the field

Finally, I offer three modest propositions.

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

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

Third, make room for the family- and community-held record. Long private records — on farms, on reserves, on family ground — are mostly unpublished, uncited, and uninheritable, because the venues that would receive them require an institutional affiliation

and a disciplinary frame that admits only one of the things the record actually holds. The loss is not primarily to the families. It is to the science, which is short of exactly the thing those records contain. The agencies have the same room to make, and Table 1 says what it would cost them: nothing they are not already spending. A partnership designed to outlast its grant — the record kept by the family, the question held open by both — gives an agency the one thing its own units of time cannot buy. . The invitation has been issued from the other side as well: the Eastern Maar authors of Pascoe et al. (2024), whose health, they write, ‘is linked to that of our Country’, end their paper by asking the scientists and the agencies to come and care for it with them; and those who have built such collaborations name three conditions — relationships, Country, and an honest accounting of power (Rawluk et al. 2023). A family on its own ground brings the first two ready-made; Table 1 is the accounting of the third.

One standard should come with that room, because it is what separates a living archive from a record: an archive is worth what it changes. Accumulation is not understanding; a ledger kept, read, and acted upon in no way differently is simply more content. The test of a long archive is not its length but whether the next pass across the ground was altered by it. By that test, the valuable part of our own file is not the counts, and not the fifty-one years. It is the five occasions on which the record made us do something we would not otherwise have done and the wildlife benefited: the roof after the raccoons, the doubling of nest protection, the second structure at the far creek, the small cages, the machine hours held to daylight.

9. The bank, and the boys

The turtle climbs a bank her mother climbed, and her mother's mother before that, and lays where she was laid. She does not remember the place. She carries it. The doe walks her circles; the ravens cross my path each dawn on their traverse while I walk mine in reverse, and we call to each other, and the young one I once lifted off the asphalt, now an adult, still veers close, and three generations after her know me through her. My family came down the same river the turtles crossed, six times over four centuries, and then a seventh time stayed.

None of that is knowledge. It is relationship, and it was here — thick, particular, fifty years deep — before we systematically applied a single camera or microphone.

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

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

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

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

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

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

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

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

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Author contributions, disclosure and statement on inclusion. Damian A. Vraniak conceived and directed the work, and wrote and edited the manuscript; all analyses, methods, statistics, results and interpretations were specified, verified and approved by the author, and the final text was written and edited by the author, who is responsible for the content of this manuscript. Observations and nest protection were conducted by the author's family on private land. Wood turtle handling and radio-telemetry (2014–2015) were carried out by the Wisconsin DNR and collaborators as part of the four-state Upper Midwest Riverine Turtle Habitat Improvement project (Competitive State Wildlife Grant no. F14AP00041); sampling and handling methods were approved by the Animal Care and Use Committee of the Wisconsin DNR (no. 14_Lapin_01). No external funding from that project was received by the author. The half-century record this essay draws on was made and maintained by the family named in the Acknowledgements, on their own home ground; the study was designed,

carried out and interpreted by residents of the place it describes, and its findings are shared on that ground with visiting practitioners, naturalists and agency staff.

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Ethics statement. The essay rests on observational camera and acoustic records collected on the author's own land; no animal was captured or handled for the analyses reported here. Wood turtle handling and radio-telemetry (2014–2015) were carried out by the Wisconsin DNR under its Animal Care and Use Committee approval no. 14_Lapin_01, within the four-state Upper Midwest Riverine Turtle Habitat Improvement project (Competitive State Wildlife Grant no. F14AP00041). Nest protection on the author's land is conducted in cooperation with the Wisconsin DNR. The living people named in Section 7 are described from their own published work and public roles.

Data availability statement. The statewide analyses use the Snapshot Wisconsin camera-trap archive, provided under data-sharing agreement by the Wisconsin Department of Natural Resources Office of Applied Science; the extract cannot be redistributed by the author, and requests should be directed to the WDNR. Derived per-year encounter tables and home-ground detection summaries sufficient to reproduce the figures will be deposited in a public repository on acceptance. The home-ground camera census and the nesting-bank record are held by the author and available on reasonable request. Wood turtle nesting-bank coordinates are withheld owing to the conservation status of *Glyptemys insculpta*.

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