

The Land Stewardship



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Graduate-Level Farming

Mastodon Valley is Setting Out to Redefine Agriculture

EDITOR'S NOTE: The *Land Stewardship Letter* is running an occasional series of articles on "ecological agrarians"—farmers who are integrating the principles of ecology into their agricultural operations. To read the first installment in this series, see page 21 of the No. 1, 2017, edition of the *Land Stewardship Letter*.

By Brian DeVore

When Peter Allen was pursuing a doctorate in restoration ecology at the University of Wisconsin, his view of the world was relatively simple: the best way to build a healthy ecosystem was to keep humans out of the picture. Before starting the Ph.D., Allen had this paradigm reinforced while obtaining a master's degree from UW in conservation biology and sustainable development and an undergraduate degree in environmental science from Indiana University. A vegetarian at the time, the role of livestock in devastating the land played a particularly large role in Allen's academic-based ecological worldview.

"I was coming from a traditional ecological restoration ecology perspective of humans are kind of bad on the landscape and we're trying to restore some sort of native natural balance," Allen says on a beastly hot summer day.

As he says this, he's standing on the upper slopes of a steep hillside overlooking southwestern Wisconsin's Kickapoo River Valley. He has just hiked past his small herd of beef cattle grazing on the lower parts of the hill. Before that, Allen had checked on other pastures as well as a restored prairie habitat on his farm while riding around in a solar powered Polaris Ranger. During the ride, he had stopped periodically to look at the other livestock—hogs, sheep and goats—he and his wife Maureen are raising on this farm and which they sell to consumers looking for naturally raised meat.

To say Allen has modified his view of how to have a positive impact on the landscape is an understatement.

As he stands on that Wisconsin hillside, watching a curtain of rain march down the Kickapoo Valley, Allen ticks off all the amenities that drew him to this 220-acre piece of ground. There is a remnant oak

savanna stand, which is one of rarest natural habitats left in the Midwest. And there are also two springs and a wetland, which provide a source of water as well as feed a small creek. Then there is the remnant native grasses growing in the hillside pastures—as he zig-zags up the hill, Allen points out yarrow, bee balm, goldenrod and black-eyed Susan. Meadowlarks, goldfinches and an angry-sounding killdeer flush as he gains altitude.

"It's got all the various ecotypes of the Driftless Area represented in this one place," Allen says excitedly, sounding like someone who has spent years studying ecology, which he has.

But then he looks down at what at first glance seems to be the least interesting part of this farm, and gets *really* animated.

Below, tucked into a pocket between the hillside and a trout stream called Camp Creek, is something all-to-common in the rest of the Midwest: a 40-acre field of soybeans. It looks relatively flat, but Allen explains that when heavy rains hit the farm, a surprising amount of the field's soil washes into the stream. Any contaminants along for the ride in that runoff eventually make their way to the Kickapoo, which connects to the Wisconsin River and eventually the Mississippi.

This domesticated, monocultural reminder of industrial agriculture's dominance of the landscape stands out in stark contrast to the naturalness of the rest of Allen's ecological oasis, which he calls Mastodon Valley Farm. And he is thrilled to have the field there. It will provide him a prime opportunity to put into practice years of classroom training, reading, research, and, most recently, on-the-ground experiments. He can't wait to begin the process of converting the field to prairie, and eventually making it part

of the rotational grazing system he has set up for the livestock being produced here.

Beyond the Fencerow

Allen's change of heart on how restoration ecology could be executed on the Midwestern landscape can be traced to some of the history he studied while in college. Specifically, he had studied the ecology and history of the oak savanna ecosystem, which consists of hardwood trees like oaks interspersed with tallgrass prairies (bur oaks do particularly well in savannas, since their thick bark protects them from the effects of grass fires). In effect, oak savannas are the transition between prairie and the woodland, so you have the best of both worlds. These are highly diverse habitats because of this mix of trees and prairie. One estimate is that by the time Europeans arrived, roughly 50 million acres of oak savanna habitat existed in a band stretching along the eastern edge of the Great Plains from Texas into southern

Canada. There were also scatterings of this habitat in Indiana, Michigan and Ohio. Most of the oak savanna habitat was wiped out to make way for farming in the latter half of the 19th century. Perhaps 30,000 acres of the habitat remains in the Midwest

today, with each parcel amounting to less than 100 acres.

However, because of the difficulty of row-cropping some of the steeper hillsides that make up regions like the Driftless Area of southwestern Wisconsin, southeastern Minnesota and northeastern Iowa, this region has prime pockets of oak savanna habitat remaining. In fact, scientists believe this region has the largest area of what they call "restorable" oak savanna.

What Allen came to realize was that oak savannas are not a climax community—what, when left to its own devices, nature will aspire to. When the first European settlers arrived in regions like the Driftless Area, what they should have found was closed canopy forests. But journals made repeated references to oak savannas, which is a habitat reliant on intervention.

"If you leave land alone, it doesn't just turn into savanna," says Allen. "It takes quite a bit of active management."

It's now commonly believed that Native American societies managed these habitats with fire. The result was a landscape rich in herbivores like deer, elk and bison, and which produced numerous nuts and fruits,

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including acorns, hazelnuts, prairie crab apples, plums, strawberries, raspberries, blackberries, pawpaws, hawthorn haws, gooseberries and highbush cranberries. In other words, the American Indians' management system was helping the land produce more food for human consumption. Just because the first European settlers didn't recognize what they considered a managed agricultural landscape—squared off fields with fences and monocrops of grains—didn't mean it wasn't being managed to produce food.

Oak savannas also have the potential to produce lots of wildlife habitat, as well as sequester carbon—the trees trap and store carbon for a hundred years or more, until they die or are cut down. The grasses, if they are managed well, can keep sequestering carbon in perpetuity, according to Allen (there is not yet scientific consensus on just *how much* carbon grasslands can sequester long into the future).

"Grasses and trees are duking it out in this never-ending battle," says Allen. "And sometimes it's going to be all grass, and sometimes it's going to be all trees. Sometimes it will be a mix of both."

While working on his Ph.D. dissertation, he developed a model of a farm patterned on oak savannas—it would integrate a polyculture of tree crops, fruit and nut production, as well as the rotational grazing of multiple species of livestock. The domesticated animals would take the place of fire as a way to maintain open spaces between the trees. Such a management system would require actually removing trees to create that open space, an idea that Allen concedes "freaks out" his environmentalist friends. At about that time, Allen was in a bar talking about this idea with a friend who was into permaculture—a method of food production that relies on perennial species that don't have to be replanted every year. "He was like, 'Oh yeah, that's kind of like what Mark Shepard does,'" Allen recalls the friend saying.

Shepard's New Forest Farm, which is near Viola in southwestern Wisconsin, has become a model for integrating, or "stacking," various enterprises utilizing

perennial species such as fruit and nut trees. Allen ended up going to New Forest Farm to collect data for a case study. "All of a sudden this idea for a dissertation wasn't just in my crazy head—there was an example of it on the ground," he recalls.

In 2012, Allen pitched a tent on New Forest Farm with plans on spending a week. He was so struck by Shepard's use of the savanna concept that he ended up spending an entire summer there with Maureen, who has a degree in zoology. They extended their stay through the winter by living in a shack on the farm, and Allen convinced some friends to go in on helping them buy six steers. By their second summer on New Forest Farm they were grazing 20 head of



"I never quite fit in," says Peter Allen of his years studying restoration ecology in college. (LSP Photo)

cattle, as well as pigs, sheep and poultry amongst the hazelnuts and other woody species growing there. Allen was hooked. He was also convinced that he didn't need to get his doctorate to accomplish his goal of using agriculture to restore oak savanna habitat. After spending a decade in graduate school, he dropped out six months shy of finishing. He and Maureen began looking for land that had that right mix of natural habitat and cropped acres, and in 2014 bought a farm just eight miles from Shepard's operation.

Allen's decision to leave school was opposed by just about everyone he knew, including Shepard. But he felt putting off getting established on the land would cost him precious "momentum"—he was finished reading and learning about ecological restoration, now was the time to take action.

If he hadn't jumped at this chance, "I would probably have a job in Madison with

the University teaching, talking about starting a farm someday, always talking about starting a farm," says Allen. "Even when I was in the academy, I never quite fit in. Most of the ecologists thought I was crazy, because I'd talk about bringing in goats to manage invasive species, or we should bring cattle in to manage these grasslands. And then the ag people thought I was crazy because I was thinking about diversity and grassland birds and pollinators and these kinds of things."

Allen does miss one aspect of academia: teaching. Since launching Mastodon Valley Farm, he has somewhat filled that void by offering an annual one-week course on designing permaculture farming systems that

combine livestock, grass and woodlands. He's also been working on a book describing his methods and experiences.

Eco-Economics

In 2017, the Allens are starting their fourth growing season on Mastodon Valley Farm. A lot has happened in a short amount of time. They've built a cabin and are living off the grid, utilizing solar power and driving 11 miles to utilize an Internet connection. The livestock herds that were launched on New Forest Farm are now fully established on the Allen place. They have also started a meat marketing enterprise to help make their ecological restoration project economically viable.

Like many ecological agrarians, they are hoping to get the environmentally-conscious consumer to financially support their method of managing the landscape. Allen relates the story of a conversation he had with someone who felt since he didn't manage land directly, there was nothing he could do to influence the health of the ecosystem.

"I told him, 'You influence the landscape three times a day. Every time you put something in your mouth you are influencing a piece of ground,'" says the farmer.

Mastodon Valley Farm sells its meat utilizing the Community Supported Agriculture, or CSA, model. Consumers in Madison and La Crosse buy a "share" in the farm, which entitles them to a monthly delivery of beef, pork and lamb. Peter and Maureen

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have about 60 regular customers and are marketing roughly 20 beef cattle, 25 hogs and 20-25 lambs annually using this model.

The farmers believe if they could double their livestock numbers it would fit their economic needs, but would not overtax their land base. Around 80 acres of the farm is currently being grazed and one of the limiting factors is being able to pipe water for livestock to some of the more inaccessible areas of the hilly parcel.

Allen is excited about the recent advances in rotational grazing that make it more possible than ever to manage such a rugged landscape with livestock. Portable electric fencing, solar energizers, and advances in watering systems all help.

"It allows you to manage animals on the landscape in a much more intentional way than just opening it all up and saying, 'There you go, we'll see you next month or whatever,'" Allen says. "With less than \$500 in resources, you can move a lot of cattle."

Being in the business of producing livestock that are slaughtered for meat is quite a stretch for the former vegetarian, but the more Allen studied ecosystems like oak savannas, the more he realized there's no such thing as grass without grazing animals, and these days, without an economic reason to raise those herbivores, it's not practical to have them on the Midwestern landscape.

"Yes, *Bos taurus* is not a native species, but it's a pretty close mimic," he says. "It's a lot better to have the function of herbivores on the landscape, even if they're not native, than to be insistent on only natives, because it's a little late for that."

At one point, Allen shows specifically what happens when those herbivores are excluded from the land. He drives by a five-acre parcel that the farmer estimates had been in corn for around 120 years before he planted it to prairie in 2015. He used funds from the USDA Natural Resources Conservation Service pollinator habitat program to

seed the spot with native grasses and forbs. The planting is coming along nicely, and once the contract expires, Allen plans on making it one of his livestock grazing paddocks. Why is animal disturbance an important part of this natural habitat's future? The answer lies further up the hill that dominates this farm.

Allen points out how on the lower portion of the slope, an open pasture has a few trees interspersed—it had been grazed by sheep and cattle by the previous owners over the years. Suddenly, there is a spot where the pasture seems to have hit a rock wall. In reality, it is a barbed-wire fence that had kept livestock out of the upper reaches of the bluff over the years to maintain "hunt-



Allen says the mix of pasture and woodland on his farm provides the perfect laboratory to test his ideas for restoring a healthy oak savanna habitat using selective logging and the rotational grazing of livestock. "Grasses and trees are duking it out in this never-ending battle," he says. (LSP Photo)

ing habitat." The result is a dense stand of 250-year-old oaks and 50-year-old maples and other hardwoods, as well as brushy undergrowth that make it all but impenetrable.

"There's not a blade of grass in there—I mean it's bare soil in there," says Allen, adding that despite the impressive timber growth, the undisturbed woodland is much less diverse than the open mix of pasture and trees below it.

Thinking Like a Mastodon

Allen concedes it has been quite a wakeup call to take what he had learned in academia and apply it to the land.

"There were things I thought I understood from a book, but when you actually see it firsthand, it's different," he says.

For example, he had always thought of plant communities as being relatively static and wasn't prepared for how dynamic they

can be, with different grassland species, for example, dominating the landscape from one year to the next.

"What's been really neat is just seeing the same place multiple seasons," Allen says as he scans the hillside and names off the various grassland species present. "I'm excited for 20 years, 30 years in."

He has adjusted his land management through observation, as well as trial-and-error. Allen has also benefited greatly from the advice of neighboring farmers, who have insights into local weather, soil and plant conditions that a lifetime of university learning could never replicate.

Allen's long-term goal is to create a 50-50 mix of grass and tree habitat throughout the farm. Ironically, if one were to look at an aerial photo of Mastodon Valley Farm, the conclusion would be that he's accomplished his mission; it's pretty much evenly divided between grass and trees. But location is everything when it comes to overall ecosystem health. The problem is, these habitats are clustered together—the trees tend to be on the tops of the hill, and the open areas are lower, where they are more accessible to livestock and cropping.

"We've got 50 percent of 100 percent canopy and 50 percent of 100 percent grass. They're not integrated, they're segregated," says Allen.

As a result, he's cutting down trees to open up where it's solid canopy, and planting trees in the open grassland. Creating that interspersed habitat means some good old-fashioned grunt work involving chain saws and brush clearing. In a way, Allen sees himself trying to replicate what the mastodons that used to roam this valley did: they removed trees and opened up the landscape, creating a mosaic effect that attracted graziers. When one is sweating over the chain-sawing of elms and ironwood to let in the sunlight, thinking about the profound impacts megafauna had on the landscape over millennia puts things in perspective.

"I'm thinking, 'I'm like the mastodon's surrogate. I've cleared a few acres—I've got a hundred to go,'" Allen says, his voice trailing off as he laughs. "I turn 34 next month—I have plenty of time." □