



CONSERVATION GRAZING

An Opportunity for Land Trusts and Conservation Organizations

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Introduction

Open just about any book or field guide on prairies and you are bound to see reference made to the loss of species resulting from livestock agriculture. Frequently, that tight causal relationship between livestock and loss of species is all the exposure that many conservationists may have had on the subject. Yet research by the Nature Conservancy and several universities has helped demonstrate that well-managed grazing effectively supports conservation goals (see references).

This report does not delve deeply into the details of different grazing approaches or how to establish the appropriate grazing strategy for any given piece of land. Such information is highly context specific and best learned through association with the Pasture Project or other conservation grazing specialists. Rather, the report lays out some of the issues associated with the decision to graze domestic livestock on conservation lands. Since many land trust and conservation organizations are relatively

new to thinking of grazing as a habitat management tool, we're focused here on the basics.

There are many reasons why a land trust or other conservation organization might consider conservation grazing on their lands or as one of their projects. These could be for neighbor/community relations, revenue generation, and habitat management among others. Still, there remains some resistance to this management tool by some whose primary focus is biodiversity conservation.

Audubon has recently implemented conservation grazing to accomplish grassland bird conservation goals. Transitioning from an organization somewhat suspicious of grazing to one that embraces it as a critical management tool for healthy grasslands was a process. The challenges identified in this paper, the recognition of the opportunity and need, and the implied path forward are drawn primarily from Audubon's recent experience.



The Scale of the Opportunity and Need

Grasslands are among our most altered, least protected, and therefore most imperiled ecosystems globally. The tallgrass prairies of North America provide a case in point. With only about 4% remaining, they are outrageously endangered and as such have been identified as habitats of high conservation concern for public and private sector conservation organizations. According to the Natural Resources Conservation Service, there are some 770 million acres of grazing lands in the lower 48 states: an area the size of 350 Yellowstone National Parks. These acres to a great extent have been left out of the conservation conversation. Often considered degraded rangelands or written off as hay meadows, they still hold the potential to provide important habitat for grassland wildlife.

Agriculture dominates land use across these areas, and grazing specifically dominates our remaining grassland landscapes. Finding ways to work with the men and women whose land management decisions will ultimately determine the fate of prairie wildlife and our grassland ecosystems on the whole is a key priority. Grazing and grasslands are indeed compatible, and some would argue that grazing is a necessary component of healthy grasslands.

Grasslands are being lost at an alarming rate (for more on rates and causes, see Faber et al. 2012), causing many in the conservation community, especially those interested in protecting grassland landscapes, to rethink long-held assumptions regarding ranching and its role in conservation. Do we have any alternative strategies that could possibly be successful on such a massive scale?

And, with a changing market driven by new consumer demands, the time is right to move beyond tired narratives that pit conservation and agriculture as incompatible.



Strategic Partnerships

An increasing number of state and federal agencies are beginning to investigate grazing as a conservation tool. Citing cost-effectiveness and its ability to sculpt a grassland habitat with more subtlety than with a mower or fire, individuals and organizations are looking to support grazing on their own property and often on private lands within certain key geographic areas as well.

Cost-share programs which defray expenses are often available and may pay 75% or more of a landowner's project expenses.

Most conservation agencies (and land trusts) have long since realized that we are not going to be able to buy ourselves out of the problems of habitat loss and degradation. Instead, the interest is in finding multiple approaches to support large-scale habitat improvements in key landscapes dominated by private lands. This need represents an opportunity for private sector groups wishing to partner with public agencies and potentially with other area landowners as well.

At Audubon we found that the investments we made in better understanding the macroeconomic opportunities for conservation-minded ranchers has complemented investments that potential partners have made (or in the case of public agencies, are able to make). This has allowed us to establish effective partnerships in which different roles for each organization complement each other. For instance, while partners like the Pasture Project understood the details of establishing a grazing operation, Audubon understood the dynamics of the ecosystem that cattle would be utilized to help restore.



Community Relationships

There are several ways that implementing grazing management might otherwise contribute to longer-term conservation goals. Perhaps of most relevance to land conservation organizations is the ability to develop real, trusting relationships with landowners within geographies critical to conservation.

Through grazing or haying agreements, conservation organizations have an opportunity to develop strong relationships with neighboring landowners. There are countless ways that being a good neighbor could be beneficial, but from a mission perspective, establishing mutually beneficial agreements represents one way to establish the kind of relationships that might lead to formal or informal land protection opportunities, and is a way to engage with individuals and the larger community in a way that allows you to influence decision-making beyond your personal ownership. Though perhaps not immediately of measurable benefit, this sort of community-based approach has served many land trusts well and has been a cornerstone for some of the most successful efforts.

In our own experience, we have often been surprised by the positive responses received from local landowners in response to our stated interest in supporting grazing, which includes grazing efforts on our own land. Responses have ranged from supportive bemusement to particularly moving generosity. Knowledgeable ranchers see our commitment and several have expressed interest in providing advisory support as we work to learn the day to day details of grazing. This collaboration has the potential to shift the power dynamic in an interesting and mutually beneficial way. One generous rancher even offered to give us some of his animals (which have been developed over decades to perform well in their environment) to help us learn the “ins and outs” of cattle management.

Instantly, the knowledgeable rancher has the opportunity to serve as a teacher or donor. At a minimum they see that we are serious about the approach and that helps to establish trust more quickly.

Revenue Generation

Traditional approaches to land management incur significant costs. To mow brush encroaching in a prairie, for example, someone (most often paid) needs to load up a tractor, fuel it, transport it to the site, mow the brush (dealing with any mechanical issues encountered along the way), load the tractor back up and return to the base of operations, and return the next day as the scale of the project or weather dictates.

The concept that a management strategy can be budget neutral, or even help generate revenue, may be new to some conservation organizations. Demonstrating the financial feasibility of this approach will be a compelling argument. As a starting place, the Pasture Project has a series of financial calculators designed for farmers and ranchers that can help quantify the economic opportunity with grass-fed beef.

Even within groups that have a history of contracting for management services, it may well be that the shifting markets that support a growing number of premium products are not well known or understood. Clearly identifying how to access these new opportunities will require very specific

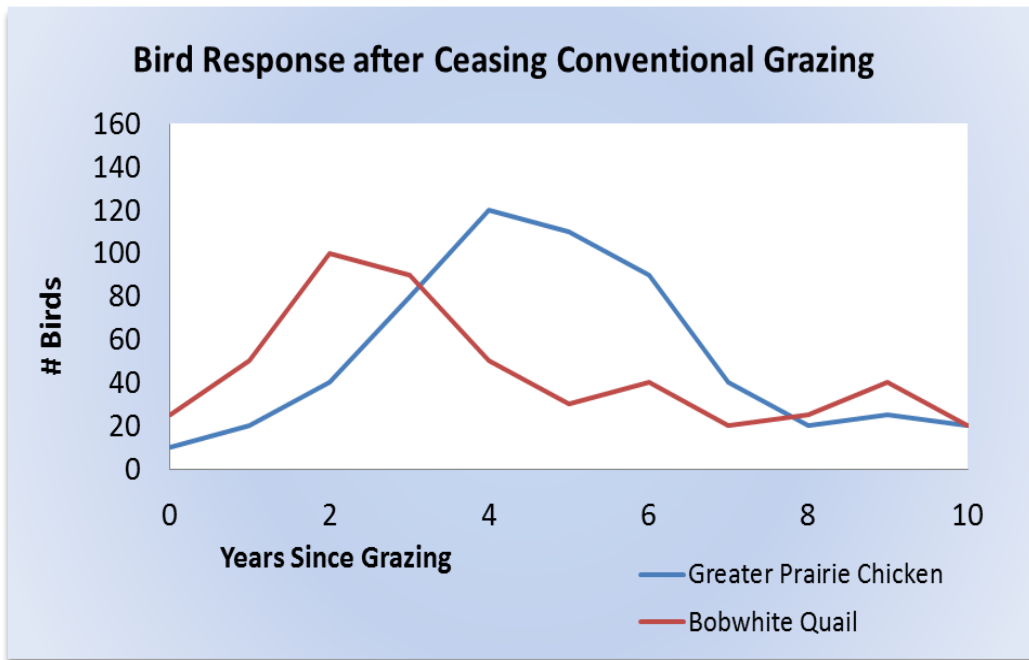
guidance, but would seem to be a relatively new opportunity and one that bears demonstrating.

While too early to report on our own financial success, we at Audubon have witnessed a promising way to manage lands in partnership with local lessees that oversee the implementation of conservation-focused grazing plans, while turning an assumed expense into a revenue stream.

Addressing Habitat Degradation through Habitat Management

The leading causes of species endangerment and extinction are habitat loss and habitat degradation. Many land trusts have focused on addressing direct loss of habitat, often through easements and other agreements with landowners. This is a critical first step in preserving biological diversity and ensuring that the protected ecosystem remains intact; however, since much of this work is being undertaken in highly fragmented landscapes, the degradation of biotic integrity must also be addressed in order for long-term conservation gains to be realized.





GRAPH 1: When conventional grazing pressure is removed, the resulting structural diversity initially supports an increase in birds like Bobwhite Quail and Greater Prairie Chicken (GPC). Within a few years, the habitat again is homogenous, only taller. An alternative approach to grazing, involving rotation of the animals across areas of the farm, can be designed to maintain high levels of structural diversity.

Conservationists have long since learned that fencing off certain areas and walking away does not constitute a viable biodiversity conservation strategy. Grasslands are dynamic and depend on periodic disturbance of one type or another in order to remain healthy. Graph 1 shows the result of removing grazing from a newly acquired parcel. Quickly, bird numbers climb, but soon those gains are precipitously lost as landscape habitat again becomes too homogenous. Findings like these have caused land managers to seek new ways to integrate grazing into their habitat management programs, using rotational grazing to build structural diversity.

For many North American terrestrial ecosystems, most notably the tallgrass prairies, the historic interaction between fire and grazing helped support a staggering diversity of plants and animals.

Large, free-range herds of native ungulates like bison, no longer roam the prairies. However, domestic cattle, when properly managed, have been shown to return many of the same habitat benefits.

Approaches like patch-burn grazing are increasingly being used to support healthy prairie ecosystems, and studies suggest that this approach also results in competitive average daily gains for livestock. Many natural area managers will assert that not only is grazing compatible with their management goals, but a critical tool in their habitat management tool box.

Historically, prairies were a diverse and dynamic patchwork of species and vegetative structures. This diversity was supported by ecological processes, like burning and grazing, and supported resilience in the often harsh and variable continental climates of the Great Plains. Homogenous annual treatment across many of our remaining grasslands has reduced available habitats, simplified their structure, and benefits certain species over others, often resulting in loss of plant diversity. Through a planned grazing system, managers are able to restore structural heterogeneity that supports diverse grassland habitats and allows for plants to move through their entire lifecycle at least every few years.

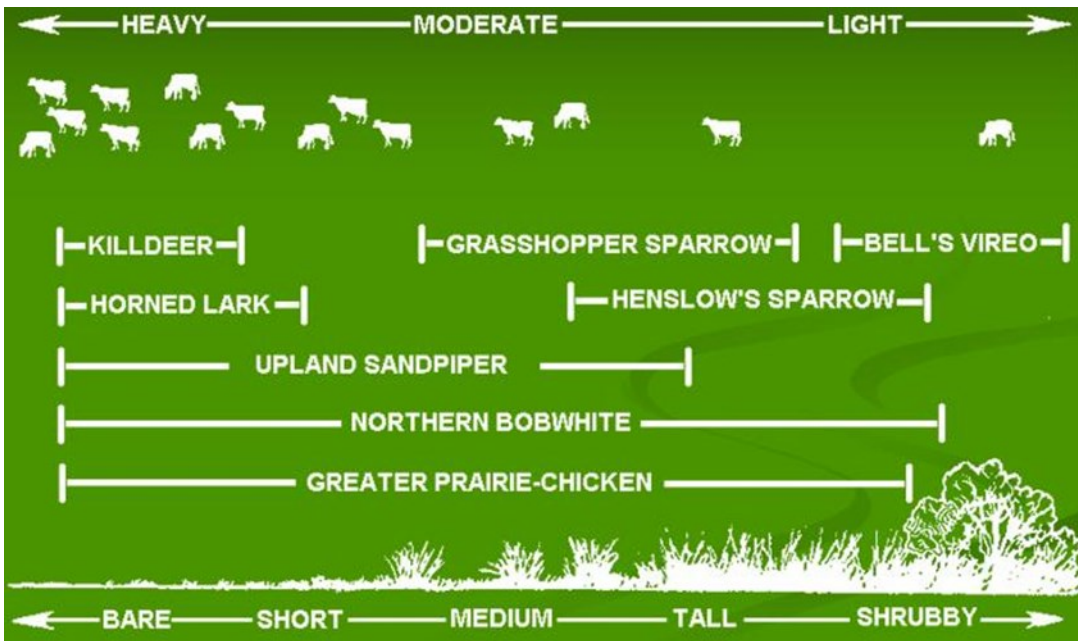


FIG. 1: Management approaches that vary grazing intensity result in the structural diversity that supports the most species of grassland birds. This represents a model landscape in MO. Target species can be defined for nearly any grassland landscape .

There further exists a large body of evidence showing how grazing can be used to support the habitat needs of ground-nesting, grassland birds; the class of birds arguably in greatest need of conservation throughout the continent. Fig 1. shows an example of how variable grazing pressure corresponds to healthy habitats for a suite of grassland birds.

Addressing Skepticism

At Audubon, we have seen repeatedly how the connection between grazing and grassland bird conservation is not well understood by partners and potential supporters. In this case, the issue is not past negative experience, per se, but an utter lack of understanding that grazing lands represent the majority of the acres available to conserve, for instance, ground-nesting grassland birds. Clearly, before a potential partner can support a strategy that embraces grazing, they need to see and understand the connection between this agricultural practice and biodiversity conservation goals.

Another often encountered issue centers on bison. Many current conservationists were raised with ide-

alized visions of the pre-European landscape. In fact, for decades, the goal of habitat restoration projects was reestablishing “pre-settlement conditions” to conservation lands.

The goal of bringing back bison is understandably compelling to staff and donors alike and, where feasible, is a fine and worthy goal. The challenge comes in when this is not feasible, the most obvious example being on land owned by cattle ranchers who have no interest in bison farming.

There is also an assumption that grazing by bison is good and grazing by cattle is bad. This perspective ignores the impact that management has on grazing impact and also ignores the reality that bison grazing does not represent a feasible large-scale conservation strategy. Even within our own ranks, Audubon has found a need to frequently reiterate this notion for people unfamiliar with land use in the Midwest and Great Plains.

While the general public are understandably uninformed about many grazing concepts, it has been a surprise that many conservation professionals are also unaware of the connection between grazing, grasslands, beef and prairie wildlife. Though making the case certainly adds to the challenge of establishing grazing on conservation lands, many who come to fully understand the opportunities become active supporters.

Well run nonprofit conservation organizations are mission-focused, if not mission-obsessed. To the extent that grazing helps to advance the work in a new, fundable way, boards and staff will more likely be open to the discussion. There may still be hesitation, and perhaps even opposition to grazing by domesticated livestock, but if it ties back to advancing the mission, there will most likely at least be a useful discussion to be had.

Informing Conservation Practice

Many conservation organizations are science-based, and look to support decisions through measurable, data-driven means.

Initial experiments with grazing open up new avenues for research that can build the knowledge base and continue to refine grazing management approaches to meet conservation objectives. For example, how can grazing management support a more resilient habitat in in light of climate change? Predictive models suggest that we are likely to encounter longer periods of drought, punctuated by heavy precipitation events. It may well be that the existing tool box (or at least the tool box of those new to grazing) is not well equipped to adapt to the highly variable conditions. To what extent does grazing provide the land manager additional flexibility? Anecdotal evidence would suggest greatly, but the opportunity to collect empirical

evidence may be of interest to known or potential partners.

A host of other opportunities exists to tailor grazing programs to conform closely with an individual conservation organization's mission. Working with a conservation-focused grazing group like the Pasture Project and its partners can help conservation organizations figure out how grazing strategies might advance organizational priorities.





Patch Burn Grazing

In the following sample of publications, you can see the fairly recent and slow move towards understanding and comfort with the patch burn grazing approach. This understanding and acceptance is still working its way through the conservation community, which indicates just how entrenched grazing skepticism is. In the case of conservation-based grazing, the current level of acceptance of the patch burn grazing approach is likely the highest give the large body of investigations that seems to confirm its benefits to species of conservation concern, while also supporting satisfactory financial gains. A principle drawback of the patch burn approach is that in many ranching communities, the use of fire is not a widely used technique. Therefore, other approaches that accomplish the same conservation impact and animal performance are needed. This is the same high bar of investigation, testing, and results sharing likely needed to be reached before other grazing approaches would receive similar support from conservationists.

In addition to the articles below, countless other internal studies and management evaluations have been produced during the same timeframe. Audubon, for instance, was peripherally involved with a management evaluation implemented by the Missouri Department of Conservation looking at the bird response, plant response and animal performance resulting from patch burn grazing on native prairieland.

The following listed citations are not meant to be comprehensive, but should give a sense of the depth of the investigation around reestablishing the interaction between fire and grazing in order to mimic the impacts that bison once had on grasslands. In the sample of articles below, one can see how, slowly, the concepts are moving from the peer reviewed literature to a wider, conservation audience.

Selected Citations for Patch Burn Grazing and Associated Learning

Steuter, Allen and Hidinger, Lori, "Comparative Ecology of Bison and Cattle on Mixed-Grass Prairie" (1999). Great Plains Research: A Journal of Natural and Social Sciences. Paper 467.

"We recommend that the focus of mixed prairie conservation be on developing ecologically sound goals and practices for grazing management, rather than on whether bison or cattle are more appropriate grazers."

Fuhlendorf, Samuel D. and David M. Engle. 2001. "Restoring heterogeneity on rangelands: Ecosystem management based on evolutionary grazing patterns," *Bioscience* 51:625-632.

Through the use of patch burn grazing "to mimic the historical grazing-fire interactions on mesic North American prairies," the authors "attempt to link the goals of conservation biologists, ecologists, and rangeland managers by presenting an approach to land management that simultaneously considers biological diversity and agricultural productivity."

Freckleton, Robert P. 2004. "The problems of prediction and scale in applied ecology: the example of fire as a management tool," *Journal of Applied Ecology* 41:599–603.

"The implication from these four experiments is that when used as a management tool, fire cannot be thought of simply as being a disturbance, but that differential effects of fire on different species are important, as well as the response of herbivores and the spatial distributions of fires."

Fuhlendorf, S. D., and D. M. Engle. 2004. "Application of the fire: grazing interaction to restore a shifting mosaic on tallgrass prairie," *Journal of Applied Ecology* 41:604-614.

The authors show that "heterogeneity has the potential to be a central paradigm for managing landscapes for multiple objectives, such as biodiversity and agricultural productivity." The study used moderate grazing of yearlings and found that "The weight gain of grazing animals differed among years but did not differ between treatments."

Vermeire, Lance T., Robert B. Mitchell, Samuel D. Fuhlendorf, and Robert L. Gillen. 2004, "Patch burning effects on grazing distribution," *Journal of Range Management*, 57:248-252.

This study of grazing patterns associated with patch burning found that "Patch burning can be employed as an effective, inexpensive grazing distribution tool."

Fuhlendorf, Samuel D., Wade C. Harrell, David M. Engle, Robert G. Hamilton, Craig A. Davis, and David M. Leslie Jr. 2006. "Should heterogeneity be the basis for conservation? Grassland bird response to fire and grazing," *Ecological Applications*, 16:1706-1716.

This study shows that "Greater spatial heterogeneity in vegetation provided greater variability in the grassland bird community....Henslow's Sparrow, a declining species, occurred only within the patch treatment." and concludes that "...uniformly applied annual fires and associated grazing practices that promote uniformity are not conducive to the maintenance of biodiversity within grassland ecosystems."

United States Department of Agriculture. 2006. "Patch burn grazing." Attachment to Biology Technical Note No. KS-34. August 10, 2006. 3 pp.

This fact sheet indicates that "Patch burn grazing ...creates a mosaic of heavily grazed and lightly grazed areas that provide a

diverse vegetative structure and increase plant diversity... From a livestock production perspective, reports from research in Kansas and Oklahoma are showing that patch burn grazing is producing weight gains competitive with cattle raised under traditional grazing management in the Flint Hills."

Rogers, Randy. 2007. "New answers to burning questions – a new strategy for managing grasslands". Kansas Department of Wildlife and Parks. 5 pp.

"...annual burning and the Intensive Early Stocking system together leave much to be desired when it comes to the needs of prairie wildlife, which have evolved with fire and grazing...What works best is a mosaic of burned and unburned areas where they can easily move from one to the other." Patch burn grazing has "... shown livestock performance, the economic side, to be competitive with other grazing systems."

Toombs, Ted. 2007. "Helping more ranchers benefit from patch burn grazing" (2 pp.) and "Kansas Cattle Rancher Becomes Steward of the Grass" (3 pp.). Center for Conservation Incentives, Environmental Defense Fund. <http://www.edf.org/article.cfm?contentID=5701> and <http://www.edf.org/article.cfm?contentID=5702>

This brief description of patch burn grazing in the Flint Hills states that patch burn grazing "can improve wildlife habitat and reduce the need for expensive fencing and other livestock distribution tools, without lowering the land's livestock potential. In this seven-year study "Preliminary data from an annual breeding bird survey, cattle performance and fixed-point photography are encouraging"

Coppedge, Bryan R, Samuel D. Fuhlendorf, Wade C. Harrell & David M. Engle, 2008, "Avian community response to vegetation and structural features in grasslands managed with fire and grazing." *Biological Conservation*, 141: 1196-1203.

In a study related to Fuhlendorf (2006), patch burns reduced abundance of the parasitic brown-headed cowbird, increased overall bird species diversity, increased grassland dependent bird richness and, compared to IES, provided suitable habitat for Henslow's sparrow, a grassland-dependent species of conservation concern.

Engle, David M., Samuel D. Fuhlendorf, Aaron Roper, David M. Leslie, Jr. 2008. "Invertebrate community response to a shifting mosaic of habitat" *Rangeland Ecology and Management*, 61:55–62.

"... the mosaic of patches in patch-burned pastures contained a wider range of invertebrate biomass and greater abundance of some invertebrate orders than did the traditionally managed pastures... a shifting mosaic across a grassland landscape provides habitat diversity for grassland species that would potentially be absent were it not for the added diversity of habitat..."

Fuhlendorf, Samuel D., David M. Engle, Jay Kerby, and Robert Hamilton. 2008. "Pyric Herbivory: Rewilding Landscapes through the Recoupling of Fire and Grazing," *Conservation Biology* 23:588–598.

"Pyric herbivory is the spatial and temporal interaction of fire and grazing, where positive and negative feedbacks promote a shifting pattern of disturbance across the landscape." This unique study shows that "Pyric herbivory applied with any grazing herbivore, even domestic livestock, may more effectively restore evolutionary disturbance patterns than reintroduction programs for any large vertebrate that do not incorporate pyric herbivory."

Smith, Leslie N. 2008. "Sparkling a new trend - Researchers discover the benefits of a new rangeland management technique." *Comboy Journal*, 10(1):19-21.

Dwayne Elmore, assistant professor and wildlife extension specialist at OSU states that "The elimination of herbicide use, red cedar and noxious weeds are very beneficial aspects of patch burning," and that "Weight gains don't differ from traditional burns, patch burning costs substantially less, and it kills noxious weeds."

Rensick, Cade Brion. 2009, "Impacts of patch-burn grazing on livestock and vegetation in the tallgrass prairie." Master of Science Thesis, Department of Agronomy, (reporting to Dr. Walter H. Fick), Kansas State University. 53 pp.

*"After one 3-year cycle, it appears that livestock gains are not sacrificed under this system ..." Vegetative studies showed that "2 years after treatment (2-YAT), no significant difference in composition ($p \geq 0.10$) was present..." between patch burn and full burn pastures. *Sericea lespedeza* occurrence was not significantly different between patch burn and full burned pastures but "...there was a trend for the number of plants in the sampled areas of the patch-burn portions to decrease*

throughout the cycle."

Allred, B.W., Fuhlendorf, S.D. & Hamilton, R.G. (2011) The role of herbivores in Great Plains conservation: comparative ecology of bison and cattle. *Ecosphere*, 2, art26.

"While there are a variety of opinions concerning differences between these two species, there is a lack of scientific comparisons, including those that incorporate important ecological variation. We developed a framework to study and compare the grazing behavior and effects of bison and cattle within grassland ecosystems."

Other Resources

Faber, S., Soren Rundquist, and Tim Male. 2012. Plowed Under: How Crop Subsidies Contribute to Massive Habitat Losses. The Environmental Working Group. http://static.ewg.org/pdf/plowed_under.pdf

High crop prices and unlimited crop insurance subsidies contributed to the loss of more than 23 million acres of grassland, shrub land and wetlands between 2008 and 2011, wiping out habitat that sustains many species of birds and other animals and threatening the diversity of North America's wildlife, new research by Environmental Working Group and Defenders of Wildlife shows.

Ofte, Rod, and Allen Williams. 2012. Grassfed Beef Financial Calculators. <http://pastureproject.org>

The Pasture Project's three financial calculators are great tools for new and experienced farmers interested in transitioning into grassfed beef.

Pasture Project Phase I Report. 2012. The Pasture Project. <http://www.wallacecenter.org/resourcelibrary/expanding-grass-based-animal-agriculture-in-the-midwest.html>

The Phase I Report provides an overview of the project's research foundations, theory of change, and key recommendations.

About the Pasture Project

The Pasture Project works in the Upper Mississippi River Basin to increase the number of acres of farmland that are sustainably managed. Long-term commitment to sustainable management requires an alignment of economic and environmental interests. We accomplish this by expanding grass-based systems of livestock production and introducing cover-crops and periodic livestock grazing into row crop farming, all of which both increase profits and rebuild soils and water cycles. Partner organizations work directly with farmers, landowners, land trusts and others to highlight the opportunities and support transitions to more sustainable management. At the same time, Pasture Project staff and consultants help ensure efficient value chains, address policy barriers, align conservation and agricultural interests, and otherwise support the development of an environment conducive to sustainable beef production.

Pasture Project partner organizations work throughout the region. These organizations have deep ties in their communities and offer workshops, farm tours and other assistance to local farmers and landowners interested in grass-fed beef. Together, these partners have conducted outreach to over 2,000 operating and non-operating landowners who collectively control about 25,000 acres of land. The Wallace Center helps support and coordinate the community-based work, and works regionally and nationally to reduce the barriers to raising grass-fed beef and increase the number of stakeholders supporting sustainable farm management.

The project as a whole reduces barriers to entry and increases stakeholder engagement by thoroughly understanding the many elements that go into making decisions about, and then implementing, more sustainable management practices. We then identify those government bodies, non-profits and businesses that touch each element, build relationships with them, and work together to encourage grazing and sustainable land management.

For those interested in better understanding how grazing might support your conservation work, please visit our website or contact us. We'd be delighted to hear from you.



The Pasture Project seeks to increase the number of acres under sustainable management in the Upper Mississippi River Basin by expanding the region's production of grass-fed livestock.

For more information contact Allison Van at
AVan@winrock.org or call 202.412.6509

Or visit our website at www.PastureProject.org

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