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# Grassland and managed grazing policy review

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Perennial grasslands, including prairie and pasture, have declined with tremendous environmental and social costs. This decline reflects unequal policy support for grasslands and managed grazing compared to row crops. To create a resource for community partners and decision-makers, we reviewed and analyzed the policy tools and implementation capacity that supports and constrains grasslands and managed grazing in the U.S. Upper Midwest. Risk reduction subsidies for corn and soybeans far outpace the support for pasture. Some states lost their statewide grazing specialist when the federal Grazing Lands Conservation Initiative lapsed. The United States Department of Agriculture, Natural Resources Conservation Service support for lands with prescribed grazing practices declined after 2005 but remained relatively steady 2010–2020. These results reveal the policy disadvantage for grasslands and managed grazing in comparison with row crop agriculture for milk and meat production. Grassland and grazing policies have an important nexus with water quality, biodiversity, carbon and outdoor recreation policy. Socially just transitions to well-managed, grazed grasslands require equity-oriented interventions that support community needs. We synthesized recommendations for national and state policy that farmers and other grazing professionals assert would support perennial grasslands and grazing, including changes in insurance, conservation programs, supply chains, land access, and fair labor. These policies would provide critical support for grass-based agriculture and prairies that we hope will help build soil, retain nutrients, reduce flooding and enhance biodiversity while providing healthy food, jobs, and communities.

KEYWORDS

**managed grazing, continuous living cover, perennial cover, policy and governance, systems change, grasslands, prairies, pasture**

## Introduction

Perennial grasslands have declined precipitously worldwide because they are planted to row-crops or converted to other land uses that degrade ecosystems and human cultural and economic relationships (Kwon et al., 2016; Lark et al., 2020; Winkler et al., 2021). Government, corporate, and non-governmental policies have contributed to grassland degradation, yet other policies aim to protect and restore grasslands. Policies are important aspects of grassland and agricultural governance because they provide incentives, regulations, market structures and standards, and assistance that shape farmer and land manager decisions about grasslands. Managed well, grasslands can enhance farmer profitability and quality of life, rural communities, food sovereignty, water quality and

flood reduction, wildlife, pollinator and plant habitat, and soil carbon (Rui et al., 2022; Sanford et al., 2022; Wepking et al., 2022). Focusing on the Upper Midwest of the United States, this policy review describes recent trends in policies, programs, and capacities that impact grasslands and provides recommendations for policy change to enhance grasslands and managed grazing. We include pasture, prairie, and savanna within the scope of this review.

Across North America, grasslands emerged as glaciers retreated (Strömberg, 2002). Indigenous communities actively managed grasslands with fire to increase food supply, manage grazing game (Fuhlendorf and Engle, 2004) and increase the visibility of enemies, promoting higher grassland productivity and more input of carbon and nutrients to soils (Frank and McNaughton, 1993). In the 1800s, the U.S. government's genocidal campaign against Indigenous communities included the destruction of bison (Hubbard, 2014), a keystone species for grassland ecosystems and Indigenous food systems and culture (Isenberg, 2000). Euro-American settlers replaced bison with cattle and row crops, parcelizing land into small and often insufficient homesteads. Overgrazing and plowing caused the degradation of grasslands (Holleman, 2017). Agricultural intensification during the Green Revolution drove more conversion from pastures to row crops. Meat and dairy markets have become highly consolidated through the increasing market share of international corporations which continues today (Lark et al., 2020), part of a major shift in global agricultural markets (Belk et al., 2014). These transitions track different ideas of production, reflecting different understandings of the value of intensive and extensive agriculture and the political economy of maximizing agricultural yields. Grassland succession into shrubs and forests along with urban and exurban housing developments have also reduced grassland area (Rajib et al., 2016).

In the Upper Midwest in particular, policies have caused grasslands to decline (Figure 1). Less than 1% of tallgrass prairie dominated by warm-season grasses remains (Samson and Knopf, 1994). While livestock were primarily raised on grass early in the 20th Century, policies in the latter half of the century incentivized farmers to transition the land to intensive production of corn and soybeans. The proliferation of subsidized corn and soybeans for animal feed in turn encouraged farmers to move cattle from pastures to confined barns and feedlots, accelerating the conversion of pasture to row crop agriculture (Gillon et al., 2016). Controls on crop supply were removed and farmers were encouraged to plant "fencerow-to-fencerow" and consolidate their operations. Corn and soybean subsidies and crop insurance expanded through U.S. Farm Bills (Imhoff and Badaracco, 2019), although subsidies were removed after international challenges through the World Trade Organization, crop insurance expanded (Schnepf, 2021). In an effort to improve domestic energy supply and provide governmental support for corn, a federal ethanol mandate required gasoline to include a percentage of renewable fuel including cellulosic ethanol from corn stover, incentivizing conversions of grassland to corn (Lark, 2020).

Rowcrops without livestock draw upon soil resources without making organic deposits sufficient to replenish reserves. However, overapplication of livestock nutrients from manure and urine results in high soil nutrient levels and runoff that pollutes ground and surface waters. In contrast, well-managed grazed perennial grasslands can produce human food while making continuous but not excessive nutrient deposits into soil (Jackson, 2020). When well-managed, grazing has the capacity to regenerate soil organic matter, provide milk and meat, improve water quality, help stabilize climate, reduce flooding, and enhance biodiversity (Franzluebbers et al., 2012; Bengtsson et al., 2019). The grassland plants in these systems shunt much of the carbon they fix from the atmosphere into belowground tissues, creating a reserve of carbohydrates and nutrients that increases over-winter survival and regrowth after defoliation. Grassland roots and symbiotic fungi are continuously turning over and exuding carbon into the soil, which contributes to soil organic matter accumulation (Liang et al., 2016; Zhu et al., 2020), enhancing soil health. Carbon storage in grassland soils has the potential to contribute to climate mitigation, although the estimates from carbon accounting and life cycle analysis vary (Garnett et al., 2017; Mayerfeld, 2023).

Grassland loss has significantly degraded biodiversity and water quality. Grassland birds, pollinators, and monarch butterflies have declined dramatically with the loss of habitat and use of pesticides on row crops (Cox, 1991; Herkert et al., 1996; Ribic and Sample, 2001; Goulson et al., 2015; Boyle et al., 2019). Grazing and other grassland management approaches can help maintain grassland and savanna habitat, along with timber harvests, prescribed fire, mowing, and herbicide applications (Wisconsin Department of Natural Resources, 2016). Managed grazing can promote biodiversity and wildlife habitat, depending on the timing and intensity of grazing (Hardy et al., 2020). The Upper Midwest contributes significantly to the runoff of sediment containing nitrogen and phosphorus that expand the dead zone in the Gulf of Mexico (Rabalais et al., 2002). Climate change impacts include an increase in extreme storm events which have caused an increase in flooding (Bendorf et al., 2021), exacerbated by greater row crop production.

Grazing and grasslands can support farmer wellbeing, livelihoods, and vibrant rural communities with new and diverse farmers and grassland enterprises (Bardgett et al., 2021). Consolidation in agriculture has led many farmers and ranchers to lose their farms and increased rural depopulation. Grazing livestock on grassland offers a relatively profitable and low-cost opportunity for farmers whose access to high quality forage reduces their feed and manure management costs (Hanson et al., 1998; Soriano et al., 2001; Foltz and Lang, 2005). Demand for grass-fed products is increasing, creating new market opportunities. While beef and dairy receive most of the focus for managed grazing, smaller animals such as sheep, goats, and poultry, can offer an easier entry-point for new farmers because they require less up-front capital and infrastructure, reproduce more quickly, and are easier to manage. Additionally, these animals are culturally important for many immigrant communities and new farmers (on goats: Lu and Miller, 2019; on chickens: Haslett-Marroquin and Andreassen, 2017). Socially just transitions to well-managed grazed perennial grasslands require equity-oriented interventions that support the needs of all communities (Lowe and Fochesatto, 2023).

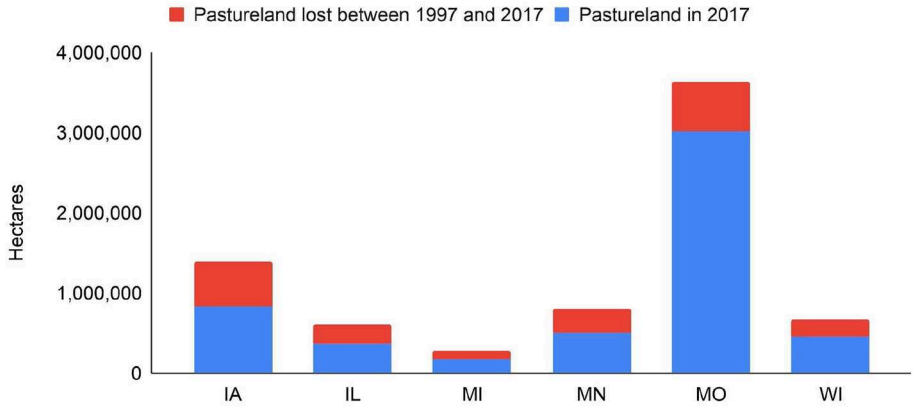


FIGURE 1
Non-woodland pasture declined across the Upper Midwest between 1997 and 2017. Data source: Agricultural Census 1997 and 2017 (USDA National Agricultural Statistics Service, 1997, 2017a).

The loss of grasslands has taken with it many cultural practices and social benefits that communities across the region are now working to recover. Tribal nations are actively re-establishing bison herds on the land and reconnecting tribal members with this ancestral practice and food source (Zontek, 2007). For example, the Intertribal Buffalo Council coordinates the transfer of surplus bison from national parks to tribal lands saying "to reestablish healthy buffalo populations on tribal lands is to reestablish hope for the Indian people" (InterTribal Buffalo Council, 2019). These initiatives contribute to seeing food as medicine, not just caloric content, through reaffirming ways of life and food sovereignty.

Land governance involves a multilayered system of policies and markets created and run by governments, private sector firms, and non-profit civil society organizations that influence the land management choices of individuals, families, and communities. Policies establish the rules of the game for agroecosystem management. Grassland policy is underdeveloped, especially outside of arid rangelands. Grassland and managed grazing are in need of a policy framework and policy advocacy coalition to increase grassland abundance and biodiversity and prevent further conversion to row crops and housing. As one indicator of this need, a Google Scholar search from 2022 reveals the number of records for "agricultural policy" (591,000) and "forest policy" (161,000) in comparison with grazing policy (1,800, with most focused on arid public land, not mesic private land), "grassland policy" (367), "pasture policy" (101), "prairie policy" (20), and "savanna policy" (3).

Given the need for greater attention to policies that support and constrain grassland and managed grazing, we synthesize programmatic information to review the policy landscape and draw on interview quotes for context. We then synthesize recommendations for policy change based on a literature review and extensive conversations with partners, interviewees, and workshop participants. The two objectives for this policy review are:

1) Review the policy tools and implementation capacity that supports and constrains grasslands, managed grazing, and prairies in the U.S. Upper Midwest.
2) Provide recommendations for enhancing policy support for grasslands and improved grassland governance.

# Policy assessment

## Policy review methods

We examined the grassland policy context in six Corn Belt and Great Lakes states of the tall grass prairie region: Illinois (IL), Iowa (IA), Michigan (MI), Minnesota (MN), Missouri (MO), and Wisconsin (WI), USA. Three of these states intersect with the United States Department of Agriculture (USDA) "Northern Crescent" region (MI, MN, WI) and four with the "Heartland" region (IA, IL, MN, MO). Iowa, Illinois, Missouri and Minnesota had substantial tallgrass prairie before European settlement (Transeau, 1935), while Wisconsin and Michigan had smaller patches of tallgrass prairie interspersed with oak savanna and hardwood forests (Cochrane and Iltis, 2000). Indigenous burning and grazing management likely expanded grassland area, reducing the size and density of forest cover (Changnon et al., 2003). This region's land cover is dominated by agriculture, predominantly corn and soybean row crops. In 2022, corn covered 4.3 million hectares in IL, 5.1 in IA, 0.9 in MI, 3.4 in MN, 1.5 in MO, and 1.6 in WI (NASS, 2022). The central portions of MI, WI, and MN contain a grass-forest ecotone.

We identified policies relevant to grasslands and managed grazing and developed recommendations through a literature review and consultation with grazing farmers, advisors, and staff of civil society organizations, agricultural industry, and local, state, and federal government agencies as part of a larger project to promote grassland agriculture called Grassland 2.0. Policies were identified and discussed through multiple venues including Grassland 2.0 meta stakeholder meetings (regular meetings 2018–2023), Grassland 2.0 policy team (regular meetings 2019–2023), perennial policy leaders meeting (February 2021), three Just Transitions to Managed Grazing workshops (January, February, and March 2022, Lowe and Fochesatto, 2023), and a Farm Bill workshop (April 2022). We synthesized these conversations and prior literature to develop the policy categories in this manuscript.

The policies are not listed in order of priority; rather we focus first on the most common policy choices discussed by participants and end with the deeper structural drivers of land, capital, and labor. For programs expected to impact grasslands and managed grazing, we summarized publicly available data on trends in enrollment.

Programmatic information is supplemented with illustrative quotes about policies from a series of 130 semi-structured interviews (Lowe, 2022). Of the interviewees, 54% were from WI, 15% from IL, 14% from MN, 6% from MI, 5% from IA, and 2% from MO. An additional 4% of non-Midwesterners were interviewed to fill in specific gaps in expertise. All of these peoples' work intersected with agriculture in some capacity, and most worked specifically with animal agriculture. Interviews were conducted by Zoom or in-person, audio recorded and transcribed, with consent under IRB 2020-1687. Quotes from farmers and other professionals engaged in grasslands and managed grazing were selected to illustrate common perspectives on each policy tool. Job titles are accurate at the time of the interview.

We synthesized recommendation from these diverse sources. We also circulated a Wisconsin policy report and received feedback that we integrated into this manuscript's recommendations. Given the format of this policy piece, we present aggregated recommendations and not detailed coding of themes from interviews and workshops. Recommendations are not necessarily consensus perspectives, and ideas that faced the greatest criticism from participants are not included here. Drafts of this policy review and recommendations were circulated with community partners in advance of publication.

## Federal subsidies, insurance, and renewable fuel standard

> *"Crop insurance…sucked the life out of grazing here in Illinois, because it puts a floor under what you're going to make or props prices up."*—Cliff Schuette, Beef Grazier, IL
>
> *"More and more farmers are not being profitable in farming grains [but] whenever grain prices go up, we see land taken out of pasture [and] planted to corn...There really isn't…an economic motivation on transitioning away from corn and beans when we still have federal crop subsidies and crop insurance...There are no other government safety nets for grazing - nothing that compares to the subsidies given to grain farmers."*—Meghan Filbert, Livestock Program Manager, Practical Farmers of Iowa & Diversified Grazier

### Commodity subsidies and crop insurance

Commodity subsidies and crop insurance buffer price and yield losses for corn and soybeans, while support provided for pasture is scant. This incentivizes planting corn and soybeans despite market signals that might otherwise encourage farmers to grow different crops or pasture (Houser et al., 2020; Burchfield et al., 2022). Together, corn and soybeans have made up nearly half of this spending nationally (Schnepf, 2017). The amount of money allocated to these programs amounts to 16% of Farm Bill spending, more than twice the amount (7%) allocated to all the other Farm Bill conservation programs discussed in this paper (USDA Economic Research Service, 2021). Because commodity subsidies and crop insurance reduce feed costs, they incentivize raising animals in confinement rather than on pasture or rangeland. Direct subsidies have been transitioned out (Figure 2). At the state level in 2016, the corn and soybean commodity and crop insurance subsidies were $984M in IA, $1,244M in IL, $211M in MI, $668M in MN, $381M in MO, and $327M in WI, compared with amount of the USDA Natural Resources Conservation Service's (NRCS) conservation program financial and technical assistance [including: Conservation Reserve Program (CRP), Conservation Stewardship Program (CSP), Wildlife Habitat Incentive Program (WHIP), Grassland Reserve Program (GRP), Regional Conservation Partnership Program (RCPP), Conservation Technical Assistance (CTA), and Environmental Quality Incentives Program (EQIP)] of $0.1M in IA, $0.08M in IL, $0.04M in MI, $0.14M in MN, $0.09M in MO, and $0.06M in WI (USDA Natural Resources Conservation Service, 2021; CSRA Science, 2022; USDA Risk Management Agency, 2022).

Pasture insurance could be provided through two programs, however adoption is very low and producers tend to find the programs unsupportive. The Pasture, Range, and Forage Program is designed to "cover replacement feed costs when a loss of forage for grazing or harvested for hay is experienced due to lack of precipitation" (United States Department of Agriculture, 2021). However, it insures only for loss of precipitation, not for heat or wind, all droughts, or other natural causes of livestock or feed loss, and it does not provide replacement costs for livestock lost. It also requires farmers to anticipate the months of likely loss of precipitation. Whole-Farm Revenue Protection (WFRP), a crop-neutral revenue insurance policy, was created in the 2014 Farm Bill and can support diversified farmers including graziers, but program rules, low payouts, farmer lack of familiarity, and paperwork requirements have hindered adoption. WFRP requires 5 years of farm tax records so can be limited for beginning farmers unless they took over an existing operation.

The lack of support for pasture relative to corn and soybeans makes it difficult for many farmers to justify growing anything other than row crops. Annual average insurance payments for corn and soybeans from 2005 to 2021 in the Midwest states were $382M in IA, $364M in IL, $72M in MI, $316M in MN, $226M in MO, and $122M in WI, compared with the amount for pasture of $0.5M in IA, $0.4M in IL, $0.6M in MI, $2M in MN, $3M in MO, and, $5M in WI (USDA Risk Management Agency, 2022). Furthermore, commodity subsidies were: $580M in IA, $484M in IL, $83M in MI, $204M in MN, $111M in MO, and $133M in WI compared with the amount for pasture of $0 for all 6 states from 2005 to 2018 (Environmental Working Group, 2020a,b).

Federal spending on crop insurance and commodity programs is variable but increasing. Because they cover both price and yield loss, the cost of these programs increases as production increases and prices drop: between 1991 and 2017, taxpayer subsidies for crop insurance have increased from $300 million to $6.1 billion (National Sustainable Agriculture Coalition, 2017). Commodity subsidies and crop insurance are expected to increase

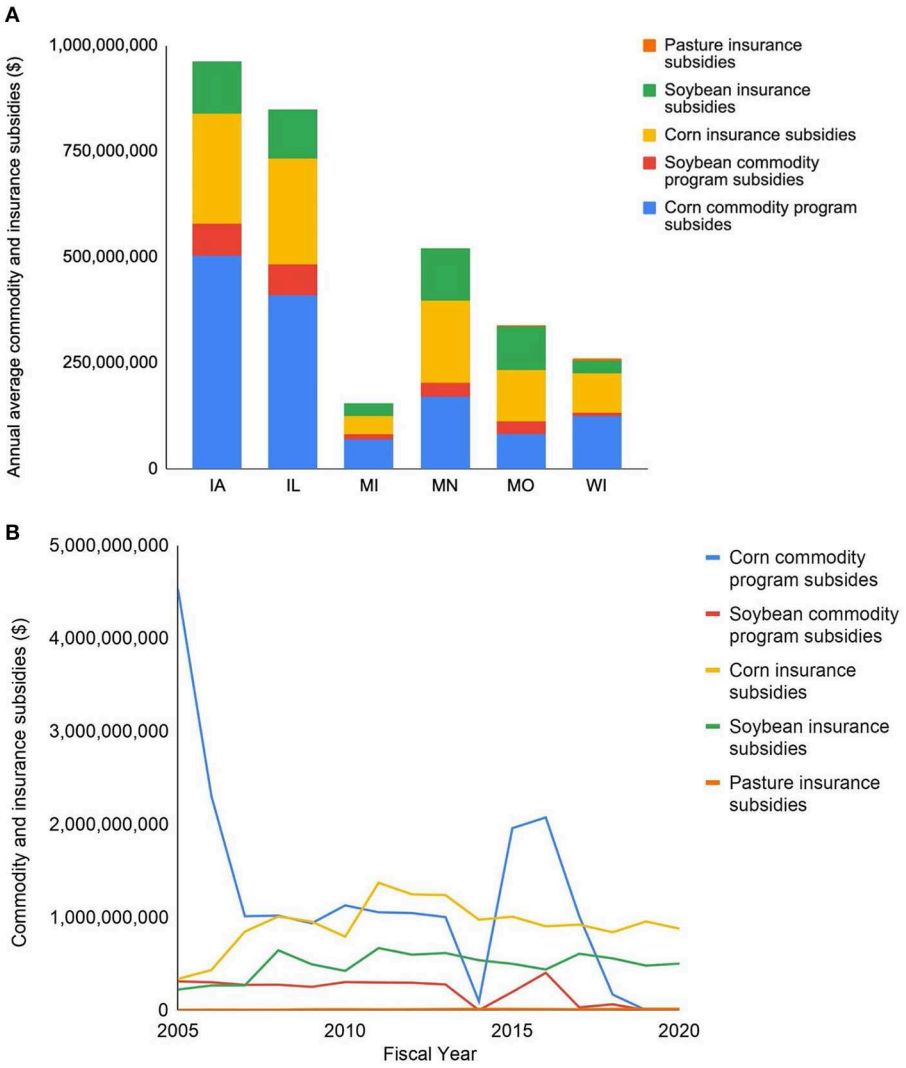


FIGURE 2
**(A)** Annual average commodity and insurance subsidies per year in Iowa, Illinois, Michigan, Minnesota, Missouri, and Wisconsin ($). Annual average is between 2005 and 2021 for insurance (17 years) or 2005–2018 for subsidies (14 years). **(B)** Subsidies by USDA commodity and insurance programs in Iowa, Illinois, Michigan, Minnesota, Missouri, and Wisconsin ($). Data source: Commodity subsidy data is from Environmental Working Group (Environmental Working Group, 2020a,b), including Direct Payments (DP) and Production Flexibility Contract (PFC) (1996–2013), Average Crop Revenue Election (ACRE) (2009–2013), Agricultural Risk Coverage (ARC) (authorized by 2014 Farm Bill, payments began in 2015), Price Loss Coverage (PLC) (authorized by 2014 Farm Bill, payments began in 2015), Price Support [Loan Deficiency Payments (LDP), Marketing Loan Gain (MLG), Commodity Certificates, and Counter-Cyclical Payments (CCPs)] (introduced in the 1996 Farm Bill). Insurance subsidy data is from the USDA Risk Management Agency (2022). Pasture insurance subsidies include forage production, forage seeding, and pasture, rangeland, forage.

greater than initially projected in coming years due to COVID-19, climate change impacts, crop price fluctuations, and trade wars (Taxpayers for Common Sense, 2022). A recent report estimates that eliminating crop insurance premium subsidies to farms with an adjusted gross income of >$250,000 would save taxpayers $20.2 billion over 10 years (National Sustainable Agriculture Coalition, 2022). Iowa farmers recognized as environmental leaders primarily supported incremental rather than transformative Farm Bill policy changes, though the majority supported conservation compliance on all lands receiving crop insurance, not just Highly Erodible Lands (Medina et al., 2020).

## Renewable fuel standard

Federal mandates for ethanol have also contributed to grassland decline and row crop expansion (Wright et al., 2017). Ethanol is mandated in the Renewable Fuel Standard which originated with the Energy Policy Act of 2005 and was later extended under the Energy Independence and Security Act of 2007 (United States Department of Energy, 2022). Oil refiners and gasoline and diesel importers are required to sell specified volumes of renewable fuels enforced through significant fines. Renewable fuels include conventional, cellulosic, and advanced biofuel, and biomass-based diesel.

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## Financial and technical assistance

> *"We have way more applications than we have money for pasture land, whether it be the state or federal programs. . . I don't know that that would ever completely go away, no matter how much money you threw at it."—Selma Mascaro, State Grazing Specialist, NRCS Missouri*
>
> *"If you're part mechanical engineer and you can get through the rules and all of the tape, it's great.—Jen Falck, Wisconsin Partnership Program Coordinator, Oneida Nation*
>
> *"...you could see the tremendous impact that having good grazing plans had on this establishment of successful grazing farms. [In] adjacent demographically similar counties [where] they didn't...the difference was very stark...It's really clear that what had made the difference really was GLCI (the Grazing Land Conservation Initiative)."—Margaret Krome, Policy Program Director, Michael Fields Agricultural Institute*

The federal government provides financial and technical assistance for managed grazing and prairie restoration through conservation practices, activities, and enhancements under Farm Bill programs. The most notable programs are the Conservation Reserve Program (CRP), Environmental Quality Incentives Program (EQIP), Conservation Stewardship Program (CSP), Grasslands Reserve Program (GRP), and the Regional Conservation Partnership Program (RCPP). While these programs provide important support, they also create frustrations among farmers and their advisors due to long wait times to receive funding and a management plan, a high level of technical engineering for some practices, high up-front capital requirements, and higher support for cattle than other livestock (Reimer and Prokopy, 2014). An important advantage of the CSP program is that it allows for payments for farmers to maintain conservation practices they have already adopted, ensuring that early grazing adopters can still receive support.

Our analysis suggests declining or stable NRCS investments in financial assistance for grazing land conservation practices between 2005 and 2020, depending on the state (Figure 3). Missouri has the most non-woodland pasture of any state in our region, and also experienced the most dramatic decline of land area receiving NRCS funding for the specific conservation practice of prescribed grazing (Figure 4). While financial data was not available for all states, Wisconsin farmers received a total of $24.3 million from the NRCS for pasture obligations from 2010 to 2019 through EQIP and CSP. This is a small fraction (6%) of total EQIP and CSP expenditures in Wisconsin. In FY20, NRCS applied conservation practices to 7,593 hectares of grazing land to improve the resource base in Wisconsin. Through EQIP, NRCS obligated $968,461 for prescribed grazing across a count of 352 practices in FY20 such as fencing, water, and seeding (Legislative Fiscal Bureau, 2019).

Some local governments also provide grazing support. Districts or counties have the ability to cost-share managed grazing practices and provide technical assistance if it is identified as a local priority. Sometimes districts provide cost-share for livestock access lanes, stream crossings, watering facilities, and pasture establishment to promote rotational grazing.

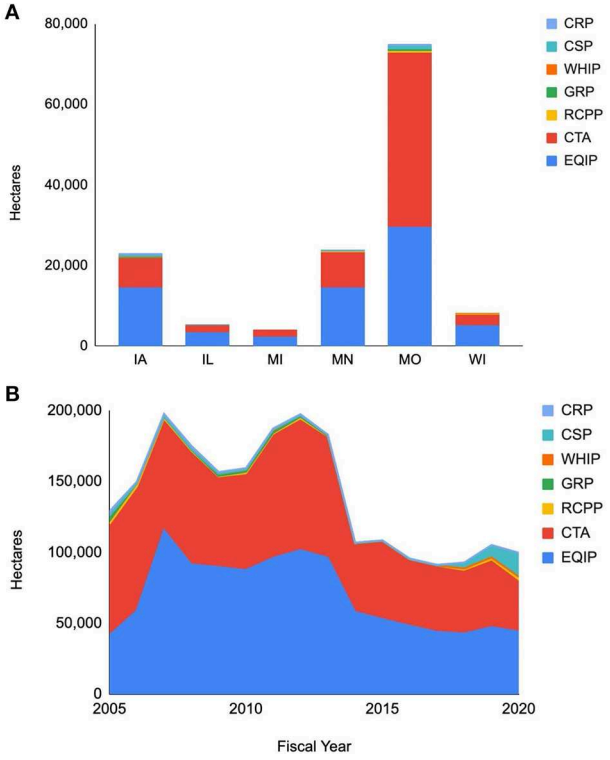


FIGURE 3
**(A)** Annual average land unit hectares per year receiving Grazing Land Conservation Practices in Iowa, Illinois, Michigan, Minnesota, Missouri, and Wisconsin by USDA-NRCS programs. Annual average is calculated between 2005 and 2020 for each program (16 years). **(B)** Land unit hectares receiving Grazing Land Conservation Practices by USDA-NRCS programs in Iowa, Illinois, Michigan, Minnesota, Missouri, and Wisconsin. The programs are the Conservation Reserve Program (CRP), Conservation Stewardship Program (CSP), Wildlife Habitat Incentive Program (WHIP), Grassland Reserve Program (GRP), Regional Conservation Partnership Program (RCPP), Conservation Technical Assistance (CTA), and Environmental Quality Incentives Program (EQIP). Data source: USDA Natural Resources Conservation Service (2020a,b,c,d,e,f), National Planning and Agreements Database, October 2020. Grazing Land Conservation Practices. The 2014 Farm Bill was the first substantial reduction in conservation program funding since 1985.

Grazed cover crops can serve as a potential on-ramp for conventional farmers to start grazing or collaborate with graziers. Cover crops can be an important approach for increasing grass and other winter crop cover to reduce soil erosion, although they do not provide perennial grassland. Some farmers reported barriers with the EQIP program including long wait times to get a grazing management plan and receive EQIP funds, the need for up-front capital which can be prohibitive, lack of support before someone has livestock which makes it difficult to plan, challenges for row crop farmers to use cover crops as a stepping stone toward grazing, and lack of knowledge and support for livestock other than cattle.

Federal funds that support grazing networks and education have declined due to the end of funding for the Grazing Lands Conservation Initiative (GLCI) which was funded federally starting in 2004 and in some states extended until 2012. The GLCI supported state-based partnerships, network coordination, and education and technical assistance and education for graziers

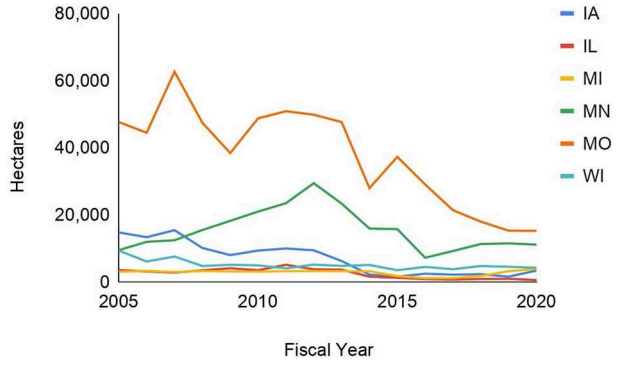


FIGURE 4
Area receiving prescribed grazing as a conservation practice through USDA-NRCS agreements. Data Source: USDA Natural Resources Conservation Service (2020a,b,c,d,e,f), National Planning and Agreements Database, practice code 528 (2020).

and their service providers. $14 million of the prior $30 million appropriation for GLCI was restored through CTA in the FY22 Appropriations Package (CSRA Science, 2022).

## Network of assistance organizations

Education, social norms, and farmer networks are important policy tools to help farmers make informed decisions with social support about how to transition and improve their managed grazing. Each state has a network of non-profit, university, and livestock association organizations that supports managed grazing, grasslands, and prairie. Some states have statewide member-based grazing organizations that provide leadership and education to farmers and consumers for the advancement of managed grazing including presentations, newsletters, field days, videos, an annual conference, and pasture walks (Grassworks, 2022; Minnesota Grazing Lands Conservation Association, 2022).

A number of organizations provide pasture walks, education, and information on grazing in their programming and publications including local Conservation Departments or Districts, NRCS, state natural resources and agricultural agencies, Grassworks, Marbleseed (formerly MOSES), Savannah Institute, University Extension, Resource Conservation & Development councils (RC&Ds), Michael Fields Agricultural Institute, and state Farmers Unions. The Wallace Center's Pasture Project has developed a pasture blueprint for Illinois and is expanding to other states. Green Lands Blue Waters is based in Minnesota and organizes information and hosts an annual meeting. Practical Farmers of Iowa is an important hub for conservation agriculture including grazing. The Missouri Center for Agroforestry is one of the world's leading centers on agroforestry, the integration of trees, crops, and livestock. The Dairy Grazing Apprenticeship program offers a recognized federal workforce development certification, which is based in Wisconsin and serves multiple states. GrassWorks in WI provides leadership and education to farmers and consumers for the advancement of managed grass-based agriculture. The Savanna Institute is researching and educating farmers about agroforestry. The UW–Madison Center for Integrated Agricultural Systems (CIAS) has also been involved in agricultural education. University agricultural research stations house dairy heifers and beef herds that can be used for grazing research and to inform farmers. Universities and non-profits also develop decision support tools such as the Livestock Compass (Hendrickson and Munch, 2018) and Heifer Grazing Tool (Mulholland et al., 2022).

Grassland management and conservation are also supported by conservation and hunting organizations that provide information, prairie walks, and management training to landowners, such as Pheasants Forever, The Prairie Enthusiasts, state Departments of Natural Resources, US Fish and Wildlife Service's Partners for Fish and Wildlife, Aldo Leopold Foundation, state Prescribed Fire Councils, land trusts, grassland partnerships, and other bird and prairie conservation organizations.

## Conservation Reserve Program

> *"Since I've been grazing for 20 years, I'm not eligible for CRP. Farmers that are thinking about transitioning - it would be beneficial for them."—Laura Paine, Grassland Farming and Outreach Lead, Grassland 2.0 & Beef Grazier, Paine Family Farm, WI*

The CRP is the largest federal program managed by the Farm Services Agency. CRP provides an incentive to farmers to plant land into grassland cover and to take marginal lands out of production in order to protect water quality, provide flood control, and establish wildlife habitat. CRP operates through fixed term agreements, generally 10-years, that are connected to the deed so that they run with the land even if the owner changes. The program provides an annual payment to the landowner. CRP enrollments have not been resilient to increasing crop prices (Secchi and Babcock, 2007). The rising price of corn combined with price loss coverage in poor market years likely contributed to reduced enrollment in CRP in the upper Midwest between 2005 and 2020 (Figure 5). CRP promotes grassland conservation but only integrates moderately with grazing agriculture. It allows for emergency grazing during severe drought and non-emergency grazing every other year, limited to 50% stocking rate reduction during the bird breeding season (USDA Farm Service Agency, 2022).

## Conservation easements and the Grassland Reserve Program

> *"Purchase of the development right is a great way for the landowner to have income and to be able to sell the land at a lower rate to a beginning farmer."*—Kirsten Jurcek, Grazing Plan Writer & Beef Grazier, Brattset Family Farm, WI
>
> *"We're silent on who owns the land. $0 provided for that…That's why we have the aggregation of land we have...Adding the ability for [ACEP-ALE] money to be used for acquisition of title to property…would go a long way."*—Ian McSweeney, Director, Agrarian Trust

Conservation easements are perpetual or long term agreements that restrict development and can promote working land uses like

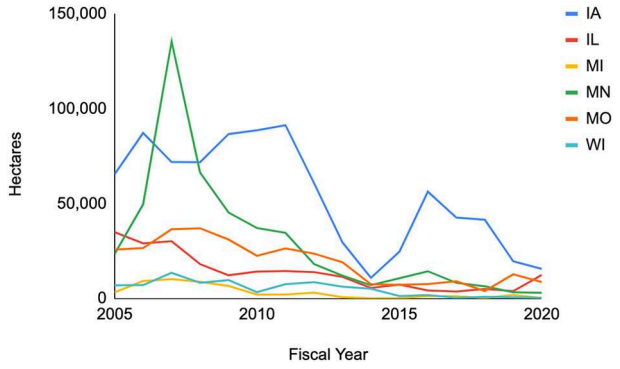


FIGURE 5
New Conservation Reserve Program contracts each year by area. Data Source: USDA-NRCS, National Planning and Agreements Database (USDA Natural Resources Conservation Service, 2020a,b,c,d,e,f).

grazing and help farmers purchase agricultural land at a lower cost. Landowners typically receive a payment or tax reduction for the conservation easement. The 2002 Farm Bill introduced the Grassland Reserve Program (GRP), a voluntary easement program under which participants limit housing development and cropping to protect grasslands and their grazing and biodiversity benefits. For all six Midwest states the total number of GRP easements totaled 6,205 hectares for 114 contracts (37 in Missouri, 31 in Iowa, 22 in Wisconsin, 10 in Illinois, 10 in Michigan, and 4 in Minnesota) when the program was ended and brought under the Agricultural Conservation Easement Program (ACEP) (USDA Natural Resources Conservation Service, 2021). Nationally, the GRP supported prescribed grazing on 87% of its enrolled acreage while only 35% of ACEP Agricultural Land Easements received support for prescribed grazing.

Many states have programs to fund conservation easements and other types of long-term grassland reserves on private land. For example, Minnesota has a sales tax passed by state constitutional amendment, the Clean Water, Land and Legacy Amendment, that supports grassland conservation and other benefits. Missouri has the Parks, Soils, and Water Tax to support land, soil, and water conservation that can support grazing and grasslands.

## Grass-fed and organic labels and certifications and supply chains

### Labeling

Labels inform consumers about organic and grass-fed practices. Some labels are connected to formal governance systems through certification. For instance, milk and meat that are certified organic by the U.S. Department of Agriculture must have cows on pasture 120 days per year for 30% of their diet, specified in 2010 rulemaking. States vary in the number of organic farms (Table 1). Some programs require 100% grass-fed, such as Organic Plus Trust and American Grassfed Association (AGA, 2021). Midwest Organic Services Association (MOSA), based in Viroqua, Wisconsin, offers Grass-Fed Beef and Grass-Fed Dairy certifications, which require at least 60% of each animal's feed to be from pasture. MOSA also offers Transitional Organic Verification cost-sharing for those who require support transitioning to an organic production system (MOSA, 2022).

Consumer demand for organic and grass-fed beef is rapidly increasing. The Nielsen Marketing Research firm found that sales of organic and non-organic grass-fed beef doubled each year between 2012 and 2016. In contrast, conventional beef sales increased by just 7% each year (Stone Barns Center for Food Agriculture, 2017). Despite the market potential for the grassfed industry, there is little governmental support for American producers (Stone Barns Center for Food Agriculture, 2017). While global consumer demand for organic milk is increasing, US dairies have been squeezed as costs increase more than prices with competition from New Zealand, Australia, and other countries (Askew, 2022).

Implementation of the Country of Origin Labeling (COOL) law for beef and pork is an important issue for many farmers raising animals. COOL previously required labeling of where meat was born, raised, and slaughtered. However, after a trade dispute under the World Trade Organization, USDA stopped enforcing country of origin labels for beef and pork in 2015. As a result, many companies are labeling meat raised abroad but repackaged at U.S. facilities as a U.S. product (United States Department of Agriculture, Agricultural Marketing Service, 2022). There is some dispute about the ramifications of reintroducing COOL for beef and whether it would lead to threats of sanctions from other countries. COOL does not apply to dairy products and while there have been some efforts to change it, the U.S. dairy industry has not been supporting the move as strongly as some cattlemen's associations (Myers, 2022; Progressive Farmer, 2022).

### Supply chains

Consolidation is a major trend impacting dairy and meat production. The beef industry's processing is highly consolidating with four companies controlling the majority of the market, sparking antitrust challenges [In Re: Cattle and Beef Antitrust Litigation, case No. 0:22-md-03031-JRT-JFD (D. Minn)]. Four large meat-packing companies control over 80% of the market and have simultaneously been paying less to farmers while charging consumers more, leading to a Presidential Executive Order for a whole-of-government approach to increasing economic competition (The White House, 2021). Critics argue that lack of antitrust enforcement contributes to consolidation, as have agricultural education, research funding, and lending. Increasing access to regional meat processing is important for grass-based producers, which has been gaining policy attention.

Federal dairy programs have failed to address problems of oversupply. Without market signals that limit annual increases in milk production relative to demand, small and medium dairy farmers are being pushed out of the market. Milwaukee Journal Sentinel's journalist Rick Barrett documented the crisis in a Pulitzer Center series "Dairyland in Distress" (Barrett, 2019). The reports were sobering before the COVID-19 pandemic, and only worsened after. In 2018, Wisconsin led the nation in farm bankruptcies, and lost 700 dairy farmers—nearly two per day. In April 2019 he documented a loss of three per day. On average, milk costs

TABLE 1 Number of organic farms, sales, and land area by state in 2016 (USDA National Agricultural Statistics Service, 2017a,b,c,d,e,f).

| | Iowa | Illinois | Michigan | Minnesota | Missouri | Wisconsin |
|---|---|---|---|---|---|---|
| Organic dairy farm | 76 | 16 | 70 | 108 | 21 | 455 |
| Organic beef farm | 17 | 14 | 10 | 19 | 7 | 59 |
| Organic dairy sales | $15,549,114 | $298,665 | Unknown | $43,326,781 | $4,898,174 | $125,933,062 |
| Organic beef sales | $389,497 | $351,885 | $161,355 | $138,654 | Unknown | $700,896 |
| Organic pasture or range (hectare) | 5,484 | 1,502 | 3,856 | 7,553 | 4,056 | 20,991 |

$17–22 per hundredweight (cwt, about 12 gallons) to produce, while the price farmers receive averages $15.13 Economic research indicates that if a federal growth management policy was adopted, an average Wisconsin grazing dairy would realize a Net Farm Operating Income increase of up to 74%, and depending on the policy design, average annual milk prices would increase between $0.73 and $1.41/cwt for farms that stayed within production limits (Nicholson and Stephenson, 2021).

Grazing is a lower-input, lower-output form of agriculture than grain-fed livestock production. Grazing requires less machinery, fertilizer, and herbicide, although it does rely on fencing and sometimes some fertilization and seeding. Due to the lower inputs in grazing, it does not attract as much agribusiness interest, demonstrated by fewer industry sponsors at grazing conferences (Lu and Rissman, 2022).

## Environmental policy interplay: Water, wildlife and plants, carbon

### Water quality policy

Well-managed grasslands can reduce soil erosion and nutrient runoff, so perennial cover is a strategy for achieving goals of the federal Clean Water Act (CWA) and state water quality policy. However, grazing can also degrade water quality through overgrazing, compaction, erosion, and streambank destabilization. Under the CWA, state agencies develop watershed plans to achieve Total Maximum Daily Load (TMDL) of pollutants reaching impaired waterways, with approval from the Environmental Protection Agency. Smaller farms are primarily managed through voluntary, incentive-based water quality programs, while point sources such as Confined Animal Feeding Operations (CAFO), sewage treatment plants and cheese factories are mandated to meet permitted amounts of pollution. TMDLs model phosphorus and sediment loads from pasture/grassland and other land uses and point sources to establish a baseline and model the potential for water quality improvements. TMDLs rely on a variety of mechanisms for implementation, including state standards. For instance, Wisconsin's agricultural performance standards prevent unlimited livestock access to waters of the state in locations where high concentrations of animals prevent the maintenance of adequate or self-sustaining sod cover" (NR 151.08).

The EPA developed guidance in 2021 for states to use the Clean Water State Revolving Fund (CWSRF) for non-point source reduction (EPA, 2021). CWSRF received a major influx of funds under the Bipartisan Infrastructure Law. While non-point source pollution accounts for about 75% of water quality impairments in the US, only 4% of the CWSRF has addressed non-point source pollution, an imbalance the EPA is seeking to remedy (EPA, 2021).

Water quality funding is more likely to subsidize manure storage, barnyards, and rooftops for confinement operations rather than incentivize transitions to lower-density managed grazing on perennial cover. States vary in their nutrient reduction strategies and state laws for phosphorus, nitrogen, and nutrient management planning. Wisconsin has a numeric phosphorus criteria and has developed a water quality trading program that allows point sources to fund conservation practices on agricultural land which can be cheaper than the marginal gains available in sewage treatment facilities and factories (Wu, 2021). Missouri and Iowa Nutrient Reduction Strategies include grazing and estimate its contributions to nutrient load reduction. States can develop standards for grazing management such as amount of residual dry matter. State erosion and phosphorus standards such as Wisconsin's NR151 also apply to grazed pastures, even though many grazing farms do not have a nutrient management plan. Examples of incentivizing grassland and pasture at the county scale include Dane County's Continuous Cover Program that provides cost share for establishment of both cool-season grass pastures and native prairie. Improving water quality is a primary goal of the program but also includes reducing soil erosion, sequestering carbon, and enhancing wildlife as outcomes.

Farmer-led watershed groups emerging in Iowa, Wisconsin and other states have stressed adoption of cover crops, no-till, prairie strips, and other practices compatible with corn and soybean plantings, while some are also educating members about pasturing livestock, such as farmer spotlights on grazing dairy heifers (WDATCP, 2022).

### Wildlife, plant, and pollinator, and rare species conservation policy

Policies related to wildlife, plants and pollinators influence grasslands. Grasslands are critical for wildlife to sustain their populations and for human uses for hunting upland game such as pheasants and grouse, birdwatching, and hiking. Many grassland birds and plants have declined with the loss of grassland habitat. Wildlife is managed by states as a common resource not owned by individual landowners, with a system of hunting quotas and license fees. Federal Pittman-Robertson Act funds wildlife research and land stewardship, including for grassland-based wildlife, through an excise tax on hunting and fishing gear including firearms and ammunition.

The federal Endangered Species Act (ESA) and state-level endangered species laws aim to protect species at risk of extinction.

While ESA has been a powerful mechanism for preventing extinction on federal lands and due to federal actions such as dams, it has not been influential in preventing crop expansion into important habitats for species on the Threatened and Endangered Species list. For instance, the Poweshiek skipperling was once common, but the butterfly was listed as federally endangered in 2014. Its surviving populations have been extirpated from North Dakota, South Dakota, Minnesota, Iowa, and Illiois, and it remains in reduced numbers in Michigan, Manitoba and one area in Wisconsin. It continues to decline due to threats including loss of habitat, pesticides, climate change, invasive species, altered hydrology, and lack of disturbance, while recovery efforts are just beginning to understand the species' biology and recovery options (USFWS, 2019). The monarch butterfly depends on milkweed and its habitats have declined and been impacted by pesticides. In 2020 USFWS determined it is warranted for listing but that listing is precluded due to capacity constraints; it was listed in 2022 on the International Union for the Conservation of Nature Red List. States also maintain threatened and endangered species lists but rarely have regulatory authority over habitat loss due to agriculture. Migratory Bird Joint Ventures organize federal, state, and non-governmental partners to conserve bird habitat.

Animal and plant diversity can be enhanced or degraded due to grazing. Grazing can impair prairie plant diversity and grassland bird nest success through trampling and feeding if not well-managed for the site. While grazing is not appropriate for all prairies, it can be beneficial for some goals in the right contexts (MDNR, 2021). Pastures that include a broad seed mix including clover and other forbs can enhance diversity. Grazing is one tool for grassland management to prevent succession to woody species, along with prescribed fire, herbicide treatment. Grasslands and the species they support often require active stewardship that can be funded through a variety of policy mechanisms and supported by social networks of professionals and volunteers.

### Carbon and other environmental markets

> *"If USDA gets involved, the carbon offset credits are going to come from just doing more of the same with some little tiny amendment … A CAFO is never going to be a carbon sink… it's just allowing polluters to keep polluting… The research just has not shown that these carbon market schemes actually reduce emissions. It's just a profit-making scheme that I think makes people feel better… we have farmers who are just like, 'I do not want to be in relationship with fossil fuel companies… that's not why I am doing soil health practices, I'm not doing it to bail them out'… I don't think that those farmers' voices are being heard."*—Non-profit employee, Michigan, Interview #96

Markets that provide payments for ecosystem services including water quality and carbon storage and sequestration are increasingly piloted and discussed. The way environmental practices are accounted for in ecosystem models is pivotal to the payments farmers would receive. Based on the broad definition of carbon practices the USDA listed in a recent request for proposals for climate-smart commodities, many are concerned that carbon markets would incentivize conservation practices such as a cover crops that result in little soil carbon accumulation over the long term (Jian et al., 2020; Blanco-Canqui, 2022), rather than incentivizing permanent conversion to perennial cover, such as through grasslands or well-managed pastures, that have the potential to provide long-term carbon storage (Rui et al., 2022; Sanford et al., 2022). The rise in private agri-environmental initiatives raises questions about how public programs can support and supplement them to ensure effective and equitable outcomes (Baylis et al., 2022).

## Public and tribal lands

### Public lands

Some local, state and federal lands allow conservation grazing in some wildlife management areas. For instance, the Minnesota Department of Agriculture provides opportunities for grazing and haying on certain public lands across the state through their Conservation Grazing Program (Minnesota Department of Agriculture, 2022). Missouri's Department of Conservation mentions the benefits of conservation grazing to manage natural grasslands and prairies (Missouri Department of Conservation, 2022). The management plans for public parks such as Ozark Highlands Southwest Prairie Area, Pawnee Prairie, Chapel View Prairie, and Robert E. Talbot Conservation Area all include prescribed grazing as a strategy to reach management goals. Wisconsin has a collaborative project with university extension and private graziers called Grazing Public Lands in Wisconsin (Grazing Public Lands in Wisconsin, 2018; Pasture Project, 2020). This project evaluates the opportunities and challenges of rotationally-grazed livestock for conservation on public grasslands. Illinois Department of Natural Resources (DNR) Wildlife Protection Program plans on using prescribed grazing to restore certain state-protected prairie lands, such as Prairie Ridge State Natural Area and Twelve-Mile Prairie (Illinois Department of Natural Resources, 2022). However, Iowa DNR only allows emergency haying and grazing on DNR managed land during times of disaster declared by the governor (Iowa DNR, 2013). The Michigan DNR has a Public Land Strategy that does not mention grazing (Michigan Department of Natural Resources, 2013).

### Tribal lands

Tribal governments are important actors in developing policies and programs for grasslands and grazing agriculture. These programs are often structured to promote food sovereignty and support food banks, elders, and community. Self-governance is the core of sovereignty, and control of meaningful processes of food production is important for Native Nations. Efforts are underway to reform the Food Distribution Program on Indian Reservations (FDPIR) to promote food sovereignty. For instance, FDPIR 638 Self-Governance Demonstration Project has given certain Nations (including the Menominee and Oneida Nations in Wisconsin) control over what goes into food boxes, enabling them to provide their communities with culturally appropriate foods sourced from Native farmers (Indigenous Food and Agriculture Institute, 2022).

Several Native Nations pasture livestock to revitalize traditional foodways and provide healthy food and connections to land. For instance, in Iowa the Meskwaki Nation Natural Resources

Department manages a wildlife refuge that commonly has bison and is seeking to expand and create a new management plan for the herd (Meskwaki Department of Natural Resources, 2017). In Michigan, the Bay Mills Indian Community runs the Waishkey Bay Farm where they pasture poultry and raise grass-fed beef (Bay Mills Community College, 2022). In Minnesota, The Prairie Island Indian Community has 40 bison that roam on 55 hectares of tribal lands including pasture and prairieland. In Wisconsin, Oneida Nation educational farm Tsyunhehkwa has a herd of cattle (Tsyunhehkwa Agriculture, 2019). The Oneida Nation Farms and Agriculture Center raises steers, cow-calf pairs, and grass-fed bison (Oneida Nation, 2018). The Forest County Potawatomi own and operate a farm called Bodwéwadmi Ktëgan, where they raise pastured chickens, hogs, grass-fed cattle and bison. The Ho Chunk Nation used to have a bison herd at Badger Army Ammunition Plant, but this program ended due to financial challenges (Wisconsin Public Radio, 2010). The Menominee Nation has allocated land for farming operations, is actively developing a food production initiative including grazing, and building an agricultural degree program at the College of Menominee Nation. In both Illinois and Missouri there are no federally recognized indigenous nations. All indigenous nations that historically lived in Illinois and Missouri were violently forced from their lands and now reside in surrounding states (University of Missouri Libraries, 2022).

## State and local plans and taxes

### Plans

While all states have Wildlife Action Plans and Forest Action Plans, most states do not have Grassland Action Plans. USDA released the Northern Bobwhite, Grasslands and Savannas Framework for Conservation Action in 2022 to direct action toward priority counties in the central and eastern U.S. (USDA Natural Resources Conservation Service, 2022). The Minnesota Prairie Conservation Plan calls for protecting all native prairie from conversion, 40% grassland and 20% wetland in core and habitat complex areas, and 10% grassland in other areas of the state (Minnesota Prairie Plan Working Group, 2018). Some county or district land and water resource management plans have mentioned the benefits of grazing and grasslands and have set goals to promote grazing. State and county comprehensive plans designate land use areas but have limited regulatory authority. States have also developed pollinator plans that promote the conservation or reestablishment of native prairies and savannas (Locke et al., 2016; Minnesota Board of Water Soil Resources, 2019; Michigan Pollinator Protection Plan Steering Committee, 2022; Missourians for Monarchs Collaborative Steering Committee, 2022).

### Property taxes

Agricultural land including grazing land has lower tax rates in our study states, however, prairie without grazing or haying is subject to higher taxes in some states. By Iowa law, the value of agricultural property taxes must be based on the current land use rather than its highest and best use. Farmers can apply for the Agricultural Land Tax Credit that provides a tax credit in an amount determined by the county auditor to offset high farm taxes (Iowa Department of Revenue, 2022). There is also the Family Farm Credit that aims to provide $10 million in property tax credits to landowners actively engaged in farming. Grazing land is taxed similarly to agricultural land. In Iowa, native prairie land and open prairie land are also eligible for tax credits or exemptions (Iowa Department of Revenue, 2022). In Illinois, the tax rate for cropland including rotational pasture is higher than the tax rate for permanent pasture. Illinois also has a conservation stewardship tax exemption for those with conservation plans approved by the Illinois Department of Natural Resources (2022). In Michigan, agricultural land has the potential to be exempt from certain local school operating taxes under the Qualified Agricultural Property Exemption program (Michigan Department of Natural Resources, 2013; State of Michigan, 2018). Land must be more than 50% in agricultural use to qualify and the definition of agricultural use includes grazing and pasture. Grasslands not under agricultural use do not qualify for this exemption. Minnesota has a few programs that allow agricultural land to be taxed at a lower rate. The Green Acres Program or Minnesota Agricultural Property Tax law states that farmers' properties should be valued using an agricultural lens rather than true market value which may be higher due to developmental pressures (Minnesota Department of Revenue, 2020). In conjunction with this program the Minnesota Department of Revenue (2018) also organizes the Rural Preserve Property Tax Program which provides the same relief for property taxes on rural land that is vacant, but still part of a farm. The Minnesota Department of Revenue (2022) also provides lower property taxes to special agricultural homesteads; land must be unoccupied and actively farmed to qualify for this program. In Missouri, property taxes are calculated as a percentage of the assessed market value of the land. Agricultural land including grazing land is taxed at 12% of market value of the property. Grain crops taxed as personal property are assessed at 0.05% of market value. Most property including grasslands are taxed at a rate of 32–33% of the assessed market value. Some agricultural producers can qualify for tax credits through the family farm breeding livestock program or the qualified beef tax credit program. Agricultural land including grazing land has lower tax rates in Wisconsin, but grassland without grazing or haying is subject to higher taxes. Farmers who graze woodlands are taxed at the agricultural rate and pay lower taxes than woodland owners without grazing in some states such as Wisconsin (Mayerfeld et al., 2016).

## Access to land, capital, and fair labor

> *"There were both legal and illegal transfers that were enforced by State-sanctioned violence against Native people and through the forced labor of Africans that [have] never been atoned for…Land didn't just pop up and exist, and people were like, 'Oh, it's yours. It's free.' That's a story that we're told, but that's not the reality in most cases."—Neil Thapar, Co-Director, Minnow*

> *"I was overwhelmed by the amount of farmers that [were interested in cooperative land ownership]...Many farmers, vegetable farmers, livestock farmers, crop farmers, said similar things."*—Meghan Filbert, Livestock Program Manager, Practical Farmers of Iowa & Diversified Grazier

## Land access

Land access is an important issue for bolstering grasslands and managed grazing as well as supporting the next generation of farmers and addressing financial and racial equity in landownership (Spratt et al., 2021). Land is increasingly out of reach, particularly for smaller farmers, because of decreasing farmland availability and skyrocketing costs. These trends are driven in part by consolidation in land ownership, urban development, and financial speculation in farmland. Subsidies and lending norms disproportionately increase the profits of large, commodity farms and CAFOs (Bekkerman et al., 2018; Azzam et al., 2021). This creates a positive feedback loop whereby as these farms gain land, they are able to leverage more capital, allowing them to acquire more land and driving smaller farms, such as many of those practicing managed grazing, out of business. Increased financialization of farmland has also led to a proliferation of landholding by companies, funds, and wealthy individuals, making it difficult for farmers, particularly smaller farmers, to compete (Ross, 2014; Fairbairn, 2020). Likewise, urban development can increase the cost of farmland especially near urban areas (Livanis et al., 2006). This is a particular issue for smaller, sustainable farmers who often rely on niche markets in cities and for many immigrant communities located in urban areas who are interested in farming. Also, if farmers are not profitable enough to create retirement accounts, that can increase the pressure to sell land for development or intensive agricultural use (Lowe, 2022).

Some land trusts, farm organizations, universities, and local, state, and Federal staff assist farmers in accessing land. This assistance includes technical support for succession planning and programs that help facilitate land transfers to beginning farmers such as FarmLink programs, state-level tax incentive programs, and the Conservation Reserve Program Transition Incentives Program (CRP-TIP). Some state or local-level programs around land access are funded through the Beginning Farmer and Rancher Development Program (BFRDP).

However, these types of support programs for land access are underdeveloped relative to other forms of technical and financial assistance for farmers (Lowe, 2022). This lack of support extends to the Farm Bill, which has no title or program focused on land access. What little funding is provided is scattered across programs like Agricultural Conservation Easement Program—Agricultural Land Easements (ACEP-ALE), CRP-TIP, and BFRDP without a coordinated approach. Moreover, very little effort has gone toward addressing the financialization of farmland and reducing consolidation in land ownership. A small number of land trusts and cooperative land stewardship programs seek to address these issues by purchasing land and enabling joint ownership by community members.

Issues with land access and affordability disproportionately affect farmers of color who have been systematically deprived of land ownership through a variety of means including many U.S. government practices and policies. Centuries of governmental policy and practices have been used to systematically remove Native peoples from their homelands, redistribute that land to white farmers, and exclude other farmers of color from land ownership (Horst and Marion, 2019). These include treaties with Native Nations, the Indian Removal Act, the Homestead and Allotment Acts, slavery, immigration and labor policy, the Japanese Internment Act, heirs property laws, and USDA discrimination against farmers of color. Because of this, few people of color own farmland. Today, 97% of agricultural land is owned by white farmers although people of color make up the majority of the agricultural labor force (Horst and Marion, 2019). This dynamic makes it particularly difficult for farmers of color to build the wealth and access the capital necessary to purchase farmland.

## Access to capital

Grazing operations require less capital than conventional livestock operations, but farmers still need capital for purchasing livestock and other equipment. Dairy farms require higher levels of capital for milking. Smaller ruminants such as poultry, sheep, and goats may have lower barriers to entry since smaller animals are less expensive and can cash flow faster.

Farmers can obtain loans from USDA Farm Service Agency, Farm Credit, and private banks for operations. Lenders are often familiar with conventional livestock operations' financial information but lack financial data on grazing operations, so it is still difficult for grazing farmers to get enough credit (Spratt et al., 2021). The FSA's Beginning Farmer and Rancher loan program offers financial assistance for beginning farmers with 3 years of farm management experience. However, farm labor is not counted as management experience, excluding many potential farmers who have extensive farming knowledge, including knowledge of animal agriculture.

## Fair labor

The Fair Labor Standards Act (FLSA) and other labor laws often include exemptions that exclude agricultural workers from protections around minimum wage and overtime pay. Poor pay and workplace abuses are exacerbated by immigration laws that prevent workers from gaining citizenship, creating a situation in which workers are afraid to report abuses due to fear of deportation. As a result, 97% of profits made in agriculture are made by white farm owners, rather than being shared more equitably across the agricultural labor force (Horst and Marion, 2019).

State laws have expanded in some cases to increase overtime, minimum wage, and workers compensation for agricultural workers. Minnesota requires employers to pay overtime to many farmworkers unless they receive a salary or are not employees. However, the other states in the Upper Midwest region do not offer overtime pay to farmworkers. Overtime requirements for farmworkers have been expanding in states

such as New York, California, and Washington (Hoard's Dairyman, 2021; Farmworker Justice, 2022). Wisconsin includes agricultural workers in its minimum wage, while the other states in this region cover many but not all agricultural workers. Labor policy is particularly influential for grass-based dairy operations because of the extra labor involved in milking.

Fair labor standards are also being improved through private governance of supply chains, such as the Milk with Dignity campaign led by the Vermont-based organization, Migrant Justice. The Milk with Dignity campaign resulted in Ben and Jerry's signing onto fair labor standards with third party enforcement (Migrant Justice, 2022). Unlike other label-based fair trade standards, Milk with Dignity is farmworker centered, with a farmworker written code of conduct and a premium paid to farmers and their workers who join as members (Frye-Levine et al., 2019). We did not find evidence of a similar fair milk campaign in our study region.

Cooperative (co-op) ownership structures are important for enhancing farmer control and profit-sharing. Many agricultural co-ops play important roles in grass-based milk and meat. For instance, Organic Valley based in southwest Wisconsin is the nation's largest farmer-owned organic cooperative, including numerous small farms located in the upper Midwest and across the U.S. Minnesota-based Regenerative Agriculture Alliance is building a cooperative network of silvopasture chicken farms as well as processing facilities and marketing structures.

## Actionable recommendations

Well-managed grasslands, savannas, and other forms of perennial agriculture are presently underutilized, yet have the ability to increase farmer profitability, grow strong, diverse rural communities, keep water clean and prevent flooding, build soil health and stabilize climate, revitalize wildlife and pollinator habitat and biodiversity, and produce high-quality milk and meat. If decision-makers want to support a transition to perennial grass-based agriculture, these recommendations from farmers and stakeholders in the grazing community suggest a variety of policy approaches. Further research is needed on these recommendations including quantitative modeling of their expected ecological and economic impacts and social science research on their perceived feasibility and legitimacy.

### Federal subsidies, insurance, and renewable fuel standard

#### Reform crop insurance and subsidies

- Improve the financial safety net for grass-based agriculture including improved pasture and whole-farm crop insurance to increase farmer adoption.
- Reform crop insurance for corn and soybeans to reduce detrimental impacts on grasslands, including greater flexibilities for base acres. Cap payment amounts and limit payments based on income.

#### Revise the ethanol mandate

- Revise the ethanol mandate to promote conservation agriculture and seek alternative domestic renewable energy sources.

### Financial and technical assistance

#### Improve financial and technical assistance

- Expand the support for grassland and managed grazing in local, state and federal cost-share, grant, and loan programs to benefit grass-based livestock, clean water, flood mitigation, soil carbon, and habitat for wildlife and pollinators.
- Enhance Environmental Quality Incentives Program (EQIP), Conservation Stewardship Program (CSP), and other programs by reducing wait times and up-front capital requirements and lowering infrastructure standards for fencing.
- Establish a Perennial Crop Advisor Program within state and federal agencies to train crop advisors on how best to incorporate grasslands and other forms of perennial agriculture into existing cropping systems.
- Improve training about grass-based livestock systems for producers and public, private sector, and tribal advisors and conservationists, including silvopasture and livestock beyond cows.
- Enhance local technical assistance delivery through additional resources for soil and water conservation districts, university extension, and other local technical advisors.
- Enhance technical assistance for non-cow livestock such as sheep, pigs, and goats to better support beginning and socially disadvantaged farmers.
- Increase technical service support to socially disadvantaged farmers by focusing on building trust and hiring grazing experts from socially disadvantaged communities.
- Develop farmer to farmer training programs and networks for socially disadvantaged farmers.
- Prioritize perennial and grassland agriculture in cross-agency agricultural and conservation initiatives that support resilience to climate change.
- Develop and communicate quality standards for grass-based agriculture to achieve desirable environmental and social outcomes.

#### Enhance Conservation Reserve Program and conservation easements

- Promote Conservation Reserve Program (CRP) adoption to enhance environmental outcomes, with flexibility for working land uses when appropriate.
- Encourage conservation easements that secure grasslands while making managed grazing land more accessible and supporting appropriate public recreation opportunities.

## Grass-fed and organic labels and certifications and supply chains

### Enhance labels and certification and supply chains for grass-based farmers

- Further develop grass-based labels and certifications to enhance market share.
- Clarify labeling for consumers by enforcing the country of origin labeling.
- Address industry consolidation through antitrust legislation and updated legal frameworks.
- Develop grassland value-added supply-chains by supporting regional processors, aggregators, distributors, and marketers focused on grassland products and their stories.
- Establish and improve available financing and capital flows to assist small businesses engaged in establishing supply chains and markets for grasslands and other forms of perennial agriculture.
- Increase grants for start-up businesses that provide key supply chain infrastructure, such as processing, storage, and distribution.
- Enhance technical support and funding availability for business planning, lending, and marketing.
- Develop and increase support for cooperative farming and marketing structures.

## Environmental policy interplay: Water, wildlife, plants, carbon

### Prioritize perennial practices in water quality strategies

- Implement an all-of-government approach to prioritize perennial conservation practices in achieving water quality goals.
- Incorporate grazing and other perennial practices in state nutrient management strategies.
- Adopt pay for performance programs that reward farmers for sustainable management outcomes.

### Enhance animal and plant diversity in grasslands

- Adopt pay for performance programs for plant and animal diversity on grazing and crop farms.
- Increase collaboration on threatened and endangered species recovery with agricultural agencies and managers.
- Increase investments in habitat stewardship to prevent extinction and future listings and keep common species common.

### Ensure carbon and other environmental markets include perennial grasslands

- Ensure that carbon markets promote the long-term soil carbon benefits of perennial land cover and contribute to environmental co-benefits.
- Design carbon markets in ways that promote equity for smaller farm operations and inclusion of socially disadvantaged farmers.

## Public and tribal lands

### Consider well-managed grazing on publicly managed lands where appropriate

- Develop and test standards for environmentally sensitive grazing on a limited amount of public land that maintains wildlife and pollinator habitat.
- Expand grazing pilot programs by natural resource agencies as a conservation management strategy on publicly managed grasslands, where appropriate for achieving biodiversity, wildlife, and public recreation goals, with safeguards to ensure public benefits.

### Support tribal grasslands and grazing

- Expand Native Nation land tenure and stewardship to restore prairie and grazing agriculture and improve food sovereignty.
- Create more positions for Tribal Liaisons (within NRCS) and invest in supporting organizations like the Wisconsin Tribal Conservation Advisory Council (which helps interface between Tribes and NRCS) for states across the upper Midwest.
- Increase coordination between the USDA and the Department of Interior Bureau of Indian Affairs to support grassland restoration and managed grazing on native lands.
- Expand Native Nation co-management of public grasslands to support food sovereignty.
- Increase Native Nation climate-smart perennial agriculture and forestry through institutional procurement and purchasing programs, such as expanding the FDPIR Self-Determination Demonstration Project.

## State and local plans and taxes

### Coordinate state-level planning, property taxes

- Develop state-level Grassland Action Plans to help guide agencies and partners in coordinating their efforts, modeled after the Forest Action Plans and Wildlife Action Plans that states must create to qualify for federal funds.
- Consider state property tax programs that ensure grazing is well-managed and provide property tax parity for well-managed woodlands, native prairies, and other grasslands.

## Access to land, capital, and fair labor

### Improve access to land, capital, and fair labor

- Increase availability and affordability of farmland by reducing farm consolidation, financial speculation, and urban sprawl.

- Improve infrastructure and programs to connect beginning and socially disadvantaged farmers to land that becomes available.
- Increase support for succession planning and decouple farmers' ability to retire from land sales.
- Increase incentives and culturally-responsive outreach strategies across land transfer programs including ACEP-ALE, CRP-TIP, and BFRDP.
- Provide beginning farmers with relief from student loan debt.
- Develop structures to help farmworkers build equity and modify programs like FSA's beginning farmer loan program to develop pathways to farm ownership.
- Encourage beginning and historically underserved farmers by providing stipends for mentor farmers, programs offering low-interest loans, debt relief, land access, assistance, and tax incentives, in order to ensure just transitions to perennial agriculture.
- Support cooperative and community-based models of land stewardship.

## Conclusions

There is a critical need to revise agricultural policies if we are to restore grasslands and support managed grazing. Restoring and maintaining grasslands and grass-based agriculture is important for achieving water quality goals, protecting wildlife and pollinator habitat, stabilizing climate, providing flood resilience, enhancing rural communities, producing healthy food, and supporting viable farmer livelihoods. Current policies support row crops to the detriment of grasslands. Crop insurance and commodity subsidies, along with the federal mandate for ethanol, have injected billions of dollars into Upper Midwest agriculture to incentivize corn and soybean production. A number of conservation policies provide technical and financial assistance for grass-based agriculture and prairie restoration and further training and funding for grazing technical and financial assistance is needed; these changes offer high political feasibility with incremental rather than transformative impacts. Increasing regional meat processing capacity and clarity in grass-based labels would help support supply chains for grass-based milk and meat, which are also politically feasible options. At a deeper structural level, graziers would benefit from policies that address consolidation in the meat and dairy industries and increase access to land, capital, and fair labor to ensure they can steward land environmentally, provide fair wages and working conditions, and earn a profit. Taking these steps would help us transition toward agriculture that better supports farmers, eaters, ecosystems, and rural economies alike.

## Author contributions

AR, EL, and AF conceived the ideas and designed methodology. AF and EL conducted interviews. YL analyzed quantitative data and created figures. AR, EL, AF, RH, and YL researched policy programs. AR, EL, AF, RJ, RH, and YL wrote the manuscript. All authors contributed critically to the drafts and gave final approval for publication.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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