

North American Ranching Industries, Beef Cattle Trade, and Grasslands: Status and Trends



Commission for Environmental Cooperation



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Introduction

The North American grasslands are the only shared, contiguous terrestrial ecoregion extending from Canada through the United States and on to Mexico. For more than a decade, the Commission for Environmental Cooperation (CEC) has supported grasslands conservation and the development of beneficial ranching practices to strengthen the resilience of this continentally-shared ecosystem.

This report stems from CEC-funded efforts to chronicle recent trends in the North American cattle ranching industry and beef cattle trade, and the grasslands that support these vital sectors.

Experts compiled data from Canada, Mexico and the United States according to an agreed-upon set of variables and procedures, including the use of common time frames and measurement units. It is, however, important to note that these statistics were originally collected by a variety of agencies under a broad range of definitions, assumptions, protocols and conditions.

Despite the challenge to compile reliable, detailed and comparable statistics across the three countries, this report underlines the importance of sustainable ranching and beef cattle trade to the grasslands, and to the societies and economies of North America. Readers are encouraged to use the information to develop their own awareness-raising and outreach campaigns, or to promote funding mechanisms, policies and research that recognize the benefits that sustainable ranching can have for the conservation and informed use of this vital, shared North American ecoregion.

The continued development and collection of data on the grasslands, the North American beef cattle industries and beef cattle trade across Mexico, Canada and the United States will strengthen trilateral efforts for a common approach to grasslands conservation and sustainable use.

“Save that prairie grass, let it grow, let it seed, and rotate your pastures differently. Because every day you’re able to graze your cattle to maintain their condition you’re saving money.”

Marj Veno, Canadian Prairies rancher

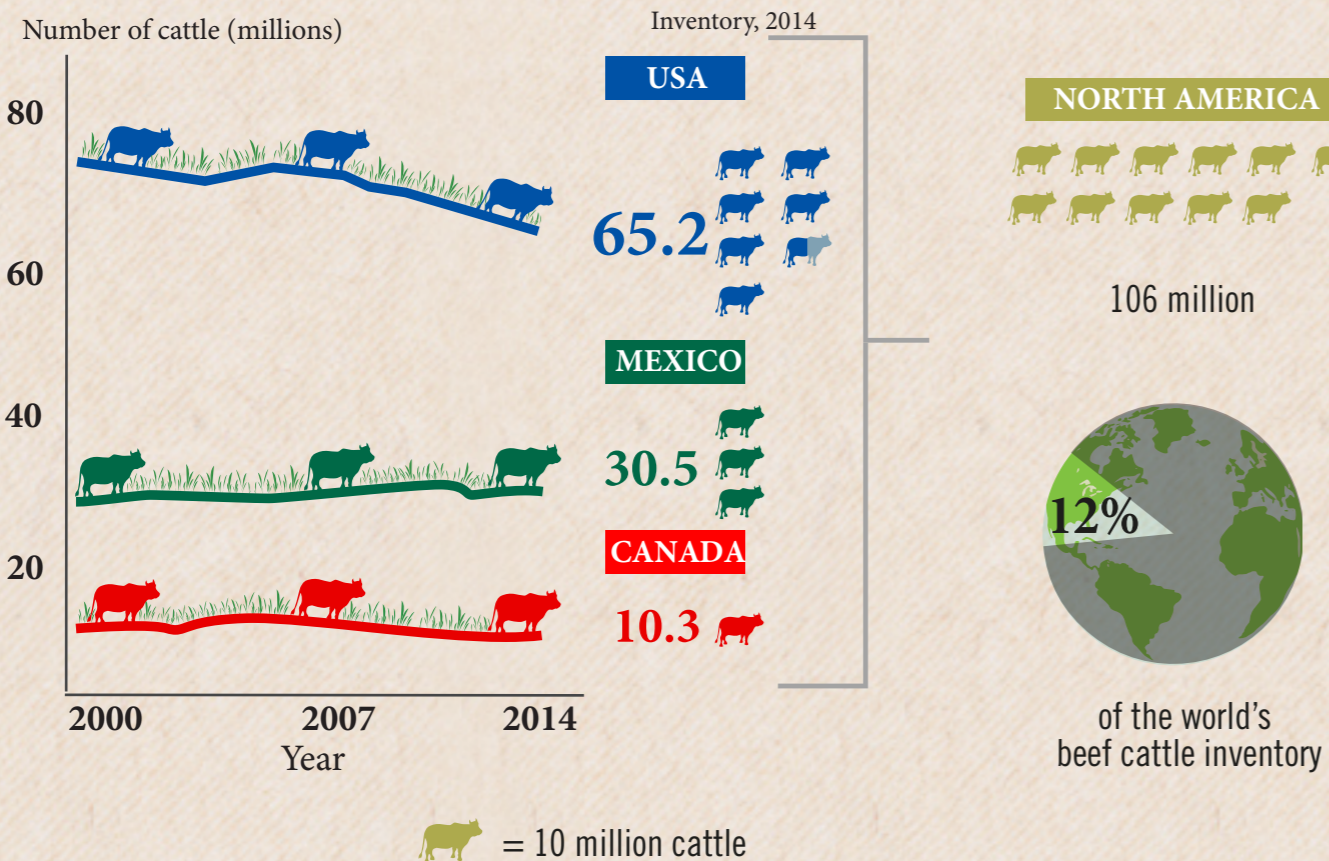


Integrated Beef Cattle Market

A healthy beef cattle market can support grasslands, and vice versa.



Beef Cattle Inventory 2000–2014



Beef Cattle Inventory in North America

North America is a large producer of beef for domestic and export purposes, and most beef cattle are grass-fed at some point during their lifecycle. Yet grasslands are North America's most threatened terrestrial ecosystem, largely due to climatic and market pressures. A strong association exists between ranch economics and grassland health, such that pressures on the grasslands may be felt by the beef cattle market and vice versa.

There are around 106 million beef cattle in North America. This represents approximately 12% of the world's cattle inventory. The United States has the largest inventory of beef cattle in North America, with around 65.2 million head, followed by Mexico with around 30.5 million and Canada with 10.3 million head.

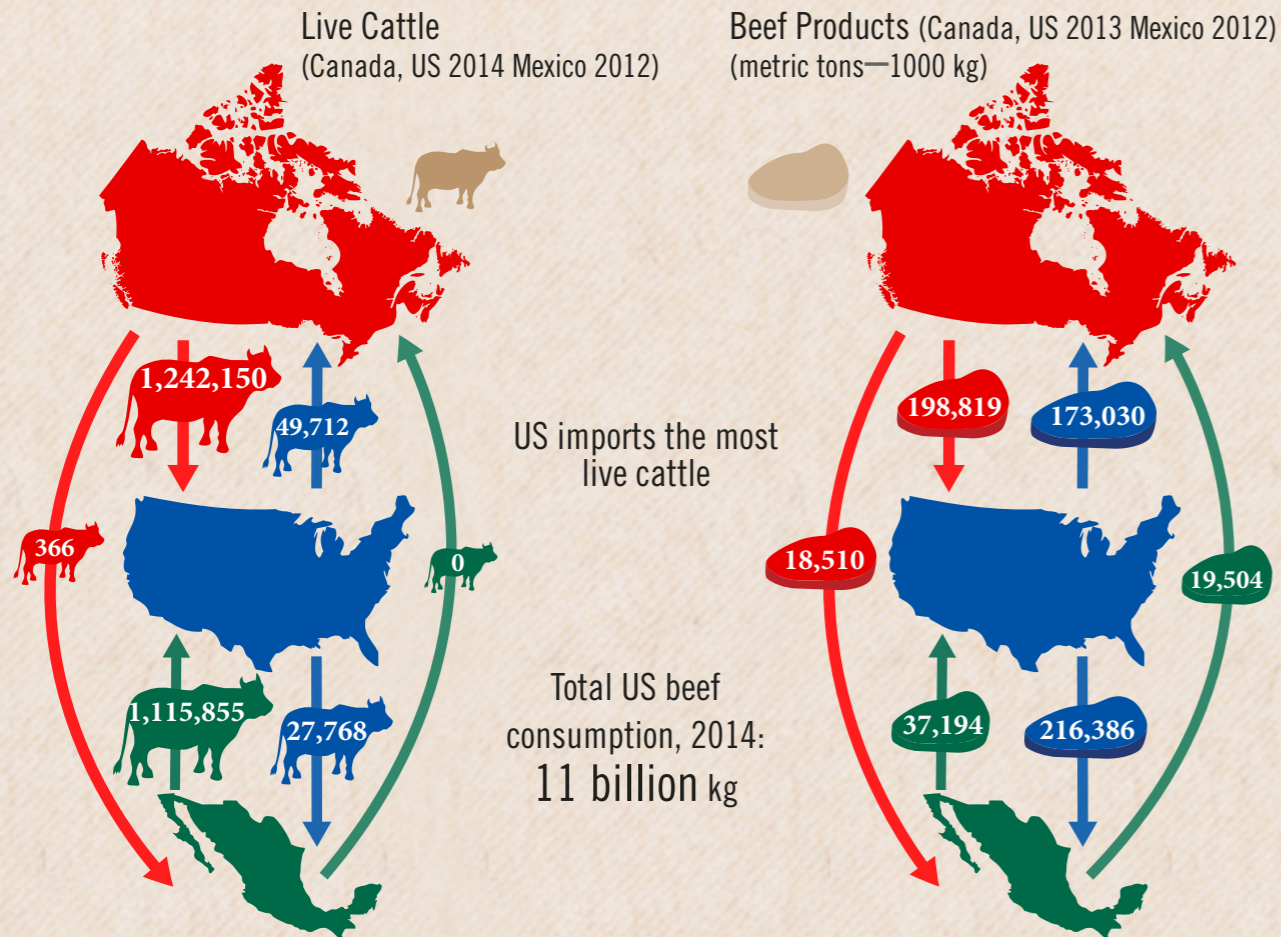
North America's 106 million beef cattle represent approximately 12% of the world's cattle inventory.

Cattle inventories in Canada and Mexico have remained quite steady since the early 2000s; however, the US has witnessed a 20% decline in inventory since the mid-1990s.

The number of beef cattle in Canada peaked at 12.7 million head, in 2005. The Canadian number decreased to a low of 10.2 million head, in 2011, and held very steady from 2011 to 2014. In 2014, Mexico had 30.5 million head of cattle. In Mexico, cattle numbers have been quite steady since 2003, with a minimum of 28.7 million head, in 2005, and a maximum of 30.5 million head, in 2011 and 2014.

Note: For Canada, numbers include purebred breeding, non-purebred breeding, calves, feeder cattle, fed cattle for slaughter (steers and heifers) and non-fed cattle for slaughter (cows and bulls). For the US, numbers include beef cows, bulls, and replacement breeding heifers, and may or may not include slaughter cattle (steers and heifers). Statistics for Mexico were compiled on a per-head basis, regardless of sex, age, or size. Numbers for all three countries exclude the dairy milk breeds and the dual-purpose (meat and milk) breeds.

Beef Cattle Trade Flows in North America



Beef Cattle Trade

The North American beef cattle industry is integrated, having both live cattle and beef products—slaughtered or processed beef—moving between the three countries.

The United States imports a significantly greater number of cattle to meet its large demand than it exports. In 2014 alone, Americans ate a total of 11.02 billion kilograms (kg) of beef.

Canada and Mexico are the only significant cattle suppliers to the US market, with Canada and Mexico having exported a total yearly average of a little over 2 million live cattle to the US during 2005–2014 (1,026,898 by Canada, and 1,005,101 by Mexico). For that period, cattle exports from Canada to the US represented 9% of Canada's total beef cattle production.

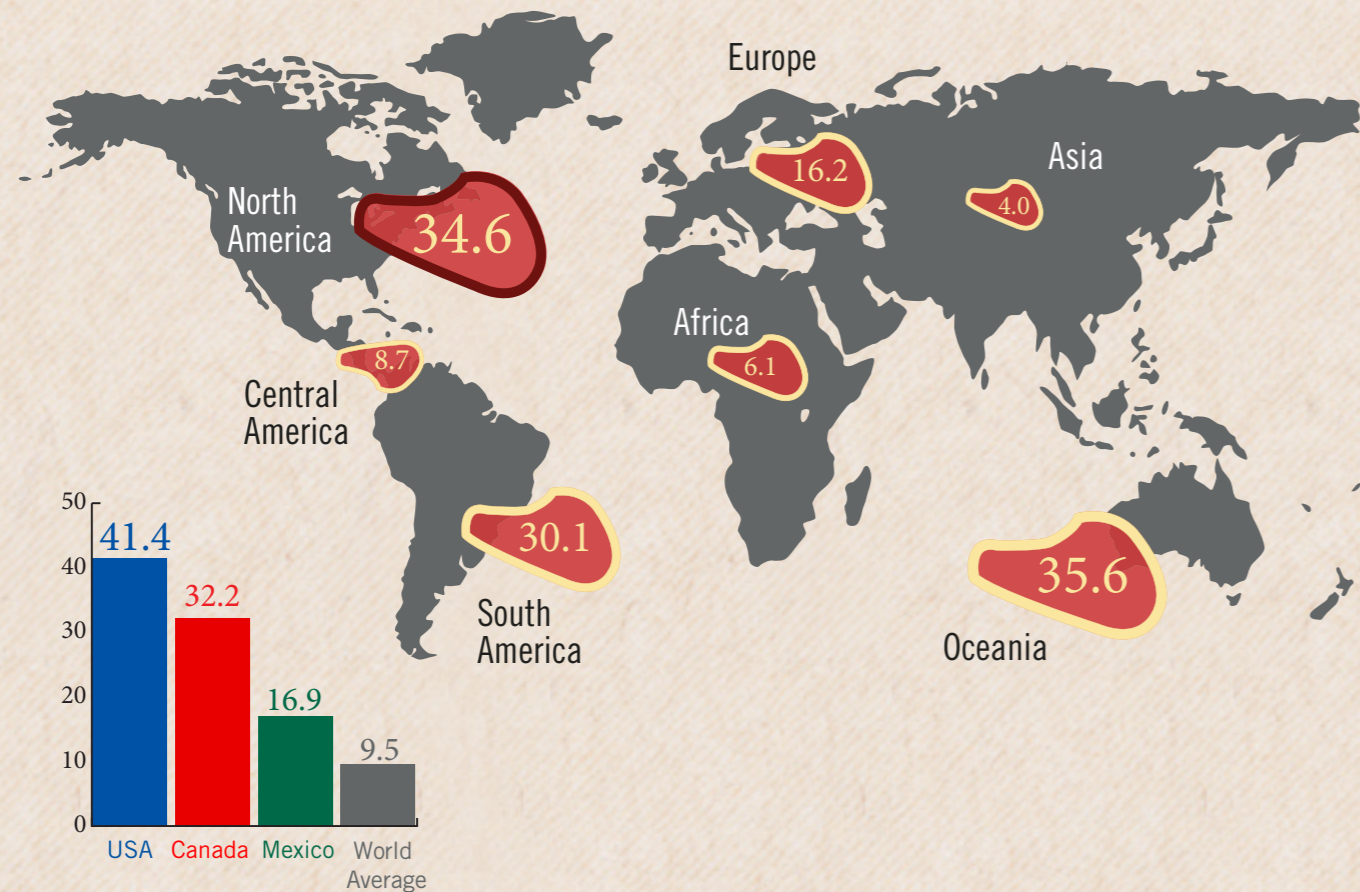
Total US annual beef consumption in 2014 was 11 billion kg. To meet its demand, the US imports from Canada and Mexico an average total of more than 2 million live cattle per year (2005–2014).

While the US does not export a significant number of live cattle to Canada and Mexico, it does export beef products. In 2013, 173,030 metric tons of beef products were exported to Canada, and 216,386 metric tons were exported to Mexico.

A significantly smaller proportion of live cattle and beef products flow between Canada and Mexico directly. Recent estimates (for live cattle in 2014 and for beef products in 2013) show that Canada exported 1,242,150 live cattle and 198,819 metric tons (1000 kg) of beef products to the US, but only 366 live cattle and 18,510 metric tons of beef products to Mexico. Similarly, in 2012 (the last year for which statistics are available) Mexico exported 1,115,855 live cattle and 37,194 metric tons of beef products to the US, but no live cattle and 19,504 metric tons of beef products to Canada.

Bovine Meat Consumption Worldwide 2000–2011

kg / per capita / year



Bovine Meat Consumption

North America has one of the highest per capita beef consumption rates on the planet. For the period 2000–2011, the global average for bovine meat consumption was 9.5 kg per person per year, while North America's was 34.6 kg, placing it among the top continents.

However, per capita beef consumption within North America varies significantly. During 2000–2011, the average American ate 41.4 kg of beef per year, the average Mexican, 16.9, and the average Canadian, 32.2.

Interestingly, while global demand for beef is on the rise, per capita consumption across North America has declined steadily over the past few years. Between 2000 and 2011, the highest yearly per capita consumption for the US and Mexico was in 2002, with 43.75 kg and 17.84 kg per person, respectively, while for Canada it was in 2003, with 34.59 kg. In contrast, the lowest yearly per capita consumption for that period was in 2011 for all three countries.

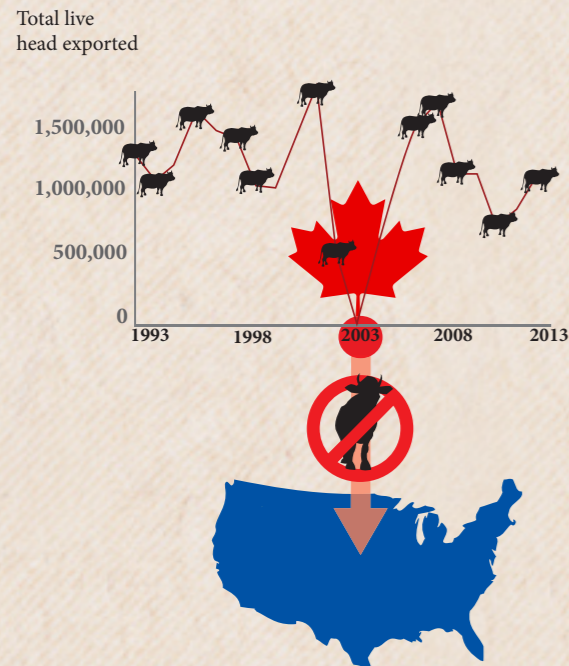
Nevertheless, for that year (2011) the US, with average per capita consumption of 37 kg, and Canada, with 29.7 kg, both ranked among the world's top 10 per-capita consumers of bovine meat—7th and 9th, respectively—while Mexico ranked 50th, with 16 kg per capita.

The US and Canada rank 7th and 9th, respectively, in terms of greatest per capita bovine meat consumption.

Market Disruptions

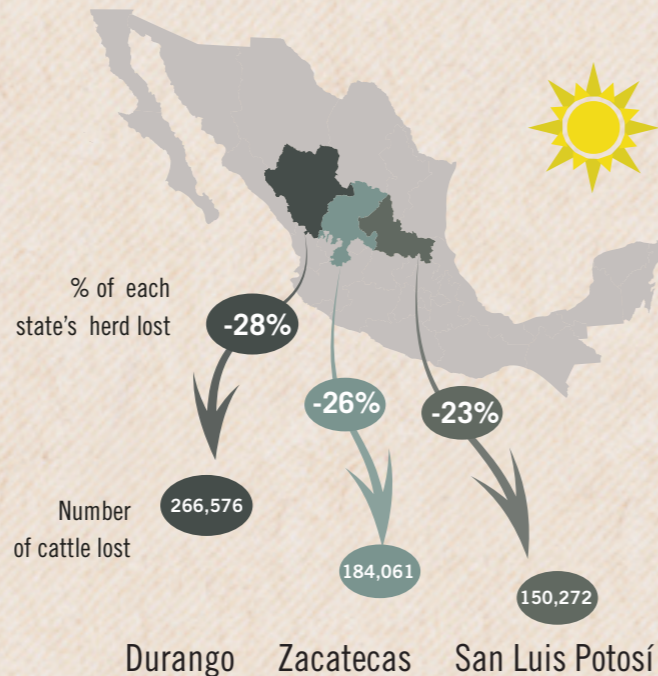
2003 mad cow disease affected Canada-US trade

Diseases



Droughts

2010–2012 drought affected Mexico



Disruptions Affecting Beef Production and Markets

In all three countries, impacts such as disease, extreme weather (e.g., drought, very low temperatures) or other market disruptions can greatly affect the cattle market. For example, the discovery of a cow infected with bovine spongiform encephalopathy (BSE, or mad cow disease) in Canada in May of 2003 halted all exports to the US for a year and Canadian ranchers had to absorb additional cattle into existing operations for a couple of years until the cattle trade fully resumed between the two countries.

During that time in Canada there was a lack of market options for all links in the beef production chain, including cow-calf producers, the largest beef production segment in Canada and also the largest group making use of grassland and forage resources.

Another poignant example is the drought that has affected both the US and Mexico in recent years. Years of drought have negatively affected rangeland growing conditions, resulting in plant loss, increased soil erosion, and minimal vegetative cover. Consequently, ranchers in the US and parts of Mexico's central grasslands were forced to destock their herds. Chihuahuan Desert grassland states were hit particularly hard by the drought, with Durango, Zacatecas and San Luis Potosí destocking 28%, 26% and 23% of their herds, respectively.

Mad cow disease halted exports from Canada to the US. Herds in several Mexican states were destocked due to drought.

“We were always running out of grass. By focusing on the soil—keeping it healthy—we can improve our production and also improve the quality of our grass.”

Brian Harper, Canadian Prairies rancher



Cattle Ranching Industry

Ranching on native grasslands is one of the most sustainable forms of agriculture.



Commission for Environmental Cooperation

Photo: Shannon Schellenberg

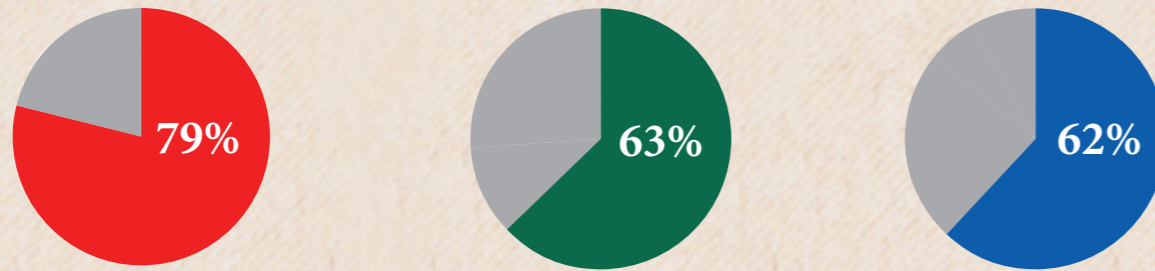


Beef Cattle Operations, Herd Size and Land Ownership

Average beef cow herd size (in head)



Private-land (colored) versus public-land (grey) grasslands



Beef Cattle Operations and Land Ownership

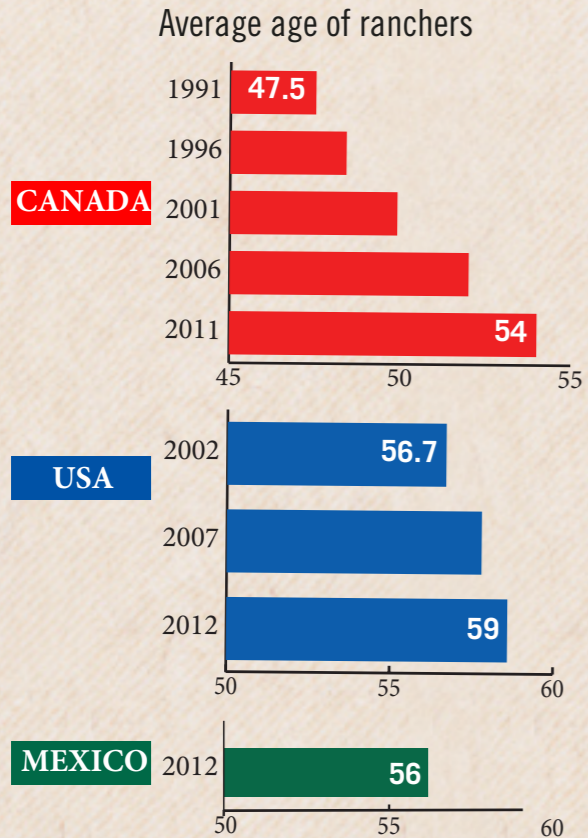
North American ranchers live off the production of grass, which provides forage for their cattle. As one rancher put it, "In reality, selling cows is a way of selling your grass." The majority of North America's grasslands are privately or communally owned and the ranchers who own and manage the land have a pivotal role in its conservation and sustainable use. In Mexico, 63% of natural grasslands are privately owned, while 26% are *ejido*, or communally-owned. Therefore, nearly 90% of grasslands in Mexico are in the hands of landowners and land managers. Approximately 79% of prairie, parkland and major water areas within Canada's Prairie Ecoregions is privately owned. And for the grassland, pasture and range categories within US land-use estimates, approximately 62% is privately owned.

In 2011, there were 80,839 beef cattle operations in Canada, down from 98,893 in 2004 (an 18% decrease). In 2012 in the US there were 729,000 cattle operations, down from 774,630 in 2004. And in Mexico in 2007 there were 392,643 production units that had cattle. No comparable trend data were available for Mexico.

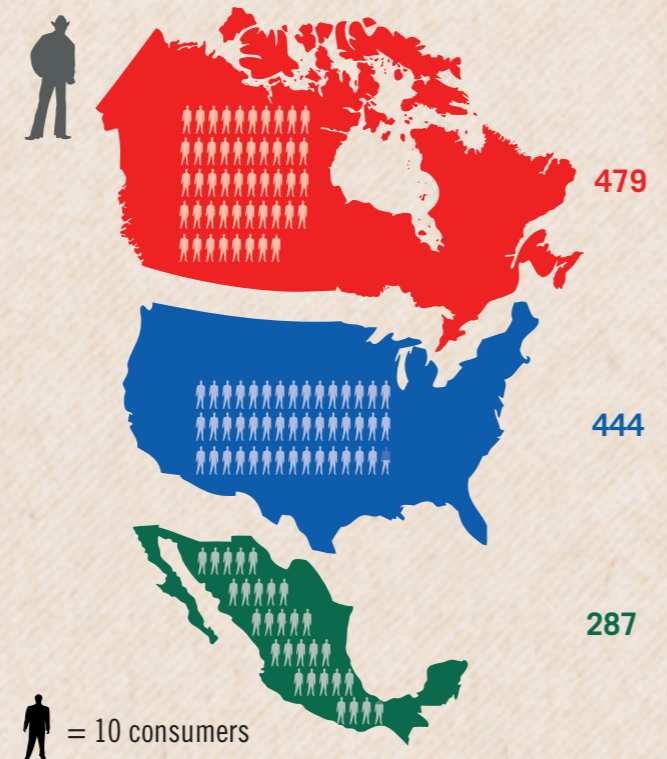
The current average beef cow herd size is 63 head in Canada, (2013) 45 head in Mexico (2014) and 40 head in the US (2013). In 2004, Canada's average herd size was 63 head per farm or ranch. In the US, 99% of beef cattle operations registered a herd size of fewer than 50 head in 2004 and by 2012, that percentage of operations had dropped to 80%. No comparable trend data were available for Mexico.

Most of North America's grasslands are privately or communally owned, but the number of cattle operations and number of cattle per ranch are both declining.

Average Age of Ranchers and Number of People They Supply with Beef



In each country, an average cattle rancher provides beef to:



consumers, respectively.

Aging Hands are Feeding North Americans

The average age of ranchers across North America exceeds 55 years, and that number is rising. According to Statistics Canada, in 1991 the average age of Canadian farm and ranch operators was 47.5 and by 2011 it had increased to 54. Statistics from USDA's Census of Agriculture are similar, with the average age of US beef cattle operators at 59 in 2012, up from 56.7 in 2002. And in 2012, the average age of Mexican farmers and ranchers was 56, with less than 1% under 26 years old and more than 40% over 60. No comparable trend data were available for Mexico.

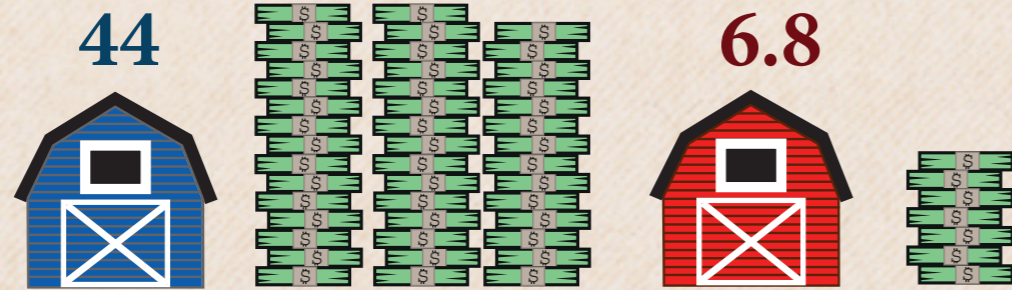
That means that aging hands are feeding the continent: each North American rancher supplies beef to an average of approximately 408 consumers. On average, each Canadian ranch supplies beef to 479 consumers, each US ranch supplies beef to 444 consumers, and each Mexican ranch or *ejido* supplies beef to 287 consumers.¹

On average, each ranch supplies beef to about 408 people.

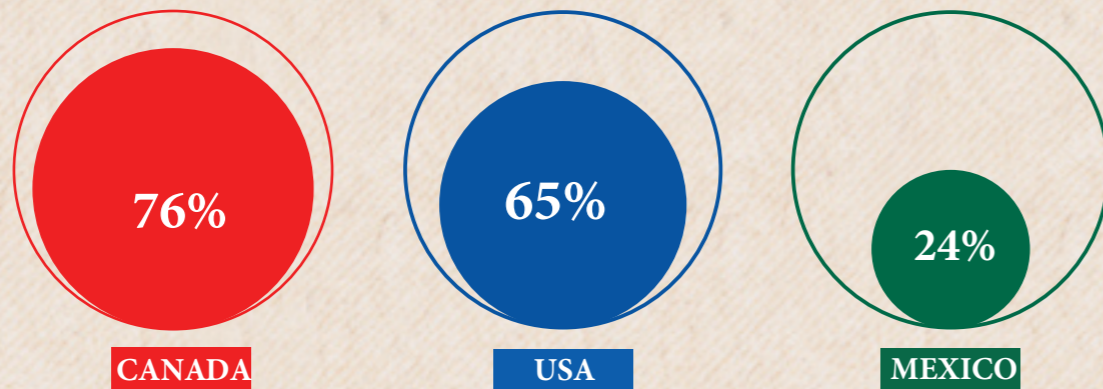
¹ These estimates were made using 2011 data for each country without taking into consideration imports or exports, using Food and Agriculture Organization (FAO) data. The calculations were based on the production cattle after slaughter, using carcass weight in kilograms (kg). For each country, the total production was divided by the number of beef cattle operations (including *ejidos*) and then divided by the average per capita beef consumption at carcass weight in kilograms to obtain an estimate of the number of consumers one rancher supplies with beef.

Ranch Income, Including Off-Ranch Sources

Farm cash receipts
(billions of US\$)



% ranchers with
another source
of income



On- and Off-Ranch Sources of Income

In 2013, farm cash receipts from beef cattle production in Canada were valued at \$6.8 billion, up from \$6.27 billion in 2011. In the US, 2013 farm cash receipts were valued at \$44 billion, slightly lower than the \$45 billion in cash receipts for 2010. No comparable data were available for Mexico.

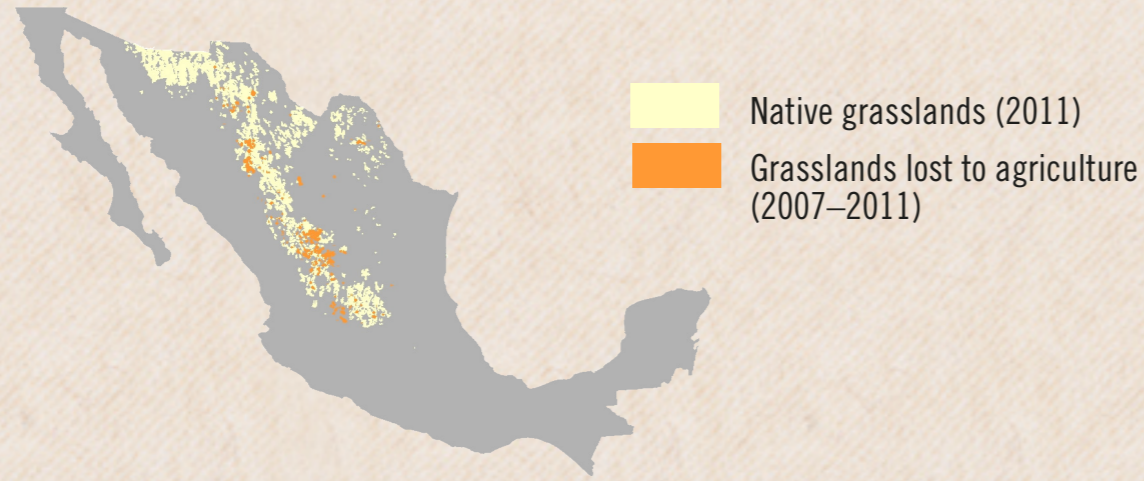
Though—collectively—their contribution to the agriculture sector is significant, the small size of most ranches limits their ability to generate large profits. As a result of reduced ranch profitability, the number of small family farms and ranches continues to decline while the number of corporate farms and ranches is increasing. In order to remain viable, many ranchers supplement ranch income with off-ranch work.

An average of 60% of Canadian farm and ranch operators reported outside sources of income during 2001–2006. And in 2011, 75.6% of Canadian farm and ranch income was attributed to off-farm/ranch activities. In 2002, 57% of US ranchers had an outside source of income and by 2012 that number had risen to 65%, including 44% who worked more than 200 days off the ranch. In 2007 (the last year for which statistics are available) approximately 24% of Mexican beef producers had an additional source of income.

The small size of most ranches limits their ability to generate large profits. Many ranchers supplement income with off-ranch work.

Conversion of Grasslands to Other Land Uses

In Mexico



In the US

Types of land converted to crop production, 2008–2012



Land Use Pressures

Competition for land is also affecting the ability of ranchers to live off grasslands. Individuals and corporations are increasingly buying rangeland for development, investment or personal reasons (e.g., recreation, retirement). Conversion of grasslands for crop production, urbanization, access roads, transmission lines and pipelines, and oil and gas extraction (including hydraulic fracturing) have all increased dramatically. In the United States, 77% of all land converted to crops between 2008 and 2012 were grasslands. The resulting increased land values lead some ranchers to sell their land, and makes the cost of entering the industry very high unless the assets are inherited. For example, in one year—from 2012 to 2013—the Canadian Prairie provinces of Manitoba, Saskatchewan and Alberta all experienced land value increases, of 25.6%, 28.5%, and 12.9%, respectively.

Increased land values lead some ranchers to sell their land, and make the cost of entering the industry very high.

**“I don’t live off of cows.
I live off of the production of grass, which comes from the land.”**

Alejandro Carrillo, Chihuahuan Desert rancher



North American Grasslands

Grasslands, characterized by grasses and an absence of trees, are the only contiguous terrestrial ecoregion shared by all three countries.

North American Grasslands



North American Grasslands

Mixed prairie:
29% remaining



Arid grassland:
14% remaining



Tallgrass prairie:
3% remaining



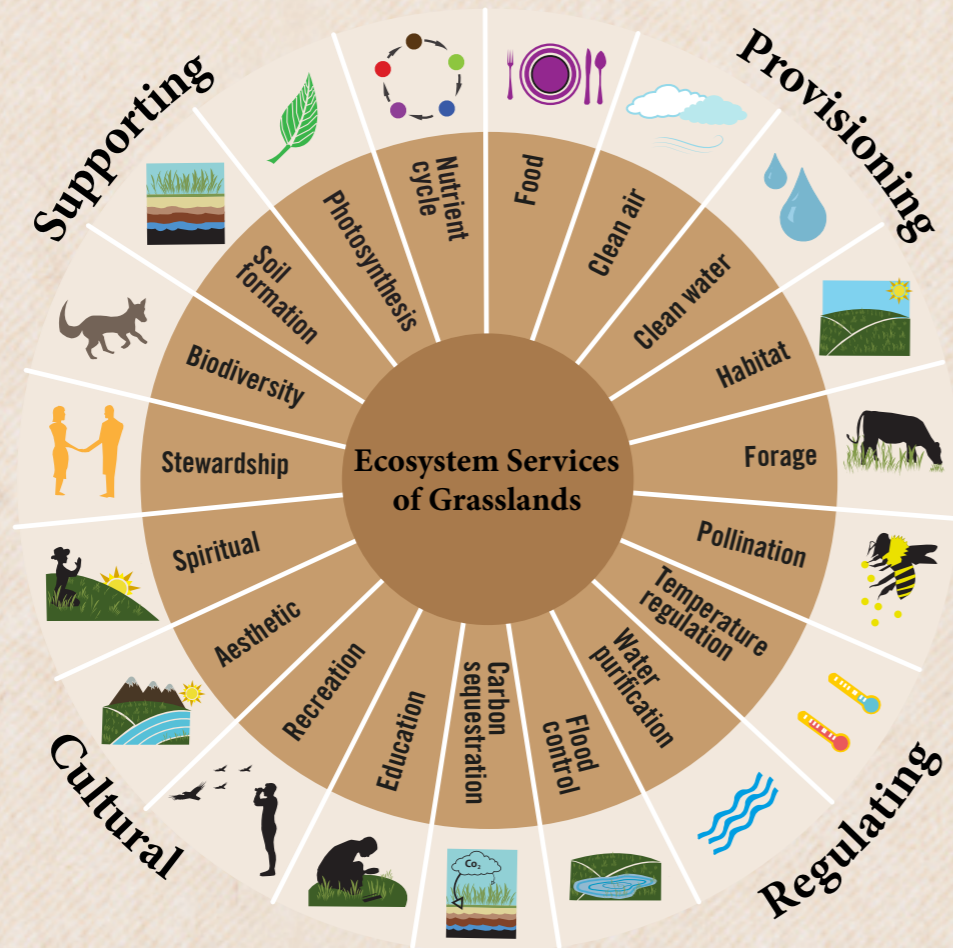
Shortgrass prairie:
48% remaining

Distribution of Remaining North American Grasslands

The North American grasslands are the only shared, contiguous terrestrial ecoregion spanning Canada to Mexico. They provide forage for cattle and critical habitat for native species. They also enhance water conservation and sequester large amounts of carbon when not stressed by fire and drought. Grasslands form a vital corridor for North America's migratory and native birds and many other important species. However, agriculture and other economic activities have significantly transformed native grasslands. Today, they are considered among the continent's most threatened ecosystems, with less than 3% formally protected, despite widespread and rapid conversion to other land uses.

According to recent estimates, grasslands today contain less than 3% of original tallgrass prairie, 29% of original mixed-grass prairie, and 48% of original shortgrass prairie. In Canada, it is estimated that less than 20% of the original 61.5 million hectares (ha) of prairie remains, with nearly 50 million ha lost between 1870 and 1930 to crop production. Of the approximately 278 million ha of original Central Plains grasslands in the US, over 105 million were converted to crops between 1850 and 1950 and another 11 million were lost between 1950 and 1990. Mexico's Chihuahuan Desert grasslands currently spans about 12.5 million ha but the original extent would have been far greater. The latest comprehensive estimate suggests that only 14% of the original Chihuahuan Desert grasslands remains, and loss continues at an alarming rate. During 2004–2009, over 404,000 ha of grasslands were converted to agriculture in Mexico. And in the Valles Centrales region, cropland expanded by 6% per year between 2006 to 2011, resulting in a loss of 69,240 ha of grasslands and shrub lands.

Grasslands are shared by all three North American countries, but less than 20% of their original extent remains.



Ecosystem Services of Grasslands

Loss of North American grasslands is of concern because they provide many societal benefits, including water cycling and regulation, soil preservation, biodiversity conservation, pollinators, wildlife habitat, climate regulation, carbon sequestration, food, and spiritual and cultural value.

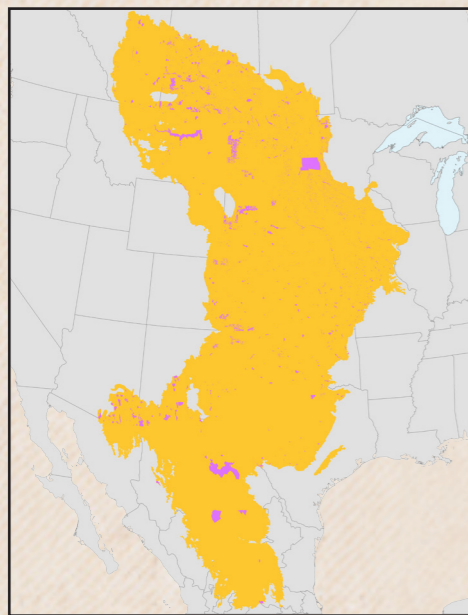
Through their deep root structures, grasses and forbs help prevent soil erosion. When grassland soils are stable, more moisture is trapped in the soil, increasing vegetation and replenishing the water table for drinking water, agriculture and industrial uses. Because of the slow surface runoff, grasslands also trap sediments before they reach the water system, reducing sediment, nutrient and pesticide loads in water

sources. In addition, grasslands provide fodder for livestock operations and habitat for grassland species—including pollinators, which perform a vital service for agriculture. And under the right conditions, grasslands can store large amounts of carbon in the soil, thereby reducing greenhouse gases in the atmosphere.

These and other benefits have real value for society. For example, they reduce water treatment and agricultural production costs, provide a buffer against the effects of droughts and floods, increase ranch profitability and offer tourism and recreation opportunities that stimulate local economies.

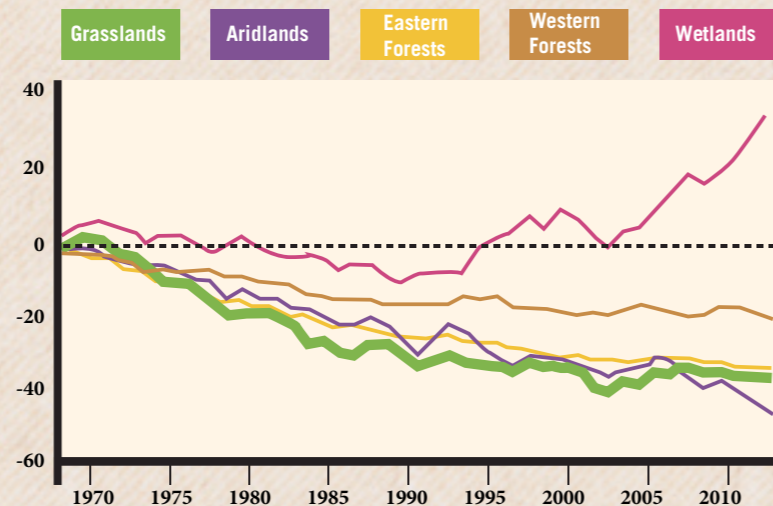
Grasslands provide many benefits to society that, if lost, would be difficult and expensive to replace.

Grassland Protected Areas and Grassland Bird Population



■ Protected areas IUCN I-VI
■ Central grasslands

Population Declines (1966–2000)



NABCI, US Committee. 2014. *The state of the birds 2014: United States of America*. North American Bird Conservation Initiative. Washington, DC: US Department of Interior.

Indicators of Grassland Health

One of the best indicators of grassland health is grassland-obligate bird populations, as many of these birds are migratory and spend different parts of their lifecycle in the northern and southern parts of the North American grasslands. There are 37 grassland-obligate bird species that span the western Great Plains to the Chihuahuan Desert: of the 88% of these bird species that are migratory, 90% overwinter in the Chihuahuan Desert.

The US 2014 *State of the Birds* report¹ points to large-scale agricultural conversion and overgrazing on Chihuahuan Desert grasslands as a significant factor in the steep decline of certain US grassland-obligate birds: 54% of the 28 grassland-breeding bird species in the US are declining significantly. In Canada, grassland-obligate birds have also experienced steep declines—40% on average since 1970, when state-of-

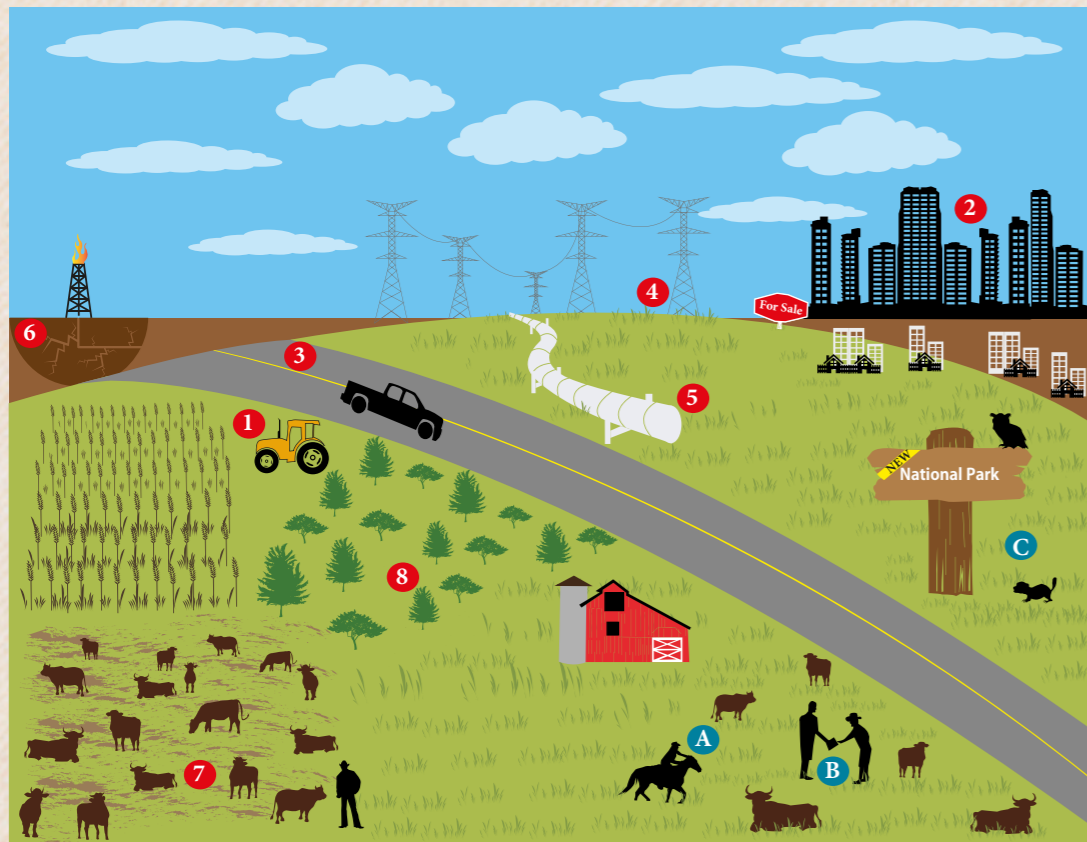
Less than 3% of native grasslands are formally protected.

bird monitoring began. Agricultural intensification, oil and gas development, habitat fragmentation and fire suppression are among the threats to remaining grassland habitat for these birds in the Canadian Prairies. Other threats that are transforming the grasslands and reducing bird habitat include overgrazing, encroaching brush and trees, and non-native invasive plant species.

Although the conservation and sustainable use of grasslands is recognized as an urgent issue in all three North American countries, less than 3% of native grasslands are formally protected as per the protected areas categories of the International Union for the Conservation of Nature (IUCN).

¹ NABCI, US Committee. 2014. *The state of the birds 2014: United States of America*. North American Bird Conservation Initiative. Washington, DC: US Department of Interior.

Threats and Solutions in the Grassland Landscape



Main threats:

- 1 Conversion of grasslands for crop production
- 2 Urbanization
- 3 Roads
- 4 Transmission lines
- 5 Pipelines
- 6 Oil and gas extraction (including hydraulic fracturing)
- 7 Overgrazing
- 8 Encroaching brush and trees, and non-native invasive plant species

Some of the proposed solutions

- A Implement beneficial management practices on privately-owned and managed grasslands.
- B Provide pivotal support to ranchers who manage grasslands.
- C Secure more formal protection of remaining native grasslands.

Threats and Solutions

A key component of grassland conservation is improving ranch profitability through the development of incentive tools that help achieve economic parity with alternate land uses, and through improved competitiveness of conservation incentives, risk insurance and other programs for ranchers. Effective solutions are emerging from partnerships, including among ranchers, conservation organizations, governments and academic institutions. These partnerships champion innovative ideas for conserving and restoring native grasslands, enhancing ranch profitability, and placing more grasslands under formal protection. This includes implementing, with local partners, beneficial management practices that address the underlying causes of grassland loss and prevent or reverse the degradation that threatens the economic viability of ranching in this ecosystem.

Despite many threats to grasslands, solutions are emerging from multistakeholder partnerships to promote conservation and sustainable use.

These improvements also benefit the conservation of biodiversity and bolster the resilience of a threatened ecosystem by increasing resistance to invasive and exotic species, as well as by increasing the profitability of rangelands, which safeguards against their sale for conversion to unsustainable industrial agriculture.

For more innovative solutions across North America to conserve and restore native grasslands while strengthening the economic stability of ranchers, visit the CEC's Grasslands Beneficial Management Practices Online Tool (www.nagrasslands.org), which includes over a hundred examples, from local techniques to national and continental approaches.

“The things I do for conservation are things I want to do for my ranch anyway, so for me they go hand in hand.”

Bill Barby, Southern Great Plains rancher



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