

Overview Section: The Eastern Plains

Decline and Potential Rejuvenation

By **Brendan Boepple and Rebecca Spira**

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Key Findings:

- An 1889 survey counted only 1,091 bison left in North America, by 2005 some 50 “conservation” herds totaling 19,000 bison existed in North America. Today areas as large as 3,000,000 acres have been suggested for sustaining wild bison herds on an ecologically meaningful scale.
- The Great Plains west of the Mississippi were plowed up at a rate of 2.6 million acres a year from 1850 to 1950.
- Ten percent of the ground water in the Ogallala aquifer has been depleted in the last 20 years, with a nine-foot drop in the water table in Colorado’s portion.
- For the Eastern Plains of the Rockies average farm size in 1930 was 1,061, in 1959: 2,479 acres and in 1997: 2,989 acres; over the same period the number of farms declined from 71,289 to 33,034
- The median age for the Eastern Plains Agricultural Zone is 38 years, three years older than the entire Rockies region
- One farmer today can produce more output than five farmers in 1940. The number of farmers in the U.S. has dropped almost 80 percent since 1910, from 40 million to about three million.
- Wind energy production in the Rockies has grown 3,904 percent in ten years

About the Authors:

Brendan Boepple (Colorado College class of ‘11) is a 2010-11 Student Researcher for the State of the Rockies Project
Rebecca Spira (Colorado College class of ‘11) is a 2010-11 Student Researcher for the State of the Rockies Project

Since the Lewis and Clark expedition first crossed the Northern Great Plains and beyond into the highest reaches of the Rocky Mountains, generations of explorers, settlers, and policy-makers have been perplexed by the question, “What are the Great Plains for, and what are we to make of them?” Lewis and Clark’s 1804-1806 exploration, and the settlement during the century to follow, plowed through “oceans of grass” with abundant wildlife, vast landscapes, and undisturbed ecological processes, as well as encountered Native American tribes. The expedition’s reports back to the “East”, along with those of Zebulon Pike in 1806, and John Wesley Powell in 1869 helped focus attention on the vast riches of the lands in the Louisiana Purchase.

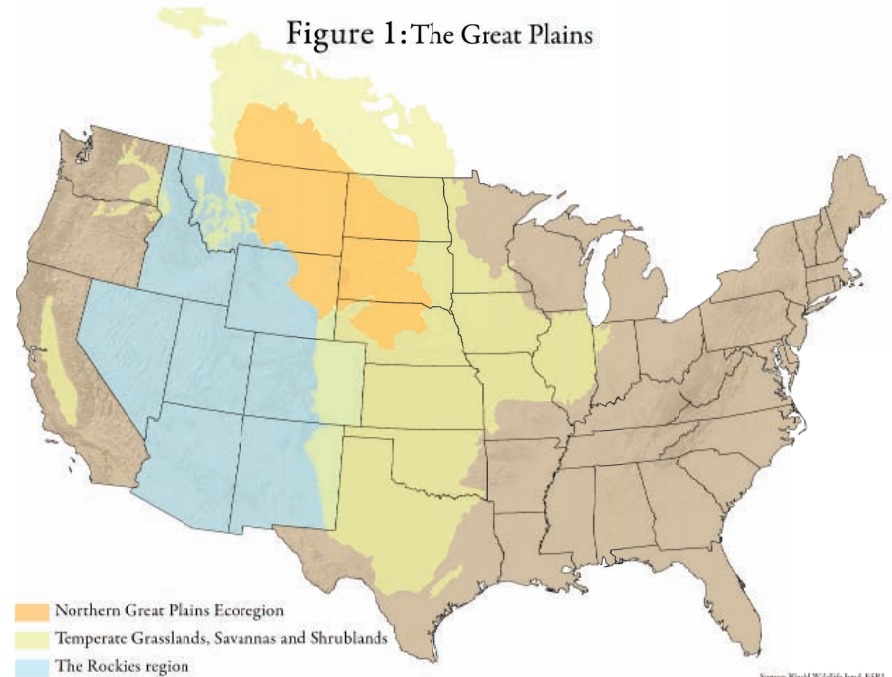
Beginning in 1862, the various Homestead Acts were an answer to the question about the Plains, and were a call for waves of settlers to “put into production” vast stretches of virgin lands only considered valuable if humans extracted a bounty of produce. The settlers could spread democratic ideals by staking out straight plots of land to make a living and hopefully a profit. Agricultural development of the West served as an answer to the question of the Great Plains, but subjected economies, communities, and the environment of the region to manic fluctuations of boom and bust. Intense tilling, plowing, and other “sod busting” agricultural practices did reach points of economic boom; however the ecological processes and climate of the Northern Great Plains were unable to support the long-term agricultural settlement. Homesteaded lands in the Eastern Plains of Montana saw their first great bust in the beginning of the 20th century. The more southern reaches of the Great Plains saw decline with the environmental disaster of the 1930’s Dust Bowl, and later with the decline of available water, including the continued draw-down of the Ogallala Aquifer. As many farmers in rural communities began to sell their farms to large corporations and move toward suburbs and cities after World War II, the Homestead Act’s “vision” of how to conquer the region was shown to be an insufficient answer to the Great Plains question.

In recent decades, loss of population and economic vitality has affected many of the rural communities in the High Plains. Numerous rural communities in the Eastern Plains Agricultural Zone (EPAZ), a small part of the larger Great Plains eco-region, have lost population, and now register low levels of economic prosperity as agricultural economies are largely mechanized and corporatized. This has left large parts of eastern Montana, Wyoming, Colorado, and New Mexico, asking the questions that the original Homestead Acts answered 150 years ago: “What are the Great Plains for and what are we to make of them today?”

Today’s economic, environmental, and political climate, resonating throughout national, regional, and local levels, has given this question direction and opportunity. Since 2003, there have been calls for a “new” Homestead Act by the federal government, intended to improve infrastructure and encourage working age populations to return to viable regional

economies.¹ In 2007, Senator Bryon Dorgan of North Dakota introduced new homestead legislation that called for bottom-up economic revitalization through tax breaks, government subsidies to start new businesses, and forgiveness of college debts for those “resettling” in eligible counties. Additionally, the push for alternative energy solutions has drawn many to dream of widespread utilization of the abundant renewable energy resources on the plains. Many areas in New Mexico and Colorado boast rich solar energy potential, while the high winds that were once a challenge to farmers and settlers across Wyoming and Montana’s plains have been recognized for

Figure 1: The Great Plains



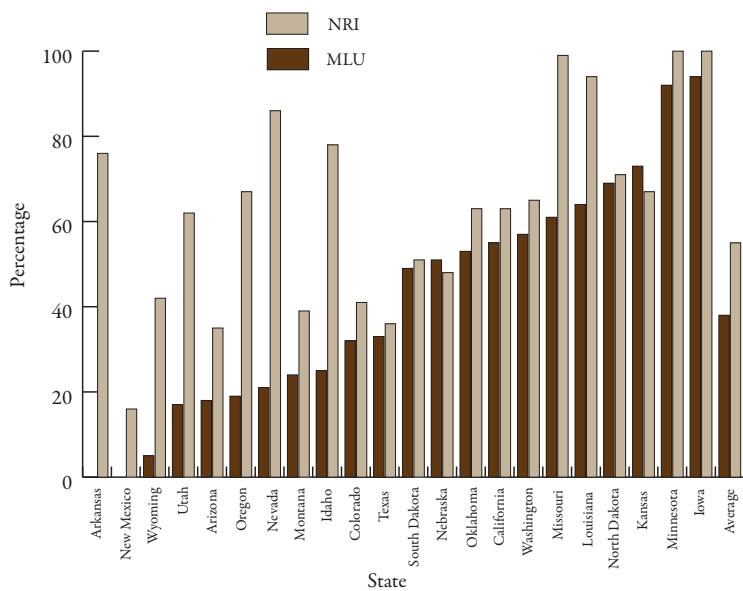
their great alternative energy potential. These renewable energies may provide long-term restorative environmental benefits along with potential economic benefits if the necessary transmission corridors are created and required capital is found to construct vast energy collection arrays. In addition some have called for a resurgence of economic and community vitality in the region based upon a “nature-based economy,” that seeks to restore the Plains to its pre-European settlement ecological conditions. “Prairie reserves” could be an effort to restore the High Plains to centuries’ past vast open spaces with roaming herds of domestic animals and wildlife. There are hopes that opening up the Plains as a “North American Serengeti,” can restore the region’s ecology from its damaged agricultural history while infusing recreation and tourism-based economic activity.

Recently, there are many people critically analyzing, evaluating, and reappraising what the Great Plains region represents, and what it has to offer in light of the current demographic and environmental situation. Finding an answer to the question of the Plains means listening closely to all of the voices that arise from the “sea of grass,” the solutions they suggest, and the needs they hope to meet. The political, economic, and environmental implications of these solutions represent a variety of interests found from region to region, state to state, and county to county. The best answer to the question of the Plains

Figure 2:

Percent of Potential Grasslands Lost as Indicated by Major Land Use Report (MLU) 1997 and National Resources Inventory (NRI)

Source: Richard Connor, et al., United States Grasslands and Related Resources: An Economic and Biological Trends Assessment (College Station: Texas A & M University, 2001)



will come from a deliberation that both remembers the past and recognizes the present in understanding future possibilities for the Plains.

Characteristics of an Ocean of Grass and its Wildlife

As seen in **Figure 1**, four of the eight states in the Rockies region contain eastern portions that overlap the Great Plains. Large parts of Montana, Wyoming, Colorado, and New Mexico are home to a prairie ecosystem, similar to that of Midwestern states like North Dakota, South Dakota, Nebraska, and Kansas. The Great Plains Research Project at the University of Michigan, part of the Inter-University Consortium for Political Science and Research, defines the limits of the region as the Canadian border to the north, the 32nd parallel to the south, the line of 700 mm or roughly 28 inches of average annual precipitation to the east, and the lands 5,000 feet of elevation and higher to the West as boundaries that fully encompass geographic commonality of the Great Plains. With agricultural settlement of this region came conversion of virgin prairie to cultivated cropland. The transformation of these natural ecosystems to agricultural lands is seen in **Figure 2**. With settlement came the decline of the grasslands west of the Mississippi, which were plowed up on an average 2.6 million acres a year from 1850-1950. The conversion of the short-grass prairie, which makes up the Eastern Plains Agricultural Zone, to crop production, did not occur until the 1880's. **Figure 2** shows an estimate of land west of the Mississippi covered by native grassland and croplands since 1850, as indicated by the 1997 Major Land Use (MLU) report of grassland pasture and range and National Resources Inventory (NRI) report of non-federal rangelands. The graph illustrates a decrease in grasslands and increase of croplands over 10 year periods throughout the second half of the 19th century until 1990. This simultaneous process of cropland conversion and grassland plow-up saw fluctuations in populations in set-

tlers. Though the prairie is still home to many communities, with numerous inhabitants being descendants of original settlers, other parts of the region were long abandoned by the middle of the 20th century.²

The Northern Great Plains (NGP), which has been referred to as an “ocean of grass,” is a natural habitat for a variety of short and mixed grasses, insects, prairie dogs, pronghorn, deer, elk, wolves, and the Great American bison. According to the 2004 Conservation Assessment of the Northern Great Plains, written in collaboration by a group of ecologists, biologists, and conservationists, including the World Wildlife Fund, the Northern Great Plains eco-region is 279,000 square miles, North America’s largest grassland eco-region, comprising the northwestern quarter of the Great Plains.² Most of the NGP receives less than 16 inches (40 cm) of precipitation a year. Precipitation varies cyclically, however, as the region is subject to prolonged drought amongst other things, natural disasters such as sporadic fires occur.

The population trends of endemic species have often been considered good indicators of ecosystem conditions and thus act as a useful index to determine the overall health of the ecosystem.³ Today 1,595 species of plants and 1,100 vertebrate species call the Northern Great Plains their home.⁴ Despite human settlement, the only extinct species that lived on the Plains before people settled there is the now-extinct Rocky Mountain Locust. Others species, like the grizzly bear and gray wolf, have been largely reduced in population, and some like the black footed ferret are highly endangered. In the Northern Great Plains eco-region non-native species account for 13-30 percent of all species, and major areas of the NGP’s biodiversity remain unaffected.⁴

Despite the resiliency of many Great Plains species, there remains concern that their continued decimation will threaten the fragile ecological systems of the region. Plant and animal life was and remains dependent upon the natural system prior to settlement. Thus, any one alteration could cause a ripple effect across the entire sea of grass, threatening the natural exuberance of the region. Great Plains ecologist Dan Licht explains, “Nowhere in the Great Plains does there exist a vestige of naturally functioning grassland ecosystem...because the prairie ecosystem has lost not only grass, but also wildlife.” He goes on, “The extermination of Great Plains wildlife was probably the largest human-caused elimination of fauna, in terms of biomass, the world has ever seen.”⁵ The decline of the Great Plains eco-system is well indicated by the threatened and endangered status of the region’s endemic species that have evolved in the Great Plains and whose distribution is limited to the NGP.

The protection of these endemic species is of central importance to biodiversity conservation because their health and survival is symbiotic with that of the local environment. Among the species of grass endemic to the NGP eco-region (apart from the blue grama and buffalo grass that remain largely abundant) are Great Plains stickseed (*Lappula cenchrusoides*), second bladderpod (*Lesquerella arenosa*), Dakota wild-buckwheat (*erigoum nisher*), and dense flower knotweed (*polygonum polygaloides*). Others grass species are of significant conservation interest because they are near-endemics, listed as endangered or threatened by the U.S. and Canadian governments, or consid-

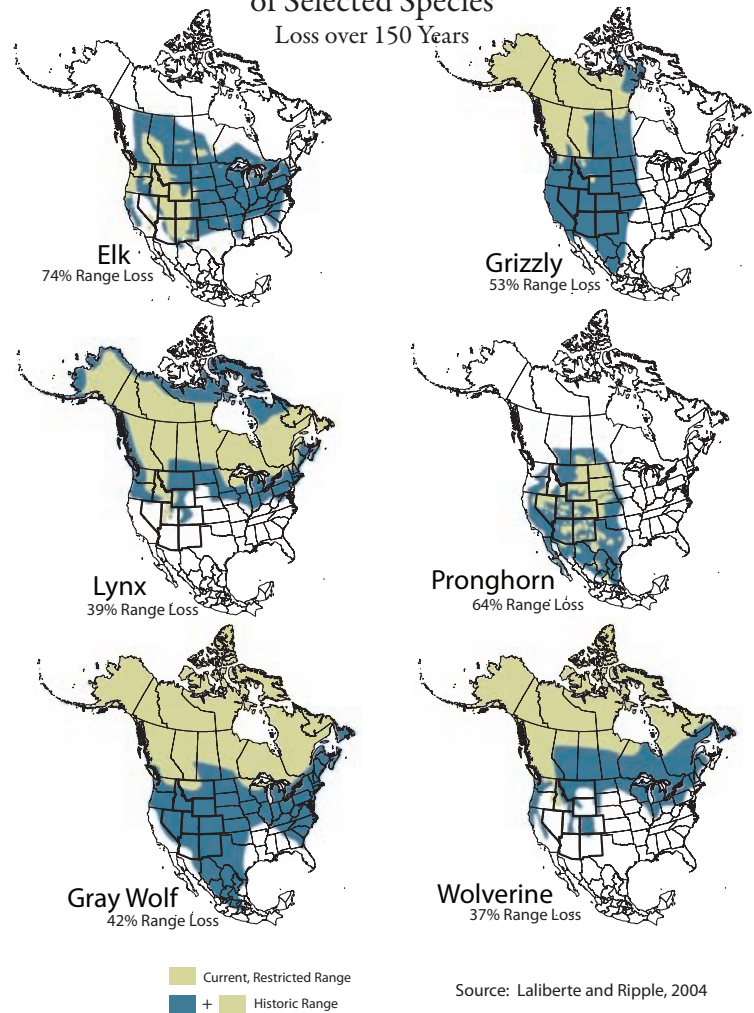
ered at risk according to Natural Heritage Network standards. The flora of the Great Plains is in need of a conservation plan, for their habitat receives the lowest levels of government protection. Of the 404 endemic species in Wyoming, only 294 inhabit protected lands with less than 15 percent of these species having fewer than 10 percent of their populations preserved.⁶ Bird species of the grasslands face the greatest threat of decimation over any other bird population in North America.

The NGP eco-region is home to 95 species of mammals, 20 of which are carnivores. **Figure 3** shows the pre-settlement territory of some of the major mammals in the eco-region. Including shrew and bats, 23 of these species are insectivorous mammals. In general, prairie carnivores have been the group most affected by human settlement of the region. Grizzly bears and the gray wolf no longer roam most of the region (though, populations do exist near Yellowstone and the Eastern Rockies High Plains). River otters and wolverines were once abundant within the region, but are now usually found only in the outskirts. The presence of mountain lions has drastically decreased, resulting in this species being threatened in South Dakota and Nebraska; the black-footed ferret is highly endangered as well. The swift fox, once more abundant than the red or grey fox, is considered at risk in the entire eco-region and occupies perhaps only 40 percent of its former range. Dramatic shifts in the abundance of prey, disappearance of the wolf, and predator control programs have altered the presence of mid-sized predators. The populations of these predators, such as coyotes (*Canis latrans*), have changed due to various factors.

The grassland elk that once roamed the tall grass prairies and the arid short grass steppes, became extinct by the late 1800's. Elk were once a primary Plains species, but their numbers have now dramatically decreased in the Northern Great Plains, and are no longer quantified as "innumerable" as early explorers of the plains once had described. Beavers have also experienced reduced numbers as a result of ecosystem degradation. Their absence is widely felt, for they have a strong influence over hydrologic regimes and plant composition that affects the distribution of other species, such as waterfowl and amphibians.⁶ The black-tailed prairie dog, which was once able to thrive throughout the NGP eco-region, now finds itself a candidate for the Endangered Species Act. The Audubon bighorn sheep, which occupied the badlands of the Dakotas, Nebraska, and Montana, became extinct around 1925 due to over hunting. The Great American Bison, once numbering 30-70 million, were completely gone from the Northern Plains by 1883.⁷

Before settlement, the grasslands were regulated by wild fires, initiated by lightning strikes and sometimes by the Native Americans. These fires helped recycle the dead grass and renew the nutrients in the soil, while also ridding the grasses of pests and plant disease. The presence of bison on the plains helps contribute to the regulatory function of wildfires—bison leave behind patches of dried grass from their grazing areas, which helps host the next fire. Settlers who moved to the Plains would extinguish these fires, disallowing the natural rejuvenation process on the plains to occur. Plants would overgrow, and weeds would eventually set in, altering and damaging the natural ecosystem functions.⁸ There is currently heavy fire suppression on the plains with only 33.4 km², or about .02 percent of the total mixed grass prairie being affected by fire per year, and only 14.2 km² of the 2,675.8 km² (.05 percent) of short grass

Figure 3: Historic and Current Ranges of Selected Species

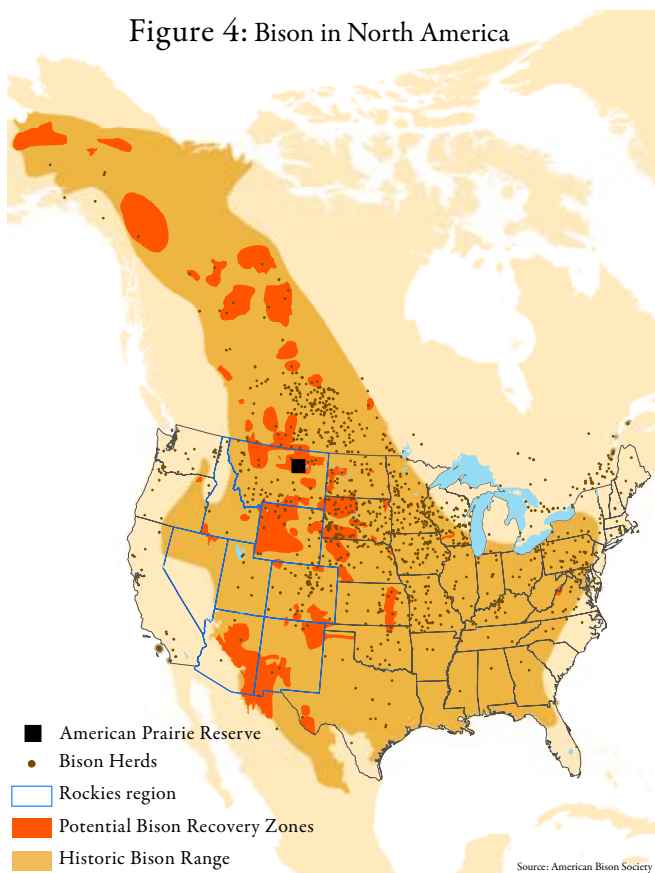


prairie being affected.⁹ While fires were once a yearly occurrence on the long grass prairie, a three to five year occurrence on the mixed grass prairie, and a major ecological driver on the short grass prairie, government managers largely ignored the important ecological roles that fires have played during the past century.⁹ Some range managers have begun reinstating fire as a management tool and the practice, when implemented during the right season, has been shown to have several immediate benefits to plant species on the prairie.¹⁰ Callenbach offers us these words:

"bison are wild, freedom-loving beasts. These weighty symbolic virtues also pose difficult problems- conceptual and practical, economic and political, cultural and ecological. Indeed, if we are to let bison be bison, we will have to modify some of our current ways of being human. These changes will benefit us as well as bison, but they will be profound".¹¹

The American Bison (also known as buffalo) is among the wildlife that was once abundant throughout the Plains, but now is sparsely scattered throughout the NGP and EPAZ. The enormity of the bison's previous territory is shown in **Figure 4**. George Catlin, on his way up the Missouri River in 1832 in what is now Montana, left us with a prophetic image of the American Bison upon witnessing them first hand. "What a thrilling specimen for America to preserve and hold up to the view of her refined citizens and the world in future ages! A nation's Park, containing man and beasts, in all the wild and freshness of their nature's beauty."¹² It is amazing how Catlin

Figure 4: Bison in North America



foresaw the demise of the buffalo from the beginning of settlement, and that their survival would be dependent upon government protection.

Frederick W. Turner states that in 1835, “more buffalo robes were being shipped down the Missouri than beaver pelts—almost fifty thousand of them annually.”¹³ Killing bison for hide and sport helped contribute not only to their own demise, but to the alteration of an entire ecosystem. The 1860’s brought not only railroads and settlement, but praise for the buffalo hunter, William F. Cody, or Buffalo Bill, as America would know him. These symbols of the American spirit seemed to necessitate the eradication of the American Bison, and the destruction of the ecosystem. “For five hundred dollars a month Cody killed buffalo, and in a year and a half while employed by the Kansas Pacific he dropped an estimate of 4,280.”¹³ Between 1872 and 1874, Turner adds, an estimated 3,158,730 buffalo were killed by the white man.¹³

The Northern Great Plains Conservation Assessment determined that there were about 50 “conservation herds” of buffalo in North America in 2005. Many believe that bison play a necessary role in the strength of the Great Plains ecosystem. While cattle have taken up a similar role in prairie ecosystems, they do not truly fulfill the traditional ecological role of the bison. In earlier centuries their rapid reproduction rate resulted in vast herds, helping to sustain the biodiversity of grassland carnivores, like the cougar and gray wolf. The absence of bison on the plains is heavily reflected by the decline of the grassland carnivore populations.¹⁴ The grazing patterns of these large herds of bison were also instrumental in maintaining biodiversity throughout the eco-region. Bison herds roam throughout the plains, moving on from one grazing area to another. Their large numbers (and appetite), make for heavily grazed areas,

which are then temporarily abandoned and provide for a patchwork of grazed land where other species can thrive. The native species of grass have adapted to these grazing patterns. Their impact on the native grasses helps spread seeds as a result of their grazing patterns, playing a significant role in nutrient cycling, and the distribution of prairie birds, prairie dog colonies, and other large herbivores.¹⁴ The Northern Great Plains Conservation Assessment estimates that there are few communities or species in the Northern Great Plains not affected, in some form, by the presence of bison.¹⁴

The Northern Great Plains Conservation assessment in 2005 helped bring a concern for bison to the ecological forefront. Bison, according to the assessment, were ecologically extinct from their historic herd locations, with the exception of a handful of places. By 2005 there were approximately 50 “conservation herds” in North America. These herds are either publicly owned, or managed by private organizations with clear conservation objects. The animals in these “conservation herds” make up approximately 19,000 bison out of about 500,000 bison in North America.¹⁴ Only six of these are free-ranging herds; of these, only four are in the U.S.. They are located in Henry’s Mountains, Utah, Yellowstone National Park in Wyoming, Montana, and Idaho, along with the adjoining Grand Teton National Park and National Elk Refuge in Wyoming.¹⁴ None of these are found within the NGP.¹⁴ Captive bison in the nine conservation herds in the NGP now occupy a mere 280,000 acres (less than 0.1 percent of their former range within the NGP). The few public herds that remain today are heavily managed.¹⁴

As Earnest Callenbach, author of *Bring Back the Buffalo!*, explains,

“the only way to replicate the ecological symbiosis that free-roaming herds once had with grasslands is to put bison, elk, pronghorn, and deer back on large territories, along with their appropriate predators (including humans, hunting on a year-round basis), and let them reestablish coexistence with the grasses and the myriad other forms of life there.”

Bison ranchers like Ted Turner can do their part to set a new standard, but much of the task, as Callenbach advises, will need to be taken up by public lands.¹⁵

In the grasslands, like any ocean, body, or natural ecosystem, one loose thread can unravel the entire ecosystem, threatening the entire ecosystem. Approximately two-thirds of North America’s mixed- and short-grass prairies have been tilled, leading experts to conclude that the Great Plains is one



of the most altered ecosystems in North America. Threats to the Plains started developing with everything that accompanied settlement. Sod busting, altered soils (and thus the species that thrive on them), grazing practices, the mechanization of agriculture, fragmentation of lands, oil and gas development, the diminished Ogallala Aquifer, and effects of climate change have all taken their toll on the Great Plains in significant ways.

It will require preservation on a vast scale to keep our current grasslands intact; its true preservation requires that grasslands become a national and global priority. The non-profit, World Wildlife Fund, has identified the Northern Great Plains as one of 10 large areas it works in, evidencing the impressive ecology and importance to the world's biodiversity. There is much at stake if preserving grassland biodiversity is left unaddressed, for it affects not only the environment but the people who live there. The homestead acts and waves of settlement helped characterize the plains as land used for agriculture. The increase in agriculture and the simultaneous decrease in grassland it brought about, along with the switch to large-scale agricultural operations, have left many rural inhabitants on the Plains facing uncertainties regarding the utility of the environment they live in.

High outmigration rates in rural areas over the past 20 years seem to indicate that many rural inhabitants have run into limited economic opportunity living on the Plains. However, there are those populations that remain, finding possibility for economic opportunity through innovative and entrepreneurial means. One example of this on the Plains is the alteration of the Switzer family ranch in Nebraska, altering their cattle operation to provide a greater diversity of bird habitat. As a result of this, the family has seen increasing returns to their cattle ranch operation as well as the environment. The environmental benefits that the ranch brings has led to its recognition and awarding of the Important Bird Area Status from the Nebraska Audubon Society.¹⁶ Innovative and entrepreneurial thinking from local landowners on the Plains, like the Switzers, shows the possibility for rethinking what economy and environment means for the Plains.

Threats to the Great Plains Ecology

In the 100 years from 1850 to 1950, major conversion of grassland to crop land started to occur. High demand for wheat during World War I, a short-grass crop, accompanied by the Homestead Act and railroad developments, sent farmers west, beginning "the Great Plow-up."¹⁷ In those 100 years, three million acres a year was converted to cultivated cropland. This resulted in an average loss of three million acres per year in grassland.¹⁸ Human impact on the Great Plains has ranged in level of severity over time and across different regions. Tillage of soils from the great "plow-up", fragmentation of lands from high road densities and railroads, and the impacts of mining and extraction industries were among the damaging factors accompanying human settlement. The "plow-up" is still occurring on many lands in the Eastern Plains as commodity prices rise, such as the price per bushel of corn which has risen in recent years due to demand for ethanol production. It is estimated that from 1982 to 1997 five to 10 percent of native prairie acres on private land in north-central Montana (Blaine, Phillips, and Valley Counties) were in decline, while crop subsidies still encouraged farming on unsuitable lands, creating

"false" profitability.¹⁹

Modern domestic livestock grazing has also been found to impact the ecological health of the Great Plains. Grazing certainly comes with many ecological benefits and is a natural ecological process among Plains species. Light to moderate grazing stimulates seed growth, distributes seedbed, and returns nutrients to the soil. This was traditionally undertaken by ungulates and prairie dogs among other species. Light to moderate grazing also benefits many songbird species in the Great Plains. Modern grazing practices, however, may affect the biodiversity of the ecosystem.²⁰ Current range management practices vary among ranches. Uniform grazing patterns, however, tend to be exhibited within management practices.²¹ The impact of grazing on the ecology of the Plains has been indicated through its bird populations, which have been found to concentrate their populations based on species and grazing preference.²⁰ Some species that prefer heavily grazed sites, like the horned lark and chestnut-collared longspur, tend to proliferate in those areas. Variation of bird densities across the Plains has been a noted effect.²⁰ Whether or not these variations are detrimental to the overall health of the Plains cannot be concluded based on this.

The extraction industry has posed threats to the grasslands that overlie large areas of oil, gas, and coal reserves. In places like the Powder River Basin of Montana and Wyoming, much of it located in a National Grassland, coal-bed methane extraction has affected the biodiversity and functioning of its ecosystem.²² Water discharge with a high salinity is a byproduct of coal-bed methane mines, affecting the nutrients in the soil, and thus the vegetation and wildlife endemic to the region.²³

A whole host of other impacts accompany the mining industry in the Great Plains, including those on humans, along with the high density roads and infrastructure that are needed. Additionally, the negative impact of removing native prairie for fossil-fuel extraction poses another problem as grasslands provide environmental benefits that are in high demand with increased climate change. Prairies may be one of the leading global repositories of sequestered carbon, containing more carbon per unit area than those of most other ecosystems worldwide. As the tillage of more and more prairie continues, stored greenhouse gases are released into the atmosphere, further contributing to global greenhouse effect. Not only does this plowing release greenhouse gases, this prairie has great potential for carbon sequestration if left untilled and undamaged. Recent research has shown that native prairie vegetation acts as a strong sink for carbon and a minor sink for methane.²⁴ While grazing lands still produce nitrous oxide (N₂O), a greenhouse gas with a greater impact than carbon dioxide, research out of the USDA's Agricultural Research Service Northern Great Plains Research Lab shows that native prairie vegetation produces three times less N₂O than seeded forage.²⁴ Considering this information, an examination of the long-term role of grasslands, not just regionally, but also globally should be considered when evaluating the future of our native prairie. The native sod still left in the Great Plains has witnessed more than a century and a half of agricultural intervention beginning with the earliest Western explorers. This past has left many an irreparable mark on the Plains, but a better understanding of the prairie's value both ecologically and economically may change the trend for the future.

Westward Expansion and Agricultural Settlement of the Rockies

“The most destructive force in the American West is its commanding views, because they foster the illusion that *we* command.” (Richard Manning)

Explorers

After acquiring the Louisiana Territory from Napoleon in 1803, Thomas Jefferson was interested to discover what he had purchased from the French and sent forth multiple expeditions to explore the newly acquired territory. These expeditions are outlined in **Figure 5**. First and most famous of these expeditions was Lewis and Clark and their Corps of Discovery. In the spring of 1804 the explorers set forth from St. Louis in order to find a “direct water communication from sea to sea formed by the bed of the Missouri and perhaps the Oregon.”²⁵ They would eventually find their way across the vast expanses of what is now the western United States, and while they failed to find a commercial water route across the region, the stories and reports they returned with ignited the frontier settlement craze that persisted well through the 19th century. Other expeditions would follow Lewis and Clark, such as Zebulon Pike’s exploration of the southwest United States from 1806-1807. The expedition sustained itself on the large herds of bison that populated the plains. Their numbers were so great that Pike commented, “I will not attempt to describe the droves of animals we now saw on our route. Suffice it to say that the prairie was covered with them...their numbers exceeded imagination.”²⁶ Pike’s expedition took a more southerly route than the previous explorers and led him directly across the Eastern Plains of the Rocky Mountains to the mountain that now bears his name. While attempting to climb what we now know is the eastern most 14,000 foot peak in the Rockies, Pike and two other expedition members were forced to spend the night in a cave without supplies. Pike and his companions “arose hungry, dry, and extremely sore...but were amply compensated for [their] toil by the sublimity of the prospect below. The unbounded prairie was overhung with clouds, which appeared like the ocean in a storm; wave piled on wave and foaming.”²⁶ The vantage point offered the explorer a look out on to the grasslands of the Eastern Plains that in less than a century would see a flood of settlers spurred on by free land and the prospect of prosperity in the newly opened West.

Homestead Acts/ Legislative History of Agricultural Settlement

Growing industrialization and commercialization in America during the 19th century opened up new markets for farmers, shedding light upon the Great Plains as a source of raw material, cultivation, and the promise of economic prosperity. Seeing great economic opportunity in the lands west of the Mississippi, President Lincoln signed

the original Homestead Act into law in 1862, which entitled citizens over 21 or the heads of households to apply for plots of land up to 160 acres, which they would then cultivate and improve for five years, after which they would be fully entitled.²⁷ The prospect of free land for cultivation appealed to the traditional American values and the “yeoman” ideal, motivating settlers to migrate to and cultivate available land in the Eastern Rockies portion of the Great Plains. The development of farmland on the Great Plains of the Rockies region can be seen in **Figure 6**.

After building a home and then successfully completing the five years of cultivation required under the Homestead Act, settlers could obtain a final patent or deed to their farm. The agricultural settlement in the newer territories in the late 19th century, which today includes much of our eight-state Rockies region, shows a very strong correlation with settlement of Homesteads in those areas.²⁷ In 1880, there were a total of 4,506 farms in Colorado and five years later in 1885, 4,804 final homesteads had been deeded to individuals.²⁷ Between 1880 and 1885 in Montana, the census counted 1,519 total farms, 1,094 of which had obtained deeds by 1885.²⁷

At the same time that land was being opened up to settlers through the Homestead Act, Congress was giving away land to corporations under the Pacific Railroad Act, expanding the land given away to railroads to 127 million acres within a 10 year period.²⁷

The dominant gaze that explorers had earlier cast upon the American West envisioned the wealth that could grow out of tilling the soil; however, their eyes deceived them. The land west of the Mississippi was untouched, and those in Washington thought that the land could universally grow crops and graze cattle, all of which could be shipped as freight to the thriving demand from the East. There were, however, those explorers who saw a different reality of the American West. In 1869, John Wesley Powell set out on the Colorado and Green rivers, becoming one of the first to realize that Congress had made a grave mistake opening up lands for public use. Pow-

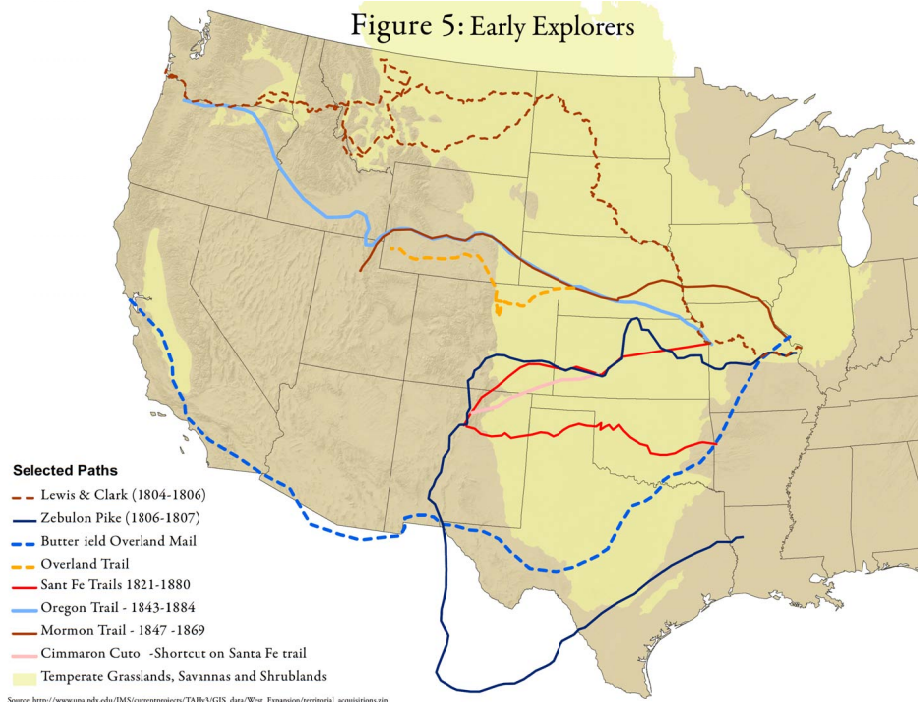
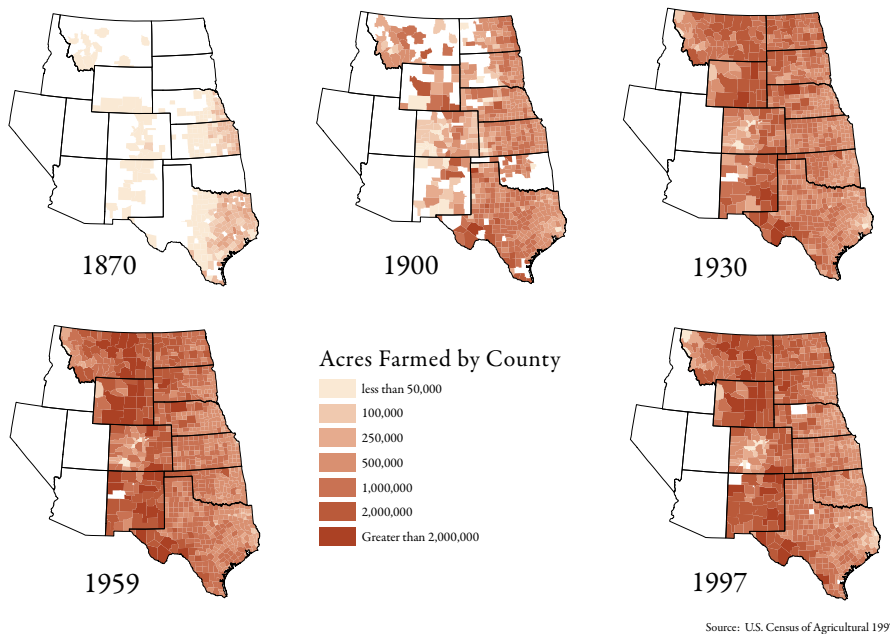


Figure 6: Progression of Farming Settlement



ell's account of the West's dry and arid landscape was largely ignored by settlers and land policy-makers, despite his seat on the first public-lands commission. Powell's report emphasized Congress' oversights in passing its Homestead legislation and commented that "All of the lands were supposed to be ARABLE LANDS."²⁸ Looking back at the situation in an op-ed piece for the *New York Times*, Nicholas Kristof labeled the 150 year period of Plains over-settlement as "one of the longest-running and most costly errors in American History."²⁹

Powell voiced his concern to Congress regarding Homesteads in his 1878 *Report on the Arid Lands of North America* and suggested a classification of lands into either timber, or irrigable lands and "all of the lands falling without these boundaries would be relegated to the greater class designated as pasturage lands."³⁰ Powell called for a minimum of 2,560-acre homesteads on pastoral lands separate from irrigable areas, recognizing that "in general, the lands greatly exceed the capacities of the streams" and thus pastoral activities should be encouraged on lands that were not suited for planting.³⁰ However, fears in Congress and throughout the country of "baronial estates" and "land monopolies," coupled with a desire to increase the population in political jurisdictions resulted in Powell's suggestions and thus those of the nation's first public lands commission falling on deaf ears.³¹ Had a land policy been instituted allowing for more acreage per homestead, settlement frequency and proximity would have declined, making it more difficult for territories to become states. Allowing larger homesteads and thus fewer settlers would have impeded political power in Washington that directly correlated to federal funding as well. However, had a different course been taken, perhaps settlers would have been better able to implement practices of agriculture suitable to the climate, rather than a practice suitable to politicians back east.

Subsequently, little was made of Powell's suggestions. The blind utilitarianism persisted throughout the early years of the 20th century. A United States Geological Survey

(USGS) report from the time claimed "The High Plains continues to be the most alluring body of unoccupied land in the United States, and will remain such until the best means of their utilization have been worked out."³² Once again, government officials failed to heed Powell's warning and encouraged the settlement of more homesteads on lands that were not suitable for the agriculture being practiced. Lack of knowledge regarding the climate of the High Plains, coupled with wet years during the height of homesteading on the Northern Plains lulled settlers into a false sense of security.³³ Coincidentally, the years from 1906-1916 proved to be the wettest on record for eastern Montana during the 20th century, with the five years that followed resulting in severe drought.³³ Belief in the Dry-farming Doctrine and claims of "rain follows the plow" disappeared with the return of drought to the upper high plains, especially eastern Montana.³⁴

In 1909, recognizing that most easily irrigable land had already been homesteaded, Congress amended the original Homestead

Act of 1862 by passing the Enlarged Homestead Act. This act doubled settlers' allotments to 320 acres and allowed for some successful homesteading in the arid areas. It encouraged the construction of irrigation ditches on the Great Plains, so that those lands could be settled. The rationale for this act met a number of interests. Theodore Roosevelt wrote in his message to Congress, "the western half of the United States would sustain a population greater than that of our whole country today if the waters that now run to waste were saved and used for irrigation".³⁵ Also behind Roosevelt's thinking was that if settlers were to depend on irrigation and a healthy clean water supply for their economic success, then it would be in their interest to protect the upstream forested land.³⁵

Roosevelt's concern for the nation's forests resulted in the creation of the U.S. Forest Service (USFS) in 1905, and the formation of a second public-lands commission. Gifford Pinchot was the first head of the USFS, having been head of the Division of Forestry in the Department of the Interior since 1898. He also took on a leading role in the second public-lands commission that came to many of the same conclusions Powell had previously voiced to Congress. The new commission held that public lands be used to "effect the largest practicable disposition of public lands to actual settlers", but also argued that the time of disposition was gone and encouraged government retention of public lands out of increasing necessity.³⁶ Heavy settlement, over-grazing, and the scale of fraud over public lands led to the position held by the commission, that "the number of patents issued is increasing out of all proportion to the number of homes."³⁶ The Commission encouraged government regulation to help conserve the overstocked grazing lands and called for the remaining public lands to be partitioned into grazing districts and grazing rights assigned to local ranchers.³⁶ A survey of ranchers across the west identified overwhelming support, by a margin of five to one, for government regulation.³⁶ This vision was finally realized in 1934 with the passage of the Taylor Grazing Act.³⁶ However, action did not come



soon enough for much of the Great Plains and many portions of the Eastern Plains of the Rocky Mountains as they experienced the incredible environmental destruction of the Dust Bowl years during the 1930's. The new grazing act was instituted in large part to stop the "sodbusting" that had torn up much of the region's topsoil with agricultural settlement during the homesteading years. Finally Congress had come to realize the grave mistake they had made by encouraging settlement and farming on the short grass prairie and recognized that the land was far more suited to cattle and other livestock grazing.

The Taylor Grazing Act of 1934 converted much of the remaining potential homestead lands into grazing land to be leased from the government. Many saw this legislation as "ending the age-old policy of homesteading" and as a signal of "the federal government's admission of the frontier's closing".³⁷ The number of patents issued did indeed decline prior to and during World War II. However, "lawmakers fashioned loopholes in the Taylor Act that permitted homesteading to continue on a limited basis."³⁸ While homesteading did continue on a much smaller scale, the era of settlement of federal lands had largely come to an end. As seen in **Table 1**, the conversion of public to private land through homesteading had its greatest effect in many of the Great Plains states, with many seeing more than a third of their total lands transferred into the hands of individuals. During the height of homesteading, from 1862 to 1934 over 1.6 million homestead applications were processed and more than 270 million acres- 10 percent of all U.S. lands-were transferred from federal to private lands.³⁹

World War II encouraged greater demand for goods and agriculture, thus helping plains economies thrive. However, the anticipated return of veterans to agriculture fell well short of previous estimates for planners in Washington who had expected, "a tremendous expansion of agriculture, industry, and trade in the West."⁴⁰ Many of the measures taken by Bureau of Reclamation after the war actually did far more to improve irrigation for previous homesteaders and other private lands, rather than returning veterans. Of the 400,000 new farms envisioned for returning veterans, only 3,041 new farms were opened on government lands between 1946 and 1966.⁴⁰ Ad-

ditionally, none of the new homesteads were settled on the Eastern High Plains of the Rockies region, but were centered on irrigable river areas in other parts of the West.⁴⁰ The record of boom and eventual decline in homesteading is effectively shown in **Figure 7**.

During the 1950's and 1960's mechanization of agriculture greatly reduced the necessity for labor in the industry, and jobs were drawn away from

farms. In 1964, Secretary of the Interior Stewart Udall called for streamlining land laws in hopes of ensuring 'continued public ownership and management' of lands. He urged the repeal of the Homestead Act and the Desert Land Act of 1877, which allowed individuals to buy up to 320 acres given under the requirement that they successfully irrigate the land. With Udall's encouragement, Congress created the Public Land Law Review Commission in 1964. This commission pushed the federal government's responsibility for land protection even further, and encouraged the government to "where feasible, enhance the quality of environment, both on and off public lands."⁴¹

Eventually, in 1976, under the recommendation of the Public Land Law Review Commission, Congress repealed the Homestead Act for the lower 48 states.⁴¹ Homesteading on federal lands was allowed to continue in Alaska for another 10 years, but was finally repealed nationwide in 1986. The final repeal of the Homestead Act paralleled with the emergence of more and more preservation efforts throughout the West. The rise of the environmental movement and subsequent legislation such as the National Environmental Policy Act of 1969 and the Endangered Species Act of 1973 began to stress conservation

Figure 7: Final Homestead Entries 1868-1960

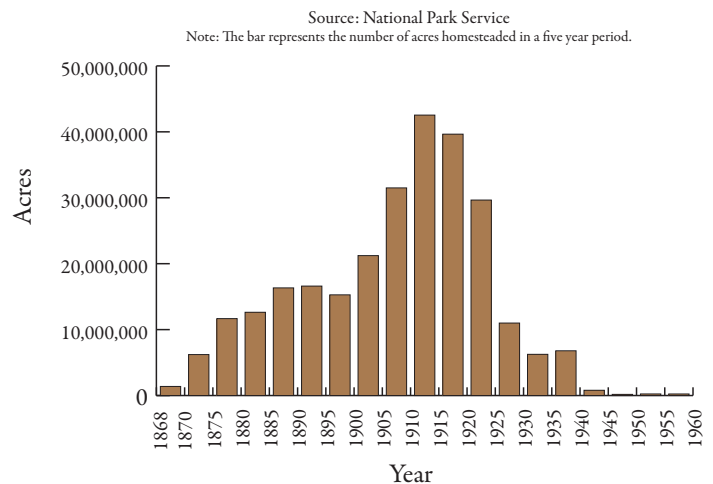


Table 1: Homesteading by State

	State	Total Homesteads	Total Homesteaded Acreage	Percent of State	Average Homestead Size (Acres)
Rockies	Arizona	20,268	4,134,356	6%	204
	Colorado	107,618	22,146,400	33%	206
	Idaho	60,221	9,733,455	18%	162
	Montana	151,600	32,050,480	34%	211
	Nevada	4370	704,167	1%	161
	New Mexico	87,312	19,422,958	25%	222
	Utah	16,798	3,607,688	7%	215
	Wyoming	67,315	18,225,327	29%	271
Borders Rockies Eastern Plains	Kansas	89,945	13,089,258	25%	146
	Nebraska	104,260	22,253,314	45%	213
	North Dakota	118,472	17,417,466	39%	147
	Oklahoma	99,557	14,865,912	34%	149
	South Dakota	97,197	15,660,000	32%	161
Other Homesteaded States	Minnesota	85,072	10,389,606	20%	122
	Arkansas	74,620	8,133,791	24%	109
	California	66,738	10,476,665	10%	157
	Oregon	62,926	10,513,945	17%	167
	Washington	58,156	8,465,002	20%	146
	Alabama	41,819	4,578,323	14%	109
	Missouri	34,633	3,644,306	8%	105
	Dakota Territory	33,951	5,244,345	6%	154
	Wisconsin	29,246	3,110,990	9%	106
	Florida	28,096	3,326,712	10%	118
	Mississippi	24,126	2,637,412	9%	109
	Louisiana	22,988	2,561,334	9%	111
	Michigan	19,861	2,321,937	6%	117
	Iowa	8851	903,164	3%	102
	Alaska	3277	363,775	0.10%	111
Ohio	108	7707	0.03%	71	
Illinois	74	5667	0.02%	77	
Indiana	30	1785	0.01%	60	

Source: National Park Service, National Homestead Monument, Homestead by Numbers

the Dakotas, Montana, Wyoming, and Colorado,” and many of the windbreaks and the lessons from the 1930’s were abandoned in favor of development.⁴³ However, boom finally led to bust in the early 1980’s, “when the oil cartel could no longer sustain high prices in the face of mounting global supplies (evoked by OPEC’s artificially high price), the cost of energy plummeted.”⁴⁴ Effects were felt hardest in energy dependent towns such as Gillette, Wyoming and Rifle, Colorado.

Major Decline in the Region’s Population, Economic Activity, and Environment

While the population of the U.S. has increased steadily over the last century, the trend has not been apparent in rural America. The Eastern Plains of the Rockies has broken with this nationwide trend of population growth. The inhospitable condition of the high plains climate with minimal precipitation and incessant winds led many settlers to abandon the agricultural lifestyle on the Great Plains. With this large outmigration of people, local economies have additionally seen decline to the point where some communities are ghost towns or mere shadows of their previous boom conditions. Across the Eastern Plains region of the Rockies, Main Street storefronts stand vacant and lack of revenue has led many towns to drastically cut social services. However, this current situation is not an isolated incident in time, but rather the product of nearly a century and a half of boom and bust that has slowly whittled away at rural communities and left them as skeletons of their past.

The cycle of boom and bust first showed itself shortly after the passage of the Homestead Act in 1873 when the Great Plains region witnessed manic economic vicissitudes. Homesteaders who were cultivating their land in the 1870’s were hit hard by the depression of 1873 that lasted until 1879.⁴⁵ Farmers were dragged further into debt, and the political climate of the age lacked the federal support to pull them out. Settlement on the Plains was rarely met with proper infrastructure to link rural and urban areas. Furthermore, the monopolization of the railroads led to exorbitant transport prices, thus preventing small farmers from participating fairly in the market, particularly when competing against large businesses.⁴⁵ Co-

operatives began and alliances such as the Grangers were formed, calling for stricter regulation and better protection of farmers.

Economic boom re-emerged during World War I; high wartime demand for wheat met with a productive harvest, only to plummet into an economic bust in 1920, with post war demand decrease and severe drought in the Plains.⁴⁵ The population on the Plains had reached its peak just after World War I, and has since seen a

Table 2: Coal Reserves in 2009

State	Estimated Recoverable Reserves (Million short tons)
Arizona	0
Colorado	9,634
Idaho	2
Montana	74,770
New Mexico	6,899
Utah	2,631
Wyoming	38,743
Rockies	132,679
United States	260,553

Source: National Mining Association, http://www.nma.org/pdf/c_reserves.pdf
 Note: Data for Nevada was withheld

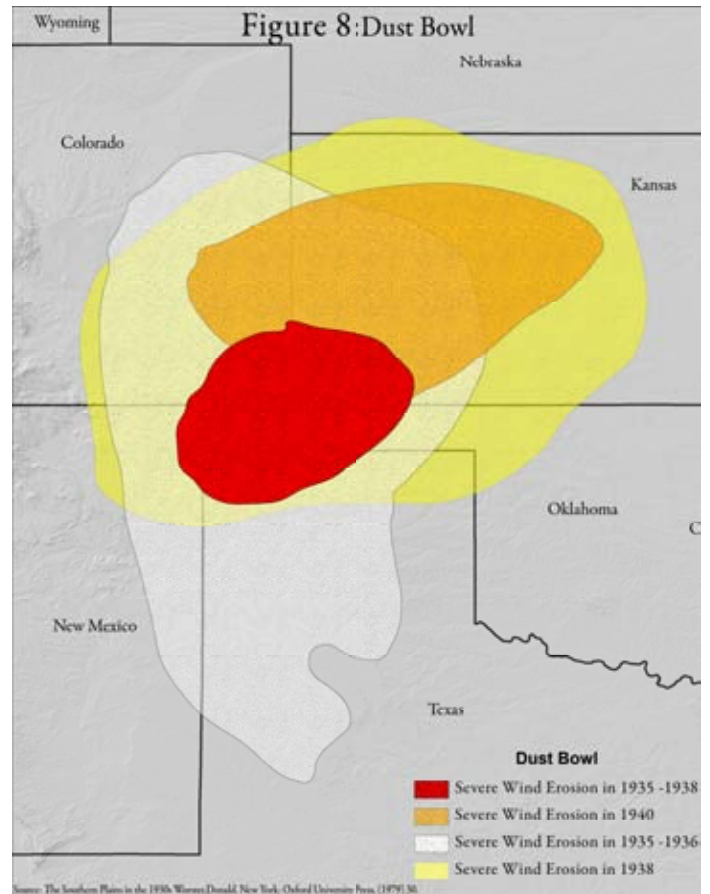
and environmental protection, resulting in a conflict of interest with homesteaders already on the land.⁴² Paramount amongst these conflicts was the issue regarding water rights between agriculturists, environmentalists, and the explosive suburban and urban development throughout the West.⁴²

Additionally, discovery and exploitation of the West’s vast energy reserves shifted the perception of the region away from its traditional agricultural role and towards one more focused on energy extraction. This shift resulted predominately because the OPEC oil embargo of 1973 and the 1979 energy crisis in the wake of the Iranian Revolution greatly increased demand on the West’s energy sector. This rise in domestic demand led to the development of many energy projects throughout the West, with some of the highest concentrations on the Eastern Plains of the Rockies states. **Table 2** shows the vast amount of coal underneath the eastern Rockies that quickly became the focus of exploitation during the energy crisis. During this period “Some 200 energy boomtowns suddenly sprouted in

steady trend of decline.⁴⁶ Responding to inquiries of land settlement from post-war veterans, Congress passed Public Resolution 29 in February 1920. This legislation saw 10,875 veterans apply for 1,311 plots of farm land in the West.⁴⁷ Veterans found themselves committed to cultivation of land that had been subjected to severe drought. Subsequently, scarcely 60 percent of these homesteaders met the law's requirements, largely due to infertile land and lack of funding.⁴⁷ Despite continued settlement in infertile lands, Congress rejected the 1925 "Fact Finder's" initiative that encouraged loans and agricultural advisors for settlers. The proposed act stipulated that no settlement project should be approved until scientific studies are conducted showing that project was "adaptable for actual settlement and farm homes."⁴⁷ As the grasses became upturned, and the land was tilled, the ideal of prosperous yeoman agriculture in the West was becoming more and more of an illusion.

The disillusion turned to nightmare in the 1930's when environmental and economic disasters collided on the Great Plains in the form of the Great Depression and the Dust Bowl. Years of "sodbusting" on the Great Plains during booms of the early 20th century, coupled with the desperation of the Great Depression left the local grasses of the prairie uprooted and allowed for the loss of topsoil in an area the size of Pennsylvania, roughly one million acres.⁴⁸ The resulting environmental degradation has been ranked amongst the worst environmental disasters in history. Hugh H. Bennett, Chief of Franklin Delano Roosevelt's Soil Conservation Service created in 1932 said of the Dust Bowl that "of all the countries in the world, we Americans have been the greatest destroyers of land of any race of people barbaric or civilized" and went on to claim that the disaster was a result of "our stupendous ignorance."⁴⁸ This environmental disaster, resulting in the near decimation of the area's agriculture sector, resulted in one of the largest instances of outmigration in American history. Only a portion of our Rockies region was directly affected by the Dust Bowl, as seen in **Figure 8**; however, this epitome of the boom and bust cycle coupled with environmental degradation and its effects on people should be well recognized by those looking at current areas of high depopulation and their potential futures. Timothy Egan makes the point regarding the Great Plains area affected by the Dust Bowl that, "By the measure of money -which was how most people viewed success or failure on the land - the whole experiment of trying to trick a part of the country into being something it was never meant to be was a colossal failure."⁴⁸ The colossal scale of devastation wrought by humans during the drought of the 1930's is depicted in the Baca County Duster Image. At the heart of our research is the question, "what is the relationship meant to be between people and land?" The Dust Bowl era did much to raise this question throughout America and the Eastern Plains of the Rockies.

The combination of these past economic and environmental trends resulted in an ecological situation starkly different than it was prior to Anglo settlement and a volatile economic and demographic condition for many communities on the High Plains of the Rocky Mountain Region. Over the past century these trends have had a strong correlation with the ups and downs of the region's main historic industry, agriculture. Paramount among these changes has been the shift in ownership of farms to larger producers, heavily encouraged by the idea of economies of scale, and the depletion of water resources



in the region. Both have put a stress upon the traditional "small family farm" agricultural economy.

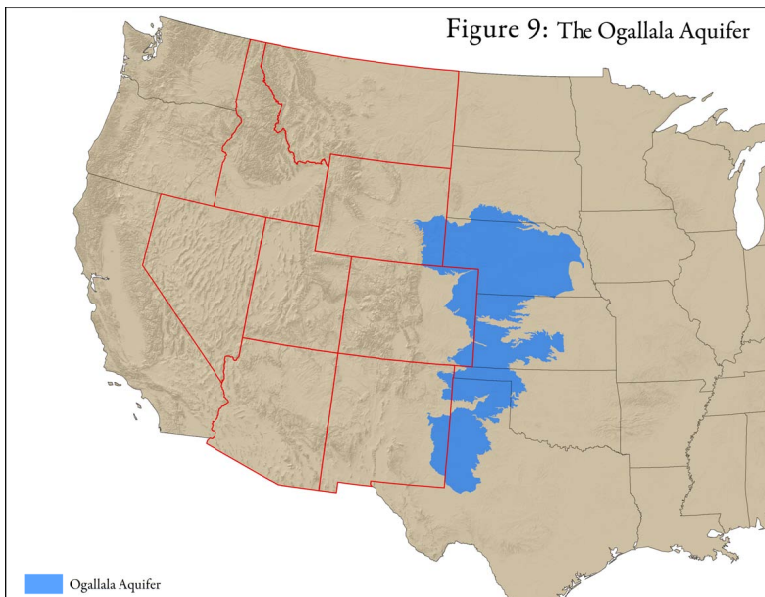
The years following World War II brought with them another boom and greater food consumption throughout the U.S. and worldwide. The greater increase in demand for goods spurred agricultural innovation on the plains and farmers found a new solution for farming the arid land. The discovery of the Ogallala aquifer, the increasing availability of inexpensive electricity, and the subsequent increase in technological innovation encouraged agriculture on marginal lands that had been largely abandoned in the drought years of the Dust Bowl. The invention of the center-pivot sprinkler in the early 1950's by Frank Zybach and its subsequent proliferation throughout the agricultural industry forever changed irrigation and farming, not only in the High Plains, but also around the world.⁴⁹ Large-scale irrigation became far more efficient just as the post-World War II demand escalated. However, the subsequent use of the Ogallala aquifer has caused it to drain three times faster than nature can refill its water reserves. The underground ocean has already lost 11 percent of its original volume and more water is extracted each day for a multitude of uses.⁴⁹ The continued use of the aquifer at such a rate may have drastic consequences as William Ashworth outlines in his book *Ogallala Blue*:

"Some of the consequences of groundwater mining are environmental: springs dry up, rivers diminish, the numbers and varieties of plants and animals are reduced. Some are economic: increased pumping costs as wells deepen, increased food costs and decreased land values as crops shrink. And some are human. The human costs may include bankruptcies, foreclosures, and forced migrations. They may include failed businesses and abandoned towns."⁴⁹

The role of the aquifer is not as large in the agricultural industry of the Eastern Plains region of the Rocky Mountains as it is in the rest of the High Plains, as seen in **Figure 9**. However the projected futures of those communities in our region that do rely on the aquifer for their existence have a questionable future. In those eastern counties of Colorado that rely on the aquifer, 10 percent of the ground water has been depleted, half of which has occurred in the last 20 years. On average, the Centennial State (Colorado) has experienced a nine-foot drop in the water table (over that many years); however in certain locations of Yuma and Kit Carson counties, the drop has been closer to 50 feet. Additionally, because Colorado sits on the upstream fringe of the aquifer, water has slowly been draining east to other portions of the aquifer.⁴⁹ A similar situation is occurring in New Mexico where the use of the aquifer for irrigation is limited to the eastern boundary of the state near the Portales Valley and Northern Lea County. New Mexico has seen 20 percent of the aquifer already depleted under its section of the High Plains, with an average decline of 13 feet.⁴⁹ Further north in Wyoming, the aquifer has been largely untapped as irrigated agriculture has been slow to develop with an economy based on other commodities. However, from 1980 to 2000, the aquifer did experience an average drop of three and a half feet in its portions under Wyoming.⁴⁹ While the aquifer does not reach far enough North to influence agriculture in Montana, the state is certainly not immune from water allocation conflicts. Our concerned counties cannot simply shut off the tap to preserve aquifer levels, nor do they exactly need to; however the slow depletion of water on the High Plains region of the Rockies must be recognized when discussing the future of the communities that reside there and when considering the care and use of the land.

The depletion of the aquifer certainly has serious implications for the future of the region; however the current effects upon the region can be just as startling. Increased electric ‘lift costs,’ due to the need for deeper wells has decreased the margin of profitability for many farmers, contributing to the consolidation of farms. This consolidation cannot be solely attributed to the diminishing aquifer, but is certainly a serious

Figure 9: The Ogallala Aquifer



© Russell Clarke, Fowler, CO

concern for many farmers living on the aquifer in Colorado and New Mexico.

Major Shifts in Agriculture

The transformation away from small family farms towards large agribusiness has had a great effect upon rural communities. From the humble start of 160 acre homestead farms to enormous corporate agriculture, the result has been a decline in workers per acre farmed, as well as a loss of family agriculture that has encouraged the exodus of farmers' children that would have previously stayed on the family farm to carry forward its production into the next generation. On the Eastern Plains of the Rockies, the average farm size in 1930 was 1,061 acres, in 1959 it was 2,479 acres, and in 1997, 2,989 acres. In 1930, the Eastern Plains contained 71,289 farms; in 1997 the number of farms was just 33,034. This agriculture trend, depicted in **Figure 10** has resulted in demographic repercussions throughout the region that bring into question the future of the plains. A high rate of outmigration, especially amongst younger individuals, has subsequently resulted in an aging population, sometimes referred to as the “Brain Drain.”⁵⁰

Current Conditions on the Eastern Plains

Over the past 20 years, counties in the Eastern Rockies Agricultural Zone have witnessed major population decline, measured by percentage of outmigration. This massive loss of population measures those who have actively migrated out of the county. In our eight-state Rockies region, a total of 70 counties have experienced outmigration losses of 10 percent or higher from 1990 to 2010 as seen in **Figure 11**. Among these

counties, 57 are in states that identify as part of the Great Plains ego-region, and 38 are part of the Eastern Plains Agricultural Zone of the Rockies. New Mexico contains nine of these high out-migration counties. All but two of counties lie in EPAZ. Colorado contains 11 of these counties, with seven on the Eastern Rockies Agricultural Zone. Wyoming only contains two counties that have out-migration percentages of 10 percent or more, and these lie just west of the Eastern Plains Agricultural Zone. Montana has 25 counties that have experienced out migration of 10 percent or more from 1990 to 2010, all residing within the Eastern Plains Agricultural Zone as depicted in **Figure 11**. All but one of Wyoming's Eastern Plains Agricultural counties have actually seen a large in-migration increase from 1990-2009, which may be a reflection of the energy related employment opportunities that Wyoming, the largest coal producer in the nation, provides.

Not only are many of the counties in the Eastern Plains Agricultural Zone losing population, but many have median

Figure 10:
Consolidation of Agriculture, Average Farm Size on
the Rockies' Eastern Plains

Source: The Great Plains Project, Inter-University Consortium for Political and Social Research

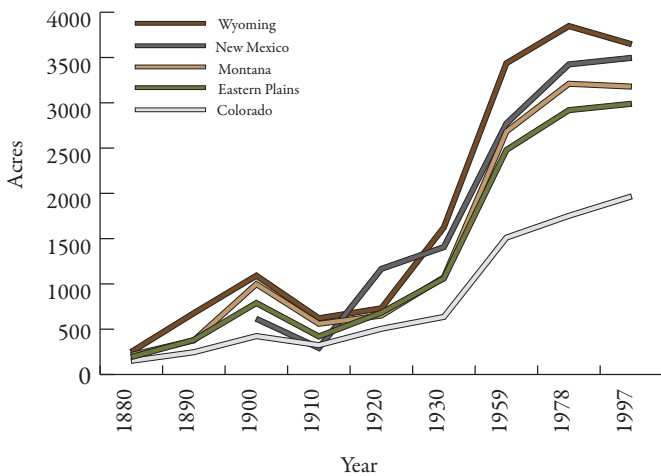
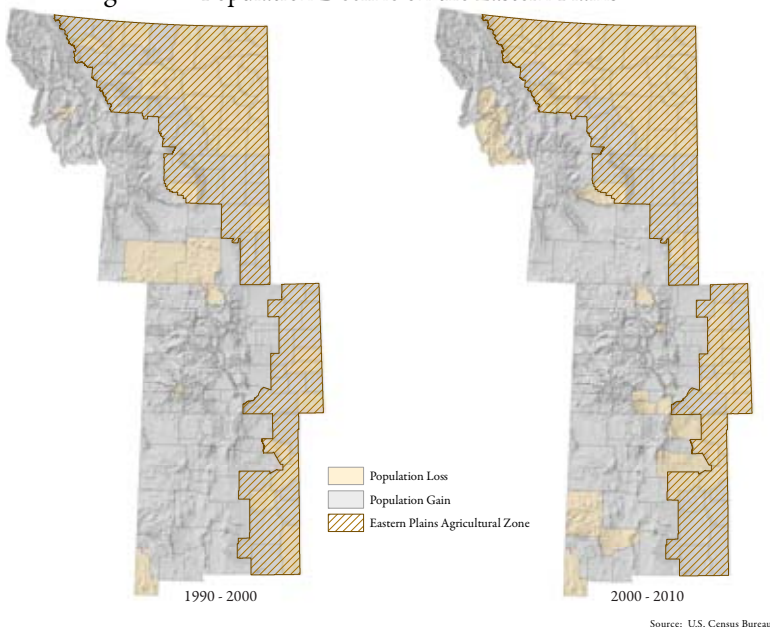


Figure 11: Population Decline on the Eastern Plains



ages far above the national average. As seen in **Figure 12**, the Eastern Plains Agricultural Zone contains many counties whose median age is between 41 and 49, a large portion of these counties are in Montana's EPAZ, while Wyoming and Colorado, and New Mexico contain several each. The median age for the Eastern Plains Agricultural Zone is 38 years, three years older than the entire Rockies region, whose average age is about 35 years old. Counties that have experienced out-migration of ten percent or more also have some of the oldest populations in the Rockies. This may indicate that younger people are the primary out-migrants of Eastern Rockies rural communities, while older generations tend to stay.

Income has often been a disputed measure of vitality for rural communities, but should be noted nevertheless. In the EPAZ of Montana, many counties have a median income in below \$40,000 in 2009. As shown in **Figure 13**, Both New Mexico and Colorado also have counties with low incomes on the EPAZ. Wyoming, is the only state in the Eastern Rockies Agricultural Zone with a county whose median income reached \$42,421-\$57,339 in 2000; this is Campbell County, whose labor source has played an important role in the coal extraction industry since the 1970's. With the exception of two counties in Arizona, no other Rockies states had median incomes this low in 2000. By comparison, the median income for the U.S. as a whole in 2000 was \$41,994.⁵¹

Economic Activity

Together, Montana, Wyoming, Colorado, and New Mexico contain 49 agricultural dependent counties. As **Figure 14** shows, 42 of these counties are located on the Eastern Plains Agricultural Zone. Montana contains 23 farm dependent counties on the EPAZ, while Wyoming only contains two in its Eastern Plains Agricultural Zone. Colorado by comparison contains 11 farm dependent counties, while New Mexico contains six on their Eastern Plains zones. Another variable worth considering regarding agriculture on the Eastern Plains is the level of government subsidies required to sustain the farming being conducted there. As **Figure 15** shows, agricultural subsidies in the Rockies are heavily concentrated in the Eastern Plains, bringing into question the viability of such practices if government assistance is eliminated.

The mining industry has a strong impact on some areas of the Eastern Plains region, with its greatest prevalence in the state of Wyoming as seen in **Figure 16**. In the Eastern Plains Agricultural Zone, Wyoming takes the lead with four mining dependent, while Montana and New Mexico's EPAZ has two, and Colorado has zero.

Another indicator of economic activity in the Eastern Plains zone is the lack of revenue from recreation that supports many other counties throughout the eight-state Rockies region. **Figure 17** shows that only five counties in the Eastern Plains of the Rockies region depend on recreation, all of which are either in Montana or Wyoming. This trend has the effect of not only minimizing the potential sources of employment, and thus revenue, but the lack of recreation in these counties also lowers the level of human amenities found there. This has a secondary effect of discouraging migration into these counties because they lack the natural and outdoor recreation amenities that attract people. These demographic and economic trends show the current state of the Eastern Plains region and portray

Figure 12: Median Age

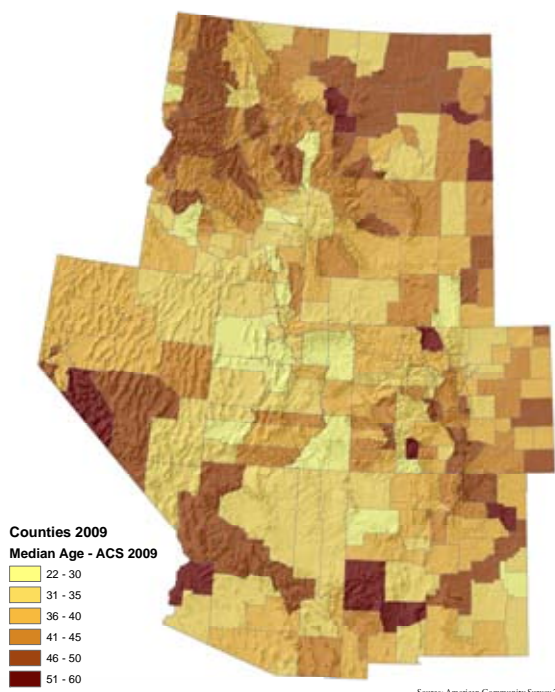
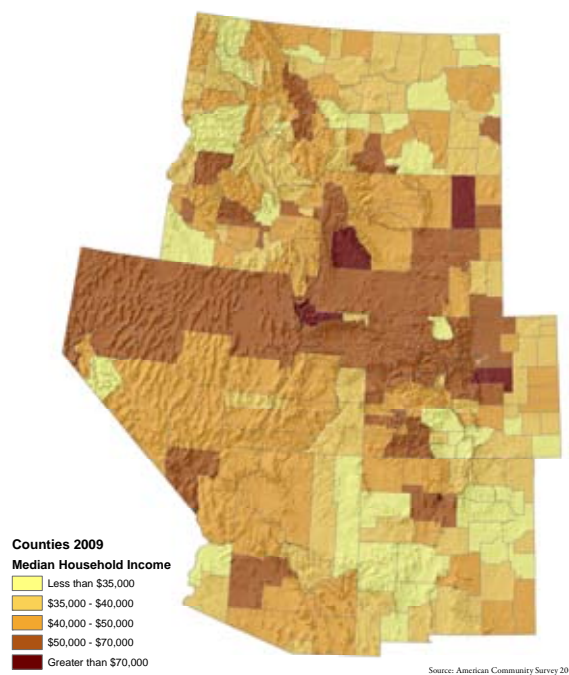


Figure 13: Median Household Income



the crossroads that many communities in the region face.

How will we decide to utilize the short-grasses that cover the region? Will bison roam? Will wind-turbines spin in the distance? Will there be a solar panel on every roof? Our country faces a new age in which to learn the lessons from our settlement history and has an opportunity to begin a new future for our national environment and rural communities.

Rejuvenation Possibilities for the Eastern Plains

In large part, the demographic and economic facts are undisputed—rural counties in the EPAZ have experienced significant out-migration. What this means for a community,

however, is the subject of much debate. Will greater economic stimulation result in an increase in community activity? Will restoration of the grasslands eco-region result in community and economic revitalization? Our inquiry into the Plains is not and never was based on how to make poor people become wealthy, nor was it a search for a panacea to the region’s environmental, economic and social problems, for answers to these questions would not yield a sufficient evaluation about the vitality of the plains. Any inquiry into the future of the Great Plains must understand the environment and politics of the region as one in the same. Aldo Leopold encouraged us to “see land as a community to which we belong” rather than “as a

Figure 14: Agricultural Dependent Counties in the Rockies

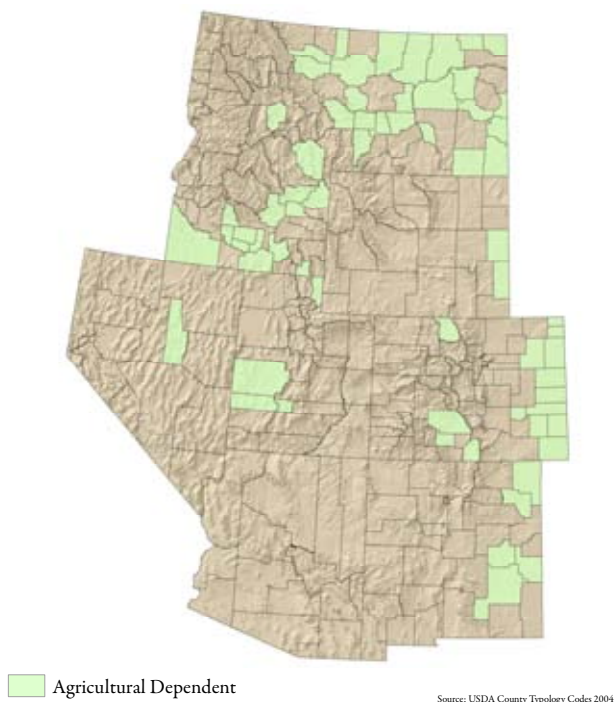


Figure 15: Agricultural Subsidies

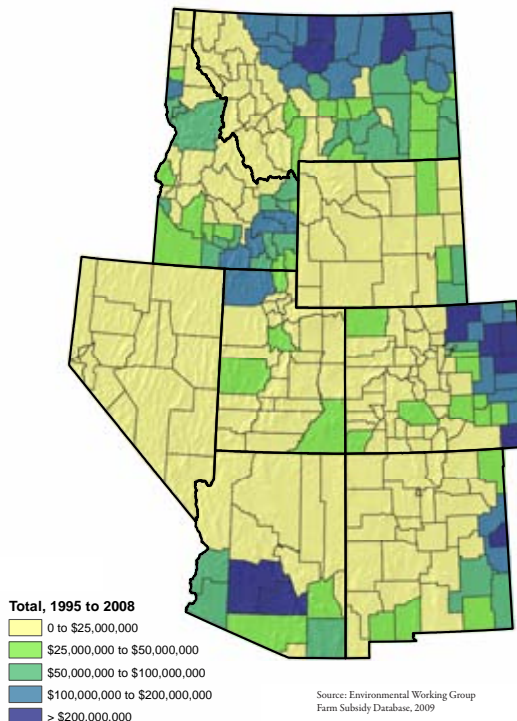
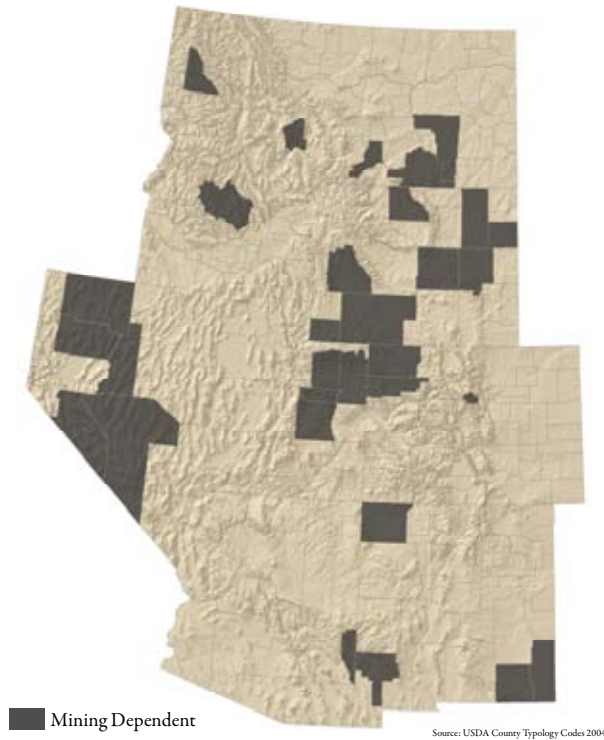
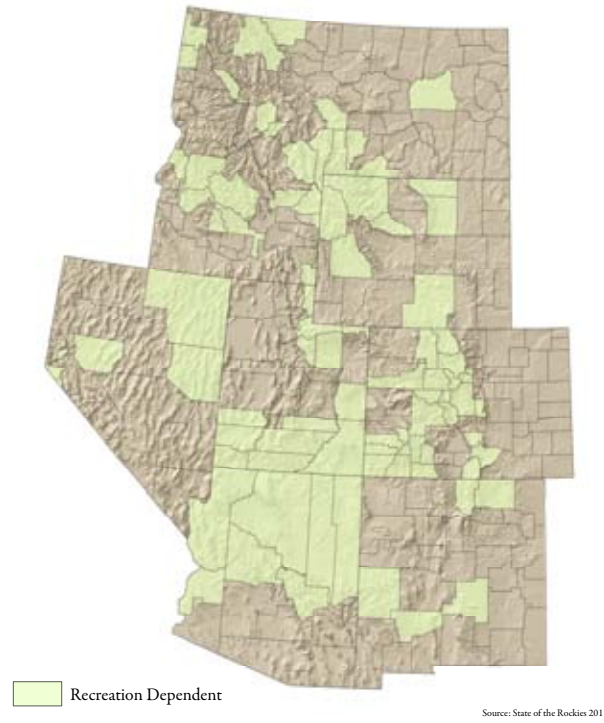


Figure 16: Mining Dependent Counties in the Rockies



Source: USDA County Typology Codes 2004

Figure 17: Recreation Counties



Source: State of the Rockies 201

commodity belonging to us” and through such a transformation “we may begin to use it with love and respect.”⁵² Leopold acknowledges the difficulties of such a shift: “That land is a community is the basic concept of ecology, but that land is to be loved and respected is an extension of ethics. That land yields a cultural harvest is a fact long known, but latterly often forgotten.”⁵² Thus, any revitalization must yield answers to questions of both community vitality and the natural world. What then is vital for both the land and the community? The answer may lie in a political and economic approach that considers the nutritional value and diversity of its essential resources. To begin with potential avenues of revitalization, we assess the economic and environmental implications of tapping a resource that existed long before the settlement of the West, the traditional ecological habitat of the Great Plains and its keystone species, the American Bison.

Preservation Efforts: Land Preserves and Wildlife Diversity

Bison

Bison once covered the full extent of the Great Plains grasslands of North America, but as seen in **Figure 4** on page 24, today they are only found in small, highly managed herds throughout the region mostly found on farms and ranches. According to the Northern Plains Conservation Network (NPCN) Conservation Assessment, 96 percent of all bison in North America are in private herds, subject to artificial selection for domestication. There are increasingly high levels of introgression of domestic cattle genes in the bison genome in those raised for meat, as well as those in public herds. Thus, among the Plains’ bison, genetic purity in herds is a rarity—if it even exists at all. Only National Parks like Wind Cave, Yellowstone, and Grand Teton maintain confidence that their herds are the *pure* versions of the iconic animal, but even they often hesitate to use *pure*. These herds *purity*, however, has recently been subject to doubt.⁵³

Large-scale reintroduction of bison herds must become a priority if risks of genetic erosion are to be avoided and the ecological and evolutionary processes of the legendary American symbol are to come to fruition. Areas as large as three million acres (5,000 sq mi/12,500 sq km) have been suggested for sustaining wild bison herds on an ecologically meaningful scale.⁵³ **Figure 4** on page 24 shows areas that would be conducive to bison reintroduction. This figure is important considering that the potential for expanding existing herds is fairly restricted—52 percent of bison herd managers report that there is no potential for expanding the range of their herds due to sociopolitical concerns. However, some opportunities may exist to encourage their expansion. Increasing opportunities for herd expansion have created a need to identify the few remaining large landscapes where high numbers of bison can be accommodated.⁵³

How is it that the great American Bison can help save our Great Plains communities, and where did this idea come from? Preservation of the American bison is not a new concept. Early explorers pioneering the Western Frontier sent back reports of the Plains teeming with bison. Such reports, and the Industrial Revolution’s demand for raw materials, sent hide-hunters and bone-pickers west, killing vast numbers of bison and diminishing the population. Homesteading and cattle ranching in the late 19th century brought further disruption to the Plains ecosystem and bison population. In 1889, William F. Hornaday conducted a survey reporting only 1,091 bison left in North America, helping to ignite Roosevelt’s conservation efforts in the early 1900’s to preserve the American bison.⁵⁴ In 1905, Roosevelt along with William Hornaday established the American Bison Society to save the American Bison from extinction. The society died out in 1935, but was revived in 1966 with the resurgence of the environmentalist movement, renamed as the American Bison Association.⁵⁵

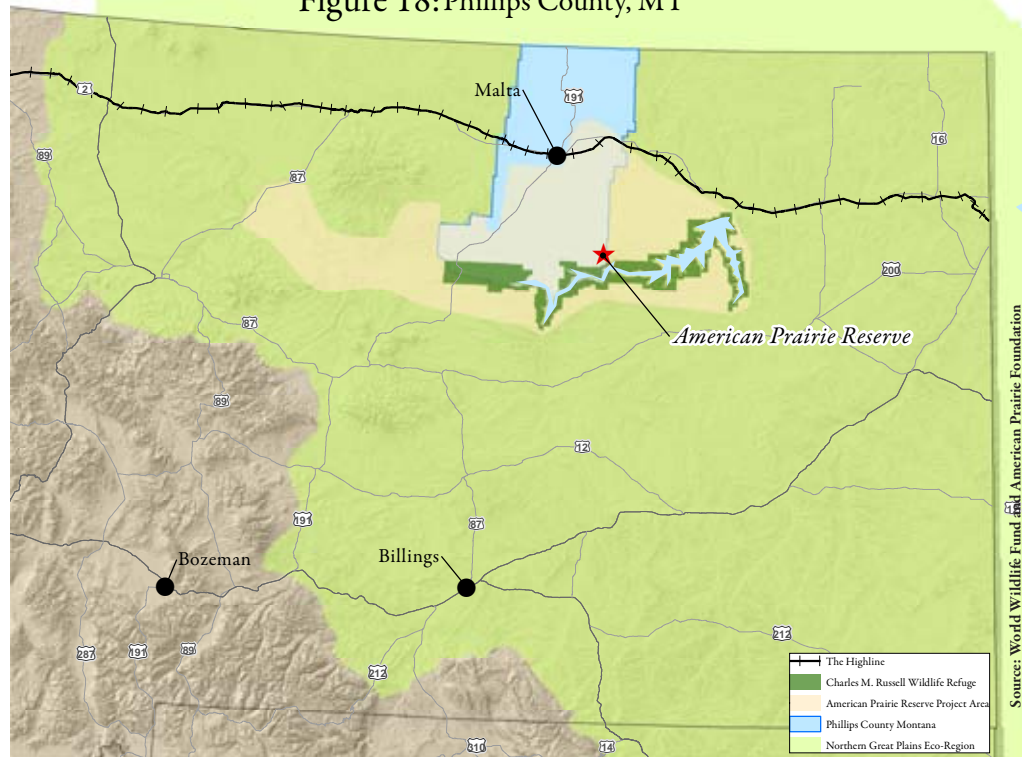
Two geography professors in New Jersey studying Great Plains economic, environmental and population trends

helped give rise to the idea that the Great Plains would be better off if it returned to its pre-settlement conditions with a “Buffalo Commons,” or a type of bison reserve. This idea was pioneered in 1987 by Professors Frank and Deborah Popper, in their essay, *The Great Plains: From Dust to Dust*. This essay, which argued against continued agricultural practices in the Great Plains, served as a metaphor for the future of the Great Plains, and continues to spark interest, discussion, and in many cases, anger, throughout rural communities. The Poppers’ essay was something of a social prophecy. Without any real footnotes or citing references, the Poppers predicted that if the federal government waited for once-settled lands to be deserted (foreseeing these out-migration trends due to the mechanization of agriculture⁵⁶), the government would actually have an easier time buying up lands. Almost 25 years later, it seems that their predictions, to a degree, may be actualized. Growing concern for the environmental degradation of the Northern Plains mixed with a need for greater economic growth and revenue in rural Plains communities has spurred the revival of Plains conservation efforts in the 21st century.

The Poppers presented a span of conservation possibilities for the Great Plains, although they all include a recognition that agriculture would not succeed in the region. They, along with geographer Bret Wallach, proposed restoring a large part of the Plains to their pre-European settlement condition. Wallach suggested that the U.S. Department of Agriculture’s (USDA) Forest Service (USFS) work with Plains farmers and ranchers, paying them not to cultivate the land, and manage them similarly to the national grasslands already under the USFS’s stewardship.⁵⁷ The farmers would, alternatively, follow a Forest Service-approved program to rejuvenate the native short-grasses. Afterward, the service would buy out their land and leave them with about 40-acres.⁵⁸ While Wallach made no references to returning bison to the Plains, the Popper’s idea of a “Buffalo Commons,” has come to fruition in Northern Montana in the form of the American Prairie Reserve.

Since 2002, the American Prairie Foundation (APF) has been working to develop the American Prairie Reserve in northeastern Montana as seen in **Figure 18**. In 2004, The World Wildlife Fund together with the American Prairie Foundation published, “Oceans of Grass: A Conservation Assessment for the Northern Great Plains,” bringing the declining state of the Northern Great Plains eco-region to public concern and discussing the conservation goals made possible with the growth of the prairie reserve in northeastern Montana. The goal of the American Prairie Reserve is to create a fully functioning prairie ecosystem, with efforts to provide ways for the public to access the wildlife and nature opportunities, and encourage ways that the land can contribute significantly to the local economy.⁵⁹ The

Figure 18: Phillips County, MT



land around Phillips County was chosen largely because 90-95 percent was already an intact grassland ecosystem. Since 2002, the APF has worked to reintroduce endemic species like the bison and the black footed ferret, to the area. APF has already contributed \$18.2 million dollars to the local economy.⁶⁰ The per-acre estimated values of ecosystem services in the Northern Great Plains are generally higher than the rental value of the land. The annual value of the ecosystem services in the Northern Great Plains is \$40 billion.⁶¹

Criticisms of the Reserve

The preservation of the American prairie has not gone without criticism and complaint. In February 2010, a United States Department of the Interior document was leaked, revealing a proposal for nearly three million acres of northeastern Montana to be turned into a possible bison range and given national monument status. The document had identified fourteen total proposed national monument sites in nine states. Though the Department of the Interior denied many of the claims made by the document, the reaction it received was widespread and felt. For some Montanans, like those involved with the Montana Community Preservation Alliance, an organization formed by land and local business owners, the national monument issue is virtually indistinguishable from the APF’s private effort to create the American Prairie Reserve. The leaked document angered many Montanans, who voiced criticisms of prairie preservation. At a forum hosted by Republican Rep. Denny Rehberg, rural landowners expressed concerns that the proposals threatened to fragment their communities and further take away ranching opportunities.⁶² The American Prairie Reserve aims to draw a tourist-type economy to Phillips county and northeastern Montana as a form of economic stimulus. For many residents of Phillips County, as Ganay Johnson, a representative for APF explained, the “idea of selling lattes to tourists”, has



not emerged as a particularly desirable form of stimulus.⁶³

Another conservation proposal that the Poppers included was an effort to slow the depletion of the Ogallala Aquifer by expanding national grasslands, BLM grazing districts, and the anti-sod busting National Conservation Reserve. Another approach, which would let ranchers and farmers keep all of their land, was to turn 15,000 square miles of Eastern Montana into an East African-style game preserve, referred to as the “Big Open.” This idea, which was publicized by the Popper’s landmark essay, was proposed by Robert Scott of the Institute of the Rockies in Missoula, Montana. He foresaw something of a North American Serengeti that could support 75,000 bison, 150,000 deer, 40,000 elk, and 40,000 antelope. A ranch of about 10,000 acres (16 sq mi) could potentially make \$48,000 a year in hunting licenses alone, along with the other jobs and businesses that would complement the hunting industry, like taxidermists, restaurants, and sports outfitters.⁶⁴ Herd management on the game reserve would be open to ecotourism and hunting, providing economic incentives for the region. Issues of wildlife management and conservation are repeatedly topics of conservation politics because they draw a wide variety of interests. As the prairie reserve idea grows, it will undoubtedly encounter the political controversies of bison management that other national parks have dealt with over the years.

Bison Politics

At the top of the list of wildlife concerns across bison herds today is the issue of cattle introgression, or in other words “bison genetic purity”. Hybridization of bison and cattle traces itself back to Spanish settlers in the 1500’s. Current concern for introgression generally traces itself back to 1873, when ranchers, like Charles Goodnight, began to crossbreed their livestock.⁶⁵ This history of crossbreeding has thus created a saga of genetic issues related to introgression of cattle DNA

into bison herds. Introgression refers to gene flow between populations caused by hybridization followed by breeding of hybrid offspring to at least one of their respective parental populations.⁶⁶ Today’s current herds, which originated from Wind Cave National Park and were moved into protected parks like the American Prairie Reserve and Yellowstone National Park, trace their roots back to bison from herds with history of hybridization.⁶⁷ Almost all bison in existence today descend from the 100 bison in five private herds, and a wild population in Yellowstone, which had about 30 bison at the turn of the 20th century.⁶⁸ These bison were used to establish public populations in the United States of America and Canada which has helped reproduce the population of 500,000 bison in existence today.⁶⁸ At Texas A&M University, new genetic testing is being conducted on animals from these herds to evaluate their level of cattle introgression. While the nature of the testing has been subject to skepticism, at the heart of the research is the question, “what does knowing the level of genetic purity in our bison herds tell us about our iconic American bison that we have worked so hard to protect”? Will genetically “impure” bison still afford the same level of protection that pure bison receive in national parks and under their state protected status?⁶⁹ To this question, bison manager of Wind Cave National Park, Dan Roddy, responded quite practically, “So long as the bison do what bison do, they are bison.”⁷⁰

Among the list of bison concerns that occupy ranchers and national parks alike is Brucellosis, yet another issue that traces its roots back to domesticated cattle. Brucellosis is a bacterium that causes abortions in ungulates such as cattle, elk and bison. The disease was first introduced to the Yellowstone National Park bison herd in 1917, having thought to be contracted from dairy cattle that were brought into the area. Brucellosis has been found in Yellowstone bison, as well as elk populations, complicating the management of the wildlife

and relationships with nearby ranchers.⁷¹ A multi-year quarantine study was designed in order to provide data about effected quarantine management techniques for Brucellosis.⁷¹

The conservation of the American bison is essential to Great Plains conservation efforts. The future of the bison, however, depends on the future of the Plains. The future possibilities for the Plains thrust the bison into a number of competing identities, as wildlife, as game for hunting, or as livestock. This is witnessed in Wyoming's joint classification of bison as livestock and wildlife.

In some parts of the country where bison have been long extinct, the animal is considered simply an American icon. In national parks such as Yellowstone, the majestic creature receives protection as wildlife. On many ranches on the Plains, as well as in restaurants and supermarkets across the nation, the American bison has been used as a tasty and nutritious alternative to beef. The classification of bison as livestock has witnessed increasing demand for the meat in health food and grocery stores. Traditionally more expensive than beef due to the lack of supply and the more expensive infrastructure and breeding stock, the growing bison meat industry has witnessed reduced prices and increasingly competes with beef. Though they are native to the Great Plains, many bison raised for meat are actually a cross breed between cattle and bison (approximately 3/8 bison and 5/8 cattle), often referred to as "beefalo." Thus, while bison are no longer in danger of going extinct, their genetic make-up is threatened.⁷² The purpose and role of the iconic American bison on the Plains will be determined by the future that we envision, create, and shape for the Plains.



© Russell Clarke, Lasater Ranch, Matheson, CO

Economic Stimulation and Community Revitalization Efforts

The Original Homestead Act of 1862, for better or for worse, made rural America and agricultural America one in the same. Thus, the USDA has provided an important avenue for federal dollars to reach rural communities. John Allen, former director of University of Nebraska's Center for Applied Rural Innovation has said, "you think about in the United States, we've correlated rural policy and agricultural policy. We've basically taken public dollars and funneled those into agriculture with the idea that if agricultural did well, rural would do well. That hasn't been the case for some time."⁷³

Much of U.S. agriculture today does not fit our iconic picture of rural America. In fact, most agriculture in the U.S. is considered by the USDA as "conventional" or "corporate" agriculture. The corporatization of agriculture, made possible by the capital innovations of the 20th century, has led to specialized crop production that yields high volumes of production, made possible by use of pesticides, fertilizer, and external ener-

gies, all exploiting economies of scale. Most of the meat, dairy, and eggs that we eat come from highly-concentrated livestock feedlots.⁷⁴ Today's conventional, large-scale agriculture has had a significant impact on the people and communities of rural America. One farmer today can produce more output than five farmers in 1940. The number of farmers in the U.S. has dropped almost 80 percent since 1910, from 40 million to about three million. The number of farms in this country has also plummeted, from over six million in 1910 to two million in 2008, with the average farm size almost tripling from roughly 150 acres to 418 acres in 2007.^{74,75,76}

The ecological impact that this type of agriculture has had on the Great Plains does not call for the exit of agriculture but calls for a new kind of agriculture. Depletion of the Ogallala Aquifer, soil erosion and compaction, and degradation of the Great Plains ecosystem are some of the environmental consequences of our conventional agriculture. Some critics have taken this to mean that if the Plains communities are to be sustainable, they must start to practice an agriculture that preserves the associated land and environment.⁷⁷ If agriculture is the heart of rural America, then how do rural communities best

act in accordance with this essential nature? The biggest challenge of "sustainable agriculture" is determining what the concept could possibly mean and how it can turn both economic and ecological profits.

While the demographic trend of the region is certainly cause for alarm, it is by no means a death sentence for the West and its rural communities. Rural communities of the Eastern Plains have weathered depression and despair many times in their past and will surely exist to weather such

forces in the future. The question at hand is what will these rural communities look like going into the future? To continue with a "business as usual" approach would be to allow the region to be at the whims of the economic and natural vicissitudes that have plagued the region since settlement. Larry Swanson of the University of Montana sees a continuation of consolidation on the plains, but sees hope for the "middle-sized places in middle places" that "can serve as lifelines into larger areas of rural decline."⁷⁸ However, for those "'small places in big spaces' it is harder and the strategies have to be focused on the big spaces and what special attributes they may have that could draw people back."⁷⁸

What strategies can be implemented for these "small places in big spaces" that help to avoid the historical economic and social turbulence? Development of energy sources both nonrenewable and renewable is one possibility, while the return to a pre-white settlement Great Plains and the marketing of an American Serengeti is another potential avenue. However, all possibilities for rejuvenation do not require drastic shifts to new industry; many of the practices currently being conducted

on the plains need merely to shift course to support a more economically and ecologically sound future. Dale Lasater's holistic cattle ranch in Matheson, Colorado is one example of a business that transformed itself from its traditional practice to one that has taken on a more ecological and economically viable approach and has increased profits through developing the niche market of grass fed and finished beef. This innovation was not pushed upon the Lasaters by the federal government or any other outside organization, but began with the family's desire to increase profits while also encouraging the natural cycles on the prairie. It is this ingenuity of individuals on the Eastern Plains, encouraged by years of resilience at the whims of nature and economic instability, which has hardened the resolve of its inhabitants and will be the greatest source for potential rejuvenation going into the future. Mark Muro, research director of the Brookings Mountain West, remains optimistic for the Rocky Mountain region because of what he calls the "Western Proposition" and comments, "self-help is a huge theme in the West -- both as a matter of necessity but also as an ethic. Self-reliance is going to be critical to finding truly sustainable indigenous sources of growth."⁷⁹

One of the greatest avenues for this ethic of "self-help" to aid Eastern Plains' inhabitants is for farmers and ranchers to transform their already existing agricultural practices towards those that are more adapted to the ecology of the Eastern Plains, thus making them more sustainable. However, some find the notion of sustainable agriculture to be an oxymoron. Jared Diamond referred to agriculture as "the worst mistake in the history of the human race."⁸⁰ There are then those like Wes Jackson and Allan Savory, who advocate a more holistic approach to agriculture.

"If Jackson's dream ever becomes reality, the future will see poly-cultural perennial agriculture. The world will see crops that do not deplete natural soil nutrients, do not consume the dwindling supplies of water and oil as rapidly as conventional agriculture, and -- since the crops won't require much, if any, cultivating- they don't destroy the topsoil."⁸¹

These ecological benefits are up against the high production levels and financial profits that corporate agriculture seeks each year. Grass-fed beef has emerged as its own unique beef product amongst the cattle industry, and thus sells to niche markets like Whole Foods and Natural Grocers. Third-party certifications of environmental ethics in cattle grazing could potentially help incentivize eco-friendly cattle grazing that benefits environmental health, but for now most of America's beef consumption will be fattened and finished on feedlots with large environmental footprints.⁸²

Rural Policy Initiatives

Many rural development organizations have

encouraged conservation easements, a separable interest in real property that limits the use of the land in specific ways and that can be enforced by a land trust, a nonprofit land conservation organization, or government agency.⁸³ Conservation easements are legal agreements that work to protect the environmental value of private land. They set limits for land use and work to ensure that conservation goals of privately owned land are being upheld.⁸⁴ The government can alternatively take action to buy back land that is no longer in production, in general, paying landowners 30-50 percent of the land's full value for a conservation easement.⁸⁵ However, rising crop prices and subsidies have led many farmers to put Conservation Reserve Program (CRP) lands back into production. In 2007, 820,000 acres of grasslands disappeared from the CRP.⁸⁵ Land conservation in rural development can also be brought about through incentives. Taxing is one such avenue to encourage development consistent with their conservation goals, recognizing that the public needs to support their public goods. Tax Increment Financing is a tool to allocate tax money toward improving sidewalks, utilities, and even planting trees in place of devel-



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opment, so long as it is consistent with the community's vision. This is more commonly found in urban areas, but the same underlying principles can be applied in rural areas too.

A Main Street Initiative program is another way to keep cultural and natural assets alive in rural communities on the Great Plains. Tax Increment Financing that recognizes cultural and historic assets can help restore economic vitality to historic Main Streets, rather than expanding development away from the town's center. Main Street programs can help bring economic diversity to the center of community, fostering community interaction and dynamic within the town's Main Street, whilst preserving the natural surrounding amenities.⁸⁶

Federal Efforts to Help Rural Communities

The federal government has undertaken a new paradigmatic approach to national economic development by targeting regional clusters as central to local, regional, and national eco-

Table 3:
Wind Power Capacity (MW)

State	1999	2004	2009
Arizona	0	0	0
Colorado	22	231	1,068
Idaho	0	0	105
Montana	0	1	271
Nevada	0	0	0
New Mexico	1	266	497
Utah	0	0	20
Wyoming	73	285	814
Rockies	96	783	
United States	2,472	6,723	28,635

Source: National Mining Association, National Renewable Energy Lab- USDOE

conomic growth. This paradigm shift in economic development encourages tapping into regional industrial clusters, so that our economy can grow from the “bottom-up.” The government budget for 2011 reads,

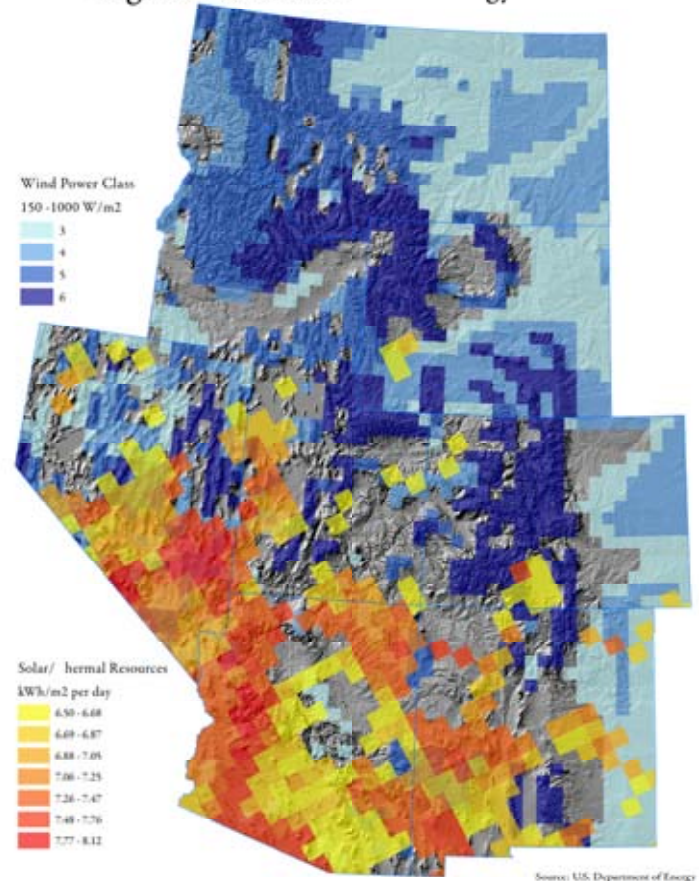
“We need to recognize that competitive, high-performing regional economies are essential to a strong national economy. That’s why the President announced a broad-based initiative to review how Federal policies impact local communities and to better target and coordinate resources across agencies to promote job creation environmental sustainability, and broad-based economic growth.”⁸⁷

Further, a new Harvard University economic study has supported the concept that clusters produce, “higher growth in new business formation and start-up employment.” These reports have led the Small Business Association to encourage the use of regional cluster development to enhance a region’s “ability to compete on a national and global scale.”⁸⁸

The USDA is among the four federal agencies that have been working together to encourage smart regional innovation for economic development in America. Among these, the USDA is calling for a new Regional Innovation Initiative to marshal federal resources to promote more economic opportunities in rural areas. Support for these regional projects will be designed to meet local needs, and funding will come from funds set aside for about 20 other existing programs (roughly five percent). The USDA has structured its budget summary for 2011 around four strategic goals: 1) promoting agricultural production and biotechnology exports to help increase food security; 2) ensuring access to nutritious and balanced meals; 3) building self-sustaining, repopulating, and economically thriving rural communities, and 4) ensuring that national forests and private working lands are conserved, restored, and made more resilient to climate change, while working to enhance water sources.⁸⁹ The USDA’s challenge is to convert this dogma into actual programs on a regional level that benefit rural communities.

The 2011 federal budget provides \$900 million for direct farm operating loans, and \$1.6 billion for guaranteed loans. These loans should serve an estimated 22,500 farmers (15,000 of whom will received direct loans, and 7,500 loans will receive guarantees). The availability of these loans provides short term

Figure 19: Wind and Solar Energy Potential



credit to farmers who need help financing costs to continue improving farm operations, like purchasing seed, fertilizer, live-stock, feed, equipment, and other supplies (capital costs).

As far as farm ownership loans go, the USDA budget provides \$475 million in direct loans and \$1.5 billion for guaranteed loans. These loans will give about 7,100 people the opportunity to either acquire a farm or keep an existing one. About 2,800 borrowers will receive direct loans and 4,300 will receive guaranteed loans. The USDA 2011 budget has increased grants by \$14 million from the 2010 level for the Rural Energy for America Program, a renewable energy loan and grant program for the purchase of renewable energy system. The budget also requests \$17 million in discretionary funding to support a program level of \$50 million for Bio-refinery Assistance Program. With this funding, the total available for Section 9003 Program is over \$950 million.⁹⁰

While the result of federal money being allocated to rural communities may seem like another government ploy, not too different from the original Homestead Act, one fact is certain —rural regions have an impact on urban areas and our nation as a whole. Just exactly what role rural areas are going to play will be answered over time, with the growing cost of natural gas and oil likely showing us our answer. Faced with rising energy costs, rural communities have begun to recognize that they must tap the plethora of renewable energies in their region to improve their overall economic viability.⁹¹ Not only does this development of renewable energies potentially lower utility costs for rural residents, rural areas pose great potential for the development of larger scale renewable energy production as the U.S. attempts to promote domestic energy sources and reduce its reliance on fossil fuels.

Wind Energy

The Rockies region has seen a great rise in the development of renewable energies over the past 10 years with wind energy showing a 3,904 percent increase in capacity.⁹² As shown in **Table 3**, in 1999 the Rockies produced just 96 megawatts of wind energy, in 2004 that statistic rose to 783 MW, and in 2009 it reached 3,748 MW.⁹² **Figure 19** depicts how many of the areas in the EPAZ have rich wind potential with northeastern Wyoming showing some of the greatest potential for wind energy. Wind development is already underway in all four states that the EPAZ spans and the various projects have already shown economic benefits. The National Renewable Energy Lab (NREL), based in Golden, Colorado has documented the economic development impacts of Colorado's first 1,000 megawatts of wind energy.

By implementing a Renewable Portfolio Standard (RPS) through state legislation, Colorado was able to power the equivalent of 248,000 homes with wind by January of 2009, nearly 12 percent of the state's total housing units.⁹³ In addition to the 1,700 full-time jobs created during the construction period, wind projects in Colorado created 300 permanent jobs in the state's rural communities, totaling \$14 million in annual payroll.⁹³ Further studies conducted by the NREL also show the potential benefits of Montana and New Mexico reaching the 1,000 MW mark. In New Mexico, 487 direct and indirect local jobs would be created, totaling \$41 million per year to local economies.⁹⁴ If Montana was to reach the 1,000 MW mark, 547 long term jobs would be created, totaling \$43.8 million per year to local economies.⁹⁵ Additionally, in 2004 Montana and New Mexico ranked fifth and eighth respectively nationwide in tons of carbon dioxide (CO²) produced for electrical consumption per capita. Wind energy would take great steps in reducing this carbon footprint, eliminating 2.6 million tons annually in New Mexico and 2.9 million tons annually in Montana. Additionally, New Mexico would save 1.1 billion gallons of water annually and Montana would save 1.2 billion gallons annually. Both statistics regarding carbon dioxide (CO²) and water consumption are especially valid in lieu of potential legislation limiting carbon emissions, and water shortages across the country that are often felt most strongly at the rural agricultural level. Benefits to rural communities would also come from the initial and annual payments to the landowners on which turbines are erected. Local property tax in states and rural areas would additionally rise, allowing for communities to invest in social amenities that would subsequently draw migrants to the area. To achieve the goals of the U.S. Department of Energy's Wind Powering America, which calls for 100,000 megawatts of wind power by 2020, the U.S. Department of Energy estimates that during the next 20 years, \$60 billion in capital will be invested in rural America, providing \$1.2 billion in new income for farmers and rural landowners, and the creation of 80,000 jobs.⁹⁶

Despite the advantages, wind energy development in the West has not come without its share of costs and complaints. Many of the most excellent or outstanding areas for wind power are in rural areas, where both the noise and construction have been considered aesthetically unappealing to locals. Some companies, like Caithness Energy who is constructing a wind

farm in eastern Oregon, offer to pay residents who live near wind farms to not complain about the noise or the unsightliness of the turbines.⁹⁷ Birds, bats, and other in-flight creatures may also risk harm from wind turbines. Not only do wind turbines pose risks to species, they threaten the migratory corridors and pollination, and insect management capacities of both bats and birds, potentially altering the grasslands ecosystem.⁹⁸

Wind turbines, which stand anywhere from 200 to 400 feet, have also been reported to interfere with aircraft radar. While no major incidents have yet to be reported, the rapid rotational speeds of the blades can mask aircraft on civilian and military radar. With speeds up to 200 mph, the blades can cause radar "clutter," producing penumbral effects that can hide planes and prevent radar signals from reaching targets. The rotation has also been found to interfere with meteorology by mimicking thunderstorm patterns.⁹⁹ The interference with radar has led to concerns with the Department of Defense, the Department of Homeland Security, and the Federal Aviation Administration (FAA). Proposals for turbines are required to be submitted to the FAA for review, which has jurisdiction over any structure over 200 feet high. As wind farms grow, concern rises, spurring research for new possibilities, among which are new "stealth" blades for turbines, to make the blades invisible to radar, which is being worked on by companies such as Vestas. Other possibilities include radar upgrades and more careful structuring of wind farm layouts. Until a workable solution is found, the FAA will continue to handle wind-turbine cases to ensure safety.

Solar Energy

A similar trend has been seen in the development of solar energy throughout the U.S. with a 36 percent growth in solar industry revenues in 2009, even with the economic recession. However, total solar capacity greatly lags behind wind capacity, with the entire U.S. producing 2,108 megawatts of power, less than the wind capacity of Colorado and Wyoming combined.¹⁰⁰ However, the continued venture capital support for the solar industry, which totaled \$1.4 billion in 2009, shows great promise for the industry, especially when considering the proportion of capital going into solar in comparison to the rest of the renewable energy industry.¹⁰¹ Additionally, national growth of 441 megawatts in 2009 shows that the development of solar energy is climbing sharply.¹⁰² As for the Rockies re-

Figure 20: United States Ethanol Production

Source: Renewable Fuels Association, Historic U.S. Ethanol Production, <http://www.ethanolrfa.org/pages/statistics>

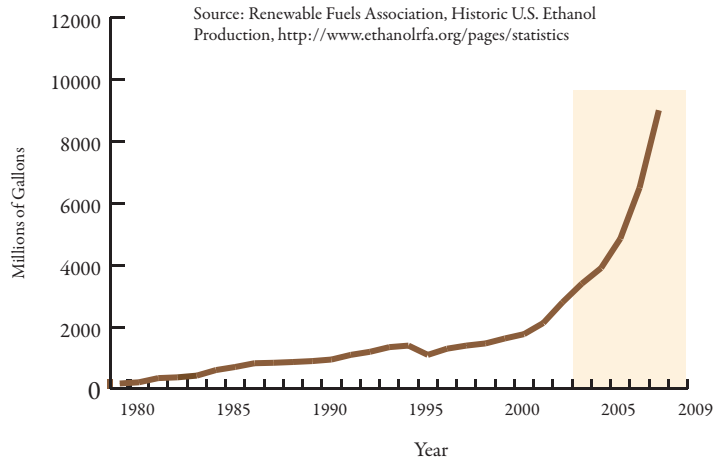
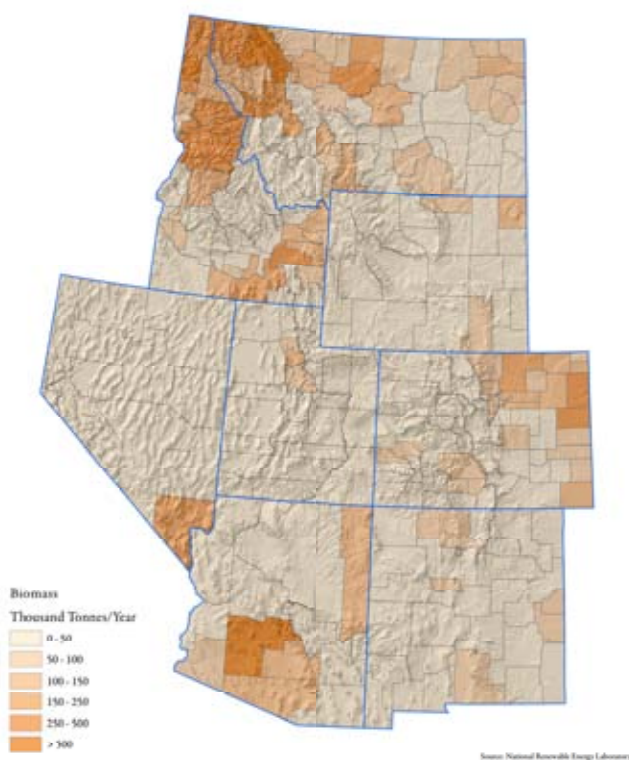


Figure 21: Biomass Potential Map

gion, Nevada, Colorado, and Arizona came in third, fourth, and fifth respectively in the nation for cumulative capacity.¹⁰² The Rockies region experienced a 31 percent increase in solar energy produced in 2009, resulting in a cumulative 212 megawatts of solar power generated by the end of 2009.¹⁰³ Arizona and Colorado had the greatest levels of development, with each state bringing on roughly 23 megawatts of new solar power in 2009; this resulted in a 64 percent increase in solar power generated in Colorado and an 88 percent increase in Arizona.¹⁰³ As seen in **Figure 19**, the Eastern Plains counties of the Rockies have excellent solar potential, especially in the southern region of Colorado and New Mexico. Solar energy provides an excellent source of small-scale energy production on the roofs of homes and businesses, allowing individuals and towns to lower their utility costs.¹⁰⁴

Ethanol

Ethanol production is one of the fastest growing energy sectors in America. Spurred by the OPEC crisis of the late 1970's, the U.S. ethanol industry began by producing just 175 million gallons in 1980, but has seen a steady increase ever since.¹⁰⁵ As depicted in **Figure 20**, by 1990 ethanol plants across the country were producing 900 million gallons annually and by 2000 production had exceeded 1.6 billion gallons.¹⁰⁵ However, the most profound growth has occurred in the new century with the greatest boom from 2005 onward.¹⁰⁶ Encouraged by government subsidies and legislation, national ethanol production reached 10.7 billion gallons in 2009.¹⁰⁷

However, the future of ethanol production is not without controversy. Scholars have asserted that the ethanol industry's production has begun to level out, or will soon because of the increase in corn prices and restrictions on additional cropland.¹⁰⁶ Additionally, in lieu of the rising national debt, some have pushed for the abandonment of subsidies for the fuel.¹⁰⁸

The Congressional Budget Office has calculated that it costs taxpayers \$1.78 to produce a gallon of ethanol made from corn and \$3.00 to produce a gallon of cellulosic ethanol.¹⁰⁹ Certain energy scholars believe that the energy balance for corn-ethanol production is actually negative, thus more energy is put into the processes of production than is actually finally produced.¹¹⁰ However, the USDA maintains that there is actually a positive net energy output when comparing amounts of fossil fuels used in production to the amount of ethanol finally produced.¹¹¹

Creation of ethanol plants may still offer great potential for rural areas and with new developments in ethanol production; many plants have the potential to be farmer-owned and dispersed throughout rural areas.¹¹² Ethanol production presents many employment opportunities throughout the rural region of the Eastern Plains. In 2007 ethanol production added \$47.6 billion to the nation's Gross Domestic Product, while additionally creating 238,541 jobs throughout the American economy.¹¹³ An additional appeal of ethanol production is its ability to retain the traditional agricultural industry of a region by encouraging higher crop prices and land values, thus benefitting farmers for a practice they had already been undertaking.¹¹⁴ Various counties illustrated in **Figure 21** show high potential for biomass ethanol production, including northeastern Montana and the Eastern Plains of Colorado. Additionally, the October 2010 decision by the Environmental Protection Agency (EPA) to allow for an increase from 10 percent ethanol blended into gasoline to 15 percent shows the potential for increased demand into the future.¹¹⁵



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Oil and Natural Gas

Production of traditional energy resources has long been an important economic dimension for the Rockies region. The reserves of these traditional energy resources also pose a potential source of economic revitalization for the future of the Eastern Plains region. As of February 2010, the Rockies region produced eight percent of the nation's crude oil with New Mexico leading the region, supplying three percent of total U.S. production.¹¹⁶ The eight-state Rockies region has an even larger share of the nation's natural gas production with 27 percent of 2008's total output.¹¹⁷ Encouraged strongly by the Powder River Basin of northeastern Wyoming and southern Montana, the Rockies region mined 52 percent of the nation's total coal produced in 2008.¹¹⁸ Considering the vast reserves of fossil fuels already lying beneath much of the Eastern Plains region and the extensive infrastructure already developed for traditional energy sources, oil, natural gas, and coal extraction pose a potential source of economic revitalization for rural

communities. However, the volatility of energy prices could make communities susceptible to the traditional boom and bust cycles of the Great Plains and historic mining towns. The booms that might develop out of rising energy prices could put pressures upon local communities with an influx of workers that would subsequently strain the already minimal social services in local communities.¹¹⁹

New Homestead Legislation

The Homesteading idea was reborn in late 20th century. In the 1980's, people began to realize that the strategy being followed by most small rural towns to try to stimulate population growth was not working. Most were trying desperately to attract large businesses, known as "elephant hunting," which often resulted in companies taking advantage of economic incentives and moving on or going out of business. Richard Wood notes the devastating experiences of "elephant hunting" in Eastern Plains communities in *Survival of Rural America: Small Victories and Bitter Harvests*. When a pickle factory, the largest employer in the towns of Lamar and La Junta, Colorado, closed down in 2005, these communities lost 453 jobs- over 10 percent of their workforce.¹²⁰ Rural communities like La Junta and Lamar, whose workforce is employed by one major industry, suffer devastating losses to the population, community, and economy when that industry closes. Over the past 20 years aging populations, low levels of income, and mass out-migration from many rural communities across the Eastern Plains has been depicted by census data. To rejuvenate some of these communities, New Homestead legislation has been proposed to encourage people to stay and start new businesses.

New Homestead Legislation of 2003 and 2007

Senators and representatives from those states with a high percentage of high out-migration counties have periodically proposed "New Homestead Acts" to help restore a sense of community, place, and vitality to rural lands by federally subsidizing those who agree to remain in these counties through alternate businesses. The new legislation would achieve its goals by offering a number of financial incentives to people willing to commit to live and work in high out-migration rural areas for at least five years. Including helping them buy a home, pay for college, and start a business.

Two Senators from North Dakota, Byron Dorgan (D)-in Congress since 1980, and Kent Conrad (D)- in Congress since 1986, along with eight other senators, introduced a bill called the New Homestead Act in 2003, specifically targeting communities with declining populations. This bill's aim was to "rekindle the spirit of the Homestead Act of 1862...and enact policies that offer hope and opportunity to the Heartland once again [including] incentives to buy a home, pay for college, and get the financing [needed] to launch or expand a business."¹²⁰

To some, the idea of a new Homestead Act brings back images of boom and bust, and the disastrous agriculture that led to the Dust Bowl. To others, it means recreating the legislation from which rural America was born, and thus the only way rural America can be revitalized and renewed. Democratic Sena-

tor Byron Dorgan has pushed the bill with the view that,

"history has already provided us a model for how to help communities in the Heartland that are hurting – and that's the Homestead Act of 1862. If we are going to reverse the effects of out-migration, and help bring prosperity back to the Heartland, we need to rekindle this spirit. We need to launch a new and equally bold initiative that challenges a new generation of Americans. And we need to do this not just for the sake of the Heartland, but for the entire nation."¹²¹

The 2003 New Homestead Act proposal claimed to benefit not just the Heartland, but America as a whole. Congress did not buy it, as the bill could only muster 16 supporters in the Senate. In 2005, Senator Norm Coleman(R) from Minnesota proposed the Rural Renaissance Act, which addressed infrastructural deficiencies in rural America and proposed allocation of \$50 billion in grants and loans for water and wastewater plants, telecommunications, police and fire facilities, hospitals and nursing homes, not to mention, renewable fuels projects. Despite the innovative infrastructural change that this bill proposed, it similarly went down to defeat in Congress.¹²²

Many opposed to the New Homestead Acts do so in opposition to further human settlement and the impacts of development on native prairie, and favor alternative energy proposals or conservation as a way to maintain vitality of the region. Others are hostile either to the expenditure of federal dollars or the presumed ineffectiveness of federal bureaucracies. Some believe "market forces" should be allowed to work themselves out in regions like the Great Plains, and find the outcome acceptable even if continued decline and abandonment is the result.

Conclusion

What then, is the best way to revitalize a declining region and its communities? What incentives can be put in place to assure a viable and healthy population, workforce, economy, and environment? Related but more profound questions arise: should these communities and region be rejuvenated by government? Or should "market forces" and profound swings in demographics and global economic forces determine what is saved and what is allowed to die? Many counties across the Eastern Plains Agricultural Zone have communities that are on the verge of, if they are not already, becoming ghost towns. Shall they be returned to near pre-Anglo conditions largely devoid of human population, as the Poppers have proposed? Or shall actions and policies be put in place to ensure that new businesses and homes and schools form the next generation "Great Plains"? While the New Homestead Act of 2007 was meant to "reward the hard work and risk of individuals who choose to live in and help preserve America's small, rural towns," legislators must also take into account the profound lessons and major failures from our past settlement efforts of the Great Plains if the nation is to plan wisely for our future.

¹ President Lincoln signed the original Homestead Act into law in 1862, which entitled citizens over 21 or the heads of households to apply for plots of land up to 160 acres, which they would then cultivate and improve for five years, after which they would be fully entitled.

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Case Study:

Judith Gap, Montana



© Russell Clarke, Judith Gap, MT

In the center of Judith Gap sits the Mercantile, which appears to be the only operating service concession in a 20 mile radius and home to arguably the “world’s best milkshake.” A short walk down the street lives Harry Peck, Judith Gap’s resident historian. Harry Peck’s life has revolved around this small town that like many other small towns west of the Mississippi came alive with the railroad industry. In 1908, the Great Northern railroad opened up a slew of railroad stations across Northern Montana including Judith Gap. In August of that year, the Great Northern sold their property to the community; Judith Gap became a change over stop for train crews and a refueling station between Great Falls and Billings, Montana. A new wave of Homestead legislation, like the 1902 Newland Reclamation Act, sought to open up the land for settlement, encouraging irrigation in more arid regions of the West. Settlers and immigrants, particularly of Scandinavian and German descent, boarded those trains to claim land that they could till in hopes of making a living and profit.

Thus Judith Gap was born in 1908; becoming known as the “biggest little town between Billings and Great Falls,” home to a movie theater, bar, prosperous Main Street, and about 1,500 residents.¹ It was a small town economically driven by the railroad industry and supported by agriculture, but by the middle of the 20th century, Judith Gap began to see major changes as a result of shifts in those industries. The switch to diesel fuel for trains and the advent of the automobile saw the removal of the Milwaukee Railroad in the late 1960’s; the harsh effects of this departure were immediately felt in this small town. Another major economic lifeline, Judith Gap’s agricultural productivity, also began to shrink with the mechanization of agriculture, and the end of homestead legislation. Mr. Peck explained that his

father was one of the first to have a four wheel drive tractor in the area, increasing the number of plowed acres per day from two to three, to 200 to 300.² Ironically such modern agriculture both reduces employment and expands output simultaneously.

Without the railroad lifelines, however, markets for agriculture were dramatically reduced. Farmers and ranchers had to travel many miles to get their product to the consumer. “There was not much to draw people to the area,” explained Mr. Peck, who in 1985 sold the family owned farm where he was born and raised, to a neighbor.

Development of Wind Farm

Prosperity in Judith Gap in the second half of the 20th century was hard to come by. Many residents packed up and left, some stayed, and those who did were not getting any younger. Little economic innovation had been brought to the community until the development of the Judith Gap Wind Farm, developed with the help of a farmer named Bob Quinn, from Big Sandy, Montana. In 2000, Quinn tracked his German ancestry and on a visit to Germany he found that distant relatives were using wind energy to turn a profit. Quinn saw the same potential for Montana, which boasts outstanding areas of wind energy potential all across the state including places like Judith Gap. In 2004, Quinn sold his project to Invenergy, a Chicago-based energy company, which was approved by the Montana Public Service Commission to sell power to NorthWestern Energy in 2005, central to the success of the project. A 20-year contract was established, where Invenergy will sell their power to NorthWestern Energy for \$31.75 per megawatt hour.³

At the Judith Gap wind farm, the 90 turbines antici-

pate providing approximately seven percent of the energy for Northwestern Energy's 300,000 customers.⁴ This means that in total, the wind farm capacity is 135 megawatts with an expected annual output of 450 million kW hours, with possibility for expanding to 188 megawatts in the future. The power produced by the wind farm enters the Norwest Energy grid. The wind speed minimum for the turbines is 10 mph and the maximum is 55 mph, with the ideal production speed being 24 mph.⁵

The Invenergy Wind Farm entrance sign off of Highway 191 points out the role of wind farms in job creation and economic stimulation. There is no doubt that the wind industry has opened up new jobs, particularly as more and more domestic manufacturing facilities have opened up in the U.S.. The American Wind Energy Association reported in June 2010, that when known announced facilities come online to join existing facilities running at capacity, more than 14,000 additional jobs will be created in the wind manufacturing sector, bringing total employment to over 30,000 jobs in the United States. Overall, the industry employed around 85,000 workers directly and indirectly in 2009.⁶

A trip to Judith Gap, however, called into question the benefits that wind farms have on employment and economic opportunities in rural communities like Judith Gap. Is a wind farm enough to revitalize a community? (Probably not.) After diesel replaced the railroads, larger homes started to be built in Harlowton, Montana, the neighboring town about 20 miles south of Judith Gap. More townspeople began to migrate from Judith Gap to Harlowton. Today many of the permanent employees at the wind farm live in Harlowton.⁷ Thus it is worth asking, which communities is the wind farm benefiting and how is it contributing to the notion of "self-sufficiency" in the West? The wind farm takes all of 12 people to operate, yet the manufacturing and assemblage of the turbines for the farm is a multi-corporation effort. About 300 temporary workers were employed during the construction, mostly coming from Harlowton, Montana and the areas surrounding Judith Gap.

Many components of wind farm equipment, as with many other wind farms in the United States, are produced by

numerous foreign manufacturers. However, in 2009, the German company, Fuhrlander AG, opened up a wind turbine manufacturing site in Butte, Montana. Other manufacturing operations close to the Judith Gap wind farm are in North Dakota, Colorado and Canada, though some components have come from Europe and Brazil. Still, these manufacturing operations employ most people from cities where there are already large manufacturing industries established. Furthermore, Montana's aging population and labor shortage that is expected with the coming generation, leaves little motivation for manufacturing companies to open up long term employment opportunities in places like Judith Gap.

Despite growth in the past few years in domestic wind turbine manufacturing, the demand for foreign manufacturing is due in large part to the incentivized manufacturing operations from the Chinese government and from European Renewable Energy standards. In 2001, The EU passed the RES-E directive, indicating a target that 21 percent of electricity comes from renewable energy sources by 2010, which has been argued to be the single most globally important case of legislation for wind energy. The EU legislation sparked many European countries, outside of the original pioneers of Germany, Spain, and Denmark, to adapt legal frameworks for investments in wind power and other renewable electricity sources. European companies have not only become leaders in wind power, but Europe is receiving commercial benefits from exports and environmental benefits, while also creating employment and spurring innovation⁸. In the U.S., statewide incentives for renewable energy, like Montana's 2007 "Clean and Green" energy law, have provided some incentive for wind energy companies by reducing property taxes for those businesses. This has allowed for the planning of more than 50 wind energy projects in the state. The wind farm in Judith Gap has certainly been a major step in the push that legislative efforts, at all levels, have made toward renewable energy.⁹

Coincidentally, the wind farm sits next to one of the 450 intercontinental ballistic missiles (ICBM) that dot the landscape across Wyoming, North Dakota, and Montana. Con-

cerns were expressed during the initial construction of the site, that the farm would be constructed on the land that held the ICBM silo. These silos are maintained by military men and women, who pass through Judith Gap daily to stop for a milkshake or food at the Mercantile, usually coming from Great Falls.¹⁰ There had been concerns that wind farm development would impede the ICBM silo site. As it is today thankfully, the Judith Gap wind farm and the intercontinental ballistic missile can both stand in harmony.

About 300 jobs opened up during the installation of the wind farm in 2005, employing people from



© Emil Dimantchev, Judith Gap, MT

Lewiston, Harlowton, and Judith Gap, the three interconnected communities in the area. “The wind farm,” Mr. Peck explained, “was good for several months.” These jobs were mainly construction jobs building roads and ditches, employees coming from different unions in the area. This type of labor brought in “transient type workers,” who did not bring their kids with them to Judith Gap. When the industry came, they hired as many locals as they could. However, many employment opportunities only lasted as long as it took to finish the project, which was just a few months.

The question still remains, how does Judith Gap benefit from the wind farm operation? Mr. Peck could only tell us what he knew from hearsay. Those who owned the land where the wind turbines were established supposedly received \$3,000 for every site and every tower. These people also received a minimum royalty for the power generated, plus a bonus if more power is generated from the turbines. They were required to set up a local impact fund that they pay into (which programs then apply to every year to for funds for community development). The Judith Gap school, of about 30-40 students, received \$50-60 thousand in funds for renovations. With the larger



© Emil Dimantchev, Judith Gap, MT

school in Harlowton attracting many children from Wheatland County, the Judith Gap school remains “awfully hard” to maintain.¹¹ As for the future of Judith Gap? Mr. Peck said that he didn’t see any real hope of economic rejuvenation. He described Judith Gap, “without any economic activity locally, it’s just the farmers and their kids. The kids move on to another program, then college, then a job elsewhere. Most of the farms that are here have descendents that are running them, but there is nothing really to increase the area.”¹² He and his wife did however, offer us a homemade cookie, and asked us to stay.

Judith Gap has a limited benefit from the wind farm, temporary jobs during construction and royalties from the production. One might ask if Judith Gap is not the sole benefactor, who else is? Mr. Peck laughed when he told us about the

repair crew that was sent from Brazil to fix a turbine that had gone down early on in the project, but what effect does that have on the potential benefits of wind farms to rural areas in the Rockies? In Colorado, statewide incentives are leading the development of solar panel factories in rural areas, like Fowler, Colorado. Though Montana does have a Renewable Energy

Standard, much more could be done to utilize Montana’s renewable energy capacity. Montana boasts the fifth best wind resource in the nation, but still ranks only 16th in terms of installed capacity.¹³ In a town like Judith Gap, with a population of 164 people, and a county like Wheatland, whose median age is 42 years old, rejuvenation may not amount to a new Main Street and dollar signs. Rather, vitality may mean letting turbines set sail on Montana’s “ocean of grass,” breathing life and vitality, and letting the tissue of the Eastern Plains restore and repair.

¹ Interview with Harry Peck, Judith Gap, MT, July 17, 2010.

² Interview with Harry Peck, Judith Gap, MT, July 17, 2010.

³ “Judith Gap Wind Farm: Montana’s Gap in wind production” *Department of natural resources and conservation*. http://dnrc.mt.gov/trust/wind/judith_gap.asp

⁴ “Judith Gap Wind Farm: Montana’s Gap in Wind Production” *Mt.gov*. Montana’s official state website. http://dnrc.mt.gov/trust/wind/judith_gap.asp. accessed 11/11/10

⁵ Judith Gap Wind Farm Tour, July 17, 2010.

⁶ “Winds of Change: A Manufacturing blueprint for the wind industry” *American Wind Energy Association*. June 2010

⁷ Interview with Karena Dale, Judith Gap, Montana, July 16th, 2010

⁸ “Legal Framework for Wind Energy” *European Wind Energy Association - EWEA asbl, 2005-2010* <http://www.ewea.org/index.php?id=197>

⁹ “Less Carbon, More Jobs” *Environmental Defense Fund*. February 20, 2009 <http://www.edf.org/page.cfm?tagID=36069>

¹⁰ “Town Hosting Missiles Anxious about Nuke” *Cuts*” *Air Force Times* Matt Volz, http://www.airforcetimes.com/news/2010/04/ap_airforce_missile_towns_040310/4/3/10.

¹¹ Interview with Harry Peck, Judith Gap, MT, July 17th, 2010

¹² Interview with Harry Peck, Judith Gap, MT, July 17th, 2010

¹³ *Renewable Energy Standard 2008 Progress Report*. Montana Environmental Information Center http://meic.org/energy/energy_policy/renewable-energy-standard-progress-report

Case Study:

Phillips County, Montana



© Emil Dimanchev, Yellowstone, WY

Phillips County, Montana, lying along the U.S.-Canadian border, rests on one of the most intact grassland eco-regions left in the world.¹ The county's communities, including the county seat Malta, have long been viewed as isolated communities. However, the grassland ecosystem of Phillips County has been at the center of debate regarding the preservation of natural prairie. Since 2002, the American Prairie Foundation (APF) and the World Wildlife Fund (WWF) have been establishing the American Prairie Reserve (APR) adjacent to the Charles M. Russell National Wildlife Refuge. 3.5 million acres of potential land has been chosen by APF for the development of the reserve; this area has been deemed large enough to function as a prairie ecosystem by scientists from the Oceans of Grass ecological assessment.

The history of Phillips County followed a trend similar to the rest of the Rockies Eastern Plains communities. The land was settled throughout the 1800's with the help of James J. Hill's railroad, known as the "Hi-line", which connected a string of towns in northern Montana, including Malta, Havre, and Glasgow. The demand for hides and raw materials back East brought settlers, hunters, and trappers out West, where the Great Plains were teeming with bison. The federal government, though the Homestead Act of 1862, the Desert Lands Act of 1877, and the Enlarged Homestead Act of 1909, provided encouragement and incentives for settlement of these lands (which conveniently bolstered use of the railroad industry).² Despite opposition advice from explorer James Wesley Powell, who warned that the arid conditions of the West would not tolerate the same patterns of agriculture and settlement that had proven successful further east, settlers were dropped off in communities on the Hi-line, eager, yet ill-informed about the conditions ahead. Richard Manning quotes historian Joseph

Kinsey's account of Montana settlement, "Thousands of men, women, and children have had their lives permanently blighted by poverty—hundreds have actually starved—thousands of head of livestock have perished, acres of soil have been lost or damaged since Powell presented his plans for the plains—because Congress and the American people paid no attention whatever."³

A large influx of cattle swept into the Northern range during the early 1880's, along with capital for farming. American and European investors sought fortune in the western frontier. The later 1870's had seen a boom in American meat imported into the British Isles, stirring eagerness in English capitalists to begin farms in Montana. The cattle, (and the farmers no doubt) were not accustomed to the harsh weather on the plains, a drought in the summer of 1887 followed by a harsh winter killed off an estimated 60 percent of the Montana herds.⁴ The homesteaders who arrived near the Missouri Breaks around 1909 were among the last, for homesteading in Montana was ending fast. During the 1890's the big ranches of Kohrs, Coburn, Sieben, and Phillips had filled fifteen hundred to two thousand of Jim Hill's railroad cars with cattle every year. By 1908 the range was practically deserted.

The explosion of the sheep industry in Malta changed the concept of the open range dramatically. As many as one hundred thousand sheep came to the Missouri Breaks region each spring for shearing. Not only did this result in legal disputes between sheep herding men and women, but between farmers and ranchers. Disputes between unsettled public lands, homesteaded lands, and most importantly water occupied the courts.⁵ Water was highly disputed around the Missouri breaks, where irrigation was being experimented with, and falsely advertised to settlers. Despite how inconceivable the concept of

robust agriculture was in such arid land, Jim Hill's railroad was flooded with settlers under the false illusion of open virgin lands.⁶ Several federal acts encouraged the settlements along the "Hi-line" that some suggest should never have been created. The Enlarged Homestead Act and Desert Lands Entry of 1909 and Stock Raising Homestead Act of 1915, meant to stimulate irrigation, brought another rush of settlers along the Hi-Line.⁷ However, Manning points out how unsuccessful the results of government encouraged settlement were: "Between 1913 and 1915, five thousand settlers moved into Phillips County, which today has a population of just over four thousand."⁸

Settlers continued to realize the difficulties of making a living off the land of Montana's plains as the years progressed. Multiple years of high rainfall and the boom of World War I, followed by a drought and post-war decreased demand resulted in a fifty-million-dollar loss in Montana alone during 1919.⁹ Settlement would continue in Phillips County, but at an ever decreasing rate. Today's inhabitants have found their economic niche and thus a livelihood, often through ranching, but only after years of prior generation's toil with the elements of the high plains.

The history and current conditions of Phillips County have led to many inquiries about its future. In 1999, The Nature Conservancy published *Ecoregional Planning in the Northern Great Plains Steppe*, which located the most important regions of the Great Plains for restoring the biodiversity of the ecoregion. The World Wildlife Fund then took steps to begin this conservation plan. In 2001, the Montana based, American Prairie Foundation was formed, with goals of acquiring enough private land to maintain and create a fully functioning prairie ecosystem on the Northern Great Plains. The reserve was established just north of the Missouri Breaks in Northern Montana, in Phillips County.

American Prairie Reserve

The American Prairie Reserve (APF) has three main goals: to accumulate and wisely manage, based on sound science, enough private land to create and maintain a fully-functioning prairie-based wildlife reserve; to provide a variety of public access opportunities to this wildlife amenity; and to ensure that the land remains productive in a way that contributes significantly to the local economy.¹⁰ The land around Phillips County was chosen largely because 90-95 percent was already intact grassland ecosystem. Since 2002, APF has worked to reintroduce endemic species like the bison and the black-footed ferret, to the area. Since the beginning of its preservation efforts, APF has contributed \$18.3 million dollars to the local county economy including the creation of local jobs, purchase of land and restoration of historic locations.¹¹

The American Prairie Foundation is located in Bozeman, Montana where its employees have easier access to large urban areas for development purposes. APF officials have been working with ranchers in Phillips County, buying up land that will become part of the Prairie Reserve, and working to encourage the economic opportunity that they hope the Prairie Reserve will bring to the area. Gaining the support of the community and policy makers has been of central importance and the subject of much debate.

Among the issues that the Prairie Reserve faces are those concerning the infrastructure, environment, and logistics

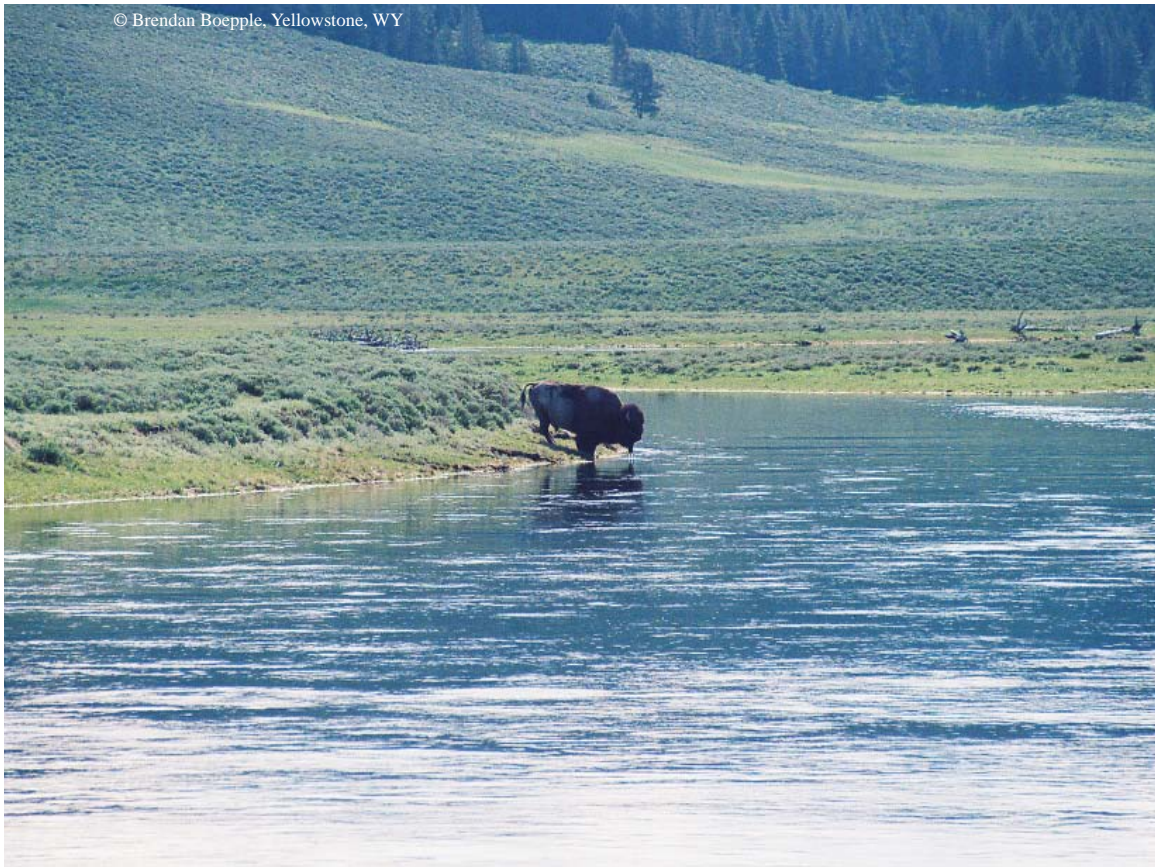
that such a project requires. Malta, Montana, the nearest town, is 60 miles from the Reserve. It still stands as a stop on the "hi-line", (serviced by Amtrak), but as of yet, has no rental car facility. Neither are there commercial airports in Malta, though airports are located in Billings, Bozeman, Great Falls, and Lewistown.

The American Prairie Foundation strongly recommends that visitors use four-wheel drive vehicles with plenty of ground clearance, given that roads on the reserve are "graveled at best and unmaintained at worst." Extreme weather conditions characteristic of the Missouri Breaks region subject the Reserve to environmental conditions that can not only be undesirable to visitors, but heavy rain and wind can even have the potential to break down infrastructural elements that connect visitors to the remote reserve. Cars have the potential to get stuck in unmaintained dirt roads when wet, which can be incredibly dangerous for visitors. The Reserve also lacks cell phone coverage, which may add to the remote experience that visitors seek in the American Prairie, may be helpful and even necessary in unexpected situations. Also absent on the reserve are gas station, the nearest reliable gas station being in Malta, Montana.¹²

The American Prairie Foundation has encountered certain obstacles in its revitalization efforts that Fowler, Colorado did not, particularly in gaining local public support. A recent incident earlier this year brings to light some of these issues. Early in 2010, an internal U.S. Department of the Interior document, that identified fourteen new sites for possible national monument designation, was leaked to Congressional Representatives. The document identified 2.5 million acres in Montana, a stretch of land from the Charles M. Russell National Wildlife Refuge to the edges of Grasslands National Park, as an area to possibly be restored and conserved as a national monument. The area includes large parts of Phillips and Valley counties. The article ignited angry responses and uproar from Montana policy makers and community members alike, and has been seen as a threat by both the community members of Phillips County and the American Prairie Reserve efforts.¹³

Federal officials and American Prairie Foundation have been working to calm outcry at the leaked document, referring to the document as "internal brainstorming." Federal officials deny that there are motions to seize these lands as a national monument, hoping to alleviate public concern. "As long as I am Secretary of the Interior, there will be no recommendation for designation of national monuments in Montana unless there is significant public involvement, discussion, and debate over any such proposal," Ken Salazar, Secretary of the Interior, wrote.¹⁴

The American Prairie Foundation has made efforts to give back to the community of Phillips County through the Community Involvement Fund. The fund, which takes the form of grants from the APF, has made contributions that stretch beyond the environmental aims of the preserve, providing the Malta High School science department with science equipment and a weather system, increasing student understanding and participation with of weather patterns and environment of the reserve. Despite these community outreach efforts, public support and involvement on the preserve may be difficult to come by. The new economy that the American Prairie Reserve hopes to establish is mainly service based, centered on prospects of eco-tourism. The idea of a "tourist" type economy has found



reiterated the notion that “preservation pays”.¹⁷ Only time will be able to tell us what the future of the Northern Great Plains holds, but it seems residents and visitors can certainly prepare by protecting its natural resources. It remains to be seen what the vision of American Prairie Reserve means for Phillips County. The value of environmental preservation has been recognized by other landowners across the Plains who are finding innovating, entrepreneurial opportunities in preservation. In Nebraska, the Switzer family has altered their cattle operation to diversify bird populations. The family has seen environmental benefits and

difficult acceptance in a county where some families have lived and farmed since their ancestors homesteaded there. Regardless of what the census numbers say about depopulation, low-income levels, and government subsidies, the agricultural tradition and identity of Phillips County has a strong influence on its willingness to become a necessary part of a Prairie Reserve. Ganay Johnson from the American Prairie Foundation noted realities and reasons for this lack of public support. Residents of Phillips County don’t live there so that they can “make latte’s for tourists.”¹⁵ Despite reluctance from certain sectors, APF has continued the project of expanding the reserve to make the idea of prairie restoration both a political, economical, and environmental reality.

The American Prairie Foundation aims to expand the Reserve to reduce the habitat fragmentation caused by agricultural and ranching usages, and to open up the Reserve’s wildlife to a greater possibility of range. The APF does so by purchasing pieces of private lands, with the intent of preserving it for public enjoyment and access. The APF representatives make it their goal to negotiate agreements with ranchers and private land-owners about the Reserve. APF’s deeded lands will eventually be put into conservation easement agreements to ensure the future protection of these lands. For some land-owners, who have long since found little utility in their land, the opportunity to sell their land to the APF is a great offer. For others, the ranches and farms they live on hold great value, having been in their family for generations. For these residents, some being ancestors of the homesteaders who first set out on the Hi-line, the prospect of giving away a piece of their home and heritage becomes a more contentious issue.¹⁶

In an interview with Frank and Deborah Popper, professors and authors of the “Buffalo Commons” proposal, Deborah

increasing returns to their ranch, in addition to be awarded Important Bird Area Status from the Nebraska Audubon Society.¹⁸ By reintroducing native species to the Prairie Reserve, and rethinking what the role that environment plays in our economy, perhaps the Poppers vision will become realized through the work of the American Prairie Foundation, and preservation will come to benefit both land and people.

¹ American Prairie Foundation

² Manning, Richard. *Rewilding the West: Restoration in a Prairie Landscape*. Berkeley: University of California Press, 2009. 58.

³ Manning, Richard. *Rewilding the West: Restoration in a Prairie Landscape*. Berkeley: University of California Press, 2009. 57.

⁴ Manning, Richard. *Rewilding the West: Restoration in a Prairie Landscape*. Berkeley: University of California Press, 2009. 52-54.

⁵ Manning, Richard. *Rewilding the West: Restoration in a Prairie Landscape*. Berkeley: University of California Press, 2009. 86.

⁶ Manning, Richard. *Rewilding the West: Restoration in a Prairie Landscape*. Berkeley: University of California Press, 2009. 90.

⁷ Mark Harvey *Western Lives: A biographical history of the American West*. 291

⁸ Manning, Richard. *Rewilding the West: Restoration in a Prairie Landscape*. Berkeley: University of California Press, 2009. 99

⁹ Manning, Richard. *Rewilding the West: Restoration in a Prairie Landscape*. Berkeley: University of California Press, 2009. 99

¹⁰ American Prairie Foundation, <http://www.americanprairie.org/goals.html> Oct. 27th, 2010

¹¹ American Prairie Foundation, <http://www.americanprairie.org/economicOpportunity.html> Oct. 27th, 2010

¹² American Prairie Foundation Self Guided Tour. <http://www.americanprairie.org/visit/AutoTourOnline.pdf> American Prairie Foundation.

¹³ John S. Adams, “Interior officials involved in national monument ‘brainstorming’” Tribute Capitol Bureau July 6 2010 [Greatfallstribute.com](http://www.greatfallstribute.com)

¹⁴ John S. Adams, “Interior officials involved in national monument ‘brainstorming’” Tribute Capitol Bureau July 6 2010 [Greatfallstribute.com](http://www.greatfallstribute.com)

¹⁵ Interview with Ganay Johnson, Bozeman, MT, July 15, 2010

¹⁶ http://www.americanprairie.org/about/annual_reports/SothebysBrochure.pdf 14)

¹⁷ Phone interview with Frank and Deborah Popper, June 21, 2010.

¹⁸ Hill, P.J. and Shawn Regan. “The Great Plains: Tragedy or Triumph.” *PERC Reports for Free Market Environmentalist* 28, no. 3 (2010): 11.

Case Study:

Powder River Basin, Wyoming



© Russell Clarke, Black Thunder Mine, Gillette, WY

The Powder River Basin of northeastern Wyoming, the country's largest coal producing state, is home to the Black Thunder coal mine, one of the largest surface coal mines in the Powder River Basin and in North America.¹ The mine, owned by Arch Coal Inc, sits atop the largest known reserves of coal bed methane in the world.² The entire operation occurs within the Thunder Basin National Grassland, the land being leased from the U.S. Forest Service. The closest town to the mine is Wright, Wyoming, with the neighboring town of Gillette 60 miles to the north in Campbell County, and Douglas located some 80 miles to the south in Converse County. Together, these towns are home to Black Thunder's 1,600 employees. The economic activity of the mine has made it one of the most prosperous areas of the Rockies' Eastern Plains.

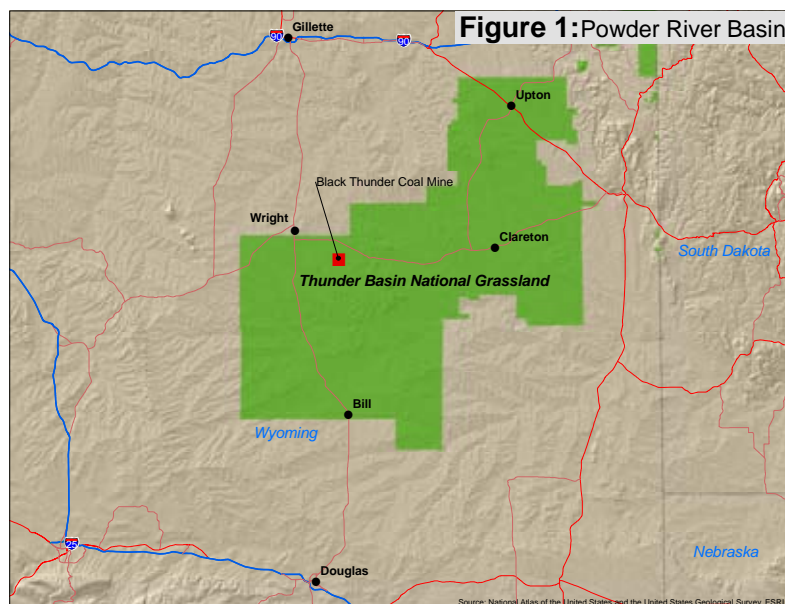
The Black Thunder Coal Mine produces low-sulfur, sub-bituminous coal used for electricity production. Wyoming coal typically has a sulfur content of 0.40 - 0.06 percent; Eastern coal typically ranges from three to five percent.³ With a heating value of 20.3J/kg in addition to the coal's moisture content, Powder River Basin coals have increased reactivity and likeliness to combust if not handled properly.⁴

Since opening in 1977, the Black Thunder Coal mine has mined and delivered nearly 2.2 billion tons of coal to America's electric generation plants.⁵ Every day at Black Thunder Mine, about 20 trains, with 120-150 cars, each holding approximately 80 tons of coal, deliver low-sulfur coal throughout 25 states. Among the mine's customers are over 115 coal-fired power plants, nearly all of whom use the coal to generate electricity for consumers. Every year, over six percent of the electricity generated in the United States comes from Black Thunder Mine.⁶ The mine has made great contributions to

America's affordable energy supply, in a nation where roughly fifty percent of the fuel for electricity comes from coal. The high economic demand for coal has allowed rural Wyoming to become something of an anomaly compared to its rural agricultural counterparts on the rest of the Eastern Plains.

As with many parts of the West that lie atop coal, oil, and natural gas, the Powder River Basin of Wyoming saw a period of economic boom during the 1970's during the world oil market crisis. Demand for domestic energy sources was accelerated by the 1973 OPEC oil embargo and the Iranian revolution in 1979. Coal beds in places like the Powder River Basin were quickly discovered and capitalized on to meet our nation's energy demand. Campbell County and Converse County saw the birth of "energy boom towns", witnessing enormous growth with the development mines across northeastern Wyoming. Campbell County, which hovered around 5,000 people, from 1920-1960 doubled to 12,957 people in 1970, and doubled again to 24,367 by 1980. In 2009, Campbell County, thanks in large part to the region's coal deposits, maintained a population of 43,967 people. Converse County, Wyoming, where Douglas is located, saw an increase in population from about 5,938 in 1970 to 14,069 in 1980. In 2009, it hosted a population of 13,578.⁷ These rural communities have retained their residents despite the recent trends throughout the rest of the Eastern Plains Region of the Rockies.⁸

While a steady flow of energy extraction has resulted in a fairly stable population for this region in recent years, the volatility of coal prices might make the region susceptible to economic vicissitudes that are often associated with the market for energy resources. However, when prices are compared with energy sources such as natural gas and oil, coal can seem



advantageous to the totality of the rural area, including the environmental effects.

Despite providing jobs for thousands of employees, and coal to fuel homes across America, mining in the Powder River Basin comes with a host of externalities that may negatively effect the environment and communities. One of the most controversial aspects of mining is the extraction of coal bed methane. Extracting the methane for natural gas requires that water be pumped from the target coal seam at rates up to 100 gallons per minute.¹⁰ Discharging this water causes extensive erosion and in some cases irreversible soil damage from high salt and sodium content. Excess sodium in soils alters its physical and chemical conditions, depriving plants and vegetation that depend on it from adequate nutrition. Excess sodium causes dispersion of clay, which lowers the permeability of the soil to air and water, while creating dense, impermeable surface crusts that greatly hinder the emergence of seedlings. Exchangeable sodium also alters pH levels in soil. High acidity or alkalin-

ity alters the ability of plant species to thrive. High salt content in water increases its salinity, making it difficult for plant membranes to absorb water, threatening the regions vegetation and biodiversity.¹¹ Each coal bed methane well produces about 20 tons of salt per year. Knowledge of sodium adsorption rate and soil types are critical for gauging the impacts of discharge water on land, particularly because water quality deteriorates substantially as it flows north, west, and south of Gillette.¹²

Energy Towns

Additionally, the Black Thunder Mine and its employees are a powerful force for their communities, supporting local economies along with education. The mine has taken efforts to support and appreciate education programs in the area, establishing a statewide K-12 classroom teacher recognition program, the Arch Coal Teacher Achievement Award. Black Thunder Mine also provides financial support to the University of Wyoming and the Gillette campus of the Sheridan Community College. We might take this cooperation between a rich industry and education to be a sign of vitality in this rural area.

The median age in Campbell County, home to Gillette and Wright, is about 33 years. The youthful population and steady employment make this rural community stand out amongst the rest of its Eastern Plains counterparts in the region, which in total has a median age of about 38. Thus the region is able to attract a youthful population to the community through its robust industry, a challenge that other communities on the Plains have struggled with. With the January 2007 price of coal at \$10.47 per ton, the United States Geological Survey (USGS) estimated that there were 10.1 billion short tons remaining in the Gillette Coal Field reserves.⁹ This estimate of the reserve is based on the current price of coal, and as demand increases price, it may become economically viable to try and mine new reserves. This may imply that so long as demand for coal keeps growing, those laborers of the coal mine will maintain their jobs, and have no reason to vacate their towns. However, given the non-renewable nature of extraction industries, and the threats to coal from the development of other energy resources, how long can we expect this rural vitality to be able to last? One must also bear in mind whether this interaction is

The Wyoming State Department of Environmental Quality is responsible for issuing water discharge permits to reduce the negative impacts to the water supply. In March 2010, the Wyoming Environmental Quality Council sided with Marge and Bill West in a case contesting one such permit held by Stephens Energy Company. The couple argued that the permit was issued under rules that the Environmental Protection Agency regarded as “unscientific.” The salt buildup from the coal-bed methane water discharge caused the destruction of 100 acres of hay meadow and 200 cottonwood trees.¹³ Such legal battles may help save land from continued damage, but this could come at an economic cost to large names in the Powder River Basin extraction industry like Arch Coal and those who benefit local employment and communities.

¹ U.S. Energy Information Administration “Quarterly Coal Report.” June, 2010. http://www.eia.doe.gov/coal/quarterly/qcr_sum.html (accessed July 27, 2010).

² Interview with Mark Vigil at Black Thunder Coal Mine July 17, 2010

³ Wyoming State Geological Survey “Wyoming’s Low Sulfur Coal.” 2002. <http://www.wsgs.uwyo.edu/coalweb/WyomingCoal/sulfur.aspx> (accessed July 28, 2010).

⁴ Mining-technology.com “Black Thunder Coal Mine, WY, USA.” <http://www.mining-technology.com/projects/thunder/> (accessed July 28, 2010).

⁵ Arch Coal Inc. “Black Thunder Mine: Delivering Coal to America.” <http://www.archcoal.com/aboutus/BT%20Brochure.pdf> (accessed July 28, 2010).

⁶ Arch Coal Inc. “Black Thunder Mine: Delivering Coal to America.” <http://www.archcoal.com/aboutus/BT%20Brochure.pdf> (accessed July 28, 2010).

⁷ City of Douglas, Wyoming “Historical Background.” http://www.cityofdouglaswy.com/index.asp?Type=B_BASIC&SEC={49979B11-FDE3-413D-97DF-00056590E20E} (accessed July 28, 2010).

⁸ US Census Bureau.

⁹ United States Geological Survey “Assessment of Coal Geology, Resources, and Reserves in the Gillette Coalfield, Powder River Basin, Wyoming.” 2008. <http://pubs.usgs.gov/of/2008/1202/pdf/ofr2008-1202.pdf> (accessed August 2, 2010).

¹⁰ Powder River Basin Resource Council, “CBM Overview.” <http://www.powderriverbasin.org/cbm-overview/> (accessed August 2, 2010).

¹¹ Powder River Basin Resource Council. *Erosion and Soil Damage Caused by Coalbed Methane Discharge Water 2009* <http://www.powderriverbasin.org/assets/Uploads/files/CBMsoildamage.pdf> Accessed August 2, 2010.

¹² Powder River Basin Resource Council. *Erosion and Soil Damage Caused by Coalbed Methane Discharge Water 2009* <http://www.powderriverbasin.org/assets/Uploads/files/CBMsoildamage.pdf> Accessed August 2, 2010.

¹³ Gruver, Mead “Wyo ranchers prevail in state CBM water case: State officials doubt ruling will have major effect on industry” March 13, 2010 http://trib.com/news/state-and-regional/article_61a9ee4e-eeb3-5fc6-b511-32112ccdf72.html

Case Study:

Fowler, Colorado



“Broad public policy and planning initiatives are interesting, and in some cases, necessary, but in the end the success of most communities individually, and of rural America as a whole, will depend more on the actions and commitment of the people who live there.”¹

“In 2008, urban population on the planet outnumbers rural for first time.”¹

Richard Wood, an astute observer of rural growth and change, argues that economic, demographic, and population statistics are not indicators of dying rural communities. What measure should be used to gauge a community’s health? Where should we put our finger if we are to find the pulse of rural communities like Fowler, Colorado and assess possible solutions? An initial hypothesis began with a set of U.S Census Bureau data documenting population decrease in counties across the Eastern Rockies Region of 10 percent or more over the past twenty years. To quote Richard Manning, author and reporter who has investigated similar questions to an extensive degree, “Depopulation is simply another abstraction trapped in numbers until it manifests itself in a community’s stories.”²

History

In 1887, the phrenologist Orson Squires Fowler stepped off the Atchison, Topeka, Santa Fe railroad at a depot just south of the Arkansas River. Appraising the land, he envisioned its potential to manifest as a fruit colony. The

fertile land around the Arkansas, surrounded by wide, open space, short-grass, and desert, appealed as the perfect and lucrative place to build irrigation ditches and raise crops.³ Thus the land was established as the town of Fowler, founded in the name of the famous pseudo scientist.

Anyone driving southbound on I-25 can imagine the phrenologist’s delight at having stumbled upon the area of what is now Otero County. Stretches of dried up short-grass, wheatgrass, and shrubs coat the landscape, drenched by an annual 300 days of sunlight a year. The desert landscape of southeastern Colorado is soon met with an oasis of green vegetation as the Arkansas River draws nearer. Today, crossing the Arkansas towards Fowler the land opens up into a farmland; large expanses of corn fields, onion crops, sheep, goats, and a charming rural town of about 1,200 people who call Fowler home. This population has remained relatively stagnant since the 1920’s.

Throughout the recent years the small town of Fowler, Colorado has been receiving more and more attention from media, policymakers, and environmentalists alike.

Fowler stands out as not just another decaying Great Plains town, but rather is embracing innovative environmental and business measures to revitalize their economy, so that this rural community can maintain a vibrant engagement with their land for generations to come. Located in Colorado's southeastern plains, Fowler stands as a pioneer of rural sustainability, dedicating itself to greener industries, community, and environment. Otero County and Fowler sit just south of the Arkansas River, thirty-four miles east of Pueblo, Colorado. To save money and create jobs the town of Fowler is moving away from the traditional electric grid, and plans to generate its own electricity, including solar, wind, bio-fuel from algae, and manure-based methane gas. It is even turning an abandoned canning plant into a new solar-panel factory for the company Helios LLC, which will open up more job opportunities.

What role will Fowler's economic shift play in the dynamic of Eastern Plains history? The story of the rural Plains, as history has told us, has been characterized by economic, environmental, and societal boom and bust, a fluctuating economy that gains and loses life. With the shift to renewables, many hope to stabilize this manic cyclical fluctuation of boom and bust, and come to a sustainable economy. Mitigation of this harmful cycle then, for a rural agricultural town on the Eastern Rockies Plains, is a matter of "becoming your own utility."⁴

A great irony of this of course, is that "becoming your own utility", means breaking away from old habits and dependencies, and requires a great deal of help. Part of what makes Fowler such an anomaly amongst rural towns across America is that it is in Colorado, which has undoubtedly the most progressive state alternative energy policies and commitments in the nation. Colorado's renewable energy industry has been driven in part by incentives put in

place by the state by the referendum—amendment 37. The state mandated that its largest utilities companies (Black Hills and Xcel) put incentive programs in place to incentivize renewable energies.⁵ Luckily, Fowler finds itself as part of a network where help is offered through power-purchase agreements. The Governor's Energy Office and a host of renewable energy companies are helping Fowler make this industrial shift.⁶ Rural towns are especially appealing for utilities companies because they can receive a great deal of financial help through USDA subsidies, which makes mid-size projects achievable.⁷

"Typically utility company pays for renewable energy credits, either up front or over time. They use those renewable energy credits to prove to the State that they are meeting renewable energy standards (financial fiction). Value of energy (value of the electricity), and environmental value get assigned financial value. These utilities need to meet their renewable energy portfolio standards, which is 30 percent of all power supplied by 2020 has to come from renewable sources. There are some fairly large negative incentives for failure to meet these targets. They use these renewable energy credits to prove to the state that they are meeting renewable energy standards. New Mexico may be doing something similar."⁸

The current economic climate that Fowler (along with the rest of the country) finds itself in makes cheaper and local utilities seem like a far better alternative than the continued dependence on fossil fuels. Political and global pressures for greener industries aside, Fowler's shift toward renewable energy began when powering the municipal buildings became too expensive. Maintaining governance and vibrancy in the community became dependent on finding cheaper, renewable energy. Town Manager, Wayne Snider has been working in partnership with the Denver based Vibrant Solar, Inc, and its sister company Helios LLC, to shift the town toward renewable energies and in the process to sustain its public services, economy, environment, and community.

Mr. Snider, on a June 2010 tour of Fowler, highlighted the eight new solar panel sites that were to begin construction in coming weeks. All but one of the eight renovation sights were funded through power purchase agreements, while the last (Fowler's golf-course) received grants from the US Department of Agriculture. The town park just off Main Street, now retrofitted with solar powered streetlamps and waterless toilets, is bringing back some of the life to the community. Until the park was renovated with funds from Go Colorado, Mr. Snider



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joked, “Residents had no idea there were so many kids in Fowler.”

In some places, renewable agriculture may seem like an oxymoron. Fowler is home to one of the largest grain combines in the United States and has historic roots in corn, wheat, onions, cattle and sugar beets. But in a town like Fowler, whose last big economic boom was in the 1940’s with sugar beet production, improving the utilization of natural resources while maintaining the tradition of rural agriculture is of central importance. Interestingly enough, 2010 was one of the best for agricultural harvests in Colorado’s history. Retaining the history while utilizing new resources means not only implementing renewable solar and

in the town with one production line, which will possibly grow to 412 new jobs for the factory. Fowler needs not only cheaper utilities costs, but also innovative industries. Fowler watches 38 coal trains travel through the town every day. None of these trains stop in the town, the old train station being nothing more than a historic monument. Now Fowler will be part of a *new* energy industry.

Why is actual structural change occurring in this community? The infrastructural renovation in town seems to indicate that Fowler is pioneering a major industrial shift. What approach will help us sustain the vitality of these communities? Fowler’s answer is loud and clear; a rational, economic approach to renewable energy has won the hearts and



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wind structures and facilities but also increasing the town’s water supply and strengthening the people’s shared efforts around the new economy through public involvement and curricula changes in the local schools. This includes developing the human amenity capacity to facilitate the use of these resources.

Excitement and initiatives once again permeate the community. In the fall of 2010 Fowler started a new a sixth grade class focused around renewable energy as a unifying theme. Such renewable energy is helping power their community and increasingly often, homes. Along with cheaper utility bills, renewable energy industries in Fowler bring the prospect of new jobs. The company Helios LLC is looking to build solar manufacturing facilities in the old abandoned canning factory in Fowler, opening up as many as 160 jobs

minds of its citizens. The town’s advisory board now has 38 members, evidence to an active and involved community, mirroring the enthusiasm of ranchers and ‘nesters’ seen in the early homesteading years. The community increasingly wants a voice in what is going on. Robert Quist, a sales representative for Vibrant Solar, explains that encouraging the shift to renewable energies in rural communities isn’t accomplished through “tree-hugging” rhetoric. Rather, Vibrant has been able to sell the shift from a hardnosed financial perspective, which is, “do business with us and we will save you money. Don’t do business with us, keep doing what you are doing and you will spend more than if you want to play with us”.⁹ Wayne Snider, more than anyone, has gained support for the utilities shift by pushing the economic incentive to the community. The huge feedlots of Rocky Ford are

coming on board as well, planning to build a methane capturing system to produce electricity from the manure from the 35,000 head feedlot.

What lessons can we learn from this small town? For Fowler to “become its own utility,” it seemed to require two prongs—the recognition of economic necessity from community members, as well as environmental necessity from governing bodies. One powerful catalyst has been the economic need from a small rural community for cheaper utilities—emptying pockets could not afford to power the town—. Wayne Snider states, “We are trying not just to save money, but also create a new revenue stream.”¹⁰ However, also essential to this industrial shift is Colorado’s environmental policy. Colorado has one of the most progressive energy policies in the country with established bodies like the Governors Energy Office, as well as well as metropolitan and intellectual hubs like Boulder, Denver, and Fort Collins. Colorado has been active in working to incentivize these energy shifts. We might be tempted to ask, is the economic good alternative energy utilities that Fowler is embracing the same good that is at the heart of renewable energy? Are we missing a point that is fundamental to the rational behind the industry shift? Isn’t there something unjust about non-renewable energy supplies that we are ignoring, aside from their economic burden that seems to be lost in Fowler’s current political deliberation? While we may not have answers to these questions, we can certainly recognize how Fowler is an example of local interest, state government and growing industries, working to restore a rural community.

Wayne Snider hopes that Fowler can act as a template for other Eastern Plains towns trying to find new sources of income while, “maintaining their identities.” While Fowler is on a large upswing, a few miles down the road sits the town of Manzanola, a community apparently not as lucky as Fowler. Unlike Fowler, Mansanola has the appearance and feel of a dying community. Many of the older people and children alike are moving to Fowler. While Manzanola is disappearing, Fowler is benefiting from the new residents and the enthusiasm and skills they bring. The dying of some communities and movement to larger clusters benefiting the mid-size or select towns is a trend visible all across the Eastern Plains of the Rockies and Fowler is intent on being a part of the surviving “mid-town clusters.”

As Fowler continues pursuing wind turbines, algae bio-fuel, solar panel production and methane capture projects, many small communities continue to dwindle. What Fowler has done with the help of Wayne Snider’s enthusiasm is to involve both youth and the elderly in charting a future for the town. Through this involvement and education Fowler has taken a giant stride in securing its place on the

Eastern Plains of Colorado for generations to come.

¹ Wood, Richard E. *Survival of Rural America: Small Victories and Bitter Harvests* (Lawrence: University Press of Kansas) 2008.

² Manning, Richard. *Rewilding the West: Restoration in a Prairie Landscape*. (Berkeley: University of California Press) 2

³ Fowler, Co- Community Powered! History <http://www.fowlercolorado.com/history.html>



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⁴ Mark Jaffe. “Fowler diving headfirst into renewable energies.” *Denver Post*. April 18, 2010. Accessed June 2010.

⁵ Phone Interview with Robert Quist, July 1, 2010.

⁶ Mark Jaffe. “Fowler diving headfirst into renewable energies.” *Denver Post*. April 18, 2010. Accessed June 2010.

⁷ Phone interview with Robert Quist, July 1, 2010

⁸ Phone interview with Robert Quist, July 1, 2010.

⁹ Interview with Robert Quist, July 1, 2010.

¹⁰ Interview with Wayne Snider, June 30th, 2010