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DRIVERS OF CHANGE IN COLORADO GRASSLANDS

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- *Population, personal income, farm economics, agricultural policy, nonagricultural demand, and demographic trends drive the grassland conversion in Colorado*
- *Colorado was the 3rd fastest growing state (30.6%) in the US, growing by more than a million since 1990*
- *Colorado is the fifth wealthiest and second most educated state*
- *Colorado land in urban uses is increasing at a rate of 28,000 acres per year*

Colorado's grasslands extended across approximately 41.34 million acres prior to settlement, accounting for approximately 21% of all shortgrass prairie in the US. Most of the Colorado's remaining Central Plains' grasslands, including substantial acreage of short- and mixed-grass prairie, are in non-federal ownerships in the eastern half of the state. As of 1997, approximately 25.79 million acres of Colorado's nonfederal lands were in native rangeland or introduced pasture grasses (grazinglands). These non-federal rangelands represent

about 37% of the state's total land base, and approximately 61% of all non-federal rural land in the state.

The conversion of Colorado's grasslands has been driven by a number of social and economic factors. In this fact sheet we examine the likely influence of human population, personal income, the economics of farming and ranching, agricultural policy, non-agricultural demand, demographic and technological trends that drive or contribute to the pressure to convert Colorado grasslands to higher intensity uses.

Human population

Pressure from growth in human population and the resulting demand for housing, businesses, roads, schools, utilities, etc. is an ever-increasing threat to traditional use of grasslands. During the past decade, 9 of the 12 fastest growing states in the US were in the West with growth rates of more than 20% (Table 1). Overall, the 22 states west of the Mississippi River gained more than 16.5 million people between 1990 and 2000; a 17.3% increase. This overall growth was achieved in spite of the fact that 9 Great Plains states grew by less than 10% including North Dakota, which grew by less than 1%.

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Table 1. Resident population in 1990 and 2000, numerical and percent change in resident population 1990 to 2000 of the 22 states west of the Mississippi River ranked by percent change.

US Rank	State	Population		Changes in Population	
		1990	2000	Number	Percent
1	Nevada	1,201,833	1,998,257	796,424	66.27
2	Arizona	3,665,228	5,130,632	1,465,404	39.98
3	Colorado	3,294,394	4,301,261	1,006,867	30.56
4	Utah	1,722,850	2,233,169	510,319	29.62
5	Idaho	1,006,749	1,293,953	287,204	28.53
8	Texas	16,986,510	20,851,820	3,865,310	22.76
10	Washington	4,866,692	5,894,121	1,027,429	21.11
11	Oregon	2,842,321	3,421,399	579,078	20.37
12	New Mexico	1,515,069	1,819,046	303,977	20.06
18	California	29,760,021	33,871,648	4,111,627	13.82
19	Arkansas	2,350,725	2,673,400	322,675	13.73
20	Montana	799,065	902,195	103,130	12.91
21	Minnesota	4,375,099	4,919,479	544,380	12.44
26	Oklahoma	3,145,585	3,450,654	305,069	9.7
30	Missouri	5,117,073	5,595,211	478,138	9.34
32	Wyoming	453,588	493,782	40,194	8.86
35	Kansas	2,477,574	2,688,418	210,844	8.51
36	South Dakota	696,004	754,844	58,840	8.45
37	Nebraska	1,578,385	1,711,263	132,878	8.42
40	Louisiana	4,219,973	4,468,976	249,003	5.9
43	Iowa	2,776,755	2,926,324	149,569	5.39
50	North Dakota	638,800	642,200	3,400	0.53

Source: US Department of Commerce Bureau of the Census, Census 2000.

Population growth is a principal correlate with pastureland and grassland loss in Colorado. Reaching 4.3 million residents in the most recent census, Colorado was the third fastest growing state (30.6%) in the US and one of eight states growing by more than 1 million residents since 1990 (Table 1). Population growth is driven by three factors in Colorado: 1) a highly educated workforce has resulted in growth in the communications, manufacturing, business services, air transportation, and regional services fields; 2) the rise of second homes in resort communities; and 3) the arrival of greater numbers of retirees.

Population and growth in Colorado is not evenly distributed across the state. Eleven of Colorado's 63 counties had populations greater than 100,000 residents in 1998. These eleven Front Range counties experienced an average growth rate of 28.7% from 1990-98. The remaining 52 counties in Colorado had populations of fewer than 45,000 people and their average annual growth rate for the period was 21.8%.

In Colorado there are 16 rural counties (population <5,000) and they had an average growth rate of 14.8% (Census, 2000).

Personal income

One factor that can be an important contributor to population growth pressure is economic opportunity. One measure of relative economic well-being is per capita personal income. In 1999 per capita personal income in the US averaged \$28,542 and has been increasing at about 5% per year since 1995 (USDC 2000). Only 5 of the 22 states west of the Mississippi River had per capita incomes higher than the US average in 1999, but 12 of the states had average growth rates of 5% or greater during the 1995 –1999 period (Table 2).

The economic prosperity enjoyed by most sectors of the US economy allows people to consider the purchase of second homes and vacation homes in desirable rural areas. These people enter the market for

Table 2. Per capita personal income, for states west of the Mississippi River, 1995–99

State	-----Dollars-----					----- % Change -----			
	1995	1996	1997	1998	1999	95-96	96-97	97-98	98-99
Colorado	24,865	26,231	27,950	29,860	31,546	5.5	6.6	6.8	5.6
Nevada	25,808	27,142	28,201	29,806	31,022	5.2	3.9	5.7	4.1
Minnesota	24,583	26,267	27,548	29,503	30,793	6.9	4.9	7.1	4.4
Washington	23,878	25,287	26,817	28,632	30,392	5.9	6.1	6.8	6.1
California	24,496	25,563	26,759	28,280	29,910	4.4	4.7	5.7	5.8
Nebraska	22,196	24,045	24,590	25,861	27,049	8.3	2.3	5.2	4.6
Oregon	22,668	23,649	24,845	25,958	27,023	4.3	5.1	4.5	4.1
Texas	21,526	22,557	24,242	25,803	26,858	4.8	7.5	6.4	4.1
Kansas	21,899	23,121	24,355	25,687	26,824	5.6	5.3	5.5	4.4
Wyoming	21,514	22,098	23,820	24,927	26,396	2.7	7.8	4.6	5.9
Missouri	22,094	23,099	24,252	25,403	26,376	4.5	5.0	4.7	3.8
Iowa	21,181	22,713	23,798	24,844	25,617	7.2	4.8	4.4	3.1
Arizona	20,634	21,611	22,781	24,133	25,189	4.7	5.4	5.9	4.4
South Dakota	19,848	21,736	22,275	23,797	25,045	9.5	2.5	6.8	5.2
North Dakota	19,084	21,166	20,798	22,767	23,313	11.0	-1.7	9.5	2.4
Utah	18,858	19,955	21,156	22,294	23,288	5.8	6.0	5.4	4.5
Oklahoma	19,394	20,151	21,106	22,199	22,953	3.9	4.7	5.2	3.4
Louisiana	19,541	20,254	21,209	22,352	22,847	3.6	4.7	5.4	2.2
Idaho	19,630	20,353	20,830	21,923	22,835	3.7	2.3	5.2	4.2
Arkansas	18,546	19,442	20,229	21,260	22,244	4.8	4.0	5.1	4.6
Montana	18,764	19,383	20,167	21,324	22,019	3.3	4.0	5.7	3.3
New Mexico	18,852	19,478	20,233	21,178	21,853	3.3	3.9	4.7	3.2

Source: USDC – Bureau of Economic Analysis

The economic prosperity enjoyed by most sectors of the US economy allows people to consider the purchase of second homes and vacation homes in desirable rural areas. These people enter the market for farm and ranch land because of the lifestyle it provides, not for the potential profits from ranching. As a result, land prices are bid higher than returns to ranching would imply, creating a sell out opportunity for ranchers and a more difficult situation in which to continue to ranch. In addition, prosperity is driving an increase in the average size of houses and of lots. Not only are high amenity areas under population growth pressure, but the land and resource demands of each individual are also increasing.

Colorado is the fifth wealthiest and second most educated state in the US. More than 1 in 3 Coloradoans holds a university degree and the state's average wage in 1999 was \$31,546. However, the distribution of Colorado's wealth and education is highly unequal. For example, Pitkin County (where Aspen is located)

is traditionally among the very wealthiest counties in the US (\$59,000 average personal income, 1998). The San Luis Valley region of the state has maintained an average income of roughly ¼ that of Pitkin County for at least a half century (13,000-20,000 average personal income, 1998). Front Range incomes are higher on average than the rest of the state, comprising about 82% of total state income and about 75% of total population.

The number and proportion of Coloradoans employed in agriculture is slowly declining. In the agriculturally dependent and grassland dominated Eastern Plains, incomes are lower on average (approximately \$22,000 average personal income, 1998) than the rest of the state. Average incomes in the agricultural sector are second lowest (to retail) in the state. The interface between the urban Front Range and the rural Eastern Plains increasingly creates scenarios where the "best and highest use" of pasturelands and grazinglands is in x-urban residential development. In some, formerly

rural, markets, average housing prices have outstripped increases in average personal income by as much as 150% in recent years, indicating that urbanites are purchasing land and building homes in formerly rural areas.

Economics of ranching vs. cropping

Wheat farming is probably the closest competitor with livestock for land resources in the west because of the marginal quality land that typically passes between the two enterprises. Though cyclical in nature, cowcalf enterprise returns-less-cash-expenses were below wheat returns-less-cash-expenses in 8 out of the 14 years from 1982 to 1995 (Figure 1), not accounting for government commodity payments that may have been received (ERS/USDA). When overhead costs were accounted for, returns to management and risk for cowcalf operators were considerably below the same returns for wheat producers. Hired labor, the opportunity cost of unpaid labor, capital recovery cost of machinery and equipment, taxes and insurance were all higher costs for cow-calf producers compared to wheat

producers. Conversely, the opportunity cost of land was higher for wheat producers.

Government policy

In general, the policy of the federal government has been to support production agriculture in the US, through either protection from competition or subsidization of production. The protection policies have generally involved the use of tariffs, import taxes and quotas to shield US agricultural production from foreign competition. Subsidization takes many forms including: product price and producer income support, disaster (drought / flood) relief grants and/or low interest loans, and subsidized input costs like crop insurance, utilities, transportation and soil and water conservation practices. In many cases, a result (albeit unintended) of these agricultural support policies is to provide incentives for landowners to convert grasslands to crop production and/or to thwart, or delay, the re-conversion of croplands back to grass. These perverse incentives are created whenever policies or programs are the cause of a piece of land being more profitable to the landowner if used as cropland in lieu of grazing land.

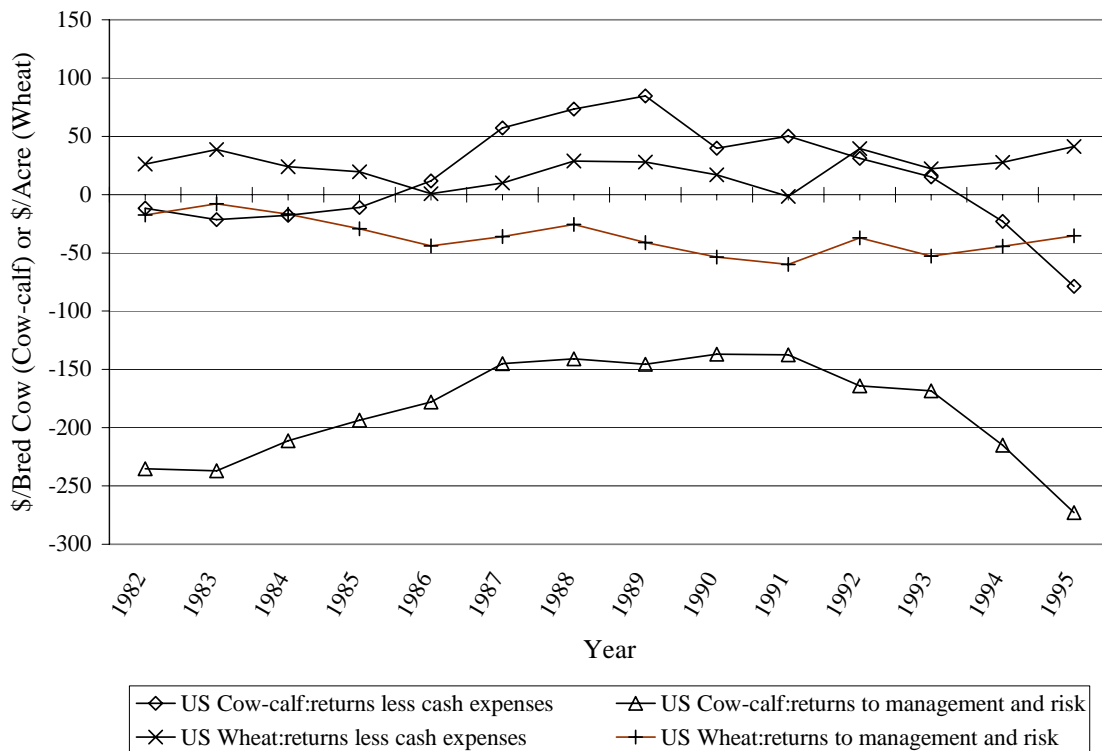


Figure 1. Returns to management and risk and returns less cash expenses for cow-calf (\$/bred cow) and wheat (\$/acre) enterprises without including direct government commodity payments, United States.

In addition to qualifying for Loan Deficiency Payments, cropland is eligible for subsidized crop insurance and/or disaster payments that are significantly more effective in reducing negative financial impacts due to crop production losses compared to livestock production losses. Thus, due to the government support programs, keeping, or converting, land in crops can be both more profitable and less risky than producing livestock on grassland.

Non-agricultural demand for land

Per acre sale prices of agricultural lands in the western US increased by 66% between 1990 and 2000 (Table 3, USDA-NASS), indicating a significant increase in the demand for land. Sale prices for pasture and cropland for 1997 and 2000 for the states west of the Mississippi River are shown in Table 3. For this period, prices for both pasture and cropland increased by approximately 10%. However, for the same period

cropland rental rates increased only 7% and pastureland rental rates increased by less than 5%. Since rental rates are considered the more accurate indicator of “value in use,” these data indicate that forces outside production agriculture are fueling the increased demand for agricultural land, especially pastureland.

Colorado agricultural lands are being converted to urban uses, 35-acre ranchettes, other low-density uses and public open lands purchases. Precise estimates of land converted to low-density x-urban development are not readily available. However, the increase in the number of farm and ranch operations and the decrease in the average size of these operations provide evidence of this conversion of working agricultural operations to “lifestyle” farms. The amount of Colorado land in urban uses is increasing at a rate of 28,000 acres per year (Obermann et al., 2000).

Table 3. Average cropland and pastureland sale prices and percent change in sale prices, 1997 and 2000, for states west of the Mississippi River.

State	Cropland Price 1997 (\$/acre)	Cropland Price 2000 (\$/acre)	% Change in Cropland Price 1997 – 2000	Pastureland Price 1997 (\$/acre)	Pastureland Price 2000 (\$/acre)	% Change in Pastureland Price 1997 – 2000
AZ	3,700	4,300	16.22	300	360	20.00
AR	968	1,080	11.57	890	1,000	12.36
CA	5,080	5,960	17.32	1,100	1,000	(9.09)
CO	772	852	10.36	320	345	7.81
ID	900	1,170	30.00	640	850	32.81
IA	1,700	1,890	11.18	615	650	5.69
KS	649	666	2.62	365	375	2.74
LA	1,080	1,110	2.78	1,210	1,150	(4.96)
MN	1,090	1,270	16.51	360	410	13.89
MO	1,040	1,250	20.19	660	790	19.70
MT	458	458	0.00	190	205	7.89
NE	1,020	1,110	8.82	200	230	15.00
NV	1,700	1,900	11.76	220	270	22.73
NM	1,330	1,370	3.01	150	150	0.00
ND	427	425	(0.47)	141	155	9.93
OK	553	548	(0.90)	361	415	14.96
OR	928	1,020	9.91	400	405	1.25
SD	456	510	11.84	155	190	22.58
TX	674	770	14.24	510	570	11.76
UT	2,300	2,740	19.13	395	420	6.33
WA	1,340	1,340	0	550	490	(10.91)
WY	744	815	9.54	150	160	6.67
Average	1,314.05	1,479.73	10.26	449.18	481.36	9.51
Average % change in annual rental rates 1997-2000			7.03			4.90

Source: USDA- NASS

In part due to the state's current affluence, Coloradans have invested hundreds of millions of dollars toward land preservation over the past decade. Coloradans created the statewide Great Outdoors Colorado Land Trust (GOCO) and the residents of more than 25 counties and municipalities have taxed themselves to preserve public attributes of undeveloped or agricultural lands, often in partnership with land trusts. Through the donation or purchase of conservation easements or outright purchase, approximately 660,000 acres of Colorado private lands have been permanently preserved from residential or commercial development in cooperation with some 37 local, state, regional and national land trusts (CCLT in State of Colorado, 2000).

Some of these trust lands were historically and will remain in some type of agriculture. Others were not suitable for agriculture or may be converted from agriculture to some low intensity use, including grassland (e.g., parks, wildlife refuges, open space buffers). In addition, more stringent growth management and planning at the state level appears likely in the near future and a prairie dog protection easement program is anticipated.

Demographics and Telecommunications

Currently, there are more Americans and Colorado residents in their late 30s and early 40s than any other age. These people are expected to remain the modal age category as they move into their 50s, 60s and 70s. They will live longer, retire younger, be wealthier and be more active than previous generations. This group of people is likely to increase the demand for second homes and ranchettes in high amenity rural areas.

Recent innovations in telecommunications have effectively separated job location from the decision of where to live. As a result, people can increasingly have their cake and eat it too; have a high paying city job, but live in an aesthetically desirable, high amenity rural area. Internet broadband, video conferencing, e-commerce, and cellular technology are facilitating a new type of rural resident, not unlike rural electrification did in the early to mid 20th century.

Summary

In this fact sheet we discussed some of the forces of grassland conversion in Colorado. The likely influence of human population, personal income, the economics of farming and ranching, agricultural policy, nonagricultural demand, demographic and technological trends on the pressure to convert Colorado

grasslands to higher intensity uses are examined. We find that Colorado is particularly affected by these forces of change due to their strength relative to much of the rest of the country and the relatively important role private lands play in the stewardship of Colorado's grassland resources. Supplemental and complementary information to that which is described here can be found in the following companion documents by the same authors: *United States Grasslands and Related Resources: An economic and biological trends assessment* at <http://www.landinfo.tamu.edu>; and *Colorado Grassland Trends* at <http://dare.agsci.colostate.edu/extension/pubs.html>.

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