



Colorado's Emissions Profile

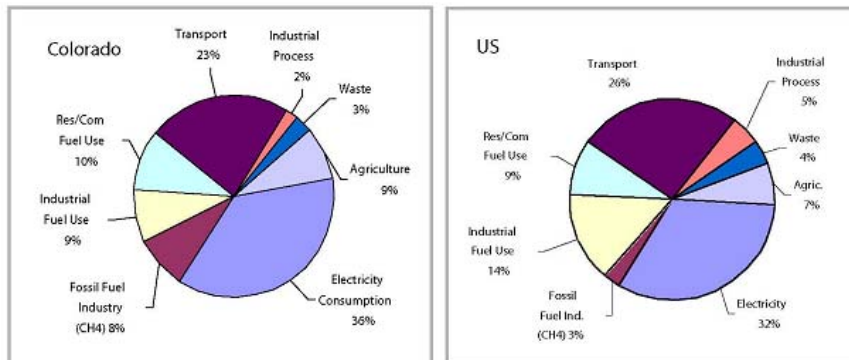


Chart 1. Greenhouse gas emissions produced in Colorado and the United States by sector, 2000

Reduce Greenhouse Gas Emissions

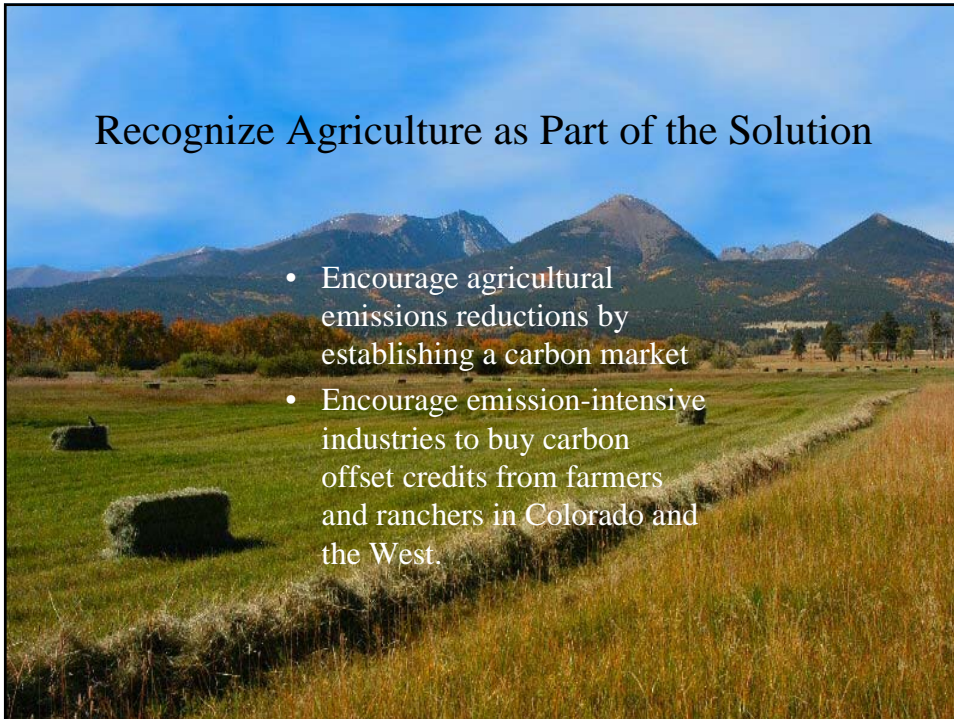


Two GHG Reduction Goals:

- 20% below 2005 levels by 2020
- 80% below 2005 levels by 2050

Recognize Agriculture as Part of the Solution

- Encourage agricultural emissions reductions by establishing a carbon market
- Encourage emission-intensive industries to buy carbon offset credits from farmers and ranchers in Colorado and the West.



Agricultural Offset Market

Changing farm practices to reduce greenhouse gas emissions:

- **Less frequent tilling limits the release into the atmosphere of carbon and carbon compounds stored in the soil, creating less CO₂.**
- **Converting tilled cropland to a permanent vegetative cover provides long-term storage of carbon in the soil. The U.S. Department of Agriculture Conservation Reserve Program actively works with farmers on this practice.**
- **Proper fertilization, irrigation, and rotational grazing can increase plant productivity on pasture lands, resulting in more absorption of carbon.**



Agricultural Offset Market

Changing farm practices to reduce greenhouse gas emissions:

- **Adjusting the amount and timing of fertilizer application can reduce emissions of nitrous oxide, a fertilizer byproduct.**

Agricultural Offset Market

Changing farm practices to reduce greenhouse gas emissions:

- **Improving the storage and management of livestock manure reduces methane emissions.**
- **Capturing and using livestock-produced methane as a biogas energy source offsets the use of fossil fuels.**



Agricultural Offset Market

1. Farmers and ranchers interested in participating would use information provided by institutions such as Colorado State University to learn about the carbon reduction options that fit their property and develop a carbon sequestration or emissions reduction plan.
2. Concurrent research would refine the methods used to measure actual reductions in greenhouse gas emissions from changed farm management practices.
3. State government would promote a market to bring together carbon offset buyers and sellers. The state will also work with public and private institutions to establish a regional carbon credit bank.
4. With measurable greenhouse gas reductions in hand, farmers and ranchers could offer carbon credits for sale on this offset market.





Establishing Partnerships

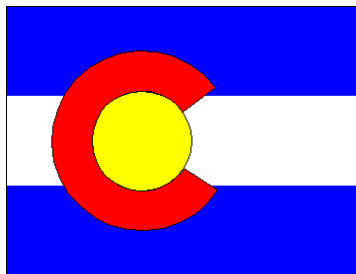
HB 1203:

Provides funding for Colorado State University to conduct county-level appraisals of carbon stocks and assess carbon sequestration and GHG mitigation potential



Colorado Climate Action Plan

Please view full report on-line:
<http://www.colorado.gov/governor>



COLORADO

Options for Conservation Reserve Program (CRP) Land

Impacts on Carbon Sequestration

Tom Lauridson



CRP Grazed in 2002

16.02.2008



CRP Options: No current USDA programs

- High “EBI” (*Environmental Benefits Index*):
 - Probably stay in CRP
- Low “EBI” Probably not renewed by USDA
 - Effect of high crop prices?
 - Likely to be farmed
 - No transition plan for this land

Loss of Soil Carbon due to tillage



No till *NOT* required

Farmland is out of FSA programs



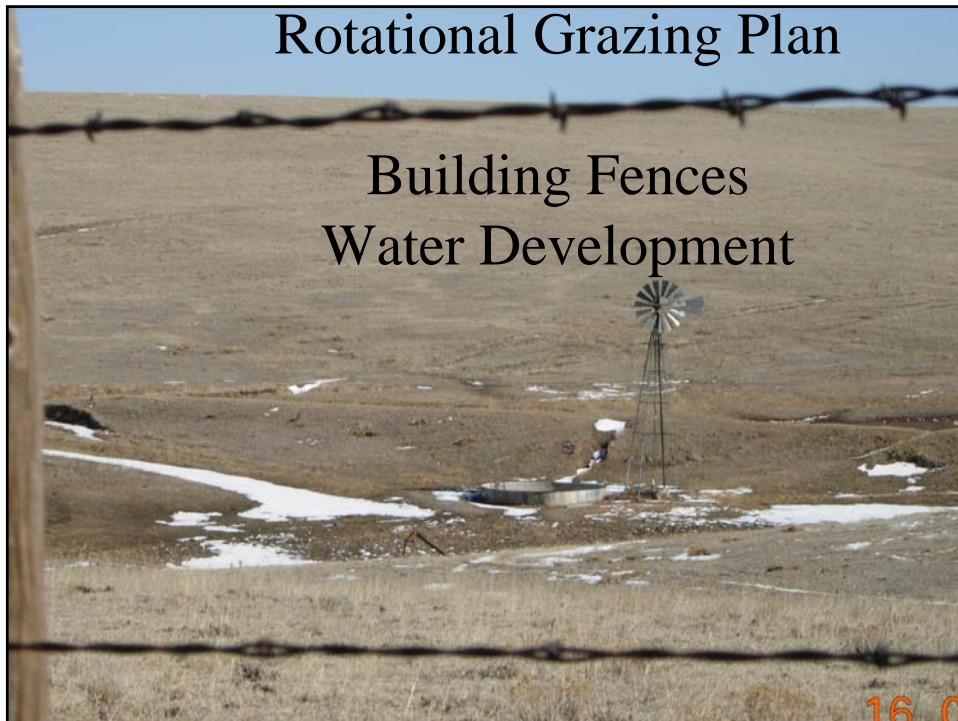
CRP Options

- Medium and Low “EBI”:
 - Effect of high crop prices?
 - May or may not be renewed by USDA
 - Producer may withdraw from CRP
 - No transition plans exist

Could “Carbon Credit” funds from private emitters pay for transition to rangeland?

Rotational Grazing Plan

Building Fences
Water Development



16 0



Summary

- Some CRP will be pushed “out of program”
- Some CRP will be withdrawn “out of program” by producers
- Therefore, some CRP will be farmed ...

Summary

- Could some CRP become well managed rangeland?
 - *Probably the best choice to keep Soil Carbon in Soil*
- Could Carbon Sequestration dollars keep Carbon in converted CRP land?
 - Rotational grazing plan
 - Fences and water

No-till farming is considered a kind of conservation tillage system and is sometimes called *zero tillage*. It is a way of growing crops from year to year without disturbing the soil through tillage. Once called chemical farming, the reference was subdued in order to promote the idea of no-till being more natural. It is becoming more common as researchers study its effects and farmers uncover its economic benefits.

From Wikipedia

Note: No-till as defined does not preclude a fallow period in the cropping rotation.

- Reasons we started no-till

- Reduce equipment outlay

- At a point that we were needing to replace equipment
 - Specialized equipment used little; poor return
 - Increase economic efficiency on remaining machinery

- Increase efficiency of labor

- High tech labor pool problems

- Increase land efficiency through more intensive usage (started 2 crops in 3 - 3 crops in 4)

- Reasons we started continuous no-till

- Fallow was a “black hole” in our cash flow

- Inefficient use of available moisture

- Fallow did not guarantee moisture availability for fall planting.

- Suspicious of moisture storage

- Sunflower was most profitable crop at the start

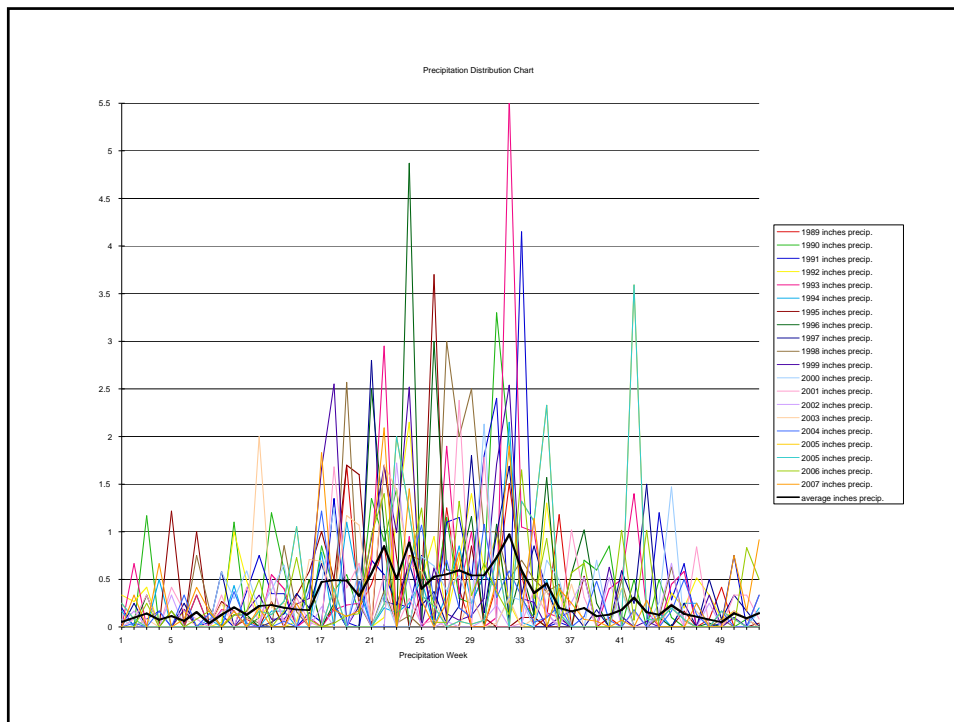
- Low sunflower residue - loss of shading and other moisture reducing effects

- Mellow ground - low residue - erosion potential

- Started cash leasing rented ground

- Landlord not supportive of intensive cropping

- Needed every acre to count every year



Carbon Sequestration - essentially building the soil

Soil's organic carbon (humus) levels in many agricultural areas have been severely depleted. Organic material in the form of humus accumulates below about 25 degrees Celsius (77 degree Fahrenheit) Above this temperature, humus is oxidized (burns) much more rapidly.

Traditional tillage (fallow) reduces standing residue, exposes soil for heating and incorporates oxygen into the soil to increase humus oxidation (stoke the fire).

No-till strives to keep the fire smothered and continuous cropping extends the advantages by maintaining a profitable, green, leafy cover crop during periods of higher temperature.

-Rotate crops - cool season grass/warm season grass/broadleaf

- Typical rotation: wheat (hard red winter/hard white winter), corn, sunflower (generally oil), millet (white prozo)

- Keep weeds and bugs off balance

-Rotate chemical action

- Best weed control is a growing crop

-Intensive cropping

- Sanitation critical

- Compaction Critical

- Residue Critical

Current Program Details

- .2 ton/ac dryland no-till, .6 ton/ac irrigated no-till and 1 ton/ac CRP type seeded acres
- Aggregator keeps 10% for expenses
- CCX (Chicago Climate Exchange) keeps 20% in a carbon bank to be sold later.
- 2006 pool paid \$3.79/ton, November 2007 \$2.70/ton, current (02/18/08) \$4.40/ton
- $.2 \times .90 \times \$4.00 = \$0.72/\text{acre}$



www.chicagoclimateexchange.com

Questions?