

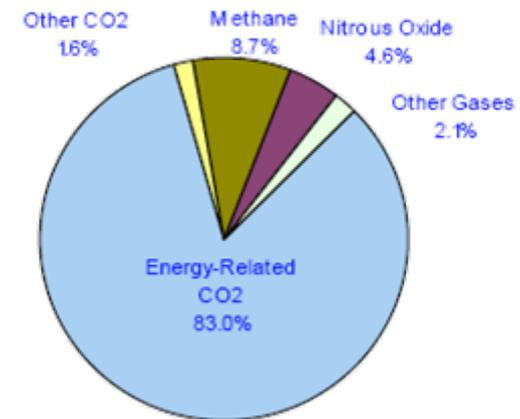
# Reducing Greenhouse Gases through Agriculture & Forestry

January 2008

# Greenhouse Gases

- Carbon Dioxide (CO<sub>2</sub>)
- Methane (CH<sub>4</sub>)
- Nitrous Oxide (N<sub>2</sub>O)
- Sulfur Hexafluoride (SF<sub>6</sub>)
- Perfluorocarbons (PFCs)
- Hydrofluorocarbons (HFCs)

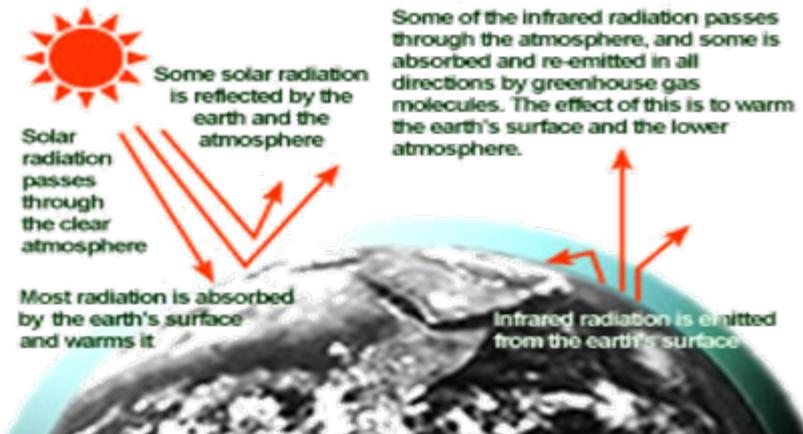
Predominant Sources of 2003 U.S. Greenhouse Gas Emissions



Source: EIA, Emissions of GHG gases in the United States 2003

- 6.9 billion metric tons CO<sub>2</sub>e total
- 545 million metric tons from CH<sub>4</sub>
- ~40 million metric tons from manure management alone

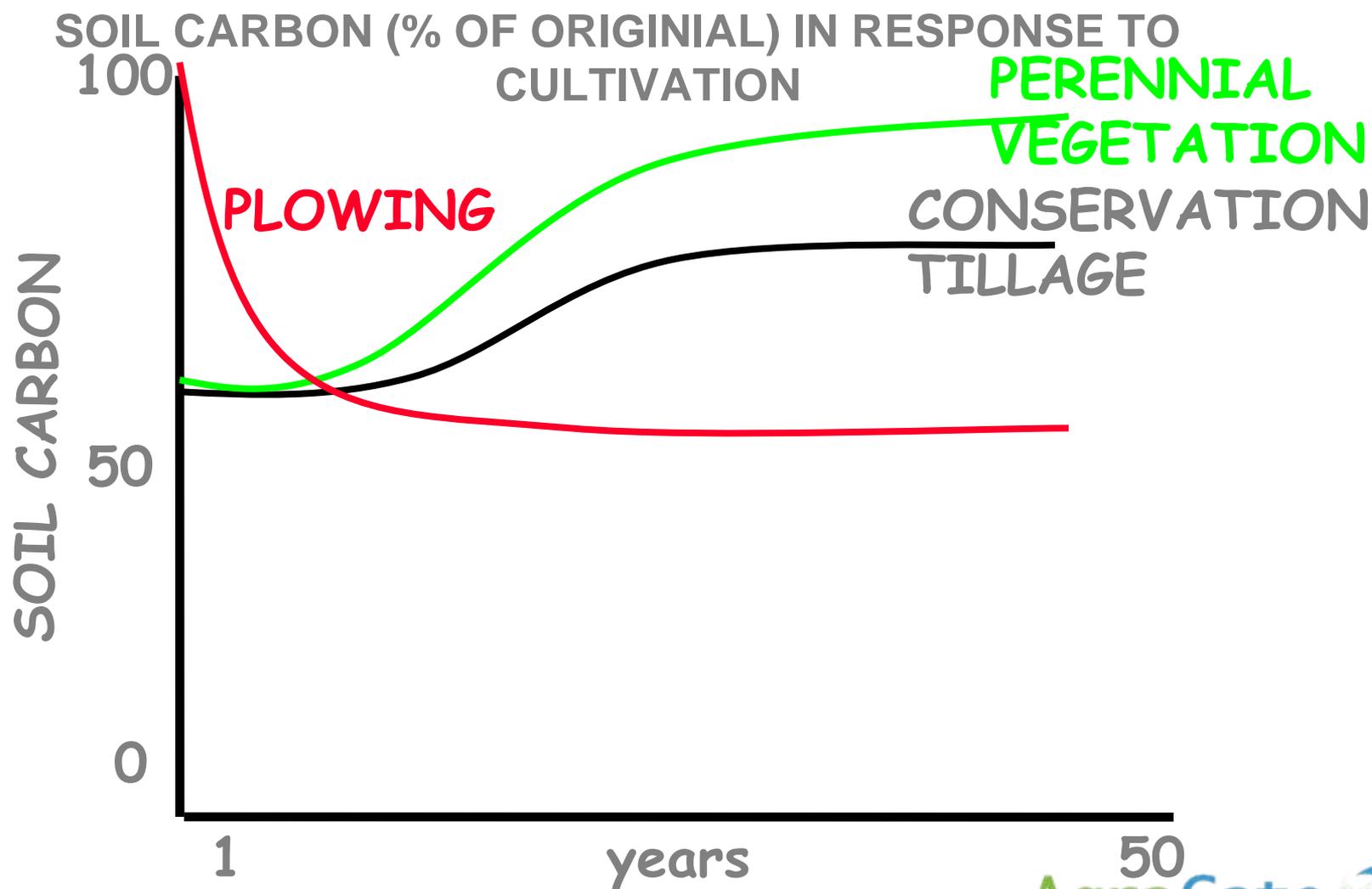
## The Greenhouse Effect



# Carbon Sequestration

Carbon sequestration can be defined as the capture and secure storage of carbon that would otherwise be emitted to or remain in the atmosphere.

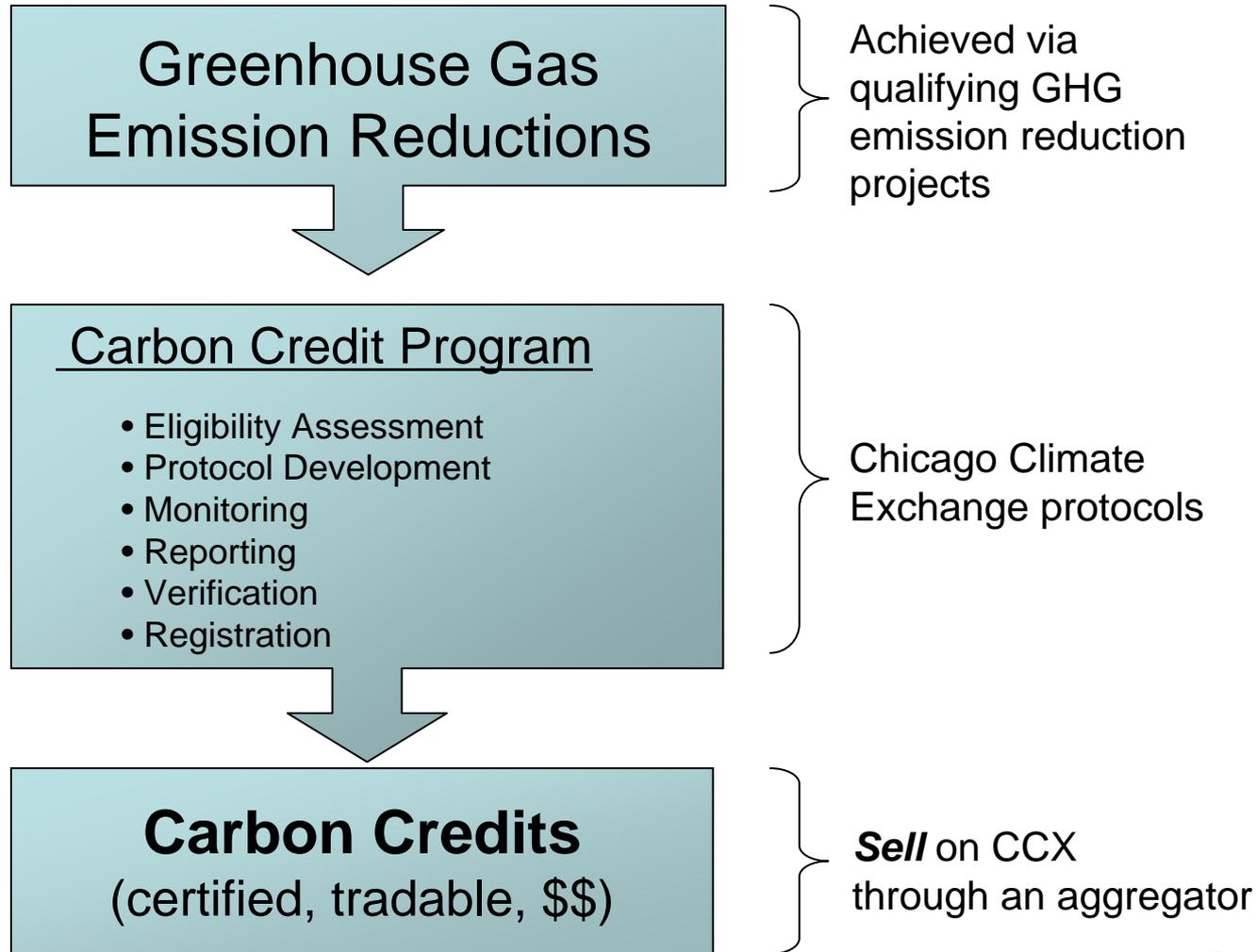
# Soil Carbon Dynamics in Response to Tillage



# What are carbon credits?

- **Carbon credits encompass two ideas:**
  - (1) Prevention/reduction of carbon emissions produced by human activities from reaching the atmosphere by capturing and diverting them to secure storage.
  - (2) Removal of carbon from the atmosphere by various means and securely storing it.

# Carbon Credit Program

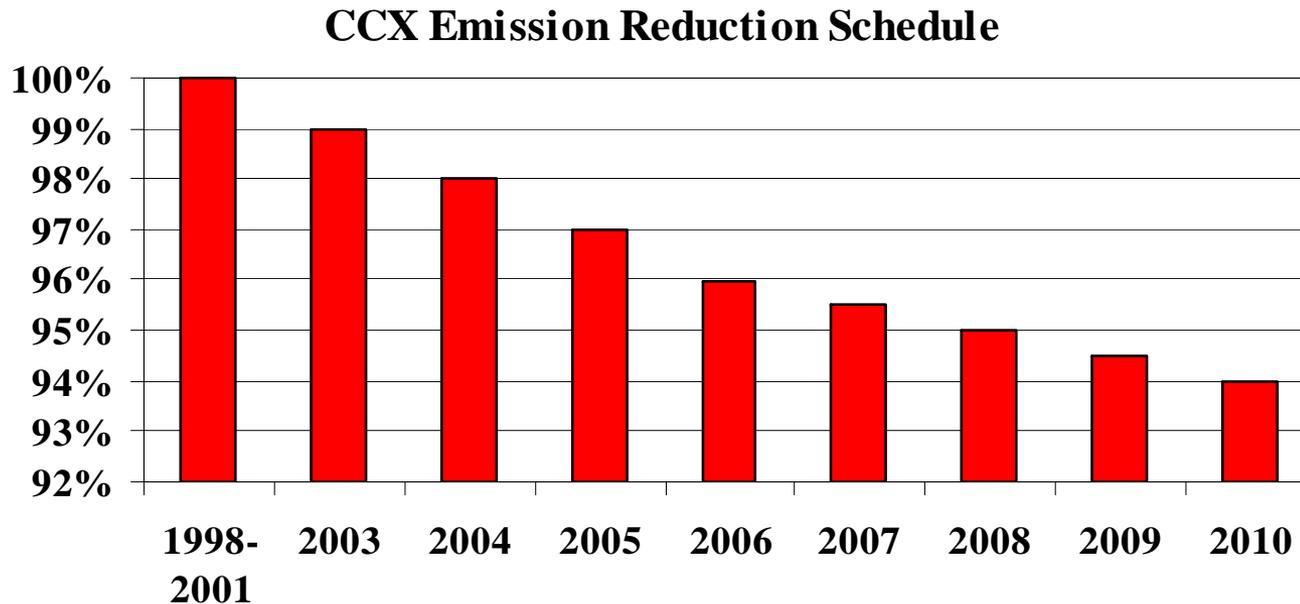


# The Chicago Climate Exchange®

- The Chicago Climate Exchange® (CCX®) is a greenhouse gas (GHG) emission reduction and trading pilot program for emission sources and offset projects in the United States and for offset projects undertaken in Brazil and other countries. CCX® is a self-regulatory, rules-based exchange designed and governed by CCX® Members.
- These members made a voluntary, legally binding commitment to reduce their emissions of greenhouse gases by four percent below the average of their 1998-2001 baseline by 2006 and a six percent reduction by 2010.

# CCX Reduction Timetable

- 2003-2006: Reduce emissions to 1%, 2%, 3%, 4% below 1998-2001 baseline
- 2006 – 2010: Reduce emissions to 6% below 98-01 baseline



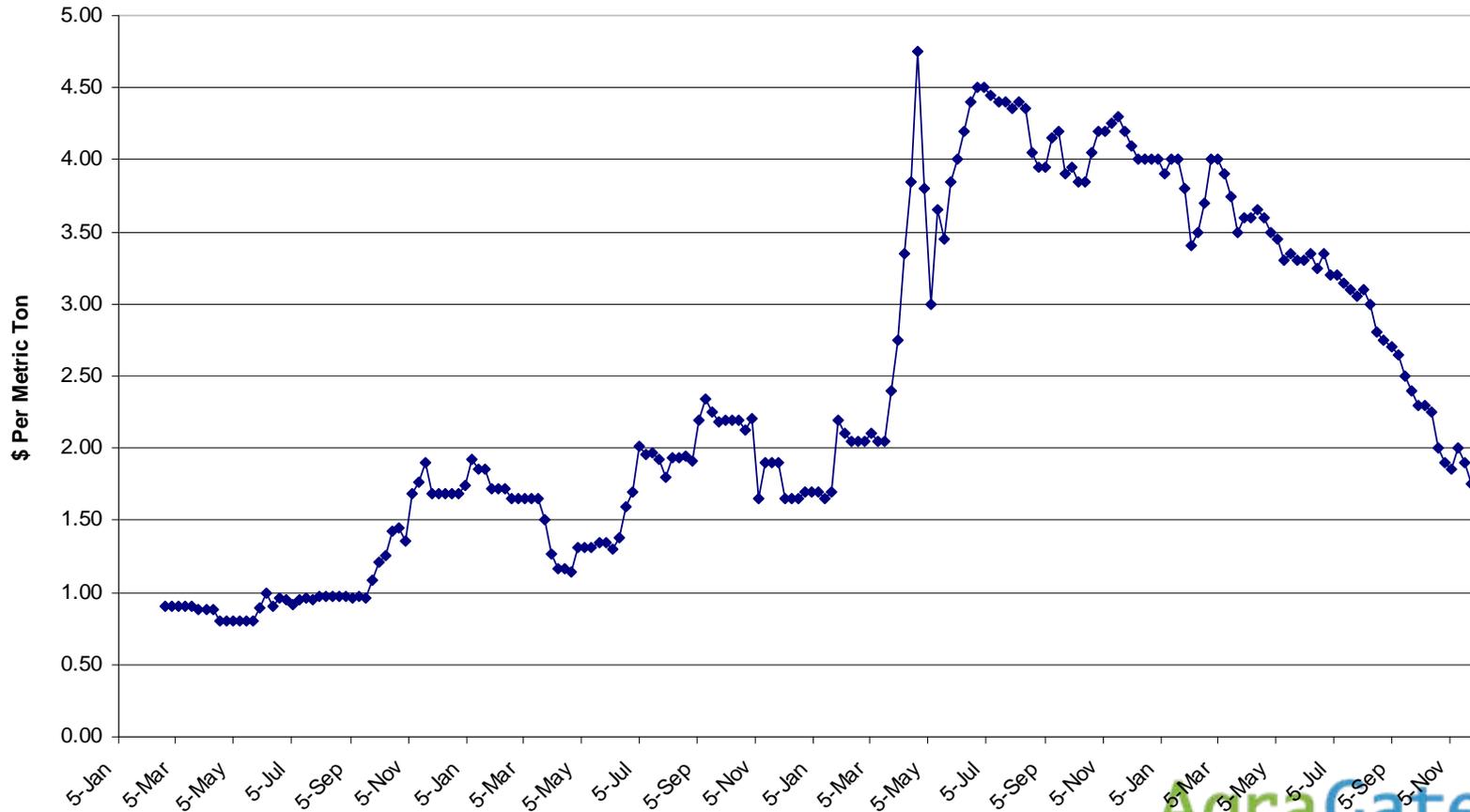
# Meeting CCX Reductions

- Allowances (x% less than baseline)
- Own reductions
- Industry credits from excess reductions
- Offsets (no more than 50% of reduction requirement)

- Soil Offsets
  - No-till
  - New Grass
  - Rangeland
- Forestry
  - New Plantings
  - Enhanced Working Forest
- Ag Methane
- Industrial Fuel Switching
- Biofuels
- Landfill Methane

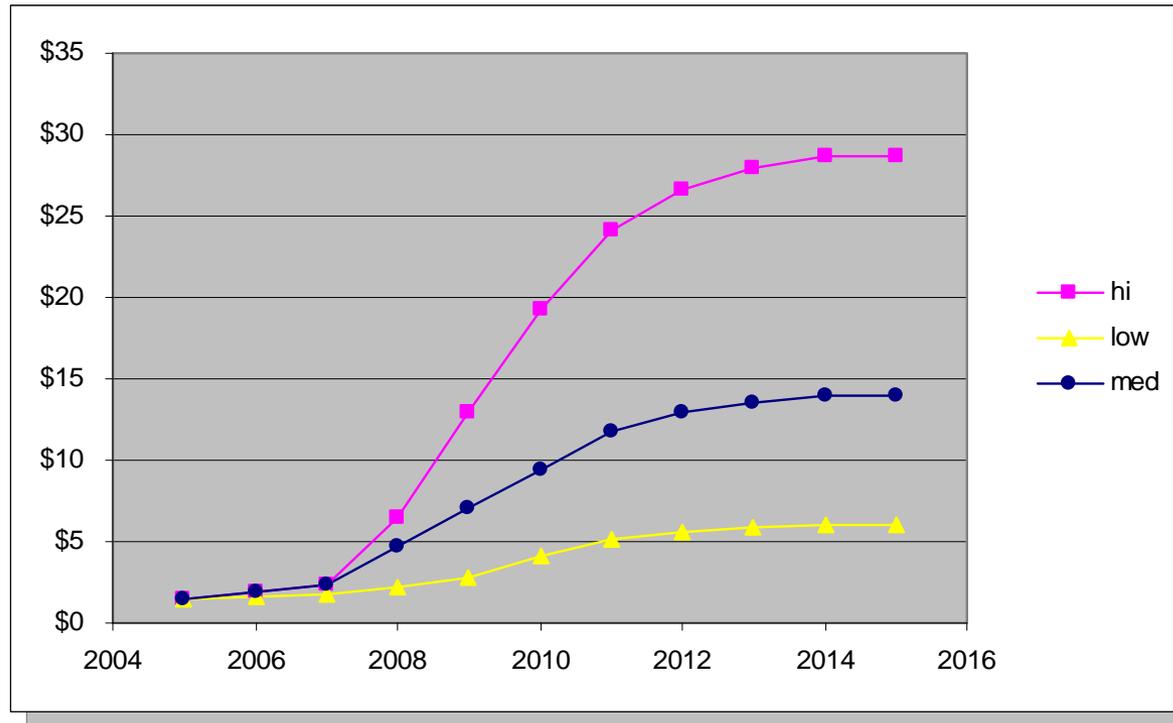
# Carbon Offset Prices, 2004-2007

2006 Vintage  
Carbon Offset Prices



# Price forecasts for US carbon credits

Figure 1. Projected price curves for US carbon credits (\$US per metric ton).

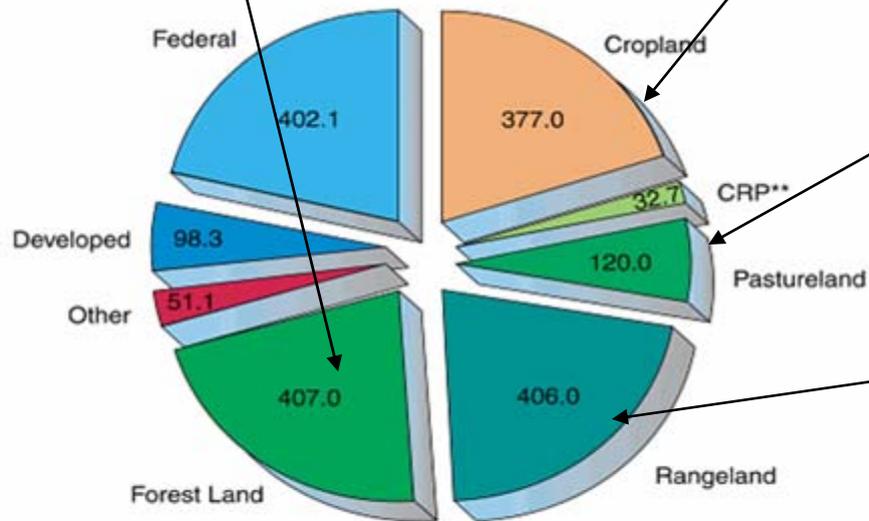


Sources: Carbon Finance, August 2004; EIA/DOE 2004. Analysis of S. 1844, the Clear Skies Act of 2003; S. 843, the Clean Air Planning Act of 2003; and S. 366, the Clean Power Act of 2003. Energy Information Administration, USDOE, SR/OIAF/2004-05, May 2004; EIA/DOE 2005. Impacts of Modeled Recommendations of the National Commission on Energy Policy. Energy Information Administration, USDOE, SR/OIAF/2005-02, April 2005; AEP 2004. An assessment of AEP's actions to mitigate the economic impacts of emissions policies. American Electric Power, August 31 2004

# HOW OUR LAND IS USED



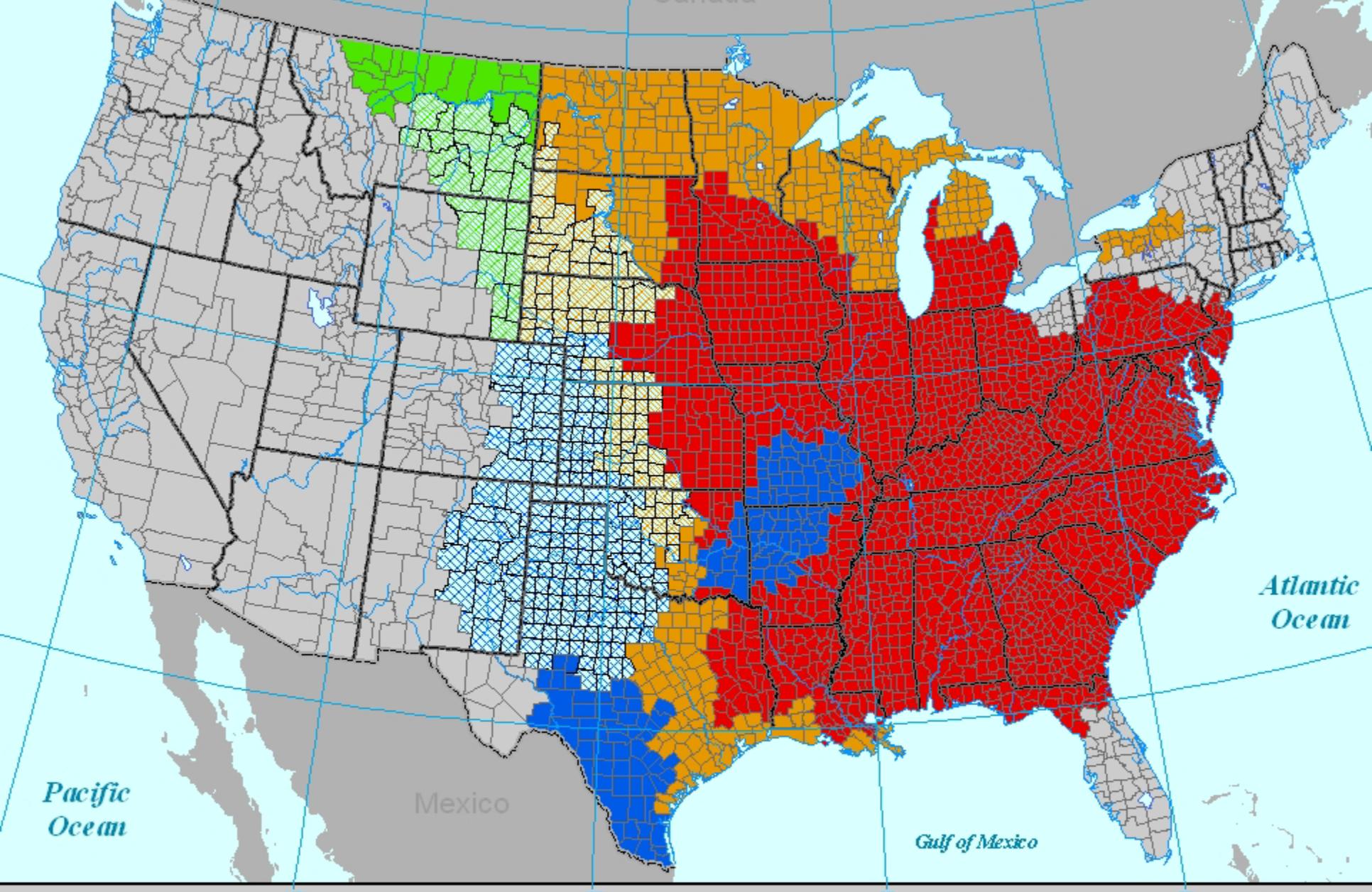
Millions of Acres\*



\*Non-Federal Land 1,492 million acres, including conterminous United States, Hawaii, Puerto Rico, and U.S. Virgin Islands.

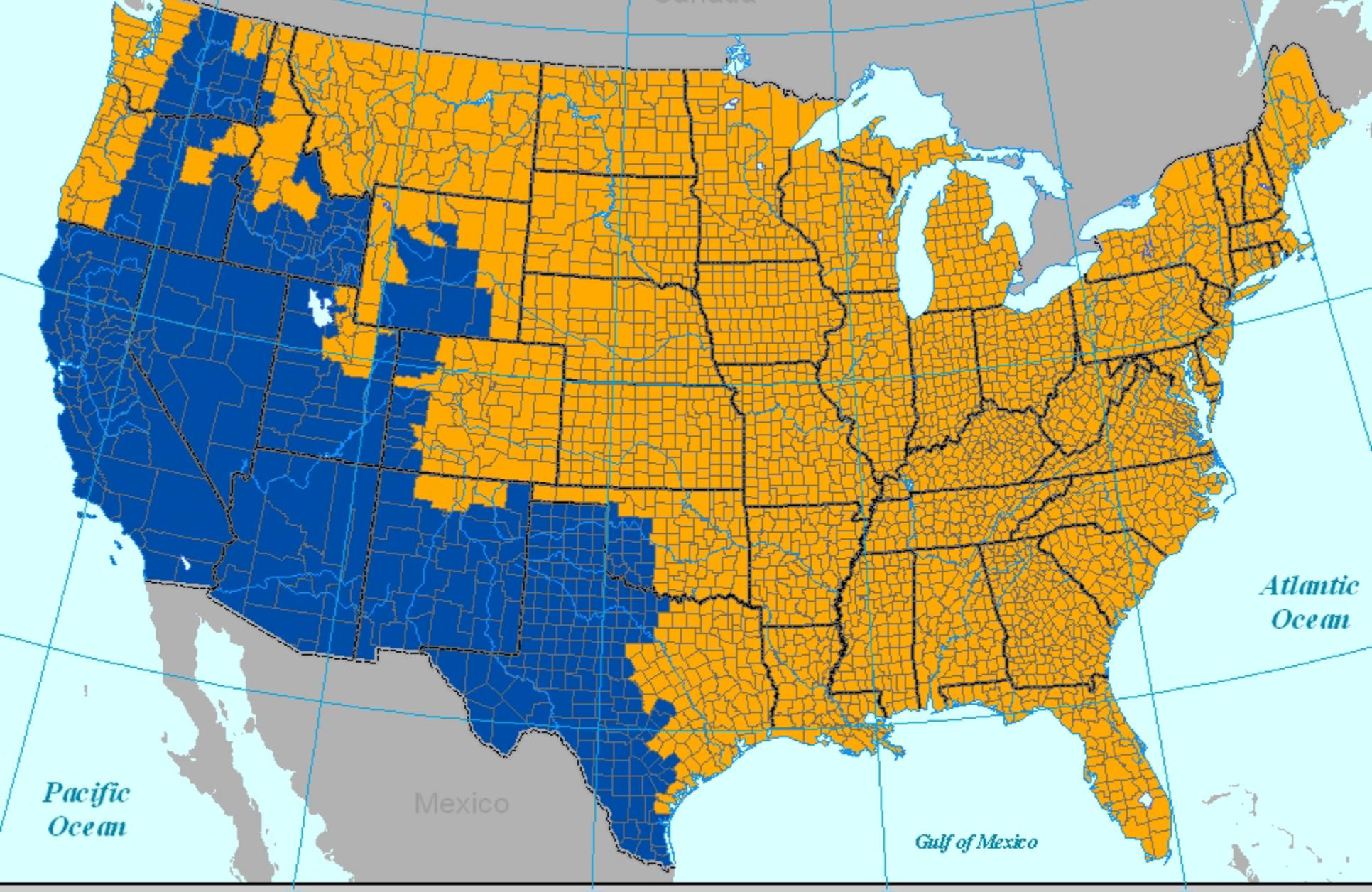
Source: USDA, Natural Resources Conservation Service  
1997 National Resources Inventory  
Revised December 2000

\*\*Conservation Reserve Program Land



**CCX**  
**Conservation Tillage**  
**Soil Offset Map**





Pacific Ocean

Atlantic Ocean

Mexico

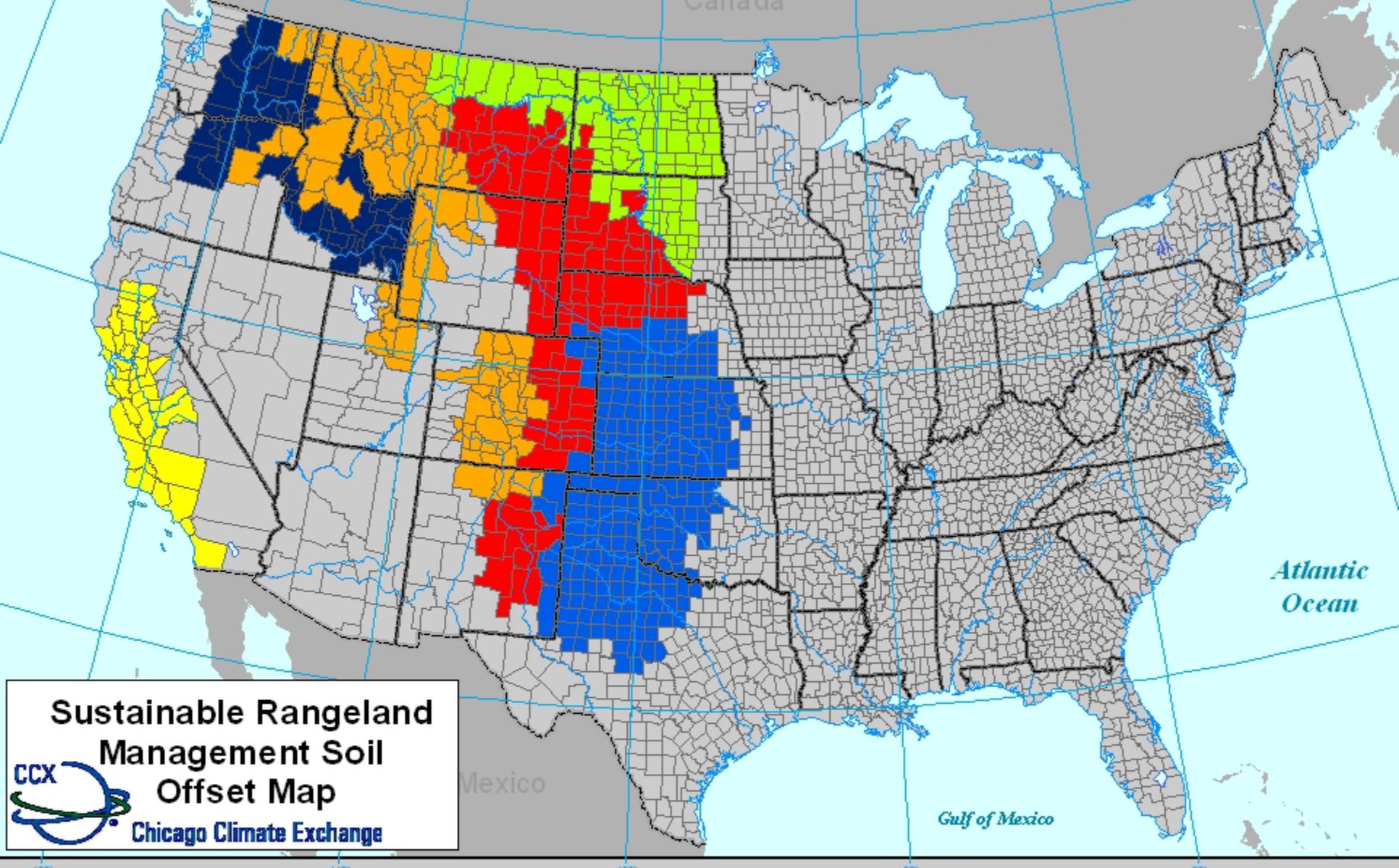
Gulf of Mexico

**CCX**  
**Permanent Grassland  
Soil Offset Map**

**Carbon Sequestration Rate (metric tons/acre/year)**

 1.0

 0.4



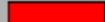
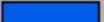
**Sustainable Rangeland  
Management Soil  
Offset Map**



**Chicago Climate Exchange**

**Carbon Sequestration Rate (metric tons/acre/year)**

**non-degraded managed rangeland/restoration of degraded rangeland**

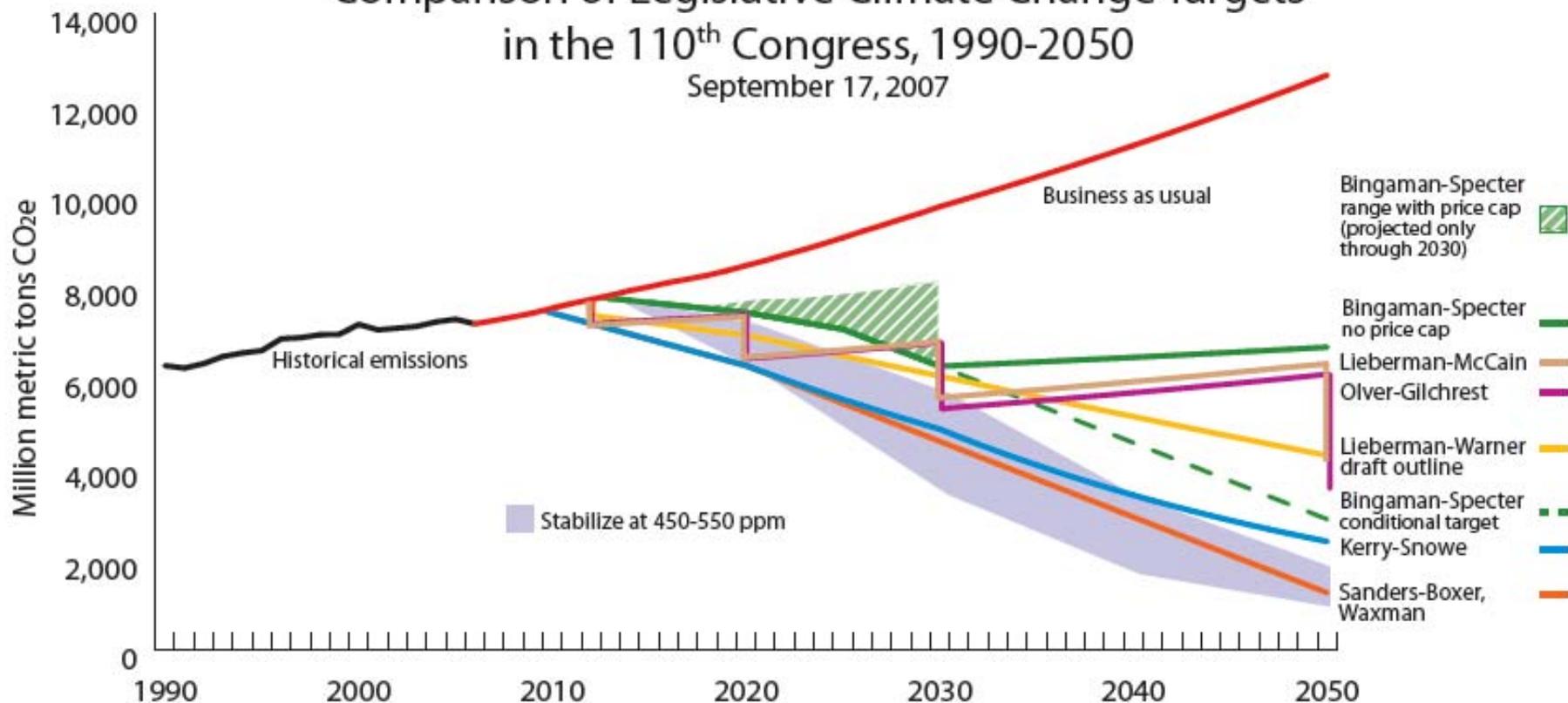
- |   |  |
|---|--|
|  Northwestern Region LRR B: 0.12/0.20  |  California Region LRR C: 0.16/0.16     |
|  Rocky Mountain LRR E: 0.12/0.28       |  Northern Great Plains LRR F: 0.12/0.24 |
|  Western Great Plains LRR G: 0.27/0.40 |  Central Great Plains LRR H: 0.20/0.52  |

# Global Warming Legislation

- The 110th U.S. Congress
  - no less than seven proposals
  - Use of market-based, cap-and-trade mechanisms.
- Specified emission caps
  - Different formulas, such as a return to 2000 levels (McCain-Lieberman) or 1.5% reductions per year (Kerry-Snowe).
  - Different time frames; some run only through 2020, while others run through 2050, usually with reductions that increase in later years.
- Bush administration policy--an [emissions intensity target](#)
- "business as usual" scenario
- Estimated U.S. emissions reduction paths that would be needed to stabilize global atmospheric greenhouse gas concentrations at 450 or 550ppm (parts per million) CO2 equivalent.

# Comparison of Legislative Climate Change Targets in the 110<sup>th</sup> Congress, 1990-2050

September 17, 2007



# Key Carbon Policy Issues

1. Sufficient science exists to act now on climate change.
2. The role of a mandatory, flexible climate program
3. The global dimensions of climate change.
4. Carbon policy design principles:
  - Recognize the importance of technology and energy efficiency
  - Be environmentally effective and cost effective
  - Be fair
  - Encourage early action
5. Climate stabilization requires immediate action and sustained effort over several decades.

# Key Carbon Policy Issues

6. Legislative establishment of specific carbon-reduction goals through a step-wise approach.
7. Cap and trade market-based regulatory system as an essential element of an effective carbon reduction program.
8. Allowing regulated entities to use emission offsets as a means of compliance for a significant part of their reduction requirements.
9. Emission offsets that sequester carbon through soil, forestry and other agricultural offsets are just as effective in reducing atmospheric carbon as are emission reductions and should be fully recognized in any cap and trade system.
10. Engagement in international negotiations with the aim of establishing commitments by all major emitting countries.

# Key Issues for Ag

- Will ag offsets be allowed?
- Is agriculture treated fairly?
- How are biofuels treated?
- Documentation requirements
- Verification procedures

# Contact Information

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