

# Climate Change Indicators in the United States



**We can't get there with what got us here...**



# EPA Report Indicators

- EPA Climate Change Indicators Report Released in April 2010
- 24 Indicators in 5 Categories
  - Greenhouse Gases
  - Weather and Climate
  - Oceans
  - Snow and Ice
  - Society and Ecosystems



# Indicator: Greenhouse Gases



U.S. Emissions: ↑ 14% 1990-2008



Global Emissions: ↑ 26% 1990-2005



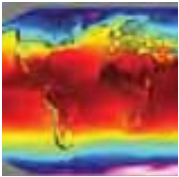
Atmospheric Concentrations ↑  
Significantly Since Industrial Era



Climate Forcing ↑ 26% 1990-2008



# Indicator: Weather and Climate



U.S. and Global Temp: ↑ Average Temps Since 1901

Last 10 5-year periods warmest on record



Heat Waves: ↑ Frequency Since the 1970s



Drought: 2001-2009 30-60 percent of US in drought.

Long term trend data lacking.



US and Global Precipitation: Average ↑ 6% per century



Heavy Precipitation: 8 of the top ten years for heavy precipitation has occurred since 1990

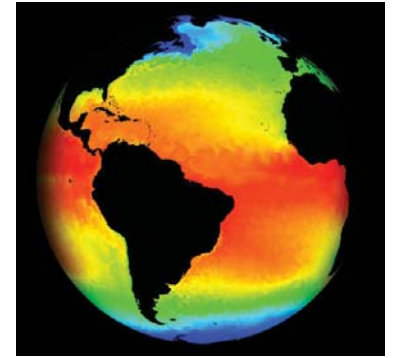


Cyclone Intensity: ↑ Significantly in last 20 years. Six of the top ten most active seasons occurred since the mid-1990s

# Indicator: Oceans



Ocean Heat: ↑ Substantially since 1950s



Sea Surface Temperatures: ↑ Significantly in 20<sup>th</sup> Century. Past 3 decades highest.



Sea Level: ↑ 6/10<sup>th</sup> of an inch per decade since 1870.



Ocean Acidity: ↑ Acidity during last 20 years. Correlated with increased dissolved CO<sub>2</sub> levels in water.



# Indicator: Snow and Ice



Arctic Sea Ice: 2009 24% below 1979-2000 Average, lowest recorded in 2007, followed by 2008/2009



Glaciers: Shrinking Significantly Worldwide. Lost 2000 cubic miles of water since 1960s. Contributes to Sea Level Rise.



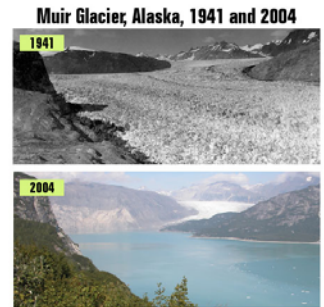
Lake Ice: Freeze Later/Thaw Earlier.



Snow Cover: 7-8% decline in North America since 1970s.



Snow Pack: Between 1950 and 2000 depth of snow decreased at most measurement sites. Spring snow pack declined by 75% in some areas.



# Indicator: Society and Ecosystems



Heat Related Deaths: Last 3 decades more than 6000 heat related deaths. Long Term Trend Elusive.



Length of Growing Season: Average Length Increased 2 weeks since beginning of 20<sup>th</sup> Century.



Plant Hardiness Zones: Moving Northward Since 1990.



Leaf and Bloom Dates: Occurring a Few Days Earlier.

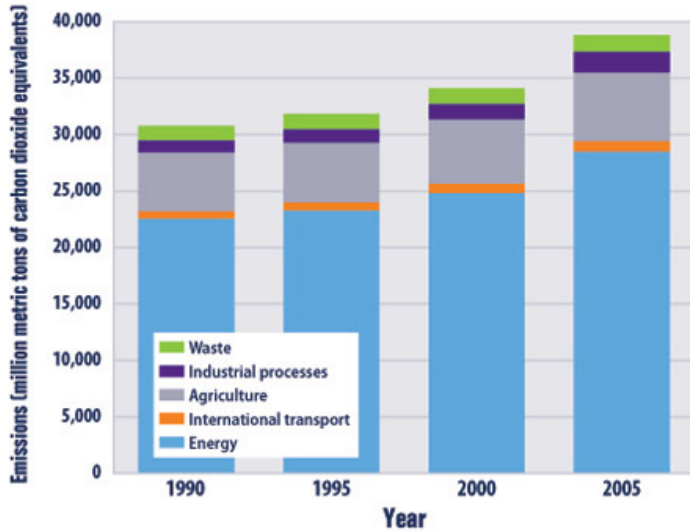


Bird Wintering Ranges: Shifting North by Average of 35 miles since 1966. Wintering Grounds Farther From Coast due to Increased Inland Temps.

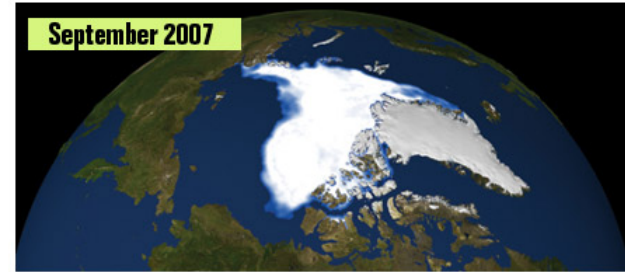
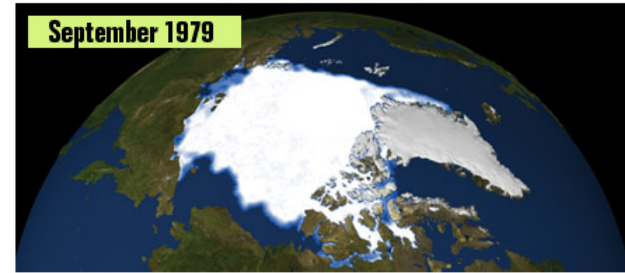


# Sample Graphs and Charts

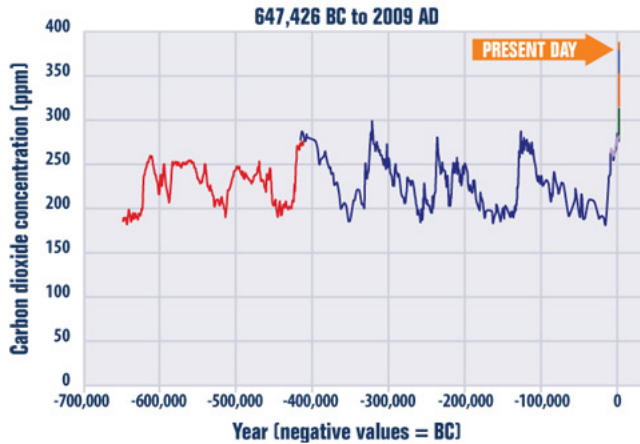
### Global Greenhouse Gas Emissions by Sector, 1990–2005



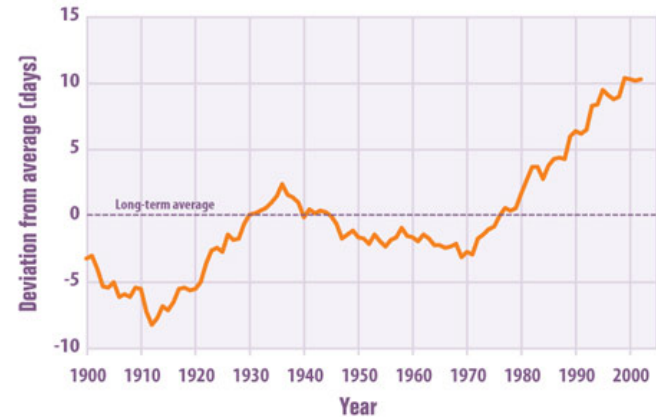
### Arctic Sea Ice



### Concentrations of Carbon Dioxide in the Atmosphere from 650,000 Years Ago to Present Day

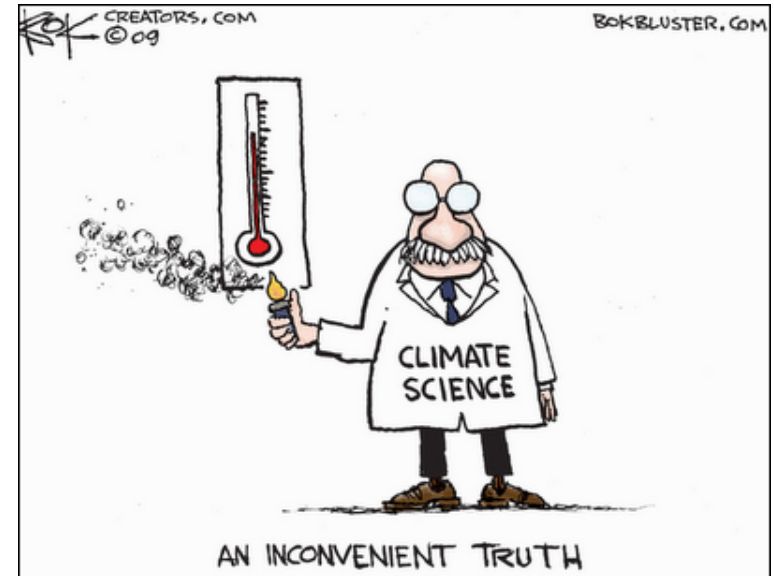


### Length of Growing Season in the Lower 48 States, 1900–2002





# Skeptic or Believer?



To learn more, go to....



# EPA Climate Change Indicators Website

- <http://www.epa.gov/climatechange/indicators.html>

