Collier Soil and Water Conservation District

Gazetteer **April 2012**

Climate effects

Pursuing more equitable and efficient nitrogen and phosphorus use has clear environmental, socioeconomic, and national security benefits.

Could improving our management of the nitrogen and phosphorus cycles also contribute to climate change mitigation or adaptation?

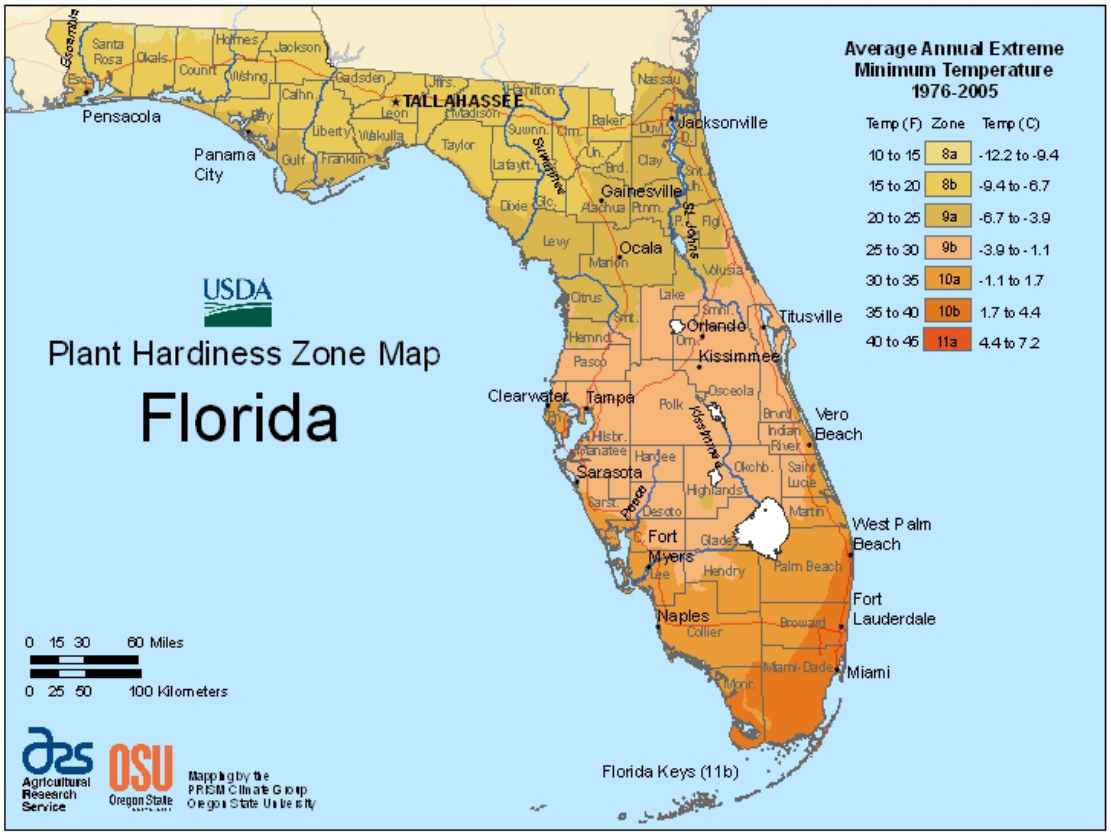
For the most part, climate mitigation is a question about nitrogen:

Because reactive nitrogen exists in many atmospheric forms, it has multiple and counteracting effects on the radiative balance of the atmosphere.

The major warming effect is via increased emissions of nitrous oxide (N20), a greenhouse gas that is 300 times more potent than CO2.

On the cooling side, human-created reactive nitrogen can form aerosols that reflect the Sun's energy back to space.

Weather Changes



2012 USDA Plant Hardiness Zone Map: http://tinyurl.com/84obpdv.

No matter what you believe, it will change when you look at the interactive Plant Hardness Zone Map that appears in “USA Today” at: http://tinyurl.com/5unvsr. Why? Because the average low temperatures in all zones has changed! “Winters are warmer.”

Nearly four decades have passed since the phrase "global warming" first appeared in a scientific journal. Writing in Science in 1975, geochemist Wallace Broecker warned that rising atmospheric carbon dioxide (CO2) levels would result in a world climate unprecedented in modern human history.

Now, as Broecker's forecast is becoming a reality, we can no longer just debate ways to slow climate change; we must figure out how to live with it. Although much of the work in this area has focused on the carbon cycle, expanding our focus to other elements, especially nitrogen and phosphorus, can make a positive contribution.

A century ago, leaders were asking how they would be able to feed a fast-growing population. At the time, the potential for food growth was constrained by finite

Moreover, airborne nitrogen compounds that are produced by agriculture, transportation, and other industrial sectors can fertilize nearby forests, thereby removing CO2 from the atmosphere.

Nitrogen's cooling effects have prompted some observers to say that human acceleration of the nitrogen cycle may be beneficial.

However, when all of the warming and cooling effects of nitrogen are calculated, they appear to largely cancel each other out in the short term.

At best, recent estimates suggest a small net cooling effect, but such effects will diminish as any boost in forest production saturates with time, and because the effective contribution of N20 to climate warming is forecast to double or more by 2100.

Thus, continued release of excess nitrogen to the environment will probably accelerate climate change with time and will also lead to the formation of more ozone holes in this century.

Contact Us:
Collier Soil and Water Conservation District
14700 Immokalee RD
Naples FL 34120-1468
Phone: (239) 455-4100
FAX:(239) 455-2693
www.collierswcd.org

reserves of nitrogen and phosphorus that could be readily accessed for crop fertilizers. Only two generations later, the situation was entirely different.

Widespread implementation of the Haber-Bosch process—an industrial means for converting the limitless pool of atmospheric N2 into usable forms of nitrogen, including fertilizer had released much of the world from nitrogen constraints on crop growth. In parallel, the ability to locate and mine reserves of phosphorus rose markedly. In combination with revolutions in plant breeding and genetics, these developments formed the foundation for the Green Revolution, rapidly increasing world food production.