Counting Carbon

By now you've heard about global warming, the rise in atmospheric temperatures that may be the defining crisis of our century. It is caused to a large degree by a rise in carbon dioxide (CO2), currently around 380 parts per million (ppm), up from around 300 ppm. Scientists and technologists are concentrating on reducing the amount of CO2 that goes into the atmosphere, but "Complete elimination of CO2 emissions is estimated to lead to a slow decrease in atmospheric CO2 of about 40 ppm over the 21st century." (IPCC Fourth Assessment FAQ, section 10.3, 2007) In other words, even if we could stop burning all fuel and forests right now, we would still be trouble. But there is another solution that pulls existing CO2 out of the atmosphere, and it's both environmentally and physically green. It's called photosynthesis.

If you remember biology classes, plants use sunlight, water, and carbon dioxide (CO2) to make plant material. This is stuff we can use as food, shelter, and fuel. But if we want to make a sizeable dent in the CO2 that is causing global warming, we need to store this carbon out of the atmosphere. Someplace safe. Underground, perhaps.

Plant roots grow and die in concert with plant tops. Cut your grass, and the roots will die back, leaving that bit of carbon in the soil as organic matter, or humus. Unless it is exposed to air or washed with water, that carbon usually stays there. How much carbon can be stored? An increase of 4.2% organic matter in just the top two inches of soil means 15 tons of CO2 is being stored for each acre. (Martha Holdridge, Summer 2008 Grassfed Gazette) When you add up the acres (San Juan County alone has over 12,000 acres of farmland), it starts to sound like a solution.

You may also have heard about "grass-fed" meat, which comes from animals who spend their entire lives on pasture instead of ending their lives in a feedlot eating grain. Some of the advantages of grass-fed meat include healthier meat, healthier animals, reduced fuel use, more grain for human consumption, and less concentrated pollution. An advantage not often cited is the reduction in atmospheric CO2 that can come from an increase in soil organic matter, the stuff of gardeners' dreams.

Plowing and overgrazing expose the soil organic material to air and water. When that happens, the carbon that had been chemically bound in the organic matter can

combine with oxygen to form CO2, and return to the atmosphere. Rain can physically wash the exposed soil away, causing erosion. When green pastures actively pull CO2 out of the atmosphere, erosion is reduced, and water is filtered (and stored) in the soil's carbon filter. When animals are the harvesting mechanism, they can fertilize the plants that feed them, saving fuel.

So the world get environmental services, the plants get water storage and fertilizer, and the animals get forage, but what does the farmer get? How about carbon credits? In Australia, saving a ton of CO2 is estimated to be worth $25. ('Managing the Carbon Cycle', Katanning Workshop, 21 & 22 March, 2007, www.amazingcarbon.com). The market for soil carbon credits is just starting in the U.S., but groups like the Soil Carbon Coalition (http://soilcarboncoaliton.org) are working to give farmers the recognition they deserve.

Where can you see examples of carbon sinks, erosion aversion, and groundwater filtering? San Juan County agriculture has usually worked without extra fertilizer or plowing, due to the costs of transportation and the low returns of plowing small acreages. Once again, we may be ahead of our times. Our small farms, permanent pastures, and grass-fed meat are the shape of things to come. And carbon credits may be the newest crop for our local farmers.