Less Fossil Fuel Use

Managed grazing systems require 20 Mcal of energy per ton of animal feed. Feedlots require 1,343 Mcal of energy per ton of feed.[xvii] Jim Munsch, a beef farmer (and statistician) who uses managed grazing, recounts a National Geographic article which reported that it took 283 gallons of crude oil used in all facets of production to finish 1,250 lb. steer - or about 1¾ gallons per pound of sellable meat.[xviii] This prompted him to conduct his own study. Through careful record-keeping, he calculated that his actual input of refined petroleum products, plus an inferred input equivalent of electricity used, was about ¾ pint per pound of sellable meat.[xiv] In another case study, a Wisconsin dairy farm switched to managed grazing and reduced fuel use from 8,000 gallons per year to 3,200 gallons per year. The ratio of milk production (in gallons of milk to one gallon of fuel) went from 17:1 to 46:1.[xx]

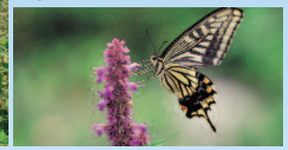
More Biodiversity and Wildlife Habitat

Managed grazing for conservation mimics natural prairie ecosystems and creates habitat for native wildlife. When ruminants graze intensely in one area and then are moved off until the next grazing cycle, they reduce the regeneration of invasive shrubs, restore diverse native plant species, provide manure for invertebrates (which are then eaten by birds and other animals) and leave sites undisturbed for ground-nesting birds. Small mammals that inhabit pastures, such as meadow voles and meadow jumping mice, are an important food source for many birds of prey and red foxes. Butterflies, such as tiger swallowtails, monarchs and fritillaries, as well as bees and other native pollinators can be found in fields feeding on clover and wildflower nectar.

Managed grazing results in greater amounts of nutritious forage than continuous grazing in pastures and increases habitat for diverse species of beneficial insects, reptiles, amphibians, birds and mammals. An early study published by the Wildlife Society found that grazing strategies may be tailored to suit the type of habitat required for a desired species, while minimizing wild deer contact with grazing cattle.[xxi] According to a 2006 study, rotational grazing may be used to create habitat that supports many species.[xxii]

A 2001 study found that careful, conservation-minded managed grazing can: 1) increase the vigor of native plants, 2) increase the vegetative cover of stream banks, 3) expand wetlands, 4) hasten decomposition of cow manure and 5) extend the growing season on the grassland.[xxiii]

According to the Natural Resource Conservation Service, rested managed grazing paddocks in Minnesota and Wisconsin provide undisturbed nesting habitat for ground nesting birds, such as upland sandpipers, bobolinks and meadowlarks, which have declined significantly in number within the past 50 years.[xxiv] A study in southeast Wisconsin found that rotational grazing with refuge areas is the best agricultural practice for ground nesting birds.[xxv] Careful implementation of managed grazing also allows ducks and other shorebirds to nest successfully in adjacent wetlands.



The Sierra Club recommends grass-fed products because managed grazing farmers tend to be "keen stewards of the land, concerned with proper grazing techniques and the nurturing of native grasses."[xxvi]

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Earth Friendly Farming

Environmental Benefits of Grazing

Recreational activities, like swimming, fishing, bird watching, hiking and hunting, depend on healthy natural ecosystems. All of our ecosystems are impacted by agriculture. Grazing is a way to farm that addresses these impacts and can actually improve environmental health.

Managed grazing is a sustainable farming method in which cattle, poultry, sheep, goats, pigs and/or bison graze through paddocks of high-quality legumes and grasses in controlled rotations or cycles of pasture harvest, then rest for re-growth. Managed grazing protects soil and water, reduces the use of fossil fuels and synthetic inputs, sequesters carbon, encourages plant biodiversity and creates wildlife habitat.

Managed Grazing Conserves and Builds Soil Resources

The world's soils have formed over thousands of years. Healthy soils consist of a complex web of biological life that builds soil organic matter. The living organisms (bacteria, fungi, protozoa, nematodes, arthropods and earthworms) are critical for decomposition and nutrient cycling. These cycles, in turn, affect plant growth, water infiltration and air quality. Better nutrient cycling means less fertilizers need to be applied to land. Organic matter stabilizes soil, absorbing and retaining rainwater, much like a sponge. Healthy soils, built through grazing, mean less soil loss and less agricultural run-off.

Each year the U.S. loses 3 billion tons of rich topsoil.[i] WI cropland loses 3.3 tons of soil per acre (T/A) due to rainfall erosion. Minnesota cropland loses 2.1 (T/A) due to water erosion and another 5.8 (T/A) due to wind erosion.[ii] The United States Department of Agriculture considers 2 to 5 (T/A) "tolerable" soil loss. When soil stays covered with grasses and legumes, there is less environmental damage.

A study in southeastern Minnesota compared soil in rotationally grazed pastures to soil from neighboring farms that produced corn, soybeans, oats or hay. After four years of monitoring, researchers concluded that land under managed grazing had 53% more soil stability, 131% more earthworms, substantially more organic matter in the top 12" of soil, better stream quality and more wildlife habitat.[iii]

Another study compared a managed pasture to a cornfield during a heavy rainstorm and found that the pasture, despite its steeper slope, lost only .026 (T/A). Neighboring fields under moldboard plow lost 5 (T/A) and those under chisel plow lost 10 (T/A).[iv] In Wisconsin, researchers found that gently sloped land planted with corn and soybeans lost 6 times more topsoil each year than managed grazing.[v]

Managed Grazing Protects and Improves Water Quality

Agriculture uses 70% of the world's water resources. Agriculture impacts both the **quality** and **quantity** of water. In the U.S., chemicals, silt and animal waste have polluted more than 173,000 miles of waterways.[vi]

On most non-grazing farms with more than 50 cows, the cows are confined to a shed or dry lot. Cows are concentrated, usually on concrete so that they can be fed from a silo and their manure and urine can be collected easily. Manure is flushed or scraped into a man-made lagoon for storage. Pits or lagoons are typically sized to hold six months' accumulation of manure slurry. Managed grazing disperses livestock across well-sodded pastures where they deposit manure. They are moved to a new paddock before manure begins to concentrate.

Livestock in **continuously** grazed sites can cause manure-related problems. A Minnesota study found that waterways adjacent to these sites have comparatively high levels of fecal coliform as well as more particulate matter, turbidity and exposed streambank soil.[vii] **Rotationally** grazed livestock do not trample and denude streambank vegetation. Wisconsin Discovery Farms studies show that managed grazing improves streams and does not cause heightened coliforms or turbidity.

Surface water quality is diminished when phosphorous fertilizer binds to soil particles, runs off into streams and rivers, and causes algae blooms and oxygen deprivation. Soil silting makes waters shallow and warmer and impacts aquatic habitat.

According to the Wisconsin Department of Natural Resources, 85% of sediment in waterways is due to streambank erosion, which can be rectified by managed grazing.[viii] Rotational grazing promotes perennial grass cover. The vast root structure of grasses keeps soil from washing away, especially during heavy rainfall, and controls flooding. This reduction in soil loss helps prevent phosphorus from entering surface water. Because it buffers heavy rainfalls, managed grazing helps control flooding.

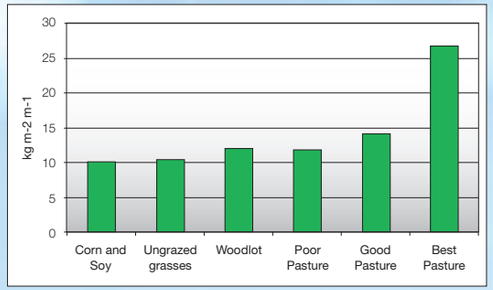
Groundwater quality is degraded when nitrogen fertilizer leaches downward. About 1 in 10 wells in Wisconsin test high for nitrate. In some areas, 60% of wells are contaminated with more than 10mg/liter of nitrate. Levels of 10mg/liter are dangerous for infants and can cause poor performance in livestock. Even low levels of nitrate are dangerous for frogs, amphibians and fish. Robust pastures help prevent nitrates from leaching in groundwater. A 2006 University of Wisconsin study found 70-90% denitrification efficiency with land under pasture.[ix] Another study found that, under managed grazing, both nitrogen and phosphorous in groundwater were within acceptable limits.[x]

Better Carbon Sequestration with Managed Grazing

According to James Hansen, Ph. D., NASA Godard Institute for Space Studies, human activity has increased CO2 in the atmosphere to dangerous levels, from 280ppm to 385ppm. But it is possible to reduce CO2 levels to 350ppm by modifying our agricultural practices and putting carbon back where it came from ~ into the earth.[xi] Rangelands occupy nearly 50% of the world's land area and are estimated to contain more than two-thirds of the world's carbon reserves.[xii] Good grazing management has been shown to enhance carbon sequestration in rangeland soils and help mitigate elevated atmospheric carbon levels.

Plants capture carbon and store it in their root systems. When a plant's leaves are grazed its roots also die back, leaving carbon (and organic matter) in the soil. Roots re-grow along with shoots, capturing more carbon. Grazed pastures have more rapid annual shoot turn-over and more diverse plant species, which results in greater redistribution of carbon within the plant-soil systems.

A 2002 Iowa State University study showed that well-managed pastures are the most effective land use for storing carbon.[xiii]



Another environmental study on the effects of livestock grazing on carbon content found that the soil of grazed pastures had significantly higher carbon content compared to non-grazed enclosures.[xiv]

Research at the High Plains Grasslands Research Station has shown that 11 years of grazing significantly increased soil organic carbon in the surface 30 cm (12 inch) of the soil.[xv] A Duke University study found that the vast underground root systems of native grasses store more carbon than tree and shrubs. Managed grazing is one way to make expanding native grasslands financially feasible.[xvi]

According to the Iowa State University study (see table above), managed grazing pastures are better at carbon sequestration than cropland, woodlot, poorly managed pastures and un-grazed grasses. Note that the best management practices double the capacity of pasture to sequester carbon.

GrassWorks is a membership organization that provides leadership and education to farmers and consumers for the advancement of managed grass-based agriculture to benefit present and future generations.

For more information: www.grassworks.org