Upland pastures of Snake River Farm.
The Farm is in a glacial outwash plan called the Anoka Sand Plain.
The sands of this Farm are small grained or "fine sand" and more than 100 feet deep.
The generally rolling topography was formed by wind.
Pre-settlement this land was primarily oak savanna and wetland.
These sands are naturally low in fertility, strongly acidic and low in organic matter.
The sand is very droughty and highly susceptible to wind erosion.
Because of its poor quality, this area was settled late, around 1900.
Eventually all of the tillable land was plowed and converted to cropland.
When the vegetive layer is removed by tillage, rain percolates the scarce organic material to the soil surface.
Once on the surface, the organic material and any smaller clay sized particles blow away.
The soil gave up the little organic material it had in a couple of decades.
Overall, half of the topsoil in the sand plain has gone with the wind.
There is a significant depression on the slope to the east.
That is the beginning of a blow out, or sand dune.
Several feet of the top surface have blown away.
That occurred before I farmed the land.
This land should never have been plowed.

In the early 1970s, I opened the area we are in to a single field of 80 acres.
I used no-till methods to stop wind erosion.
I irrigated 200 acres and got 200 bushel per acre corn yields with heavy fertilization.
The lack of organic material in the soil, plus heavy application of chemicals including anhydrous ammonia killed all biological life in the soil.
There was no mineralization going on. Each year a new trace element shortage appeared.
I would have last year's missing element added to the fertilizer and then a new deficiency would occur.
It was unsustainable.

In 1990, I took the farm out of production with the intention of turning it back to grassland.
My general plan was to plant native grasses on the south part of the farm and exotic, cool season plants on the north.
That met with limited success, although the natives did reasonably well.
I assumed much of the land would re-vegetate on its own. It did so, incompletely and very slowly.
Many areas remained virtually bare ground 20 years after cropping stopped.

Legumes, with their microbial allies and their nutrient building capability are crucial.
I started with Red Clover, which is easiest to get established and tolerant of acidic soil.

I have surface applied lime twice in the past ten years. The soil PH has increased from a strongly acidic 5 to 5.5, to 6.5 to 7.
I have been surprised to find soil samples from one inch and six inches all have a neutral PH of 6.5 to- 7.0.
In the last few years, I have learned to mix as many different grasses, forbs and legumes as possible.

The things that Gabe and others are telling us, really work.
Understanding and using these new concepts has enabled me to increase the rate of recovery for these soils terrifically.
The key for me was learning to think of the soil's needs as biological, not chemical.
Each plant species provides habitat for different soil microbes.
Each type of microbe works symbiotically with others to accelerate soil building and plant growth.
The paddocks directly south of us were my worst pastures two years ago.
The land was virtually useless with 50% bare ground on the south facing slopes.
Only a few sandburs would grow there and single species seeding was useless.
We planted a cocktail of twenty grasses (native and exotic), legumes, and forbs.
Good rains followed and the paddocks are now incredibly improved.
Good grazing management will accelerate the recover even more.