

Onondaga Buffalo

Healing Land & Community

a native American experience

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Early in 2005, I spoke to two elder chiefs at Onondaga Nation in central New York about improving the nutritional quality of pasture where the Nation keeps its buffalo. For over 40 years, the Nation had as many as 40 American bison, and learned to manage this native American herbivore—a challenge, since this indigenous animal's normal annual migration covers hundreds of miles of open plains.

Each year, a few bison are sacrificed to provide meat for the Onondaga community. This keeps the herd small, reducing their desire to crash pasture fencing to roam the countryside, startling citizens and disturbing dairy farmers.

The 160-acre pasture is an unusual geological feature—an alluvial outwash terrace left 12,000 years ago at the end of the last Ice Age. At the south margin of the retreating continental ice sheet, fast-flowing, west-to-east torrents of glacial meltwater rushed into wider, south-to-north Onondaga Valley. As rapid eastward flow entered slower Onondaga Valley waters, silt, sand and gravel deposited a delta at the valley mouth.

The thick alluvial outwash is coarse, stony soil with gentle, rolling topography. Coarse sand and stone lacks clay, so is well drained, with little capacity to retain water or nutrients. Soluble fertilizers leach quickly though this coarse, boney blend, leaving soil poor, with sparse vegetation.

Early April 2005, when pasture grass was only ankle-high, I scattered 100 pounds of SEA-90 sea minerals on a plot behind the hay barn. On this, my first attempt to broadcast sea minerals by hand in a field, and I fumbled calculating the rate from pounds per acre to cups per square foot.

Later, reviewing my math, I discovered errors. My numerical blunders meant I spread sea minerals at twice Dr. Murray's highest dose. **Four times SeaAgri's highest recommended rate!**

As a pioneer always exploring new ideas, I'm used to failures inherent in "trial-and-error" creativity. Errors often are valuable lessons. But at double the highest dose, the dessicating salts suck water out of plant cells, killing existing leaves. Roots will survive, and quickly sprout vigorous, new growth to cover the soil thicker than before.

But dead grass wouldn't demonstrate what I wanted, nor inspire my Onondaga friends, and might cause doubt about sea minerals. After all, farmers are taught by conventional wisdom to believe salt will poison soil and inhibit plant growth.

Two months later, I returned to inspect my test plot. Pasture grass was now knee-high. From the fence, I saw an obvious hole in the forage foliage. Walking to the plot, I saw a thin veneer of green, so I assumed my overdose of salt had killed



the grass, now just begun to regrow.

Stepping into the plot, looking close, I saw the grass was an inch tall—not because they died and sprouted new leaves—but because buffalo clipped the crowns as close as possible. Ignoring nearby knee-high forage, they chewed my test plot almost to dirt, and I saw signs buffalo licked the soil to eat sea minerals directly.

Delighted by this unexpected discovery, I started a new test plot 200 feet away, with a new 100-pound bag of sea minerals, and two 25-foot tapes. Methodically, with cup and tape measures, I carefully scattered crystals on four adjacent plots at 1x, 2x, 3x, 4x—where 4x was Murray's maximum dose: **1-ton per acre.**

Two weeks later, I returned. The buffalo already found the second plot: 1x was nibbled; 2x well chewed. But 3x and 4x were chewed to the ground, just like my first plot. But the herd was still licking soil to eat sea minerals directly.

This wasn't the test I wanted, so I tried a third plot 100 feet away. I repeated my carefully measured application, this time only at 2x, 3x, 4x. Happily, minutes after I finished, a thunderstorm from the west saturated the soil with heavy rain. I knew this would dissolve the crystals and wash sea minerals into soil, out of reach of salt-hungry buffalo tongues.

Two days later, I stopped back. To my surprise, the buffalo already discovered my new plot. Again, they chewed 3x and 4x to the ground, leaving an inch of green stubs. And they still licked the soil.

Looking at the well-grazed grass, I knew the buffalo now knew something is going on, and were alert for more. They smell sea minerals, and are sniffing for more. Their desire for sea minerals was emphatic, clear and strong.

Two days later, I returned with my camera for photos of my plots. To my surprise, the buffalo were standing right by the gate. Before, they were out of sight on the hill. I'd never seen them so close—only 50 feet away

Now, they were right by the gate. I had to walk the pasture in full sight of these huge, horned, semi-wild beasts. I'm disabled, walk

Full Spectrum Fertility

"From the start, my sea solids produced excellent results. It is now conclusively proven the proportions of trace elements in sea water are optimum for growth and health of land and sea life."

Recycle the Sea



"My research clearly indicates Americans lack complete physiological chemistry because the balanced, essential elements of the soil have eroded to the sea. Consequently, crops are nutritionally poor, and animals eating these plants are, thus, nutritionally poor.

"We must alter the way we grow food, the way we protect plants from disease and pests, the way we process our food."

—**Dr. Maynard Murray**
Medical Research Doctor



with a crutch, unable to run, and I don't speak buffalo. Doubling it is wise to wander alone in the buffalo domain, I called Chief Johnson on my cell.

Vince drove over in his 4-wheeler. We went in the pasture to visit each test plot. We hadn't talked in months, so I told each test plot's tale, and we saw the buffalo response. We talked almost an hour.

Results were clearly visible: buffalo kept each test plot grazed to the ground. Their acute interest in sea minerals was visible as thin green stubble in each plot. No grass in my test areas was higher than an inch, with uneaten knee-high forage inches away.

Chief Johnson revealed two calves died already that year of undiagnosed infection. We talked about the Nation's lack of veterinary help for buffalo. Their best was to send corpses to Cornell for autopsy by the large animal vet. My reply was infections are a sign of trace element deficiencies. Intelligent organization for the immune system is precisely what full spectrum sea minerals supply.

We agreed the buffalo made their

preference plain. Sea minerals should be spread on the entire pasture—a quarter section—nearly 160 acres. At minimum 500 pounds per acre, this requires a 24-ton trailer, at a cost over \$6000, likely more as fuel prices rise to haul dense crystals 3,500 miles from northwest Mexico.

Chief Johnson was certain the Council would approve funds, but the Council had major issues on its mind, including a lawsuit against New York State, Onondaga County,

Opening Statement

of

The Onondaga Nation Land Rights legal paper

The Onondaga People wish to bring about a healing between themselves and all others who live in this region that has been the homeland of the Onondaga Nation since the dawn of time.

The Nation and its people have a unique spiritual, cultural, and historic relationship with the land, which is embodied in

Gayanashagowa The Great Law of Peace

This relationship goes far beyond federal and state legal concepts of ownership, possession or legal rights. The people are one with the land, and consider themselves stewards of it.

It is the duty of the Nation's leaders to work for a healing of this land, to protect it, and to pass it on to the future generations.

The Onondaga Nation brings this action on behalf of its people in the hope that it may hasten the process of reconciliation and bring lasting justice, peace, and respect among all who inhabit the area.

City of Syracuse, and six corporations. It might take time to get agreement on our soil restoration.

We talked again about glacial dust from a nearby aggregate quarry. Vince would get a load of crusher screenings—quarry by-product—to spread at different rates.

Next year, we would observe any effects, and learn about interactions of rockdust, sea minerals, pasture soil, and plants. I talked about testing microbial inoculants, and seeding native forage plants, like buffalograss and fireweed.

We left the pasture at twilight—too dim for focused photos of buffalo standing amid farm machinery. Vince and I sat outside the gate discussing other issues, sharing stories.

After 30 minutes, I climbed out of his 4-wheeler. I looked over my shoulder, but saw no buffalo. Turning, I saw they had wandered, and divided in three groups—each standing on one of my test plots. All looking right at us.

I laughed out loud, pointing to the herd. Vince laughed, too. He agreed these indigenous herbivore are very instinctual and highly intelligent. They watched us talk at the

test plots. They know what we're doing. They stated their consensus: 100% vote for full scale sea minerals.

The year rushed by before a 24-ton **SEA-90** shipment arrived at Onondaga Nation. More delay from busy travel, schedules and projects. Soon, the growing season ended. Plants set seed and went dormant.

To spread fully soluble sea crystals in the fall, when plant growth is dormant, risks that winter snow and spring rain will leach elements out of root reach. The pasture soil food web was weak and porous, with little clay, carbon or biomass, poor capacity to capture and hold nutrients.

We agreed to wait and broadcast sea minerals early in spring, to assure they are available to soil life and plant roots when their rush of





spring feeding begins. More nutrients will be recycled as biomass in the soil.

March 2007, I drafted a plan and maps to spread sea minerals on the pasture: adjusting the spreader for minimum application rate, make one pass over, then a second pass on half, then two more passes on a quarter for three application rates (1x, 2x, 4x).

Then spread quarry dust in three strips perpendicular to the sea minerals, overlapped in a 2-way test grid. Glacial dust spread at 1x, 2x, 3x created a grid of 16 plots, each at a different rate, from no treatment, up to 4x sea mineral + 3x



make amino acids—the carbon-nitrogen chains that are spun into proteins, DNA and hormones. The keys to this transformation—the limiting factors—are trace elements, delivered by the sea minerals.

My accidental overdose of sea minerals two years before was now an outburst bloom of clover—protein-rich plants in carbon and protein deficient soil. A small piece of pasture now converted to a protein factory—critical to feed massive herbivore anatomies.

I'm certain this clover bloom is no fluke. Two other plots with light to heavy sea mineral doses—1x to 4x—had similar, but less prolific, clover blooms, and areas with heavier doses had thicker blooms.

I believe this can happen in one year by properly timed deliveries of sea minerals, clover seed and bacterial inoculants. After this mineral enrichment enlivens the soil, and boosts protein and carbon, a new succession of plants can be seeded to further upgrade forage nutrition. This will greatly benefit health and productivity of the buffalo.

Dense clover blooms in the pasture illustrate the natural, biological pathway to deliver nitrogen—a critical soil nutrient—and sequester carbon—a greenhouse gas—to curtail emissions into Earth's atmosphere.

Molybdenum is only one of a full spectrum menu of elements in sea water, each of which plays key roles in biology, ecology and soil. Some day, biology will discover many more elements are essential—many for DNA replication, reproduction and immunity at parts per trillion. In balance, together, these elements empower a biological synergy greater than the sum of its parts

glacial dust.

In April, Chief Johnson plowed and seeded the test area with a grass and clover mix. After sea minerals were spread, a 15-ton truck of glacial gravel dust from the South Onondaga quarry was spread on a test area.

Early in June, after sea minerals were spread, I visited the pasture. Unfortunately, hay had been cut and baled recently, so I couldn't make effective observations of ankle-high grass just starting to grow back.

I walked across the area spread with sea minerals. Grasses looked thicker in the 4x area, but any difference wasn't distinct or obvious.



Blooming Mad

However, when I saw my first test plot—overdosed at twice the recommendation—I nearly leapt in the air. The area, and an apron around—especially downhill—was densely grown with red and white clover in prolific bloom—many times thicker than anywhere else.

My joy was to see a small spot in carbon-nitrogen poor pasture is now producing high quality protein—key nutrient for buffalo. The process is complex, but the keys are a few trace elements—mostly molybdenum—and certain specialized microbes, mostly *Rhizobia*.

Sea minerals supply **molybdenum**, a hard-to-find trace element co-factor in *nitrogenase* enzyme, which combines **nitrogen** with **oxygen** to make **nitrate (NO₃)**. *Nitrogenase* is made by *Rhizobia* bacteria living in nodules on legume roots—one of a few families of nitrogen-fixing bacteria. This is the biological way to supply nitrogen to soil and plants.

Sea minerals added enough molybdenum and allied trace elements to nurse a proliferation of *Rhizobia*, to synthesize more *nitrogenase*, to fix more **nitrogen** into **nitrates**, to grow more biomass—a positive feedback cascade unleashed in soil.

Currently, half U.S. hydrogen is used to synthesize nitrogen fertilizer—a chemical process consuming fossil fuel, releasing CO₂. Then, nitrous oxide and ammonia are released as vapor from plowed and fertilized fields, while nitrates leach into groundwaters.

Clover then combines nitrate with carbohydrate to

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