Ecological Land Management with Goats

Lani's goats put to work on Homeowner's Association land outside of Denver. Photo by Stephanie Davio.

By Lani Malmberg

Eds Note. Lani Malmberg, with a ranching background and Masters in Weed Science from Colorado State University, manages land restoration projects with herds of goats, restoring soil health and eliminating unwanted vegetation, typically referred to as weeds. She is a board member of Beyond Pesticides. What follows are excerpts of the talk that she delivered at Advancing Sustainable Communities: People, Pollinators and Practices, the 32nd National Pesticide Forum, Portland, OR, April, 2014. In her talk, Ms. Malmberg provides critical context for her work to restore living systems with animals, as opposed to machines and toxic synthetic chemicals. You can view Ms. Malmberg's talk on the Beyond Pesticides' YouTube channel at http://bit.ly/32npfLaniGoats.

How did you get here? I'm going to go back about 10,000 years. Do you all know what the first domesticated animals were? Yes, goats. During the 18th and 19th century, it was the Industrial Revolution. During the 1930s and the Great Depression, the people who lived through that period, my grandparents and my folks, were affected in a powerful way and they never forgot it. I didn't live in the Great Depression, but I was taught so many lessons from then that you would have thought I did. Then, we got the Green Revolution, starting in the 1940s in Mexico. We had to grow more calories per acre and we did that really well. And we did that with bigger, and bigger, and bigger machinery, force and destruction, more chemicals, more technology and then genetic engineering.

The culture of control and war

We are a culture of controlling everything. War. Chemicals were developed as warfare agents, used in World War II (WWII), the Korean War, and the Vietnam War. The defoliant Agent Orange, used in the Vietnam War, is half 2, 4-D and 2, 4, 5–T. In 1945 when WWII was over, the chemicals were being distributed, sold or marketed to farmers. Also at that time, they started feeding corn to cattle. There was no such thing as corn-fed beef before that. I took this picture (See slide 1, page 12) in southern Nebraska where I got a job to manage Eastern Red Cedar trees. Every day the farmer of the land would have some sort of implement going up and down all over these fields and spraying the heck out of it. You see signs everywhere that say, "Mix this with your herbicide and bump your yield." It's amazing.

Environmental warning

In 1962, Rachel Carson wrote *Silent Spring*. She is the first one to say wait a minute, here we need to say something. Around 1972, EPA was formed. In that period, the *Clean Water Act* and other environmental protection laws were adopted. In 1975, the *Fed-*

eral Noxious Weed Act passed. Then, in 1981, Jay Feldman created the National Coalition Against the Misuse of Pesticides (NCAMP), now Beyond Pesticides. In 1990, Lani goes to college. On one side, in the 1900s, we have huge corporations, government agencies, gigantic money and power. On the other side, it's Rachel Carson, one person, Jay, one person and me, one person.

Asking the correct question

I went to college because I thought that was the only way I could get out of being a ranch manager. What was I going to do when I was 50? Now, I am 56 and I am a goat herder. But, when I was in college at Colorado State University (CSU), I called around trying to find information on Russian knapweed and couldn't find anything. I got a hold of George Beck, Ph.D. and I asked him, "Is there a program of study on knapweed where I can get a Masters?" He said, "I can't believe you asked me that. I have a program, a stipend and no student. Do you want it?" I said, "Yeah, I'll take it." I said, "What do I get?" He said, "You get a Masters in weed science." And I said, "I've never heard of it, but I really need that stipend." Because I had two little boys to raise as a single mother and I needed that stipend, I took it. And that's how I got a Masters in weed science. I was a ranch girl and a cowgirl, 36 years old, and the oldest student in the department. While I was there, everybody else was 20-something, really smart, and funded by a chemical company –everyone except me. I got a stipend of $1,000 a month. I had to pay for my own books, tuition fees –everything. All the industry-funded students got everything paid for and a stipend of $30,000 a year. They all had DuPont caps and coats, were wined and dined, and had three boxes of donuts every Monday morning in the lab.

That was when I first noticed chemical company influence of the academic research agenda. What do you research? You research the question that the industry gives you. So, what is the question? The question was, "How much should we use?" It was not, "Is this the best way to control Russian knapweed?" That wasn't the question. It was, "How much should we use –pint or quart to the acre?" Should we spray in the spring or fall, or both? So, the answer was one of those.

On the other hand, I was off doing my own thing. In 1996, I took a class, *Ethics in Agriculture*, taught by Robert Zimdahl, Ph.D. There was only one other class like it at Cornell University. We used to sit around and talk. "Well OK, chemical companies fund you guys, what do you do?" If you don't take their money, then nobody is in school. What do we do? Take their money and go to school or nobody goes to school. Then, back to the timeline, we get into genetic engineering (GE) and the seed companies are all bought up by the giant chemical companies. Then we start getting patents on the hybrid seeds.

Being told what and how much to use?

When the land owner/land manager calls for help, the question may be, "I've got this Russian knapweed in my horse patch, what do I do?" They call consultants, experts, county extension agents, and the county weed person and those guys pull from the research and the knowledge that's out there. The response then is about spraying, not about the best thing to do to manage Russian knapweed. It's about how much to spray and which chemical to use. The information gets misconstrued going through to these people. A lot of them don't know how research is done and never thought about the research question driving the answer. They don't think about that. They just get the information and, boy, it is really skewed by the time it gets to the people on the ground.

War on weeds

In 1999, President Bill Clinton signed an executive order on weeds. The executive order contained various statements, including, "This is an all-out battle" and "serious threat," "major economic and environmental damage," "the cost is high," "this is an on-going fight," "28.8 million in funding to combat invasive weeds." "This is war. We are going to declare war on weeds. And to protect the natives, we have to kill all the aliens."

Slide 1. Lani shows a picture of her goats in Southern Nebraska at the 32nd National Pesticide Forum in Portland, OR.

So now, the 2000s. We have GE "Roundup

Photo by: Larry Crist, USFWS Photo Contest Entry #152

"Craneberries"

I was so lucky to get to go see the Sandhill Crane migration at Kearney Nebraska. 600,000 Sandhill Cranes, 60% of the world's population, comes right through that little area on the North Platt River. And they stop, eat, and rest so they can fly on to Wisconsin and Canada. And they're eating all GE corn.

Cranes stand about almost five feet tall. They have red on their head. At some point in time I suppose, the natives up in Wisconsin, with the cranes coming to the fields to eat berries off these plants with blooms of little red berries that looked just like a crane's head, named the berries "craneberries." They dropped the "e," and now they're cranberries.

Ready" crops, which are banned in Europe. Ethanol starts being made from corn. There is suppression of science and activist scientists. And then Jay gets on the National Organic Standards Board (NOSB). We have brilliant people like, Terry Shistar, Ph.D., my dear friend who is a brilliant scientist and Beyond Pesticides board member helping Jay get all this information where it's supposed to be. The Farm Bill gets signed and they are no longer giving subsidies to the farmer. Now, it's going to insurance companies. Then, I looked up a few facts on Nebraska because I was there with my goats. In Nebraska, they produce about a trillion bushels of corn and 98% of it is GE. Nebraska just passed Texas as the number one cattle feeding state. That shocked me. In 1900, Nebraska grew corn at 26 bushels to an acre and in 2009 it was 178 bushels. Corn hit $7.00 a bushel a couple years ago. And they plowed everything a tractor could get to. Remember this from the 1930s? Remember?

So I am in Nebraska with my goats and I am standing in a corn field with everything plowed to the edges of property lines with a pivot on it. There are plowed rolling fields that shouldn't be plowed.

Holistic perspective

I took a class with some of Brett Ramey's elders [Brett is an outreach worker for the University of Washington medical school and Beyond Pesticides board member] this past summer and they told me that Mother Earth is not happy. One elder predicted at the beginning of last spring, a year ago, that Mother Earth is pushing back and we're going to see violence with fire, water, air, and the earth, including earthquakes, fires, floods, tornadoes, and hurricanes. And, boy, did I see that. The goats and I outran the fires and floods all year and during our summer work. We were right on the front edge of the black forest fire in Colorado. We were two days out when we left Estes Park, Colorado, a couple of days before the thousand year flood hit and wiped out the Thompson Canyon. So, we were just right in front of these disasters, thank goodness.

Contrasting the old and new culture

The old in our culture is based on things, how to control things, and monoculture farms. A wonderful girl worked for me for a couple of years, someone I found in Washington D.C. where she worked for Beyond Pesticides. She worked for me for two years and once said, "The biggest thing that I learned from you and these goats is that control is an illusion." There's nothing like a herd of goats to teach you that. Then, there's the new culture. Now, we are moving into a culture based on people and holistic understanding. We're going to work with nature, and we want biodiversity, not monocultures. With the rising awareness, everybody is looking to the future. The young staff of Beyond Pesticides, I applaud you. These are the most wonderful young people and they do great work. They are fabulous. And they are, at this point of the rising awareness, the future, and thank goodness we have them.

When I got out of college, I did the same thing all you guys would do, I went out and bought a 100 goats and started a business. I manage these goats to achieve a goal on whatever land I'm working. I thought this was great, when I got out of school in 1997. This is great as an alternative to chemicals and machinery. It works where you can't get machinery and you don't want to spray chemicals, or can't because it's illegal near waterways. I started this business because I'm a ranch girl and the only thing I knew how to do really well was manage animals and be outside. So, I got 100 goats, went to work and I bought a portable electric fence.

Land restoration

I do land restoration. This is a huge paradigm shift from trying to control everything to trying to bolster the system, nurture and build the nutrition of the soil. It's all about soil. I have to feed the system and I have to recycle this stuff. I don't care if they're weeds. I want the goats to eat the vegetation, recycle it, and release all those nutrients to build the soil organic matter, and hold the water in place. I'm going to add to the soil. I'm not going to kill anything.

Slide 2. Goats reaching high.

I'm going to add, add, and add —vitality, vigor, and joy. There's nothing like a bunch of baby goats playing on a rock or whatever they find to stand on. That is really joyful, that is pure joy. A border collie chasing a stick is pure joy. So I'm just going to recycle these natural resources and get this energy flow going. I'm going to recycle this problem to cash. Solar energy's free, and I'm going to recycle my knowledge of being an old cowgirl to cowboy up and take these goats wherever I can go.

Experience shows it works

For 18 years, I have with my goats done weed management, brush control, fire fuel load reduction, erosion mitigation, flood control, reclamation, and re-seeding. I have contracts with federal, state, county, city governments, private people, local groups, homeowner associations, and giant corporations. My work balances science and art. I got the science when I went to college. The art is managing the animals to get them to do exactly what you want, where you want, how you want, when you want, and keeping them out of trouble.

On a Chevron oil field job in western Wyoming, they had 60 acres to the north with a 80,000 pound earth moving machine, and I had 60 acres to the south. My herd weighs over 150,000 pounds, it's alive, and recycling everything it eats, as it poops and pees. There are about 1,500 goats. That's 6,000 hooves working the earth as they go, and they're self-propelled. That's it, one stop shopping. We do it all. I'm doing twelve things at the same time. I just hate it when people say, "You're too expensive," and I say, "Well no I'm not." They say, "Well I can buy a quart of Tordon for $70.00." And then I say, "Well first of all, you can't compare what I do. I am doing twelve things. I am healing the system. You're doing only one step and you're causing about a billion dollars' per acre worth of damage that might take 50 or 100 years to correct. I'm doing it all at the same time."

Goats are so fascinating. First of all, they're really smart. They have all these skills that no other grazing animals do. I always say that the weeds are really smart, smarter than the desired plants usually, and goats are the only thing smarter than a weed. The only thing smarter than a goat is a Border Collie. People are about eighth on a good day, right under bacteria. Goats climb trees, they run up and down these steps and play. Every goat will be on his own step. I work where there are endangered species, such as the Western Sage Grouse and their babies, which were seen for the first time in ten years in an oil field where I work. It's also where the cattle have been kept out because there has been no water for three years. The goats have been in trouble because they always go to this place where we aren't supposed to be. The cattle rancher was furious and he went to the Bureau of Land Management (BLM) and tried to get the environmental assessments pulled so we couldn't work there anymore.

Goats stand on their hind legs. When I do fire fuel load mitigation, my big wethers (a neutered male), stand on their hind legs and can reach about nine feet up. So I want these big boys. They strip everything, nine feet all the way to the ground and it's all recycled right in place. That's the best fire mitigation.

Goats are easy to move. You can put them onto a semi, but I prefer walking across the country, but I haven't done that yet. I do walk 20 or 30 miles, but, if I have to go 600 miles, we use four deck semis. One time in Boulder, Colorado the trucker forgot to bring his portable chute and we stacked five coolers up and we loaded 1,000 goats onto trucks on five coolers. You can't do that with any other animal. When you get to where you're going, a lot of places where I go, you can't get a semi off the road and you can't get them turned around. So you just get close, open all the doors and all the goats jump off. You get the Border Collie to go put them where you want them.

We worked at the golf course right under Teton Village in Jackson Hole, Wyoming. This year they called us. They had two budgets, one was for H-2A migrant workers, which they filled, and a second was for local youth to work. They put out their advertisement for the local youth to come and work; you know whatever golf courses do. One kid showed up and he rode a tractor for two

hours said it was too hard and quit. So the golf course manager called us and we took goats and worked there last summer. I didn't do that job. My son did that because you need golf etiquette when you work there. And you can't yell or cuss at the dogs or anything.

Challenges

Newborn goats start eating weeds and doing their job when they're just a few hours to one day old. This year I had something very interesting happen. The oil field is around six million acres of unfenced land, called the Red Dessert in Wyoming. The section is 50,000 acres and the babies at one to two days old walked about ten miles. It was a really hard all-day walk. There was no shade because we're doing reclamation work and seeding bare ground on old abandoned locations. The babies would crawl down the badger holes to get shade. So they'd be lined up like train cars down the badger holes to get shade. We were at about 7,500 feet elevation. Hydrogen sulfide (H_2S) gases naturally escape when you drill natural gas wells. It's highly, highly toxic. It's a heavy gas you can't see and it smells like rotten eggs. It sits in big clouds and because it's heavy it will roll right down the hills. So, if it's produced somewhere else, it will roll down a drop and accumulate and hit all the low spots. The gas went down into the badger holes where the babies died from exposure to toxic levels of H_2S. At first, I could not figure it out. So yes, when I work in the city, its people's loose dogs, but this one I have never thought of before as a predator.

The Collies are the heroes. All you need is one good dog. In Nebraska, we moved from one work site to the next. We just took off down the county roads and across the country, like an old cowgirl would. We just took off walking until we got where we were going after two days. The dogs are the key and they're the bosses of the whole operation because they are so smart and magical. On an air force base in Cheyenne, Wyoming, with one dog, Zippy, my son, Donny, and 1,000 goats had exactly ten days to restore 120 acres with an endangered plant, two "noxious" weeds and a poisonous plant, all in one area. We did it.

In the middle of Denver, we ran down the street with a herd. I had a job at Excel Energy Plant and the manager wanted me to run over to do the ponds under the highway. He said, "Are you going to truck the 500 goats?" and I said, "No I'm going to run them down the street carrying an orange flag." He said, "We're all taking bets in the office you'll be in jail by 5 o'clock." I called the cops so that it would be on the dispatch record that I called first and told them what I was going to do. So they sent a squad car to flag us through that stoplight. One dog and the animals, which have so much respect for the dog and for us and for what they're doing, made this possible. They're just really easy to handle.

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Slide 3: Moving goats through Denver.

Responding to different conditions

It's really important to be at the right place at the right time at the right season because plants behave differently. The animals behave differently. Everything is different in different seasons. Knowing the animals and the plants and what's going on with the biology of the plant tells you when to be there. I want to be on Canada thistle when it is in full bud. I don't care what day, or month, or elevation it is, but when this plant is in full bud, it's just the right height. Because when the goats are standing it's nose high. At nose height, a goat at a high trot can eat the buds off Canada thistle and not even slow down.

Everything I own has four wheels or four legs and goes to where the work is. In an Eastern Red Cedar tree area in Nebraska, the corn farmer treats his pasture likes a corn field and he wants all the trees gone and gone instantly. I said, "Your problem here, [pivots all around], isn't your Cedar trees. They're actually trying to hold the soil. This horrible erosion is from cattle walking in single file because that's what cattle like to do. They're big and heavy, they walk single file and they make cow trails and all your water is shooting off the trails making horrible head cuts. That's your number one problem. Your second problem is that you have no diversity in this pasture. I cannot find any broadleaves except musk thistle, which he hates. He sprayed Chaparral (aminopyralid and metsulfuron) herbicide out of an airplane last year and there are no broadleaves. I said you have no diversity, you have the poorest quality grass for cattle in a monoculture here, you have no broadleaves, you killed them all and this erosion is trouble. No cow pies are broken down. I said, "You have no life here, no insects are alive, and no nutrients are being recycled." When I kicked the cow pie over, it was all dead underneath. I said there is nothing alive in the soil and I have to bring this back to life with my living animals. They spot sprayed musk thistle. So this musk thistle turned brown and fell over. I said, "Why is this three foot area around here dead? Did you use that Chaparral herbicide and did you calibrate the equipment?" He said, "Oh no, we used the death mix on that one, by God." You have to feed the system. Build diversity and stability. So I took 1,100 goats and walked them perpendicular to all the trails that the cows had made to try and get this system to undo the damage. After three days, we reshaped the landscape with the herd. We tried to mellow off the sharp head cuts caused by erosion. The herd tromped organic matter into the soil with the goal of stopping further erosion.

Slide 4. Goats grazing along a hillside in an urban setting.

In an urban context, for 15 years, we have brought the goats to the Organic Community Gardens in downtown Colorado Springs to help manage the buffer zones around the garden to keep chemicals from intruding into the space.

We are nurturing living systems. With the goats, we bring life to soil and plants. Thank you very much.

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Goat Grazing Across the Country

With Lani as a true visionary, the use of goats in communities across the country is becoming an increasingly common tool for managing landscapes. Here are just a few examples of high profile cases where goats have been or are currently employed:

- ***The Congressional Cemetery, Washington, DC***. The cemetery tasked over 100 goats in 2013 to control poison ivy, ground cover, and other invasives that threatened large mature trees, which have the potential to fall and damage historic headstones.
- ***Pacific Gas and Electric (PG&E), Auburn, CA.*** The company used over 900 goats to clear weeds and dried brush on 100 acres of its property in 2013 to prevent wildfires.
- ***O'Hare International Airport, Chicago, IL***. In 2012, approximately 30 goats and sheep were used to eliminate an overgrowth of poison ivy, and poison oak, and reduce habitat for wildlife hazardous to airport operations.
- ***Maryland Department of Transportation's State Highway Administration, MD.*** In order to protect Bog Turtle habitat, the administration enlisted 40 goats to graze along a major highway bypass in 2009.
- ***Google Corporate Campus, Mountain View, CA.*** Google hired 200 goats to manage weeds and brush in order to reduce fire hazard starting in 2009.