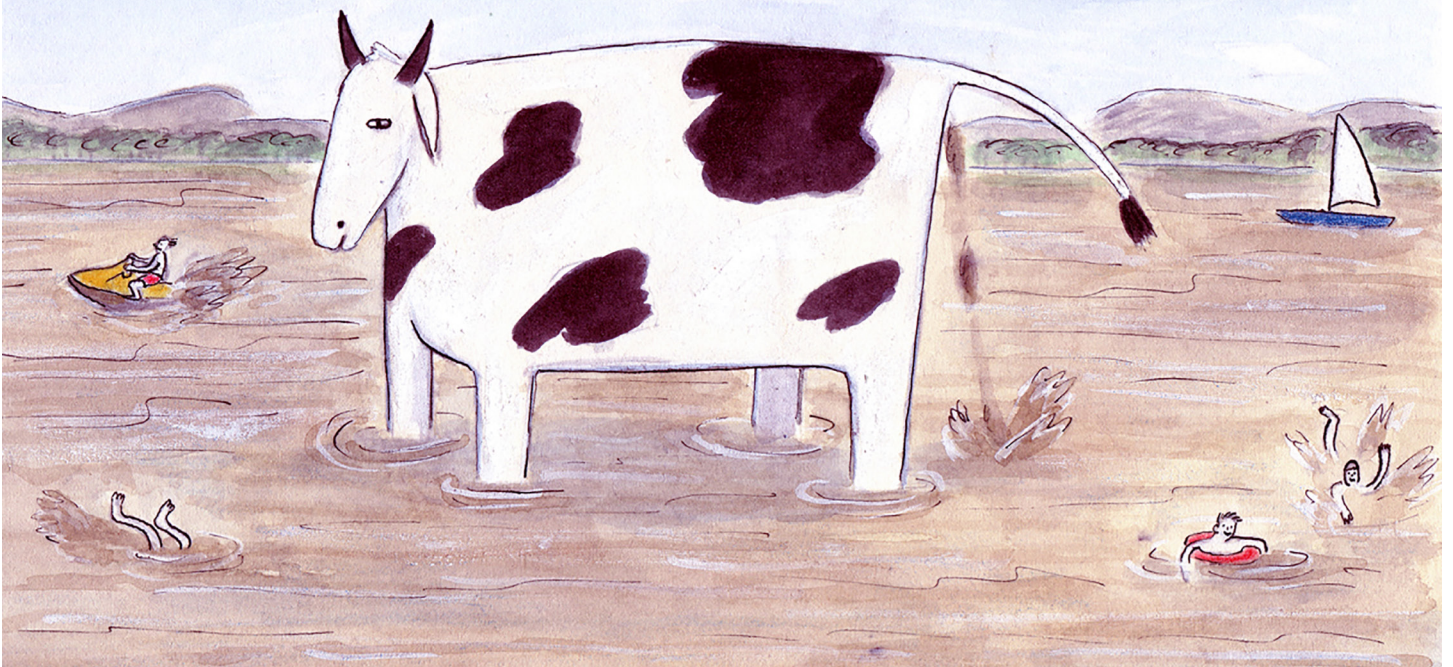


A Failure to Regulate:
**Big Dairy & Water
Pollution in Vermont**



By Will Allen, Michael Colby, and Kate Duesterberg

REGENERATION
VERMONT



Vermont's Lake Carmi is in crisis. It's being overwhelmed by cyanobacteria, a blue-green bacteria that grows in phosphorus-polluted waters. Lake Carmi sits at ground zero for the state's industrial dairy industry, Franklin County, home to more than 36,000 confined cows (and only 47,000 people), creating a staggering amount of phosphorus-rich manure. This county's mega-farms are the primary dairy suppliers for Ben & Jerry's ice cream.

A Failure to Regulate: Big Dairy & Water Pollution in Vermont

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About the publisher: Regeneration Vermont is a nonprofit educational and advocacy organization that is working to halt the catastrophic consequences of Vermont's adoption of degenerative, toxic and climate-threatening agricultural techniques, particularly within the dominant dairy sector. We are affiliated with Regeneration International, a bold organization working to educate, unify and mobilize movements around agricultural-based solutions to the world's climate, hunger and environmental crises.

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Vermont's large-farm dairy industry is under increasing scrutiny for a variety of economic, ecological, and humanitarian transgressions. Ben & Jerry's, for example, was recently the subject of a *New York Times* exclusive that reported on the existence of the pesticide glyphosate in 10 of 11 samples of its ice cream.

But contamination from the mega-dairies that supply Vermont's big brands, like Ben & Jerry's and Cabot Cheese, is nothing new to Vermonters, especially when it comes to the contamination of our waterways. For decades, these iconic brands have garnered enormous profits - each hovering around the \$1 billion-a-year level - while pushing a kind of confinement, non-grazing dairy production, resulting in a toxic farm runoff that is literally choking our lakes and streams. Even the beloved Lake Champlain is one of more than 100 other bodies of water in Vermont that are classified as "impaired." And, in many cases, "impaired" means filled with the green slime that is cyanobacteria, smelling so badly that summer camps have become uninhabitable, and beaches are posted with signs that warn, "no swimming."

The tales of long-time residents like Jerry Hayden of St. Albans, where the bay is among

the most polluted sections of Lake Champlain, are sadly typical of people who have grown up engaged with the state's lakes and rivers. Hayden is a lifelong fisherman of St. Albans Bay.

"It's not like it used to be when I was a kid," Hayden told VTDigger. "We went down to Black Bridge and caught huge fish, and it was crystal clear water. Now you can just about walk on it out there. If it gets hot, the weeds grow right out of the water, then there's stuff on top of the water that floats and stinks real bad."

Every year, more state and federal money gets spent on trying to reverse the decline of our public waters in Vermont. Yet, every year the problem gets worse. And it seems destined to continue until citizens of all stripes -- consumers, property owners, taxpayers, farmers, and naturalists - rise up and force the state and the

The mega-dairies that supply Vermont's big brands, Ben & Jerry's and Cabot Cheese, are contaminating the state's waterways.



Vermont — like the rest of the nation — is producing too much milk, turning manure pits into dumping grounds for the excess milk. These pits also receive the loads that are rejected due to high antibiotic levels. And all of it will be pumped out of these pits and spread on farm fields.

corporations to shut off the major sources of water pollution that are devastating our lakes and rivers.

We can't adequately address the problem, however, until the state regulators and legislators admit that the major source of the pollution problem is confined dairy. And then there must be a plan to stop -- not just regulate and attempt to dilute -- dairy pollution. At some point, we are going to have to get beyond the "all in" rhetoric of the dairy industry and its complicit regulators, whereby they attempt to convince us that even though they're causing more than half the problem, taxpayers should pay for all of the cleanup.

It's "all-in" for the taxpayers, and "not-in" for the milk co-ops, like St. Albans (suppliers for Ben & Jerry's and Crescent Ridge) and Agri-Mark (Cabot Creamery). But they are doing the damage, while we, the taxpayers, are paying for the cleanup. And what do taxpayers get in return? Very little, it turns out, as dairy now represents just 1.4% of Vermont's GDP. Worse, there are other economic, ecological and social

justice issues beyond the water pollution that industrial dairy is forcing upon the state.

This has created a great disconnect between how Vermonters think the state farms and how we are actually farming. The marketing of the once-bucolic hillside farms, with cows grazing in the sunshine is not the reality today. Today's industrial cow, which represents 80% of Vermont's agriculture now, never puts a hoof on pasture, instead is confined on concrete, and is all-too-often in need of medication to keep up with the production demands.

The barn work is no longer family work, either, as these factory operations - 2000-plus cows - are now largely staffed by migrant workers. The underground relationship between the farms and these farmworkers makes for conditions all too ripe for exploitation. The migrant workers can't, for example, even leave the farm for fear of immigration officials and deportation. But this much is certain: they are paid low wages, work very long hours, and do not have even the most basic workplace protections.





Industrial dairy's damage to Vermont's waterways is perhaps the most documented of its many threats. Recent estimates from public and private sources are that from 40 to 79% of the phosphorous and nitrogen pollution in Vermont's waterways comes from dairy farms. And, almost all of the pesticide pollution comes from these dairies. Consequently, the regulation of these dangerously polluting large-scale farms and processing plants is essential, and way overdue.

The official attitude of Vermont's state agencies is to defend confined dairy and its polluting practices, including the abundant use of pesticides, fertilizers, and antibiotics. In spite of this, officials at the top know that Vermont's dairy problems are severe and getting worse. According to Julie Moore, the current head of Vermont's Agency of Natural Resources (ANR), just 3% of the runoff into the lake comes from "point" sources, like wastewater treatment plants or factories. Moore told the Addison Independent that the remaining 97% comes from nonpoint sources — meaning locations all over the watershed, ranging from farms to front yards to highway and road runoff. Moore concluded that roughly half -- 48.5% -- of that pollution comes from agricultural sources. So, even the regulators know that the major polluter in Vermont is the dairy industry. Yet, they refuse to act.

Ironically, for literally decades, Vermont legislators have passed bills and measures requiring the agencies to regulate dairy pollution, agricultural runoff, pesticide and fertilizer abuse, and excess use of antibiotics, the most recent effort being Act 64. With the passage of each, Vermonters celebrated and then relaxed, thinking that the regulators would enforce and support the enacted regulations. That expectation has been wrong, as state

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regulators consistently refuse to regulate dairy, no matter how many laws are passed.

For example, the Agency of Agriculture and the Agency of Natural Resources are required to collect data on pesticides, fertilizers, antibiotic abuse, water pollution, and toxic effluents, but the agency mandates seem to stop there. They collect the data, then they either don't analyze it, or they analyze it and hide it. No publications, or no analyses are shared with the public to whom they should be accountable. Instead, we at Regeneration Vermont, along with several other nonprofit organizations, have had to file FOIA requests to obtain the data so that we could analyze it.

As a result of this lack of transparency and the refusal to regulate in Vermont, a state still branded as bucolic, 15 lakes and 86 rivers and streams were deemed as impaired in 2016 by the US EPA. None of Lake Champlain's 174,175 Vermont acres fully support all designated uses due to the combined effects of mercury contamination, PFOA pollution, nutrient accumulation (nitrogen and phosphorus), and non-native species. To punctuate how widespread the pollution is, according to the EPA, more than 138,900 acres (80%) of the Vermont portion of Lake Champlain were not even swimmable during the summers of 2015 and 2016.



Nutrient Overload Spawns Contamination

Vermont's industrial dairy production is heavily dependent on feed corn, a crop that has replaced pastureland and grazing for today's confined cows. Corn is, by far, Vermont's top row crop, now grown on over 92,000 acres in the state. Not only is nearly all of Vermont's feed corn GMO derived, but it is also treated with a wide variety of toxic pesticides and climate and environment-threatening fertilizers, particularly nitrogen and phosphorus.

According to Mike Winslow, a scientist for the Lake Champlain Committee for over 15 years, an enormous amount of phosphorus fertilizer was imported into the state from 1924 until 2007. In the last ten years, Winslow told the Addison Independent, because of increasing pollution and pressure from EPA, phosphorus applications have decreased. However, slurry

pond applications, which contain high amounts of phosphorus, have increased as dairies get bigger. So, phosphorus emissions keep rising. Winslow concluded that from a water quality perspective, "corn is terrible for the lake," and "grass is definitely better." Unlike GMO corn crops, growing grass for grazing cows does not require polluting fertilizers.

While most nutrient problems in Vermont's rivers and lakes are usually attributed to phosphorus, nitrogen pollution is at least as serious. Nitrogen is most frequently the cause of excess algal growth and, ultimately, oceanic dead zones. Nitrogen overloads currently originate from non-point sources, and agriculture is the largest source of nitrogen pollution to coastal waters.

Vermont's Agency of Natural Resources tested lakes and rivers for nitrogen levels from 2002 to 2016 and found that the highest levels of nitrogen were found in Missisquoi Bay and in the South Lake region, but that nitrogen pollution



was common in all parts of Lake Champlain. Here's how Dr. Hans Paerl, a marine and environmental sciences professor at UNC-Chapel Hill, explained it to Lake Champlain Life: "Excessive amounts of growth are caused by high levels of both nitrogen and phosphorus. Nitrogen is not worse than phosphorus, but both need to be reduced. The bottom line is that nitrogen input needs to be controlled along with what we already know about controlling phosphorus input... If we only reduce phosphorus we may not get there fast enough in terms of getting a lake or even a marine system back to what we would deem desirable."

Each year, as a result of excess applications of both of these fertilizers, cyanobacteria devastates the Missisquoi Bay and the lake area adjacent to St. Albans. Not coincidentally, this region has Vermont's highest concentration of confined dairy farms, including several that are suppliers of Ben & Jerry's cheap milk.

Cyanobacteria now pollutes more than 35 square miles of the Lake Champlain shoreline during summer months. Swimming or wading in water with cyanobacteria causes minor skin rashes, sore throats, diarrhea, stomach problems, or more serious health problems. Children and pets are at highest risk of exposure.

"The smell is horrendous, especially when that algae goes blue-green," Gil Gagner told VT Digger. His community of Highgate Springs sits right on Missisquoi Bay, "and when it smells bad, people leave. Some of the tourists leave and move inland. They just can't stand the smell."

Cyanobacteria now pollutes more than 35 square miles of the Lake Champlain shoreline during summer months.



Drowning in Cow Manure

There is no secret to the primary cause of Vermont's water woes: too many confined cows creating too much manure. Because what we put on our fields – especially at saturation levels – ultimately ends up in our rivers and lakes.

Nevertheless, it's confounding to most people how a small state like Vermont, with a well-marketed environmental ethic, could have such polluted waterways. Currently, for example, there are more than 100 streams, rivers and lakes classified as "impaired" in Vermont, much of it from industrial dairy runoff.

But it's not confounding when we stop to consider how much manure our mega-dairies are producing, collecting and spreading, especially in Franklin and Addison Counties where the confinement dairies are concentrated and, not coincidentally, the waterways are most polluted.

According to the U.S. EPA's Office of Research and Development (2004), "a farm with 2500 dairy cattle is similar in waste load to a city of 411,000 people." It's an astounding number, for sure, and it makes more sense when you realize that the modern, industrial cow is fed nearly 130 pounds of feed a day – mostly GMO-derived corn silage. It's all part of a commodity-based model aimed at maximizing milk production. The more you feed, the more they produce – in both milk and manure.

More than half of Vermont's 134,132 dairy cows reside in just two counties -- Franklin and Addison. Franklin County has 35,736 cows (and 48,799 people), while Addison County has 32,498 cows (and 37,035 people). Using the EPA's ratios for calculating cow to human waste comparisons, Franklin County's cows are creating waste that would be equivalent to 5.87 million people. And Addison County's cows create a waste equivalency to that of 5.34 million people. Statewide, Vermont's 134,132 dairy cows create the same amount of waste as would be created by over 20 million people.

Suddenly, the confusion is gone when contemplating Vermont's water woes, especially when you realize that the solution for all this manure – from the equivalent of more than 20 million people – is to simply spread it on our fields – raw and untreated. Compare that to what is understandably required of homeowners and towns and cities when dealing with septic and greywater waste. Hint: Tossing it in the yard is prohibited.

Vermont, we have a problem: Too many confined cows and too much manure. It's as simple as that.

Source: "Risk Management Evaluation For Concentrated Animal Feeding Operations," U.S. EPA Office of Research and Development, National Risk Management Research Laboratory, May 2004.

Pesticide Pollution of our Public Waters

As early as 1996, the state knew that it had a problem with the use of the herbicides atrazine and simazine (both used on feed corn). Both were suspected to cause alteration in the sex of smallmouth bass and amphibians in Lake Champlain. Researchers recently found that 60-70% of the male fish in Mississquoi River have eggs, a disturbing example of sex changes from the overuse of endocrine disrupting agricultural pesticides like atrazine and simazine. In 2001, they finally began sampling for these weed killers in Lake Champlain and in state water wells. They sampled from 2001 through 2015, but didn't publish the data.

Finally, water quality advocates at the Lake Champlain Basin Program published a significant portion of the state's data in 2016. These studies found that atrazine and metolachlor, both feed-corn herbicides, are ubiquitous in our surface waters. They also found that tile drainage from dairy cornfields could be a large source of herbicides and insecticides.

In a Regeneration Vermont analysis of the state's pesticide data, we found that 1,432,650 pounds of the weed killer metolachlor were used on Vermont corn from 1999 to 2013. Metolachlor is the third most common pollutant in US rivers, streams and lakes. It causes cancer, birth defects, and is an endocrine disruptor.

We found that 1,037,575 pounds of the weed killer atrazine and 224,628 pounds of simazine (total: 1,262,203) were used on Vermont corn from 1999 to 2013. Both are water polluters. Atrazine is the second most common water pollutant in the US, after glyphosate (Roundup). Both atrazine and simazine are banned in the European Union because they are carcinogenic, cause birth defects, are endocrine disruptors, and pollute drinking water.

Our review of pesticide and fertilizer use revealed that Vermont pesticide use was up 39% and nitrogen fertilizer up 17% from 2008 through 2012 after farmers adopted GMO corn almost entirely (96%) on 92,000 acres of dairy corn.

NITROGEN FERTILIZER INCREASES IN VERMONT, 2002-12, IN POUNDS

YEAR	NITROGEN	PCT. GMO CORN
2002	8,924,000	8
2003	14,864,000	16
2004	14,170,000	19
2005	12,362,000	28
2006	16,188,000	37
2007	21,436,000	46
2008	12,048,000	67
2009	16,928,000	77
2010	*	89
2011	17,072,000	109
2012	16,538,000	90

The excess nitrogen and phosphorus not used by the plants ends up polluting our rivers, lakes, and the ocean and worsens global warming problems, because nitrogen manufacture and use emits nitrous oxide, which is 300 times more damaging as a greenhouse gas than CO₂.

Much of this excess usage ended up in streams, rivers, and lakes.

The Vermont Agency of Agriculture conducted a 13-year survey of private and public well water. But once again, they did not publish their findings. As a result of FOIA requests, the Champlain Basin Water Program obtained and evaluated this data in 2016, covering the period from 2002-2015. They found that herbicides were widespread in lake and river samples, though rarely detected (6%) in public or private wells. They also found that nitrogen was not only widespread in Lake Champlain, but was detected in 52% of the 675 wells tested from 2006-2010.

Vermont public waters have been damaged by a series of spills, excessive effluent, irresponsible land management, and other dairy and creamery violations of the Clean Water Act for decades. Among the most egregious water violators are Vermont's two dairy co-ops, St. Albans (Ben & Jerry's) and Agri-Mark (Cabot). The spills at Cabot's hometown facility have included illegal discharges that have killed fish, sterilized miles of river, and polluted the river with sewage. Each time, it promised to discontinue polluting our public waters. Promises it has never kept.

Compiled from VT Agency of Agriculture Reporting Data.





Beached: Dairy Pollution & Water Sports

Vermont's Department of Health would like beach-goers, swimmers, and water recreationalists of all types to add another item to their aquatic planning: check the state's "Cyanobacteria Tracker" website to see if the river, pond or lake they're seeking to enjoy isn't too toxic for them or their pets. And check it frequently, they advise, especially in the summer months when cyanotoxins are at their highest levels. Other than that, enjoy the water.

This is not good. There is a deep discordance between the marketing of Vermont's waterways as clean and pure and the dire warnings from the Department of Health about acute water toxicity, particularly at the more than 100 Vermont lakes and rivers dirty enough to be classified by the EPA as "impaired." It spells doom for Vermont's outdoor tourism industry, built upon an image of reverence for our land and water.

It is accepted science that more than half of Vermont's water woes are the direct result of agricultural practices employed by mega-dairies, from poor manure management to excessive use of fertilizers. It is perhaps the greatest warning sign yet to Vermonters that the impacts of industrial dairy production reach far beyond the farm, threatening not just our image of being protectorates of our natural resources but are ability to enjoy them.

Vermont's waterways are monitored for health and safety in a number of ways. One is by calculating the ratio of carbon, nitrogen and phosphorus found in phytoplankton, a nutrient check of sorts. It's called the Redfield ratio, and healthy bodies of water have about 16-to-20 parts of nitrogen to every part of phosphorus. By comparison, many sections of Lake Champlain and other popular Vermont rivers and lakes will show ratios closer to 10-to-1, a phosphorus-rich blend that promotes the growth of the toxic blue-green algae known as cyanobacteria.



Cyanobacteria and the toxins they emit can cause a host of health problems, from the relatively minor like rashes or a sore throat to more serious stomach problems. Dogs – and certainly wildlife -- have died from ingesting the cyanotoxins found in Vermont’s waters.

The Vermont Department of Health pulls no punches when it comes to warning people about the extreme dangers of coming into contact with these toxins, including a rather ominous spotlight it puts on “cyanobacteria and neurological diseases.” The fact sheet linked to its tracker website includes this swimming killjoy:

“BMAA is an amino acid produced by some cyanobacteria. Researchers are testing the hypothesis of a link between BMAA exposure and ALS. This research is very preliminary and has not been proven. The Health Department will continue to review information as it becomes available.”

It’s why the Vermont Department of Health is taking the issue so seriously, working with nonprofits and concerned citizens to collect and share as much information as possible about cyanobacteria outbreaks. Its “Cyanobacteria Tracker” site is a sobering and valuable tool, by highlighting the dangers, providing information necessary to help identify these bacterial blooms, and giving clear warnings about the state of our waterways.

In the current summer (2017), the “Cyanobacteria Tracker” site has already put out dozens of warnings about public waterways it has declared to be at “low alert” or “high alert” levels for cyanobacteria toxins. It’s a frightening commentary on the way we’ve allowed dairy farms to become so big as to be antithetical to any reasonable ecological or animal welfare standards. Vermont beaches are closed or on their way to being closed because of the way the state has allowed dairy farms to grow beyond recognition, with smaller farms being gobbled up and thousands of cows put under a single roof, where cows never put a hoof on pasture – ever. Sadly, cows on grass are a thing of the past in Vermont’s industrial, nonorganic dairying.

And the results are as obvious as beach closures and health warnings about even touching the water we once splashed in and drank from without fear. Vermont shouldn’t be in a position of asking beach-goers to check the toxic profile of the water they’re seeking to enjoy. That’s not the Vermont any of us want.



The Regenerative/Organic Solution

Although dairy's contribution to state revenue is small, Vermont dairies produce 67% of New England's milk (85% of which is shipped out of Vermont). Vermont farmers only provide 5% of the state's non-milk food, which makes this the most off-balanced agricultural state in the country. At a time when industrial, confined dairy is in crisis, we need to look seriously at other alternatives in Vermont. Do we, the public really need this much cheap milk if farmers are dumping it? How can we convert dairies to scale down and be regenerative organic? How we can convert excess dairy acreage (since there is too much milk) and diversify our farms and do a better job of providing a wider variety of local foods for our own communities?

The answers are in fact already at hand. Vermont has more organic dairies per capita than any other state. In fact, 25% of the total number of dairies in Vermont have converted to organic. These farmers are able to make a living and they are not polluting our land and our waterways. We have the technical expertise in the state to help more farmers convert. Because so many conventional farmers are on the verge of bankruptcy, many more would convert to organic today if there was a ready market.

Big dairy buyers like Ben & Jerry's, Cabot Creamery, or Green Mountain Greek Yogurt could, with a decision to buy organic ingredients, almost immediately turn around the problems of Vermont's dairy economy, poor working conditions on farms, polluted waterways, and unhealthy cows. If only there was a will to do so. Ultimately, the public must collectively decide how to clean up our lakes and rivers, and who is going to pay for the cleanup. Don't forget, up until now, public taxpayers have put more than \$200 million into cleaning Vermont's public waters. And they are still getting dirtier, as industrial dairy gets bigger.

Unlike Entergy, the owner of the Yankee Nuclear power plant, Big Dairy, the majority polluter of our lakes and rivers has no polluter-pays clean-up fund, no habitat restoration department, no fiduciary responsibility. They can literally walk away from the crime scene. In this case, the big dairy co-ops and their major clients, Ben & Jerry's and Cabot, do not pay. Consumers pay and citizens pay -- in state and federal taxes. And they will continue to pay more and more and the problem will only get worse if the big dairy co-ops and their major clients don't lead the transition toward regenerative organic practices. And if they won't lead, the citizens and the state must pressure the corporations and the regulators to do the right thing.

Vermont is overdue for a transformation in the way we work the land. Regeneration Vermont is calling for a statewide transition to regenerative and organic methods.

This is not the dairy farmer's fault. Farmers did not invent antibiotics, synthetic hormones, pesticides, GMOs, or fertilizers. Chemical corporations did. Farmers did not invent confined animal feeding prisons. Chemical corporations, USDA, and the universities did. The current dairy pricing system is designed to do just what it has done -- get rid of the small and medium sized farmers who didn't want to be big, replacing dairies that cared with large-scale cow prisons where abuse runs rampant for the cows, the land, the water, the labor, the consumer, and even the farmer.

Is that the Vermont brand we want to sell? As Migrant Justice has shown us in their valiant effort to bring some dignity to migrant workers on Vermont's dairy farms, and as we have tried to illustrate in our series of investigative pieces: currently, there is no dignity in Vermont's dairy system. And it represents more than 80% of Vermont's agriculture —most of it confined. Unfortunately, being defined by how we farm is no longer a pretty picture.

But we can fix it. Vermont is overdue for a

transformation in the way we work the land. This kind of change has been a constant in Vermont's agricultural history. The big problems being caused by large-farm dairies – everything from water pollution to farmworker exploitation to animal abuse – can be solved with some big solutions.

The reality is that the necessary agricultural revolution won't begin with our governors, regulators, or legislators. The record shows that they've only enabled Big Dairy for decades. The people are going to have to lead on this one.

And we have a plan. It's as bold as it's required to be given the importance of Vermont's dairy industry to our heritage, our values, our working landscape, jobs, tourism, and our brand identity.

Regeneration Vermont is calling for a statewide transition to regenerative and organic dairy production. This plan was endorsed by more than two-dozen of Vermont's agricultural, environmental and food economy leaders, including the state's former secretary of agriculture.

This transition must go hand in hand with market demand, so that farmers can receive a higher – and more stable – price. Again, more than 200 of Vermont's dairy farms have already made this transition, reaping the economic benefits and putting into place the agricultural practices that protect water quality and the environment, keep cows on pasture, build healthy soils to sequester carbon, reject GMOs and toxic pesticides, and honor Vermont's values and brand identity.

We can do this.





Resources & Supporting Documents

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