

VNRC

Published
by the
Vermont
Natural
Resources
Council, Inc.

Vermont

Environmental Report

Climate Change Solutions: Clean Energy and Beyond

Winter/Spring
2020

Member Profile

Julie Wolcott

Julie Wolcott farms organically on Green Wind Farm with her partner Stephen MacCausland and family in Fairfield, Vermont, where they also produce and sell maple syrup. After 40 years of milking cows, in 2019 Green Wind Farm transferred ownership of its Jersey cattle and contract with Stonyfield Farm to a new family of farmers, who are carrying on the organic tradition on the same land.



Photos: Stonyfield Farm

“Be ready for work, sacrifice, and reward,” says Julie Wolcott to aspiring organic farmers. Right: Green Wind Farm.



Why are you a member of VNRC?

There are so many reasons. VNRC is a state-wide organization with a veteran staff working on collaborative solutions to existing and potential environmental issues. Your programs are focused but overlapping and comprehensive. I trust VNRC to speak out and up for policies, rules and legislation that protect all of Vermont’s natural resources and promote healthy communities of people, animal life, forests, and waterways.

How does your role as an organic farmer inform your views on climate change?

Being farmers, weather influences our plans every day, sometimes down to the minute. The extreme weather is challenging, from strong winds, to heavy rains, to extended dry periods, to variable winters. Cropping windows are narrow. Animal health is compromised with fluctuating temperatures.

But the standards for organic farms are a climate change resilience playbook. Green Wind Farm has maintained organic certification for crops, ruminant livestock, and maple syrup. Maple syrup standards require a forest management plan, a diverse species, trail and road maintenance to prevent erosion, and tapping standards to promote tree health to maintain the canopy.

Livestock standards include a pasture rule requiring enough grazable forage to make up 30% dry matter in a cow’s diet plus requiring at least 120 days of grazing. Our farm is all in grass so there is no exposed soil. The soil’s capacity to withstand extreme weather events has increased over time.

Regenerative agriculture is a term we’re hearing a lot lately as a way to make our land more resilient in the face of climate change. How does it work?

Regenerative agriculture is an approach to farming that is applicable to all types of farms: conventional, organic and biodynamic. Soil health is put on a pedestal and all land management decisions, from cropping to animal and human uses, are decided through a “bettering soil health” lens. Improved soil does not sequester much carbon but it does allow for more water absorption and more biodiversity in soil life and the forages grown.

Unfortunately, in Vermont the term “regenerative agriculture” has been associated with the organization

Regeneration Vermont, which has sharply divided the agricultural community by emphasizing the negative aspects of certain types of farming. As farmers, we need to work together to solve our problems, and speak with one voice to rebuild the farming communities in Vermont.

Where do you find hope and inspiration around preparing Vermont for a better future?

I’ll answer this from a farming perspective. There is a next generation that is eager to farm. Even though, as far as dairy is concerned, there are fewer farms, the same amount of land is still being farmed.

I am hopeful that the farm/land owners will work with aspiring farmers with a commitment to increasing the number of farms and farm families. This could be by sharing equipment, infrastructure, land, animals, time, and knowledge. Vermont also has a slew of dedicated technical advisors in the Vermont Farm & Forest Viability Program, at UVM extension, and at nonprofits (Land for Good, for example).

There is also financial support available through state initiatives that are eager to assist existing and beginning farmers. These include the Working Lands Enterprise Initiative; the Agency of Agriculture, Food and Markets; and federal cost sharing through the Natural Resources Conservation Service (NRCS).

Do you have any advice for aspiring organic farmers?

Work for and with a respected farmer for a few years. Come to understand the systems that work and systems that don’t for the land base and infrastructure. Start small, confirm your market, invest in what will provide you income (for instance, cows instead of equipment). Be ready for a 5-10 year slog. Be ready for work, sacrifice, and reward.

VNRC Advisory Committee

Maude Barlow
Bill McKibben
Will Raap
Gus Speth

VNRC Board of Directors

Kelly Coleman, *Chair*
Elizabeth Courtney
Lindsay DesLauriers
Judy Dow
Chad Farrell
Carolyn Finney
Don Hooper
Scott Johnstone
Will Lintilhac
Ira Marvin
Kesha Ram
Amy Seidl
Darren Springer

VNRC Staff

Brian Shupe, *Executive Director*
Alex Baad, *Americorps Member, Community Energy Coordinator*
Nancy Davila-Groveman, *Finance and Operations Director*
Jamey Fidel, *General Counsel/ Forest and Wildlife Program Director*
Kelsey Gibb, *Operations Coordinator*
Stephanie Gomory, *Communications Director*
Shelden Goodwin, *Vermont Conservation Voters Outreach Coordinator*
Jon Groveman, *Policy and Water Program Director*
Lauren Hierl, *Vermont Conservation Voters Executive Director*
Ian Hitchcock, *Community Organizer*
Colin Keegan, *Membership and Outreach Coordinator*
Kate McCarthy, *Sustainable Communities Program Director*
Johanna Miller, *Energy and Climate Action Program Director/VECAN Coordinator*
Stephanie Mueller, *Development Director*

Publications

Stephanie Gomory, *Editor*
Tim Newcomb, *Design*



Through research, education, collaboration and advocacy, VNRC protects and enhances Vermont's natural environments, vibrant communities, productive working landscapes, rural character and unique sense of place, and prepares the state for future challenges and opportunities.

VNRC is the Vermont affiliate of the National Wildlife Federation.

VNRC membership includes a subscription to the Vermont Environmental Report. Join VNRC in protecting Vermont with your membership of \$40.

Copyright © 2020, VNRC

Cover photo: Bob LoCicero

The Two Pillars of Resilience

By Brian Shupe, *Executive Director*



“Adaptation and mitigation are the two pillars of resilience, and focusing on both is the challenge of our times.” I wrote this in our Fall 2013 issue of the *Vermont Environmental Report*, when climate change was the leading environmental issue of our time, but not nearly as stark or urgent a piece of the global zeitgeist as it is now, just seven years later.

The concern is local, too. In a poll commissioned in 2019 by our partner organization, Vermont Conservation

How we deal with land use can either equip us for the future or lead us into further crisis.

Voters, 76% of Vermonters said they were either very worried or somewhat worried about global warming, with 61% stating they are very worried about the topic, up from 35% saying they were very worried about global warming just three years earlier.

In 2013, as now, mitigation referred mainly to reducing our contributions to climate change by cutting down our greenhouse gas emissions. Adaptation meant developing smart strategies to withstand, and hopefully thrive in, a period of unprecedented change.

The interplay between adaptation and mitigation remains crucial. And as the years pass, it's increasingly clear that addressing climate change requires going far beyond the obvious solutions around clean energy and electrification. It requires significant improvements in our transportation system and how we manage our forests, farms, and waterways — and recognizing that how we deal with land use can either equip us for the future or lead us into further crisis.

There is no aspect of nature or society that will escape the effects of climate change, and so too there is no piece of Vermont life we can ignore when planning for a better future, whether embracing the power of intact forests and agricultural soils to sequester carbon, improving flood resilience along our waterways, or promoting increased public transportation options in smart growth locations.

This issue of the *Vermont Environmental Report* is dedicated to exploring these solutions — the ones that don't immediately (not yet, anyway) come to mind when reading the latest report on our global and local failure to decrease fossil fuel emissions from our cars, homes, and businesses.

Given how large a percentage of Vermonters said they were worried about global warming in the aforementioned poll, we hope many of our friends and neighbors will find this issue useful as we enter what may be the most important — and hopefully transformational — decade of the century.

At publication, we find ourselves adapting to another crisis as well: the threat of COVID-19. Please know that VNRC is still hard at work advocating for your environmental priorities, even though we will be teleworking and meeting with partners remotely until the coronavirus is under control.

You can always find us online at vnrc.org and on Facebook and Twitter, where we'll keep you up to date on our efforts. Stay well.



Climate Change Solutions: Clean Energy and Beyond

Bob LoCicero

In 2018 the United Nations' Intergovernmental Panel on Climate Change warned that the planet had just 12 years to avert a climate change catastrophe. By the time 16-year-old Greta Thunberg was named *Time's* 2019 person of the year, a renewed fervor around climate activism had — at long last — swept the globe.

Vermont was no exception. Last year 76% of Vermonters said they are either very worried or somewhat worried about global warming, with 61% saying they were very worried. That's up from 35% of Vermonters saying they were very worried about it just three years prior.¹

We're collectively aware of the crisis, but do we understand the suite of solutions required to abate it? For many, the climate problem encapsulates a single idea: the urgent need to reduce carbon emissions from the fossil-fueled machines that run our lives. Images of solar panels, windmills, and electric cars come to mind.

Ending our addiction to fossil fuels is an absolute imperative. In fact, the world's leading climate scientists say that we have ten years to cut society's collective combustion of fossil fuels by half, or risk catastrophic consequences. But even more steps are needed to avert the crisis underway.

A comprehensive approach to addressing and resisting climate change takes us deep into how we manage our forests, farms, and flood plains. It informs how we build and grow our cities and towns, and how we get around. And it entails changing our habits, economy, and even our culture.

Building a more complete transportation system

Take transportation, Vermont's highest source of carbon emissions, which accounts for 44% of the state's climate

pollution.² It is tempting to wonder: If all cars, buses, trucks, and trains simply ran on electricity, wouldn't it vastly improve the situation? Electric vehicles are indeed part of a sustainable

transportation future and a crucial pollution-reduction strategy. But they must also be paired with broader, longer-term solutions.

“Electric cars and buses, powered by Vermont's increasingly clean electric grid, are an important part of driving down climate emissions, especially in a rural state,” says VNRC Energy and Climate Action Program Director Johanna Miller. “Still, we must do far more, relying less heavily on single occupancy vehicles and fundamentally transforming the system that we have built on the fallacy of access to cheap, abundant fossil fuels, considering the dire consequences of this reliance on our climate.”

Changing the dominant culture around driving — and all the infrastructure we already have in place — is a monumental task. But building cleaner, more equitable transportation options does not need to be. The Transportation and Climate Initiative (TCI) is one potential way for Vermont, along with neighboring states, to invest in such solutions.

TCI would place a cap on climate pollution from transportation fuels — requiring fossil fuel companies to pay for the pollution they are generating — and use the revenue raised to fund new ways of getting around, such as electric buses, rail transport, bike and pedestrian infrastructure, hybrid and electric vehicles, or even building housing closer to where people live and work.

Vermont's participation in a cap and invest program is not new. Under Governor Jim Douglas, the state joined the Regional Greenhouse Gas Initiative (RGGI) in 2008, which covers the

Ending our addiction to fossil fuels is an absolute imperative. But even more steps are needed to avert the crisis underway.

electric sector in the Northeast. RGGI has proven very successful, reducing consumer costs and carbon pollution from the power sector by 40 percent. Vermont has strategically invested these revenues over the years, directing the \$2 million annually into weatherization programs that help Vermonters save energy and money.

TCI has the potential to make a big impact, too, if given the chance. In December 2019, Vermont joined 11 other New England and mid-Atlantic states, along with Washington, DC, in issuing a draft plan for the initiative that outlined modest but significant measures to foster a cleaner, more diverse transportation network. For us to move ahead with the program, Vermont Governor Phil Scott will need to choose to formally adopt it or the Legislature will have to require it. It will be an uphill battle, as Scott has been skeptical of the program's potential to raise fuel costs for Vermonters — costs that we believe would be far outweighed by the initiative's immense value.

“If we take the dollars we're currently sending out of state to pay for imported fossil fuels, and instead invest them in transportation that moves more people while creating green jobs right here at home, the benefits for Vermonters of all income levels will outweigh any gradual increase in gas prices fossil fuel companies may pass on to consumers over the next decade,” says Miller.

She is among the advocates leading the charge for an equitable implementation of TCI that spotlights expanding transportation choices to better serve all Vermonters, particularly the state's rural and aging populations, people with disabilities, and people with lower incomes. These groups currently bear the highest burden of transportation accessibility and costs. Low-income and marginalized communities also often suffer disproportionate impacts of vehicular pollution.

The Transportation for Vermonters (T4VT) coalition, founded in part by VNRC, is another group emphasizing equity and stressing the intersections between how we get around and other aspects of our lives. Working with cross-sector members like the Vermont Energy Investment Corporation (VEIC), the American Lung Association in Vermont, and Local Motion, T4VT recognizes that supporting downtowns, villages, and compact community centers can lay the foundation for a diverse, sustainable transportation system.

When housing, jobs, schools, and services are closer together, people have more transportation choices, including walking and biking, which saves them money and reduces greenhouse gas emissions. “Where and how we build our communities matters, because it informs how we build our transportation system,” says Kate McCarthy, VNRC's Sustainable Communities Program Director, who also coordinates T4VT. Find T4VT's 2020 policy platform at tinyurl.com/transportation4vermonters.

Our transportation choices inform how and where we live, too. In an op-ed published in *VT Digger* in December 2019, Maura Collins, Executive Director of the Vermont Housing



Finance Agency, addresses the counterintuitive notion that living in lower-priced homes in Vermont can actually make for a less affordable lifestyle. “Less expensive housing in more rural areas can have hidden costs. Long commutes mean workers spend more on gas and car maintenance, especially in the more rural areas that lack public transportation networks,” she writes.

McCarthy explains that because Vermont is a rural state, many are quick to assume there is no alternative to personal vehicles, and that public transit is “not for us.” To that, she proposes we get creative about more convenient and cleaner ways to get around. This means looking beyond what initially comes to mind — fixed-route buses, electric cars — and to an entire network that links people where they need to go. That might include car shares; shared rides through transportation companies like Lyft or Uber; bike shares and improved biking infrastructure; safer, wider sidewalks; more housing choices in downtowns and villages of all sizes; or even on-demand micro transit. See the inset for some examples of such solutions from around the state.

“In Vermont, it is not only that we are accustomed to driving; we often have no other choice. But we shouldn't have to choose between getting around today and preserving a stable climate for tomorrow,” says McCarthy.

“Things like public transit, ride-sharing, and housing in our smart growth centers are the longer-term structural changes that most people don't often think about when hit with the climate crisis and the urgent need to radically reduce our reliance on fossil fuels,” notes Miller. “But they are also investments we must make if we want real progress and a resilient transportation network.”

Developing carbon markets

If the Transportation and Climate Initiative provides a way to cap carbon emissions from fossil fuels and invest the revenues in our ailing transportation system, carbon offset markets (or carbon sequestration markets) function on the flip side. They reward landowners for keeping their forest land intact, recognizing that forests store and sequester carbon, which in turn promotes climate stabilization.

A forest carbon offset is a financial instrument that represents the equivalent of one metric ton of sequestered carbon dioxide, which can then be sold and retired to “offset” emissions elsewhere in the economy, and can also be traded like a stock certificate.³

Carbon markets are not yet widely used in Vermont, but researchers and the Vermont Legislature are evaluating their implications for our future, and that includes the potentially powerful role our farmlands — and our soils — might play in sequestering carbon. Vermont's forests are already playing an important role, removing more than 8 million metric tons of carbon dioxide, along with 1,610 metric tons of other pollutants annually, from the atmosphere.⁴ In Vermont, approximately 50%

of all carbon emissions are sequestered by our forests, compared to 35% of emissions in New England and 15% in the United States overall.⁵

Here's how it works: Forests take in, or sequester, carbon dioxide from the atmosphere to make energy through photosynthesis. They then store carbon in the form of living and dead biomass (that includes leaves, tree trunks, stumps, and soil) and ultimately release it back into the atmosphere through plant and animal respiration and decomposition. One half of a tree's weight consists of stored carbon.⁶ Forests are often called "carbon sinks" because they absorb more carbon dioxide than they release.⁷

In 2019, the Vermont Legislature passed Act 83, establishing the Vermont Forest Carbon Sequestration Working Group to study how to create a statewide program to enroll Vermont forestlands in carbon sequestration markets. Following a four-month investigation, the Working Group published a final report in December 2019 that explores how to facilitate landowners'

use of credits in a state where carbon offsets are not yet widely used, and how the State could play a role in encouraging landowner participation.

Among the Working Group's policy recommendations are that the Agency of Natural Resources (ANR) analyze the feasibility of developing a forest carbon offset project for at least one parcel of state land by July 1, 2022. The project would be expected to build staff expertise that could be used to assist municipalities and private landowners with enrollment in carbon markets, provide a public model of what the Working Group calls "exemplary pro-carbon, climate-resilient forestry" (managing lands to optimize their sequestration potential), and generate revenue that could fund greenhouse gas emissions reduction projects across the state.

Since in Vermont, as across New England, most forestland is privately owned by families and individuals, maintaining intact forests will be dependent on giving landowners reliable options to conserve their land after their lifetimes. Estate planning,

Getting Creative About Transportation: Sharing Rides

Building a more complete transportation system means re-thinking the modes of transport we are accustomed to using and seeing, and considering the entire landscape of how we get around. Luckily, many Vermonters are getting creative.

The Vermont Agency of Transportation (VTrans) and Sustainable Montpelier Coalition (SMC), for example, are implementing an on-demand micro transit system in Montpelier. It will replace local (intracity) fixed-route, fixed-schedule bus routes, which can often be slow, inconvenient, and hard to access in small-city rural regions.

Using the on-demand transit provider Via, the micro transit system will set up users with on-demand rides along efficient automated routes in shared-use vehicles. Request a ride when you need it by using an app, visiting a website, or making a call — and leave your car at home.

SMC expects the micro transit system to be up and running by early fall 2020. In addition to successfully transitioning current bus riders to the new system, the group aims to cater to the nearly 1,200 residents it estimates live and drive to work in Montpelier, and to seniors in need of more access and flexibility when it comes to transportation.

Micro transit will do more than decrease emissions and vehicle congestion by reducing daily car trips through and



Phoenix Mitchell

into town. It will also reduce the need for in-town parking, which even electric vehicles demand. SMC has found that more than 60% of downtown Montpelier is currently dedicated to parking. "This is space that could serve as people-centered places to live, play, and shop — a prime example of how transit and land use are intertwined," says Kate McCarthy, Sustainable Communities Program Director at VNRC.

Someone else getting creative with ride sharing is Adam "Phoenix" Mitchell, a Worcester resident who launched a program called The Hitching Post in 2019 to

harness the potential of single-occupancy vehicles already on the road. He calls the program a "mash-up of carpooling, ride-sharing, hitchhiking, and resilient community."

Find one of several "Hitching Posts" at locations throughout Central Vermont, then simply raise one of the attached flags to signal an interested driver passing by to pick you up. For those not comfortable with the idea or practice of hitchhiking, The Hitching Post operates through a Facebook group as well, where users can arrange ride shares more formally.

Community-based transportation grants are available from VTrans for any town in the state that is interested in setting up its own Hitching Post. Learn more at <https://www.thehitchingpost.org/>.

conservation easements, and the Vermont Use Value Appraisal (UVA)/Current Use Program, which eases tax burdens by valuing forestland for its productive use versus fair market — or development — value, are some ways to accomplish this. Carbon markets are another potential fit.

Ideally, landowners, including private landowners and state or local governments, would receive financial payments for managing forests for carbon, while the State could support policies that maintain or increase the levels of carbon sequestration and storage in Vermont forests. Towns could even potentially generate additional revenue from town forests, which could then fund land management costs, recreational improvements, and additional climate resiliency and conservation efforts.

We encourage those interested to read the full Working Group report at tinyurl.com/vfcs-final. Another useful publication, authored in part by the University of Vermont's Bill Keeton,



Bob LoCicero

is called *Vermont's Forest Carbon: A Market Opportunity for Forestland Owners*.

Slowing the rate of forest loss

Though carbon markets are just emerging in Vermont as a key strategy, tapping into forests' potential to curb climate change is not a new idea. During the administration of Vermont Governor Jim Douglas (2003-2011), slowing the rate of forest loss in Vermont was actually considered the most effective strategy, from a cost/benefit perspective, for dealing with climate change, due to forests' high rates of carbon sequestration and storage.

"There is increasing interest in carbon markets being an emerging tool to incentivize landowners to keep forests as forests, so we can continue to harness the benefits they provide," says Jamey Fidel, Forest & Wildlife Program Director at VNRC. "Anytime we can leverage an opportunity to keep our forests intact, we need to pay attention. The timing is crucial."

Updating Act 250 for a Changing Climate

In late February, the Vermont House of Representatives passed H.926, an Act 250 modernization bill, with tripartisan support. This legislation strengthens Act 250's environmental protections and equips Vermont's land use law to better serve current and future generations.

For instance, H.926 adds criteria to Act 250 to better protect forest blocks, wildlife habitat, and river corridors, which are increasingly stressed by climate change — an issue that was not in the public consciousness when Act 250 was enacted in 1970. The bill also addresses climate change by considering the transportation and energy impacts of development, and supports smart growth by reducing

sprawling development while facilitating development in our compact downtowns, villages, and neighborhoods.

"Act 250 was passed 50 years ago this year, and the challenges facing our state have changed and grown," says Brian Shupe, VNRC's Executive Director. "Modernizing Act 250 is yet another way we can resist and prepare for a changing climate, by acknowledging that there are ways to develop our cities, towns, and infrastructure that can alleviate rather than worsen our energy burden, and vastly improve our transportation system."

Learn more about VNRC's advocacy to strengthen environmental protections in Act 250 by visiting vnrc.org/act-250.



Bob LoCicero



Fidel is referring to the fact that Vermont lost an estimated 102,000 acres of forestland from 2012-2017⁸ and we continue to convert our forests for residential and commercial development. VNRC researched parcelization trends with partners in 2018, finding that the amount of Vermont’s “woodland” parcels, which represent mostly undeveloped forestland, decreased by approximately 15% over the study period (2004-2016) mostly due to forests being converted to residential and other land uses. Acreage in large parcels (50 acres or larger) declined, while the number of parcels 50 acres or smaller increased by nearly 9,000 parcels.⁹

“If forests are our front line for maintaining a resilient landscape to mitigate the effects of climate change, we need to make sure we’re being smart about our land use patterns,” says Fidel. “How and where we develop is important.”

Currently, Vermont’s landmark development law Act 250 does not adequately consider how to maintain intact forests when large subdivisions and impactful roads and driveways are proposed. VNRC has been leading efforts with the current administration to develop criteria and jurisdictional changes to Act 250 that better address how to minimize forest fragmentation.

This includes addressing sprawling development around interstate interchanges and examining long incursions from roads and driveways in intact rural and high elevation lands, which break up the landscape and threaten wildlife connectivity. Ensuring a connected landscape is key to maintain healthy

If forests are our front line for maintaining a resilient landscape to mitigate the effects of climate change, we need to make sure we’re being smart about our land use patterns.

populations of wildlife that can adapt to a changing climate.

These proposed changes are among many others that make up a bill, H.926, that passed in the Vermont House at the end of February and will next go to the Senate. Learn more in the inset.

With wildlife connectivity in mind, VNRC is also working on a 2020 update to our publication *Community Strategies for Forests and Wildlife*. The most important addition will be a section to help guide municipalities in implementing Act 171, a 2018 law encouraging municipalities and regions to identify areas that are important as forest blocks and habitat connectors and to plan for development in these areas to minimize forest fragmentation.

Additional efforts at VNRC include a ten-year assessment of town plans and regulations to address how forest and wildlife conservation is occurring (or not occurring) across the state. We published similar assessments in 2000 and 2010. We are developing a survey to collect input for strategies to maintain working forests through Act 171, and coordinating with regional planning commissions to analyze effective strategies to keep forests intact. We look forward to updating you on these endeavors.

Given the immense value of our forests in reducing carbon pollution through sequestration and fostering a resilient landscape where wildlife and humans can thrive, “keeping forests intact is one of the most important things we could possibly do” when it comes to climate change, explains Fidel. “Having our state policies reflect this goal is one VNRC’s highest priorities.”

Reducing Emissions Takes a Diversity of Approaches

Well-known strategies for mitigating carbon emissions include putting more electric vehicles on the road, adopting wind and solar power, and adding heat pumps to homes and businesses. But there's more to the story.

Consider the potential scenario illustrated in this infographic from the Energy Action Network (EAN). Based on currently available energy technologies and proven best practices, the chart shows one path for how Vermont could reach our Paris Climate Agreement commitment to achieve emissions reductions of at least 26-28% below 2005 levels by 2025.

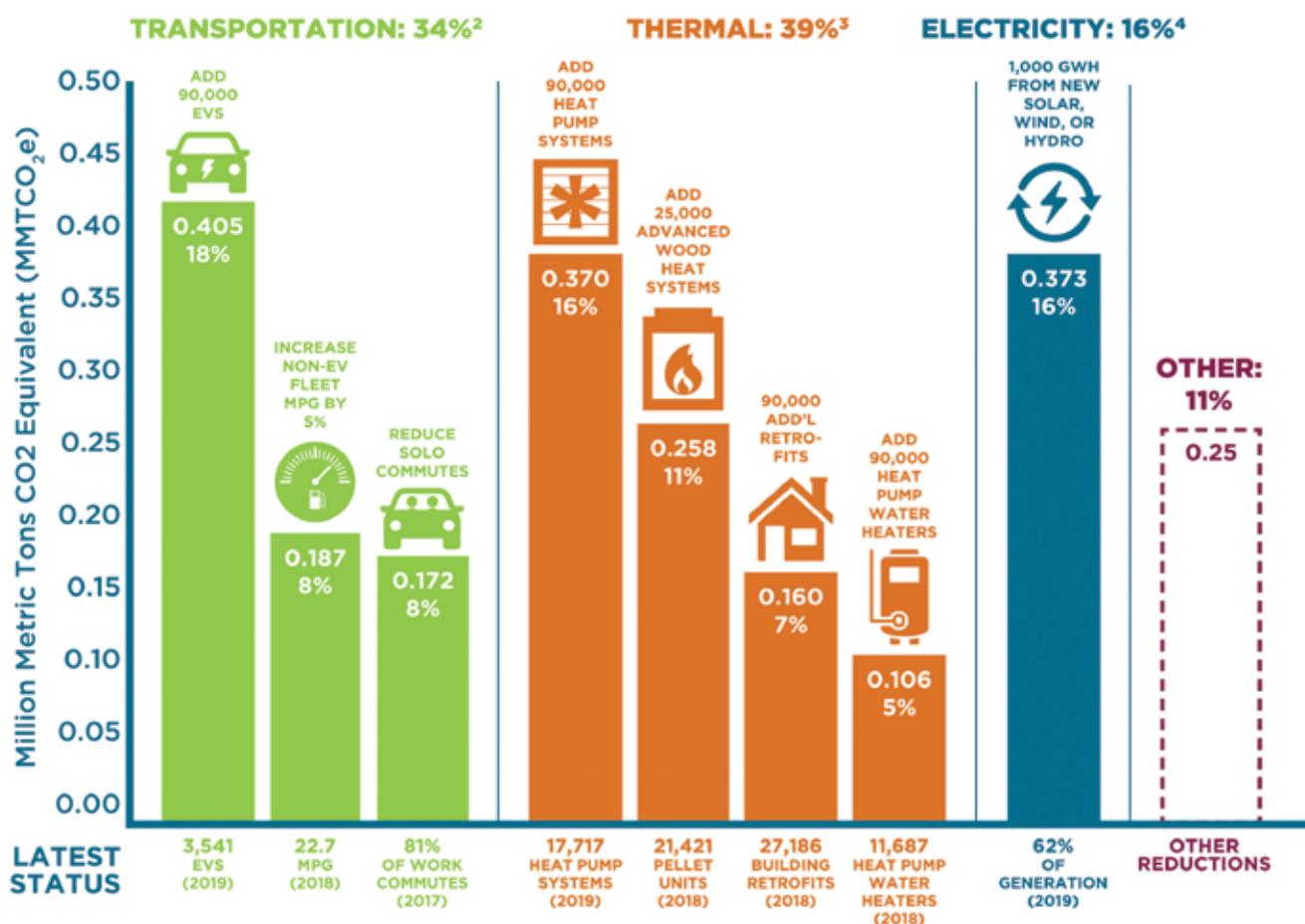
In the graphic, you'll see a diverse range of efforts — electrification, renewable energy, heating efficiency — that would be urgently required to mitigate emissions, plus 11% more from additional measures. These include carbon

sequestration through forests and agriculture.

Despite longstanding climate goals, Vermont has fallen dramatically short of reducing our collective carbon pollution. We have the highest per-capita greenhouse emissions of any New England state and are the only state in the region that has failed to reduce emissions below 1990 levels. Strategies to dramatically reduce fossil fuel consumption in the transportation and heating sectors in particular are critical to turning this trajectory around.

EAN's analysis (intended to be illustrative and not prescriptive) helps portray how in a comprehensive approach to dealing with climate change, non-energy related emissions reductions strategies will play a role, too, as we explore in our feature article. Find EAN's newly-released 2019 annual report at eanvt.org.

2.3 Million Metric Tons CO₂e Reduction by 2025 Is Required to Meet the Paris Agreement¹



1. Vermont Agency of Natural Resources. January 2020. 2. Transportation data is the latest available from the Energy Information Administration (EIA) (2019), Vermont Agency of Transportation/UVM Transportation Research Center (2019), and Drive Electric Vermont (Oct 2019). 3. Thermal data from EIA (2019), Efficiency Vermont (2019), Department of Public Service (2019), Biomass Energy Research Center (2019), Department of Forests, Parks & Recreation (2019). 4. Electric data from the Department of Public Service (2019) and ePUC (Certificates of Public Good: September 2019).

Restoring our river corridors

The same could be said for protecting our rivers as temperature changes increase the occurrence of severe weather events. On Halloween last year, Vermont endured a major rainstorm that caused an estimated \$5 million in damages to state, local, and federal roads. Many towns have still not completely recovered from the catastrophic flooding they suffered in the wake of Tropical Storm Irene in 2011.

Rivers need space to move, and they need an adequate buffer around them — a *river corridor* — to absorb floodwaters. But this term is fairly new. For decades, river scientists limited their concern to an area around the river called the “floodway fringe” or the floodplain, which looked only at impacts of flooding in the immediate area surrounding a river’s banks. Most of Vermont’s cities and towns are nestled closely beside rivers, after all, and placing residences and commercial properties nearby has been a common practice.

As climate change made flooding from extreme storm events more commonplace, experts began mapping rivers more carefully with a sense not only of their current path — channelized to accommodate human settlements — but of their intended path, based on patterns of movement over time. “Once scientists started mapping where the river *wanted* to go, the concept of the river corridor was born,” says Jon Groveman, Policy and Water Program Director at VNRC.

Today, ANR defines a river corridor as the area of land surrounding a river that provides for the meandering, floodplain, and the riparian functions necessary to restore and maintain the naturally stable or least erosive form of a river, thereby minimizing erosion hazards over time. (Note the mention of

meandering, recognizing a river’s dynamic state of movement.)

Act 250, meanwhile, still bases its regulation of land use in floodways on the outdated concept of the “floodway fringe,” which is not reflective of our changing reality in a changing climate. In VNRC’s work to update Act 250, one of our priorities in addressing development along rivers is simply inserting the term “river corridor” into the law and recommending that ANR create a program to regulate development in river corridors based on maps that indicate where a river is going to move over time.

There is little we can do to change the layout of communities that have been built along the water, explains Groveman. “What we can do is improve the way we approach and regulate future development along river corridors, to mitigate the dangerous effects of flooding and reduce the occurrence of erosion, a major source of water pollution,” he says.

“Keeping people out of harm’s way, and protecting the banks of the river so they’re able to adequately absorb floodwaters — it’s all related,” says Groveman.

Removing unused and unmaintained dams

Dam removal is another valuable tactic for restoring what Groveman calls “the energy of the river” while making our landscape more resilient. Vermont has more than 800 known dams, many of which were originally built to supply mechanical power for sawmills and gristmills. Others were built to provide water supplies for communities and industries, or for recreational purposes.

Today, however, we estimate that hundreds of the state’s dams serve no useful purpose. Instead, they degrade water quality and aquatic habitat, restrict the movement of fish and other wildlife,

Read Our 2020 Plan for Climate Action

In January, VNRC was one of 30 Vermont organizations representing business, youth, poverty alleviation, public health, environment, and other diverse interests to present a platform for climate action in Vermont in 2020.

At a glance, the four legislative priorities for this 30-member coalition are:

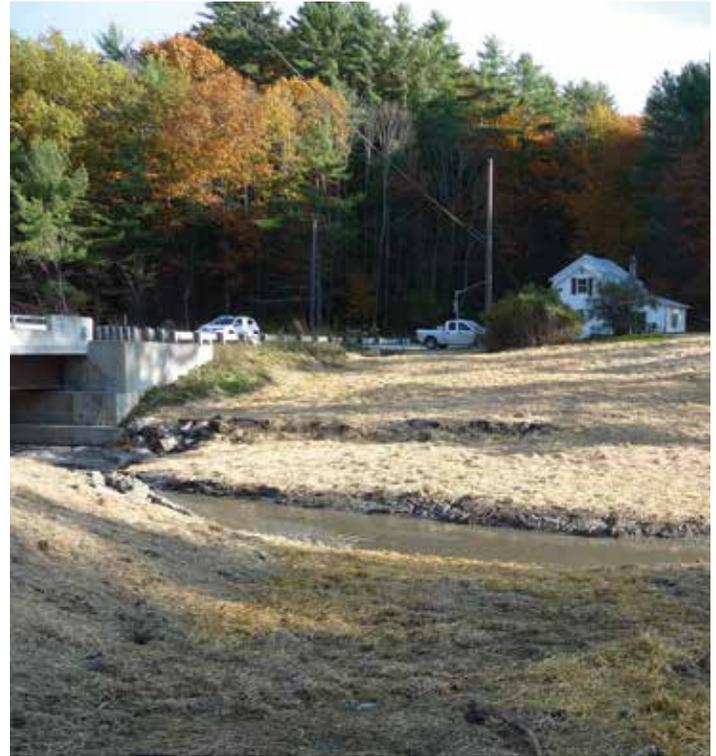
- Enacting a **Global Warming Solutions Act** that enables and requires state government to achieve climate emissions reductions, by holding the state accountable to developing and implementing a plan that will meet our commitment to the Paris Climate Accord by 2025 and achieve net-zero carbon emissions by 2050
- Making a commitment to **100% renewable energy by 2030** to move our state infrastructure away from imported fossil fuels and strengthen our local economy
- **Modernizing Vermont’s energy efficiency utilities**, enabling them to focus on reducing climate pollution through innovative new technologies while reducing the cost burden by helping low- and moderate-income Vermonters access cleaner, healthier, and more affordable heating and transportation solutions

- Participating in a just, equitable implementation of the **Transportation and Climate Initiative** (TCI), a regional effort to reduce climate pollution by placing a cap on emissions from fossil fuel companies and using revenue raised to help participating states invest in cleaner transportation options

Update: The Global Warming Solutions Act passed in the Vermont House by a margin of 105-37 in February, and now moves on to the Senate.

Read the full *2020 Plan for Climate Action* and learn how to get involved at www.actonclimatevt.org.





Before and after: Mill Pond Dam in the early stages of removal (left) and the restored flood plain after removal (right)

drive up costs in maintenance and liability, and pose significant risks to public safety. While a dozen or so dams in Vermont were built expressly for flood control, most others are essentially “full” all the time with a very limited ability to store extra water during a flood, and can actually increase flooding upstream.

Removing dams lowers water levels during floods and other high-flow weather events, making it easier for riverbanks and surrounding soils to absorb rains, reducing the likelihood of catastrophic flooding.

Consider VNRC’s recent removal of Mill Pond Dam in Colchester, a deteriorating dam that was classified by the Dam Safety Program as a “significant hazard,” having not served a useful purpose since the mill it powered burned down in 1941. In addition to eliminating 2,200 feet of free-flowing riverine habitat, the dam’s impoundment had filled in the former mill pond with an estimated 17 tons of phosphorus, which was contributing to algae blooms and excessive aquatic plant growth in Lake Champlain.

With support and assistance from partners including the U.S. Fish & Wildlife Service and The Nature Conservancy, VNRC broke ground on the Mill Pond Dam removal in August 2019 and completed the project in November. In the process, we reconnected 31 miles of stream and brought Indian Brook closer

to its natural state as a free-flowing stream. Later this year, trees and shrubs will be planted in the new floodplain.

At completion of the dam removal, a renewed diversity of aquatic habitat had already appeared, with river otters, great blue heron, coyote, black bear, deer, red-shouldered hawk, and minnows appearing in and alongside the stream. Find a video documenting the dam removal at vnrc.org/clean-water/dam-removal.

A holistic approach

VNRC has worked heavily in the clean energy arena for over a decade. (To get a better sense of what we’re working on now, view our 2020 climate policy priorities in the inset.)

But we have also been dedicated to the climate solutions that, though less intuitively recognized by the general public, are crucial as we adapt to a warming world — and as we take steps to mitigate further harm.

Removing dams, limiting development in river corridors, incentivizing landowners to keep their forests intact for carbon sequestration, and improving our transportation system are among the many ways Vermont is addressing and resisting extreme temperature change throughout our natural and built environment.

- 1 From 2019 polling conducted by Vermont Conservation Voters (VCV) and the Vermont Public Interest Research Group (VPIRG). Find the results at vermontconservationvoters.com.
- 2 EAN’s analysis of the ANR’s *Vermont Greenhouse Gas Emissions Inventory and Forecast: Brief 1990 – 2016*.
- 3 Vermont Forest Carbon Sequestration Working Group. 2019. Available at tinyurl.com/vfcs-final
- 4 Trust for Public Land and Vermont Forest Partnership (which includes VNRC). 2018. *Vermont’s return on investment in land conservation*. Available at tpl.org/vermont-roi

- 5 Vermont Forest Carbon Sequestration Working Group, 2019
- 6 Catanzaro, Paul and Anthony D’Amato. 2019. *Forest Carbon: An essential natural solution for climate change*. Available at uvm.edu
- 7 Keeton, William, et al. 2018. *Vermont Forest Carbon: A Market Opportunity for Forestland Owners*. Available at www.vlt.org/land-management/carbon
- 8 Morin et al, 2017. Forests of Vermont, 2016. Resource Update FS-119. Department of Agriculture, Forest Service, Northern Research Station.
- 9 View the full report, *Tracking Parcelization Over Time*, at vforesttrends.org/reports

Recent Highlights of Our Work

Energy and Climate Action

Advances conservation, efficiency, renewable energy, and transportation solutions that reduce fossil fuel usage and save Vermonters money.



- Worked with partners in a 30-organization coalition to craft and release a 2020 Plan for Climate Action in Vermont with four main policy priorities: Turning our long-held climate goals into requirements through a Global Warming Solutions Act, requiring 100% renewable electricity by 2030, modernizing Vermont's energy efficiency utilities, and shaping and joining a strong, equitable Transportation and Climate Initiative (TCI).

The Global Warming Solutions Act passed in the Vermont House by a margin of 105-37 in February. We now must ensure that the bill gets a strong vote in the Senate and secures the support of as many legislators as possible to avoid the veto pen of Governor Phil Scott.

- Continued our work in the TCI-focused northeast regional Our Transportation Future coalition to advance carbon pollution reductions in the transportation sector and invest revenues raised from this market-based program in transportation electrification, transit, bike and pedestrian solutions. Crafted joint comments and have worked to ensure Vermonters are engaged in this process, including hosting a well-attended webinar on TCI with Senate President Pro-Tem Tim Ashe.

- Began another year of weekly broadcasts from the State House through our Climate Dispatch, which provides live updates on what is happening on climate and clean energy efforts and outlines how concerned Vermonters can get involved.
- Continued to support and start town energy committees. We hosted our 12th annual VECAN Community Energy & Climate Action conference in December, which drew nearly 300 people. We also helped organize two successful regional energy forums for local energy leaders, hosted several webinars on timely topics, celebrated another successful Button Up Vermont effort with partners, including Efficiency Vermont, and began exploring other opportunities of interest to communities, including the DIY Window Dressers efficiency initiative.

Forests and Wildlife

Maintains and enhances the ecological and economic vitality of Vermont's forests, and healthy wildlife populations.



- Made recommendations to address forest fragmentation, and promote working lands and wildlife connectivity through new criteria and jurisdictional changes to Act 250, including examining long incursions from roads and driveways in intact rural lands, and assisting the viability of forest-based enterprises.
- Continued coordinating with partners in the Forest Partnership (Audubon Vermont, The Nature Conservancy, The Trust for Public Land, and Vermont Land Trust) to elevate

forestland conservation and legislative opportunities to address forest policy.

- Together with partners and trail organizations, developed a proposal for an alternate environmental review process for trails that would be housed at the Agency of Natural Resources. The concept would include the use of best management practices and oversight and technical assistance from agency professionals to assist sustainable trail development in Vermont.
- Conducted outreach on the results of our parcel trends research, including a Phase III report analyzing subdivision trends in Vermont.

Smart Growth

Promotes and protects Vermont's smart growth development pattern of compact settlements – with options for transportation, housing, and employment – surrounded by farms, forests, and natural areas.



- Continued developing proposed changes to Act 250 that would equip the law to better promote compact development and support a wider range of transportation choices across the state, among other smart growth issues.
- Launched a re-booted version of VNRC's Community Planning Toolbox, which provides guidance to local officials on a range of smart growth issues. The Toolbox, originally developed by Smart Growth Vermont, is now easier to navigate. It can be accessed at vnrc.org/community-planning-toolbox.



Johanna Miller
Energy and Climate Action Program Director/VECAN Coordinator
jmiller@vnrc.org



Jamey Fidel
Forest and Wildlife Program Director
jfidel@vnrc.org



Kate McCarthy
Sustainable Communities Program Director
kmcCarthy@vnrc.org



Jon Groveman
Policy and Water Program Director
jgroveman@vnrc.org



Lauren Hierl
Vermont Conservation Voters Executive Director
lhierl@vermontconservationvoters.org

- Continued to coordinate the Transportation for Vermonters (T4VT) Coalition, releasing our 2020 policy agenda, which calls for promoting the Transportation and Climate Initiative (TCI), expanding and increasing public transit, promoting compact community centers, and reducing barriers to the adoption of electric vehicles.
- Serving on the Advisory Committee for an I-89 Corridor Study, a multi-year planning and engineering process, in order to ensure that any proposed changes don't lead to sprawl, and to make sure that non-driving options — rather than just road expansions — will be used to reduce pressure on the system overall.

Clean Water

Protects and enhances the quality of Vermont's streams, rivers, lakes and ponds, wetlands, and groundwater.



- Continued developing proposed changes to Act 250 that would redefine the way river corridors are protected, and address the way other waterways should be reviewed to ensure that they are consistent with the current state of the science and reflect modern approaches to protecting these resources.
- Completed, with partners including the U.S. Fish and Wildlife Service and The Nature Conservancy, the removal of Mill Pond Dam in Colchester. The project reconnected 31 miles of stream, removed an estimated 17 tons of phosphorus from the impoundment, and brought Indian Brook closer to its natural, free-flowing state.
- Worked to ensure that an ANR draft permit to regulate parcels with three acres or more of impervious surface is not rolled back or delayed, and to address concerns that have been expressed by the regulated community in a constructive way that results in

greater reductions in discharges to Vermont waters.

- Worked with partners in the Water Caucus to ensure that Vermont's new wetland protection law is strengthened and not weakened as part of a legislative working group addressing how the program will operate.
- Together with partners, including Trout Unlimited, the Connecticut River Conservancy and Vermont Law School, worked to address unregulated surface water withdrawals, that have increased as a result of the growing hemp industry, vegetable farming and the potential legalization of commercial cannabis.

Toxic-Free Environment

Advocating for policies that protect Vermonters' health by reducing exposure to hazardous chemicals, holding toxic polluters accountable for the harms they cause, and ensuring our waters are clean and safe.



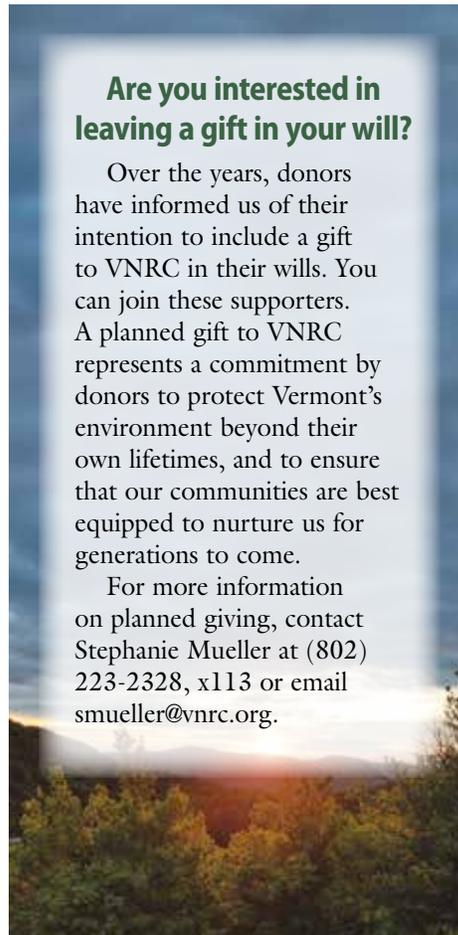
- Continued advocating for the Legislature to override the Governor's 2019 veto of S.37, a bill that allows victims of toxic pollution to seek costs for medical monitoring needed as a result of exposure to toxic pollution. Though a federal judge released a decision in December allowing victims of PFAS contamination in Bennington to seek medical monitoring legislation in the courts, enacting legislation is necessary to ensure that all Vermonters have clear access to medical monitoring now.
- Worked with the Single Use Products Working Group, after being appointed by the Speaker of the House, to advance policy proposals that reduce the use and toxicity of single-use products and packaging.

- Continued serving on a national steering committee of organizations collaborating on chemical policies, and hosted a nationally-supported screening of Dark Waters, a film about PFAS contamination and corporate accountability.
- Advocated for legislation that will restrict the use of toxic PFAS chemicals in firefighting foam, food packaging, and carpets and rugs.
- Released the 2020 Vermont Environmental Common Agenda at a reception at the State House on February 4th. The Agenda highlights the top environmental priorities and proposed solutions from a range of environmental organizations across Vermont. This year, highlights include action to better address toxic chemicals, climate change, and Act 250.

Are you interested in leaving a gift in your will?

Over the years, donors have informed us of their intention to include a gift to VNRC in their wills. You can join these supporters. A planned gift to VNRC represents a commitment by donors to protect Vermont's environment beyond their own lifetimes, and to ensure that our communities are best equipped to nurture us for generations to come.

For more information on planned giving, contact Stephanie Mueller at (802) 223-2328, x113 or email smueller@vnrc.org.



News & Notes

VNRC Launches the Vermont Brewshed Alliance

In November 2019, VNRC launched the Vermont Brewshed® Alliance (the Brewshed). The Brewshed is a mutually-beneficial partnership between breweries, pubs, and VNRC to engage our members and their patrons in protecting the clean water we all depend on. The founding members are Alchemist Beer (Stowe), Halyard Brewing (South Burlington), Lawson's Finest Liquids (Waitsfield), Magic Hat Brewing Company (South Burlington), and Zero Gravity Craft Brewing (Burlington). VNRC is seeking participation from breweries across the state. Learn more at vnrc.org/brewshed.



Welcome to new VNRC Board members Judy Dow, Carolyn Finney, and Lindsay DesLauriers; Farewell, Richard Czaplinski

We were thrilled to welcome three new VNRC Board members in recent months. Judy Dow of Essex is a Vermont Native with an education career spanning more than three decades, who is a recipient of the Governor's Heritage Award for Outstanding Educator. She is also the Interim Director of Gedakina, a nonprofit that works to connect Native rural, urban, and reservation communities.



Judy Dow

Carolyn Finney of Burlington is a renowned author currently serving as a scholar in residence at Middlebury College. She works to develop greater cultural competency within environmental organizations and institutions, challenge media outlets on their representation of difference, and increase awareness of how privilege shapes who gets to speak to environmental issues and determine policy and action.



Carolyn Finney

Lindsay DesLauriers of Huntington is co-owner and President of Bolton Valley Resort and co-owner and Managing partner of Bolton Valley Community Water and Sewer, LLC. Formerly, she was the founding Director of Main Street Alliance of Vermont, a nonprofit organization that works with small business owners on public policy issues.



Lindsay DesLauriers

We were sorry to see Richard Czaplinski of Warren Village complete his final term as a VNRC Board member in January. We'll miss his wisdom and steadfast commitment to creating a more resilient and sustainable Vermont.



Richard Czaplinski

Lawson's Finest Raises Over \$10,000 for VNRC's Clean Water

Lawson's Finest Liquids pays its staff living wages and generous benefits. In lieu of tips at its taproom, the Waitsfield brewery invites guests to support its Sunshine Fund to benefit local nonprofits that help the people and environment of the Mad River Valley and Washington county. From November 1-15, the Sunshine Fund raised over \$10,000 for VNRC to benefit our clean water work. Thank you, Lawson's Finest, for making this incredibly generous gift possible! We are also very grateful to the community for supporting us.



Vermont's 2020 Environmental Common Agenda is here

In February Vermont Conservation Voters (VCV), VNRC, and partner groups released Vermont's 2020 Environmental Common Agenda, a guide to this year's top legislative priorities for the environment. The Common Agenda represents the priorities of a range of environmental organizations across Vermont who are working to engage policymakers and the public on issues affecting our water, air, land, wildlife, communities, and health. Find it at vermontconservationvoters.org.

Dark Waters Spurs Vermonters to Action

In December, our partner organization Vermont Conservation Voters (VCV), along with Participant Media and Safer States, presented a screening of *Dark Waters* to a packed house at Merrill's Roxy Theater in Burlington. The film tells the true story of an attorney (played by Mark Ruffalo) who uncovers a dark secret about one of the world's largest corporations knowingly dumping toxic chemicals into water supplies across the nation.



Following the screening, VCV held a panel about PFAS contamination in Vermont and filmgoers wrote postcards to their legislators urging them to override Governor Scott's veto of S.37, a bill that would hold polluters accountable for medical monitoring costs for victims of toxic contamination. Thanks to those who participated.

Membership Growing

VNRC membership has been growing as the result of expanded outreach and a wider portfolio of events, from mini film screenings to community nights at restaurants, to lectures and talks by authors and experts. If you have an idea for an event or opportunity you'd like to see us offer, please contact Colin Keegan, Membership and Outreach Coordinator, at ckeegan@vnrc.org. Don't miss out — join us today at vnrc.org. We're looking forward to another year of great programming!

Farewell, BT Fitzgerald!

We wish Brian T. (BT) Fitzgerald well in his second retirement. Fitzgerald began his position as VNRC's Dam Project and Vermont Dam Task Force Coordinator in 2013, after retiring from the Vermont Agency of Natural Resources, where he focused on dam removal and mitigating the impacts of dams on Vermont's rivers.

"BT's significant experience and patience were instrumental in building VNRC's dam removal program over the past six years," said Brian Shupe, director of VNRC. "Removing dams is expensive and time-consuming work, but with BT at the helm we've accomplished so much."

Most recently, Fitzgerald oversaw the ambitious removal of Mill Pond Dam in Colchester in the fall of 2019. The project reconnected 31 miles of stream, bringing Indian Brook closer to its natural, free-flowing state. View our new video that recounts the dam removal journey at tinyurl.com/MillPondDam.



Celebrating Another Successful VECAN Conference

On December 7, the Vermont Energy and Climate Action Network (VECAN), which VNRC coordinates, held its 12th Community Energy and Climate Action Conference at Lake Morey Resort in Fairlee. This year's theme was *Meeting the Moment: Collectively Confronting the Climate Crisis*. Break-out sessions addressed transportation electrification, weatherization, improving soil health for climate resilience, tips for energy committees looking to effectively engage their municipalities, and much more.

Chloe Maxmin, Representative for House District 88 in rural Maine and the first Democrat to ever win that District's seat, delivered an energizing keynote address about strategies for engaging even the least expected supporters on climate action. Thank you to the nearly 300 people who attended the conference!



An Evening with Author and New Board Member Carolyn Finney

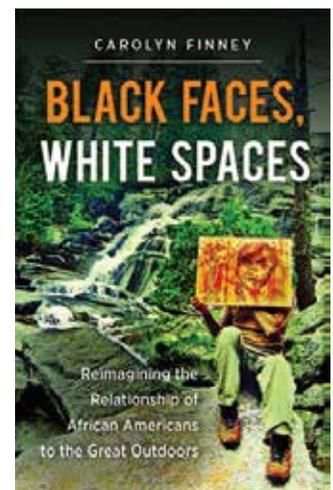
On January 24 in Burlington, VNRC was honored to welcome renowned author Carolyn Finney for a conversation centered around whose stories we leave out when we talk about the environment and the people who steward it.

Finney is currently a scholar in residence at Middlebury College. She is the author of *Black Faces, White Spaces: Reimagining the Relationship of African Americans to the Great Outdoors*, which was given honorable mention as one of *Outside* magazine's most important books of the previous decade.

We are very pleased to welcome Finney as a new Board member of VNRC! Thanks to all who attended her talk and to Board member Keshia Ram for facilitating the discussion so artfully.



Hope Leigh





9 BAILEY AVENUE
MONTPELIER VT 05602

Email: info@vnrc.org
Web: www.vnrc.org
Twitter: [@VNRCorg](https://twitter.com/VNRCorg)

NONPROFIT ORG
U S POSTAGE
PAID
THE MAILING CENTER
05641

The *Vermont Environmental Report* is printed on recycled paper with soy-based ink, by a digital printing process that does not flush polluting chemicals into our waters. *This issue can be recycled wherever you recycle paper. You can also re-use it by sharing it with family and friends!*

Vermonters Are Worried About Climate Change

Vermonters are concerned about climate change and they support a wide range of actions to cut the state's climate pollution. Here are some telling results from a recent poll commissioned by Vermont Conservation Voters (VCV) and the Vermont Public Interest Research Group (VPIRG):

- **76% of Vermonters said they are either very worried or somewhat worried about global warming**, with 61% stating they are very worried about the topic. That's up from 35% of Vermonters saying they were very worried about global warming just three years ago.
- **84% support expanding the work of Efficiency Vermont** and Vermont's other efficiency utilities to focus on cutting climate pollution.
- **76% support requiring Vermont's electric utilities to get to 100% renewable electricity by 2030**, with 73% supporting "significantly" increasing the requirement for in-state renewables.

Find the full results at vermontconservationvoters.org.



Our first priority during the COVID-19 crisis is ensuring the health and safety of VNRC staff, supporters, and our communities. But we are also still hard at work advocating for your environmental priorities.

Keep up to date on our efforts at vnrc.org and on Facebook and Twitter.