Impacts of Industrial Wind Development On Wildlife and Ridgeline Habitat

Vermont and New Hampshire Mountains

Photo by Roger Irwin

Sentry on Seneca Mountain

Peak Keepers
OF VERMONT'S MOUNTAINS

Compiled by Fred Person and Dhyan Nirmegh

DISCLAIMER

This is not a scientific document, but a limited document with the intent to inform and share with our citizen legislators and the average person to what is happening to our mountains and wildlife habitat concerning the development of industrial wind.

First Edition: December 2013
Ninth Printing: 100 Booklets
1400 Booklets Printed as of April 1, 2014

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Vermonters for A Clean Environment, Inc.
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Danby, VT 05739

Making a Stand Photo by Roger Irwin

Dedication

Every New Englander has a right to have an unencumbered and uncompromised mountain in their backyard. This is dedicated to all New Englanders in the private sector and government who have put their energy, time and money towards the preservation of these fragile mountain landscapes.

For these mountains are a part of their heart and soul. They are about freedom, wildness and diversity. They allow us to step back from our fast-paced world and walk into the future with our past beside us.

Being alone in the woods with its quiet sounds feeds your soul in a way that nothing else can. Aloneness becomes your very essence.

This photo essay is dedicated to all animal species, large and small, that rely on these mountains for their home habitat, for their water, their food and social interaction. They have no say in our world. They cannot decide to tear apart a mountain for their own good. For them there is no such thing as global warming or green energy.

One of Twenty-One Wind Turbine Pads, Lowell Mountain, Vermont Photo by Steve Wright

DISTURBANCE OF THE ECOSYSTEM

It is important to emphasize that many proponents of Industrial Wind Turbine projects have little or no experience in this high mountain environment. Frequently these proponents pay a brief visit only after a wind generation facility is built. One can only truly comprehend the scale of disturbance by first visiting an undisturbed mountain ecosystem and then being present for all phases of construction from design to the finished operation.

Will Staats

Both Photos Coos County, New Hampshire

Before Construction of Roadway Toward Mt. Kelsey

Same Roadway After Blasting on Way to Mt. Kelsey

Granite Reliable Wind Project
Including Fish Brook Ridge, Owls Head and Mt. Kelsey

Road to Mt. Kelsey After Blasting Coos County, New Hampshire

FRAGMENTATION OF WILDLIFE HABITAT

Removing more forest and inviting more roads, human access and noise into an otherwise unfragmented habitat dramatically increases disturbance and wildlife mortality. Crucial security habitat becomes degraded and wildlife recruitment is compromised, threatening the long-term viability of populations. Acre by acre, disruptions and disappearing habitats represent incremental and cumulative losses. Fragmentation results in habitat patches that are too small and too insular to provide adequate food and security for wildlife.

Chronic noise exposure associated with wind energy construction and operations has definitely been documented to contribute to a broad range of problems which threaten the bio-energetics, foraging success, anti-predation strategies, acoustic social communications success, reproductive success and fitness of many taxa. Ecological consequences of chronic noise exposure have also caused changes in the density and diversity of various bird and mammal species populations, as well as changes in community structure.

Sue Morse

Photo by Roger Irwin

NORTHERN MOUNTAIN BOBCAT

Lowell Mountain, Vermont Photo by Steve Wright

DISRUPTION OF HOME RANGES

Crucial bobcat habitat and ridgetop trails that serve as travel corridors were severely altered by wind turbine construction on Lowell Mountain.

Dhyan Nirmegh

New England's ridgelines will play an increasing and integral role as global climate change forces countless species of plant and animals to seek new habitats in which to adapt and survive.

Sue Morse

Photo by Roger Irwin

SNOWSHOE HARE ON SENECA MOUNTAIN

Uncontrolled Blasting, Lowell Mountain, Vermont Photo by Shirley Nelson

ECOLOGICAL STRESSES DISRUPT WILDLIFE POPULATIONS

Over time, and across vast habitats, the cumulative effects of a multitude of stresses causes wildlife to experience behavioral, physiological, demographic and distributional changes. These challenges result in reduced fitness, in necessary and costly energetic expenditures, and avoidance of altered habitats and human infrastructure. In addition, resulting population declines have been further attributed to lowered reproductive rates and recruitment success.

Cumulative Assessment is a relatively new applied environmental science which seeks to more comprehensively measure and predict anthropogenic stresses which have negatively influenced wildlife in the past, are now occurring, and will harmfully influence wildlife in the future.

Sue Morse

Sheffield, Vermont Photo by Steve Wright

Lowell, Vermont Photo by Steve Wright

NOT SO GREEN MOUNTAINS

The mountains are integral to our identity as the Green Mountain State, and provide us with clean air and water and healthy wildlife populations. This desecration, in the name of "green" energy, is taking place in Vermont's Northeast Kingdom on one of the largest tracts of private wild land in the state. Throughout New England and Cape Cod, the allure of wind power threatens to destroy environmentally sensitive landscapes.

Erecting those turbines along more than three miles of ridgeline requires building roads with segments of the ridgeline road itself nearly half as wide as one of Vermont's interstate highways—in places where the travel lanes are now made by bear, moose, bobcat and deer.

Ironically, most of the state's environmental groups have not taken a stand on this ecologically disastrous project. Apparently, they are unwilling to stand in the way of "green" energy development no matter how much destruction it wreaks upon Vermont's core asset: the landscape that has made us who we are.

The pursuit of large-scale, ridgeline wind power in Vermont represents a terrible error of vision and planning and misunderstanding of what a responsible society must do to slow the warming of our planet. It also represents a profound failure to understand the value of our landscape to our souls and our economic future in Vermont.

The New York Times – Opinion – Not So Green Mountains – Steve Wright – Sept. 28, 2011

Northeast Song Bird
Winter Wren in Hobblebush

Photo by Roger Irwin

Photo by Roger Irwin

GAME BIOLOGIST WITH AMERICAN MARTEN

Lowell Mountain Wetland before Construction Photo by Justin Lindholm

MIXED AGED FOREST NEEDED FOR WILDLIFE HABITAT

These high elevation forests provide stands of trees in an older, aged condition with interspersed gaps in the canopy due to frequent natural disturbances. The mixed softwood and hardwood cover, with its associated complex stand structure, are preferred by American Marten, a species listed as endangered in Vermont and listed as threatened in New Hampshire.

- Some wildlife use mountain ridgelines as a refuge from more developed areas. Black bears seek out these areas for den sites due to their remote location.
- The mountain ridges are the only undeveloped areas in a region that serve as critical corridors for wide ranging species including bobcat, lynx, bears, fisher and marten.
- These animals exist more successfully with infrequent human contact.
- The rarest bird in the Northeast, the Bicknell's thrush, resides exclusively in high elevation forests.

Will Staats

Photo by Roger Irwin

BARRED OWL ON ALERT

Bull Moose on Seneca Mountain Photo by Roger Irwin

MIGRATION TRAILS AND FLYWAYS

In many places these quieter natural lands are the last stand habitats for wildlife—wildlife that would otherwise face the uncountable hazards of being pushed close to us, where they are not welcome and where premature death most often awaits them.

Migrating birds, bats, moose, bobcats, and other species regularly use these important pathways. Ridgeline travel routes facilitate species and genetic exchange throughout an impressive assemblage of connected habitats both locally and throughout the northeast and neighboring Canada.

Sue Morse

Photos by Roger Irwin

RED FOX MOTHER AND KITS RELAXING

Lowell Mountain Development Photo by Steve Wright

WILDLIFE POPULATION DECLINES

Large scale habitat loss and disturbances as a consequence of industrial energy exploration and development, mining, timber extraction, and backcountry recreation have been demonstrated to contribute to wildlife population declines.

Described by conservation scientists as “death by a thousand cuts”, individual impacts may be regarded as minor. However, these disturbances are now recognized to be incremental and are collectively significant when measured over time and space.

In my opinion, it appears that the entire northeast is rushing into wind energy development without responsibly undertaking Cumulative Effects Assessment. While this science is certainly highly technical and requires long term research commitment and a much larger budget, we must insist on doing these projects properly, or not at all.

Sue Morse

Natural Resource Caucus in Seneca Mountains Photo by Roger Irwin

HIGH ELEVATION WINTER GATHERING

We have long known that moose typically seek shelter during winter months in the coniferous cover found in high elevation forests.

I consider the mountain ash the most important mast producing species found at high elevations. The abundant red fruit is an important food source for a wide variety of mammals and birds. During the winter months the bark is highly favored by the moose.

Will Staats

Quiet Time Photo by Roger Irwin

MOOSE NEED HIGH ELEVATION FORESTS

Cool wet seeps in the mountain habitat provide birthing areas for moose calves in spring. As the climate changes, these cooler altitudes will become increasingly important for moose seeking relief from warmer temperatures in both summer and winter.

Roads, and even trails that follow along power line corridors, introduce significant stress factors within the foraging, resting and denning habitats that sustain numerous species of animals.

Will Staats

Photo by Steve Wright

AERIAL VIEW OF BALD MOUNTAIN WEST OF THE SENECAS

Photo by Steve Wright

ONE ARM OF THE SENECAS

INTEGRITY AND LAND USE

In the 1920's Aldo Leopold synthesized an ethic for use of the land: A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. We need integrity in our public dialogue, and we must avoid deception. There is a national guideline for discussing renewable energy that has been violated thousands of times in Vermont.

It was violated when the Lowell project was first presented to the public; it was violated when the citizens of Lowell were mailed descriptions of this project before their vote; it has been violated in testimony before the Public Service Board. The guideline is simple and best illustrated with an example. The example comes directly from the Federal Trade Commission, the national institution charged with assuring integrity in the marketplace.

This is the example. A toy manufacturer places solar panels on the roof of its plant to generate power and advertises that its plant is 100-percent solar powered. The manufacturer, however, sells renewable energy certificates based on the renewable attributes of all the power it generates. Even if the manufacturer uses the electricity generated by the solar panels, it has, by selling the renewable energy certificates, transferred the right to characterize that electricity as renewable. The manufacturer's claim is, therefore deceptive, because reasonable consumers would likely interpret this claim to mean that the manufacturer uses renewable energy.

Climate change is a global problem and, for all the world's citizens to effectively address this problem, we must address it with integrity. I recommend that the State of Vermont adopt the Federal Trade Commission guidelines for describing renewable energy in all its work, legislation, publications, and deliberations, in place of the current practices fostered by the energy corporations and their lobbyists that serve private and not global interests.

Anne Morse

Canada Jay on Spruce Branch

Photo by Rodger Irwin

Photo by Roger Irwin

MOTHER HAWK WITH CHICKS IN ASH TREE

Photo by Roger Irwin

RUFFED GROUSE ON THE LOOKOUT

Roadway Foundation Coos County, New Hampshire

PLIGHT OF MOUNTAINTOP HABITAT

My name is Will Staats and I live in the Northeast Kingdom town of Victory, Vermont. I make my living as a professional Wildlife Biologist but also run a small guide business in my spare time. I am an avid hunter, trapper and have spent a good portion of my life exploring wild places. For the record I believe in global warming. It is this very fact that causes me concern about the plight of our sensitive mountain ridgeline habitat. In fact, as the climate warms, these high elevation islands of fragile habitat will become even more important.

Wildlife Biologists and Natural Resource Managers are expressing their growing concerns regarding large scale wind development and its impacts to sensitive mountain habitats. High elevation habitats are a scarce resource in the Northeast and are limited to approximately three percent of Vermont's total land area.

For the past four years I have been closely involved with the environmental review of an industrial wind turbine project consisting of 33 Turbines in Northern New Hampshire. This project covered four mountain summits. I've monitored all phases of this project including hiking the alignment, review of turbine locations, providing testimony, helping to formulate

mitigation and developing pre and post construction studies. This project has given me a firsthand knowledge of what a mountain looks like before and after construction and has helped me to better understand the process of proper siting, construction and resulting effects on the mountain ecosystem.

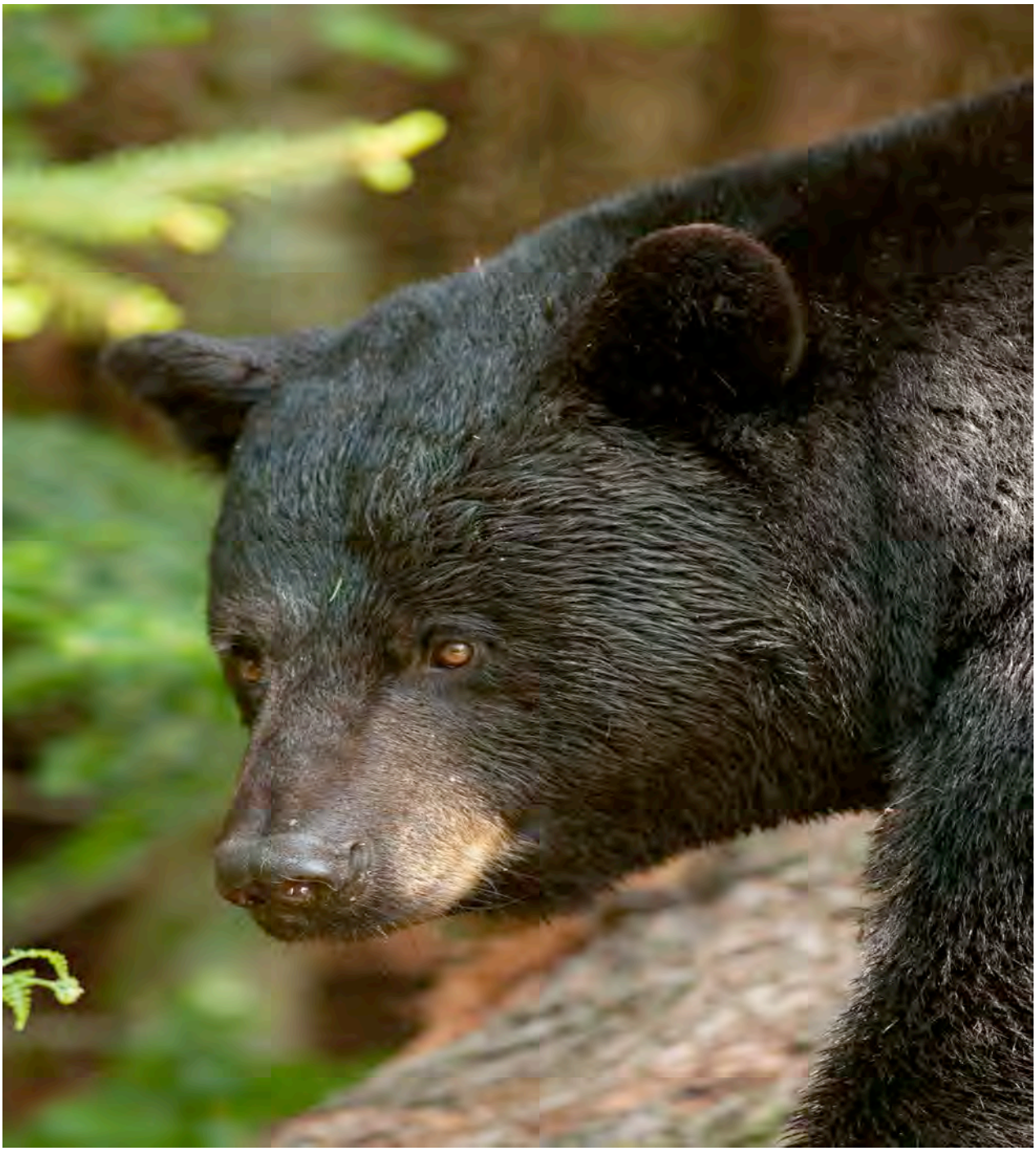
As part of this work, my agency has spear-headed two ground breaking wildlife studies on the affected mountain ridges, studying the ecology and the impacts to the American marten and Bicknell's thrush. These are the very first studies of this kind, performed in this habitat, involving these species.

Wildlife is impacted by industrial wind turbine development at both forest landscape and the forest stand level. Impacts are dependent on wildlife species, location of the ridgeline and the greater landscape context. At a stand level, forest cover is removed and permanently lost for some species due to the project footprint. Important wetlands are compromised and destroyed during construction. Headwater wetlands, seeps and feeder streams are directly impacted. At a landscape level, habitat connectivity and resiliency across the forest landscape is compromised. For birds and bats, turbines pose a new source of mortality in these habitats.

Over the years I have come to recognize the significance of high elevation habitat for the American marten in Vermont. We have learned that marten, due to their small size and heavily furred feet, are able to exploit deep snow environments. Fisher, coyotes and other predators can be direct competitors with these animals but are less able to negotiate the deep fluffy snow conditions found on our mountain ridgelines. Here marten can more readily avoid competitors commonly found at lower elevations. However, our research in northern New Hampshire has demonstrated that turbine access roads built on these remote mountains become vectors for coyotes and foxes.

Maintenance vehicles traveling to and from the turbines continually pack the snow providing a firm base on which these canines travel from lower elevations to the ridgelines. We have followed tracks of these animals demonstrating this behavior on numerous occasions. Windswept turbine pads and road cuts contribute to the creation of a packed snow surface in the unbroken forest adjacent to these openings. Canine predators can now penetrate the mountain forest where the snow would previously have consisted of a loose and fluffy surface. As a result of the project construction, the ecological community of these forests have been drastically changed, putting added stressors on the endangered marten. An alarming number of these animals were killed near the project area by coyotes, foxes and fisher.

Will Staats



Northeast Kingdom Black Bear Photo by Roger Irwin

STATEMENT TO THE FRIENDS OF GRAFTON, VERMONT

"Birds, bats and bears are expendable" in order to keep the "planet safe."

Governor Peter Shumlin July 2013

Coos County, New Hampshire

DESTRUCTION OF HIGH ELEVATION HYDROLOGY

I am a stormwater hydrologist and Principal of Watershed Consulting Associates in Waitsfield, VT. My firm specializes in modeling, designing, and permitting stormwater management systems. I have conducted water quality research and designed stormwater systems in high elevation watersheds. I have also closely reviewed stormwater designs and permit applications for the Sheffield Wind, Kingdom Community Wind, and Deerfield Wind Expansion projects.

High elevation areas of Vermont include numerous seemingly insignificant seeps, where groundwater oozes from the subsurface and begins to concentrate to form discrete stream channels. These headwater streams and wetland areas are the birthplace of our surface water resources. They constitute the greatest percentage of total stream length in an undisturbed river system, but are also mostly unmapped. They are vitally important for providing clean and cold water, habitat, and flood control; however, they can only provide such services if they are protected from disturbance.

With continued development in Vermont and our nation, conversion of undeveloped pervious surfaces to impervious and the potential impact to the hydrological water balance from climate change, protection of these headwater resources is a very wise investment for a sustainable future.

We now know the best way to keep pollution out of our surface waters and to preserve stream hydrology is to control the overall volume of stormwater being generated on a

developed site, by designing sites to replicate natural conditions. Current State stormwater regulation was not developed on this premise.

Preserving high elevation hydrology cannot be successful by playing defense; the approach must be holistic and include minimizing the project footprint as the primary consideration.

Lowell, Sheffield, Deerfield, and Georgia Mountain will result in the creation of 81 acres of new impervious surface, not considering the acres of newly exposed bedrock. This is more than eight Williston Wal-Mart facilities combined.

The only solution to water quality protection is to downscale the infrastructure required for these projects.

Monitoring, before and after development, is an absolutely key component to a successful strategy.

This monitoring plan must allow for instream testing on the project site, where the small headwater areas are located and at the points of stormwater discharge, not just at locations a mile or more downstream of the project site, as was done in Lowell and Sheffield.

Many acres of roads have been constructed to service the Lowell and Sheffield projects. Shortly after construction, these roadways have compacted to form an impervious surface akin to pavement.

I have repeatedly expressed my concerns to ANR on this issue but have been disregarded. If precipitation events intensify, as predicted, with the onset of climate change, the inaccurate modeling of runoff from these projects will result in even more water quality impact and downstream flooding impacts.

Andres Torizzo

Moose River in Vermont Photo by Roger Irwin

Coos County, New Hampshire, Photo by Vermonters for a Clean Environment

ADDED INFRASTRCUTURE

Industrial Turbine Sprawl, Lowell, Vermont Photo by Steve Wright

WHO DECIDES?

The transformation to 90% renewable energy will require unprecedented changes in our state, and our choices have tremendous implications for our landscape. It seems undemocratic to make those decisions about what our landscape will look like in 100 years by an appointed three-person public service board. And so I'm suggesting that we need to do something outside the permitting process as a more comprehensive land use plan that has more public input.

Ann Ingerson

Tower Looming above Forest Floor, Lowell Mountain, Vermont Photo by Steve Wright

ENDANGERMENT OF BATS AND SONGBIRDS

Air pressure drops caused by spinning turbine blades results in bat and songbird deaths. These animals die of lung damage as a consequence of being sucked into a low pressure area behind the turbine blades.

Bats are obligate insectivores and contribute immeasurably to human society by their daily consumption of millions of insects that would otherwise destructively affect forest and wildlife health, agricultural crops, and pose health hazards to people, livestock and pets.

Sue Morse

NO NATURAL SUBSTITUTES FOR BATS

Prior to the appearance of the invasive fungal disease, white-nose syndrome, bat biologists viewed wind energy as the most potent threat that bats had ever faced. The tree bats were believed to be the ones in trouble. Dramatic bat mortality events were documented at wind energy sites along forested ridges in various locations in the eastern U.S.; notably Virginia and West Virginia. The majority of dead bats were hoary bats. Red bats and silver-haired bats were also vulnerable to the wind energy operations. Wind turbines also kill cave bats, particularly little brown bats and tri-colored bats.

Today, Vermont's bats, nine species in total, face a double whammy: white-nose syndrome and wind energy. The tree bats do not get white-nose syndrome, but are likely being badly affected by wind energy. Most of the cave bats are unaffected by wind energy, but because their numbers are now so low, any losses from any additional cause, such as wind turbine operations, could be extremely significant to the population as a whole. In effect, an entire suite of mammals is now at great risk, both in Vermont, and in the eastern United States, because of these dual threats.

The Center for Biological Diversity asks the Vermont Agency of Natural Resources to take a broader view of bat conservation than simply issuing take permits for listed species. The state of Vermont is in jeopardy of losing the ecological services of its primary night-flying insectivores. Essentially, there are no natural substitutes for bats. Their precarious status must be seen as a broad threat to the state's ecosystems as well as the human environment.

Scientists have estimated that the value of bats to American agriculture is between $3.7 billion and $53 billion per year. Bats eat thousands of tons of insects every summer. Without them, farmers will either suffer more crop losses or be forced to turn to greater use of pesticides. The loss of bats is likely to have impacts on the rest of us, as well, with bats no longer eating pesky, biting insects such as mosquitoes, and bats no longer feeding on moths and beetles that cause damage to valuable timber.

Mollie Matteson

Photo by Andrew Stein/VTDigger

Golden Eagle Feeding Photo by Roger Irwin

ECONOMIC COSTS FOR VERMONT COMMUNITIES OPPOSING INDUSTRIAL WIND

While Big Wind has pockets deep enough to pay for lobbyists, PR and lawyers such that they can overwhelm thoughtful opposition, the case has not been made to my satisfaction that Industrial Wind is a viable component of a responsible energy policy for Vermont. Since there are several major wind projects already in operation, there is ample opportunity to evaluate their contributions, as well as their costs, in the next few years.

Steven B. Young

Rural Vermont communities do not have deep pockets. The communities of East Haven, Sheffield and Lowell, have populations ranging from 300 to 750 people. People opposing the wind projects in their towns spent between $250,000 and $700,000 to be involved in the Public Service Board process. It is an unlevel playing field. The new proposals for energy siting policy do not offer a means by which towns or individuals can afford to participate in a consequential way.

Lesley Becker

ENORMOUS COSTS ASSOCIATED WITH INDUSTRIAL WIND DEVELOPMENT

My academic specialty for over forty years has been research on long-term climate change and its effects of ecosystems

There is no question that there are enormous costs associated with industrial wind development. We are not merely installing wind turbines; we are destroying mountain ranges. The damage is physical, in terms of geological and hydrologic effects. It is biological, in that it destroys critical habitat and migration routes, and it is aesthetic and cultural, not least in that it has caused deep divisions in the environmental community—divisions that play directly into the hands of corporate interests whose roots lie outside Vermont.

Over a generation ago, the conservation community applauded Act 250 and its commitment to protect areas that lie above the 2,500 foot elevation level. The main developer and supporter of this concept, Dr. Hub Vogelmann, made a strong pitch that the lower limit should be 2,000 feet. There is good reason for his suggestion. The peaks and ridges of our lesser mountain ranges are the most pristine environments and ecosystems in Vermont. They are too low to have been built up for ski areas and too far off the beaten path to support major hiking trail systems. They are too high and cold, and have too little soil, ever to have supported agriculture, and they are generally too precipitous and the trees too small to have been heavily logged.

These areas support the most extensive boreal forest ecosystems in the state. They are critical for species such as lynx and pine marten, which are repopulating Vermont after a long absence. The ridges sustain air currents that make them critical for the migration of many birds, especially hawks and eagles. The effect of wind turbines on these flight patterns, and bird mortality, are not yet known.

Steven B. Young

White-Tailed Doe in the Brush

Photo by Rodger Irwin

Lowell Mountain Photo by Steve Wright

MOUNTAIN-TOP MINING

COMMUNITIES TORN APART

I'm a wildlife biologist. I've worked for years on endangered species issues across the United States and at the federal level. When this project first started, I basically had my head in the sand, but, I also felt as a Vermonter for all my life that our environmental laws and our environmental groups would look out for our wildlife on that mountain top. As I drive to Jay to go skiing now and see how many wildlife species have been displaced up there. I am appalled!

I also read the information that was put out by the wind people and I've never seen a worst-prepared, if you want to call it an environmental impact statement, for wildlife. It was terrible. I've worked at the federal level on endangered species, and I expected that some endangered species could have been addressed at the federal level, but I never came upon any of it. Hopefully the Island Pond and Newark project will be a whole different story.

As a Vermonter I have seen how wind projects have destroyed communities, people against people. I don't believe the Public Service Board has the credential or capability to look at projects of this size. They don't have the knowledge. Three people to look at something like this? The impact it's going to have on our environment is huge. I was flabbergasted how fast this project went through and that Act 250 isn't even a part of it. Act 250 above 2,000 feet – I mean it's like, no, you can't do anything above 2,000, no roads, no nothing. I know these laws, and I felt, as a Vermonter, this would be addressed. It wasn't. So I ask that you, as the siting commission, to address these issues, because people don't understand in our state that Act 250 isn't part of these siting – decisions.

Take into consideration that Vermont doesn't need this. And the incidental take permit. Incidental take is, if a bat gets killed by the turbines, it is only being monitored by the company. It should be monitored by outside people. Any incidental take permit is to be monitored either by a U. S. Fish and Wildlife service biologist or somebody outside of the company.

Peggy Struhsacker

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Lowell Protesters
Photo by Mountain Occupiers

White-tailed Buck

Photo by Roger Irwin

OLD WARRIOR WATCHING FROM THE FIRS

EDITORS

Dhyan Nirmegh. I am a Vermonter working and moving through these mountains and hills. Woodcutter, tree farmer, stonemason, conservation and environmental activist. The massive destruction of the topography has assailed my sense of cultural identity.

Fred Person provided technical support and conceptual layout of the material. He was unwavering in his patience and thoughtfulness. His tenacity to follow through with the job was the key to this project. Master of Extension Education, UVM.

ACKNOWLEDGEMENTS

Will Staats. Wildlife biologist. Knowledgeable woodsman, writer, illustrator, wilderness canoeist, hunter and wildlife guide.

Sue Morse. Founder of Keeping Track, a non-profit organization. She has spent well over three decades researching wildlife and documenting her findings in articles and public presentations. Her research includes monitoring wildlife and documenting the presence and habitat needs of bobcat, cougar, black bear and Canadian lynx. Wildlife photographer and the eyes of the woods.

Steve Wright. Aquatic biologist. Former Commissioner of Vermont Department of Fish and Wildlife. He considers Vermont his home no matter where he is at, and has worked tirelessly to protect its “billion year old mountains.”

Roger Irwin. Vermonter, farmer, woodsman, logger and wildlife photographer, one of Vermont’s best.

Justin Lindholm. Vermont Fish and Wildlife Board. Hunter and outdoorsman. Knowledgeable and steadfast in his dedication to the preservation of Vermont’s mountains.

Ann Morse. Wilderness advocate, educator, canoeist. Teacher, Outdoor Education, Sterling College.

Andres Torizzo. Stormwater hydrologist. He has conducted water quality research and designed stormwater management systems in high elevation watersheds.

Ann Ingerson. Natural resource economist, focusing on how to live on the earth without destroying it with development. Degree in Agricultural Economics, Oxford, England.

Mollie Matteson. Conservation advocate at the Center for Biological Diversity. She is the driving force to place the Bicknell’s thrush and little brown bat on the federal endangered species list.

Steven Young, **Ph.D**. Anthropologist, botanist and founder of the Center for Northern Studies in Wolcott, Vermont.

Lesley Becker. Playwright, *Winds of Change*, a play about the impact of industrial wind development on a rural family and their community. Appreciation for editorial guidance.

Peggy Struhsacker. Wilderness advocate from Northern Vermont. She has a keen appreciation of the land she lives in.

Annette Smith. Environmental advocate. Executive director, Vermonters for a Clean Environment. Director and organizer of groups questioning this destructive push for industrial wind development.

Elizabeth Cooper, Environmental advocate, and experienced naturalist, outdoor educator, and land use planner. She works with Vermonters for a Clean Environment.

Don and Shirley Nelson, Their life and farm now under the Lowell wind turbines, have faced numerous obstacles with power companies and politicians. They continue with courage and persistence.

Peak Keepers, Is an ad hoc working group of scientists, educators and advocates focused on protecting and promoting the integrity of Vermont's mountains and their environmental, cultural, and economic value.

Special thanks to: Luke Snelling, Vermonters for a Clean Environment, Energize Vermont, Mountain Talk, Craftsbury Conservation Commission, Save Our Senecas, Newark Neighbors United, Brighton Ridge Protectors, Citizens for the Preservation of Georgia Mountain, Holland-Derby Citizens for Responsible Energy, Ridgeline Protectors, Save Vermont's Ridgelines, Friends of Grafton's Heritage, Friends of Northfield Ridge, Kingdom Commons Group, Friends of Grandpas Knob and The Ira Group.

Photo by Justin Lindholm

PITTSFORD RIDGE NEAR RUTLAND, VERMONT

CONCLUSION

We as humans are connected to our wildlife. Destroying their habitat we destroy our selves.

Most of the animals featured in this booklet are the top tier of Vermont's wildlife. They have the legs and mobility to move out of the way of the construction process.

When using thousands and thousands of pounds of explosives and heavy machinery for a project across our mountain tops, all other wildlife and its habitats are assaulted.

Squirrels, chipmunks, mice, voles, porcupines, raccoons, ground birds, insects, frogs, newts, salamanders and toads are immediately killed by blasting, by concussion, and by compaction.

It raises the question, do we have to destroy so many species of plants and animals in order to save them later?

We wouldn't normally think of doing this to our mountains and wildlife but it seems global warning has become a "just cause". And we humans have been known to avoid our responsibility of our actions for a "just cause".

In the quest to slow global warning down the industrial wind development has destroyed and flattened these mountain tops in just the past 4 years.

So what is the answer?

Dhyan Nirmegh

Near Rutland, Vermont Photo by Vermonters for a Clean Environment

PITTSFORD RIDGE LOOKING TOWARD GRANDPA'S KNOB

PART OF THE TACONIC RANGE

ONE OF VERMONTS PROPOSED INDUSTRIAL WIND SITES

Near Island Pond, Newark and Ferdinand, Vermont Photo by Steve Wright

VERMONT'S SENECA MOUNTAIN PROPOSED INDUSTRIAL WIND SITE

Impacts habitat includes Ferdinand Bog, West Mountain Management Area & Madison Basin.

Ruffed Grouse Eggs at base of Yellow Birch Photo by Roger Irwin

SENECA RANGE