

The background of the image is a landscape photograph. It shows a series of rolling hills and mountains, likely the Worcester Range and Northeastern Highlands. The foreground is a dark, dense forest. The middle ground shows several layers of hills, with the most prominent ones in the distance. The sky is a clear, pale blue, suggesting a bright day. The overall tone is serene and natural.

AN ENDURING PLACE

Wildlife and People in the **Worcester Range** through the **Northeastern Highlands**

Dear Reader:

The places mentioned in the following pages are special. People have lived here and loved this land for its beauty, for its utility, and for a myriad of reasons beyond words. These pages offer a snapshot in time of the place and its people from the Worcester Range all the way through the Northeastern Highlands of Vermont. This area of some thirty towns represents a diversity of land and people that is difficult to capture in one publication, but we hope to show its unity and continuity across this expanse. Not only are the people of these places connected in common ties of experience and economy, but wildlife and the landscape itself is also connected across this area. We hope you will come to see this as yet another reason why this place is special. The connectedness of forests across this land is incredibly important for the continuation of a host of wildlife species and a lifestyle that helps define this place and add value to our experience of it.

The **Staying Connected Initiative** is a collaborative partnership of state fish & wildlife departments, agencies of transportation and a host of non-governmental organizations in New York, Vermont, New Hampshire, Maine and southeastern Canada focused on sustaining a *connected forested landscape* across the north woods. We are working with local communities to protect wildlife and local values in a changing world. The partnership does not tell communities what to do, but instead offers up the best-available science and technical assistance and asks how local communities see overlap with their interests and work. For some communities this has meant organizing volunteers to do wildlife tracking along roads to figure out where wildlife are crossing. For others it has meant presentations and outreach to community members and landowners on the importance of habitat for wildlife. And for some communities it has meant action in town planning. You decide what approach is right for you and your community, and know **Staying Connected** is here to help make your vision a reality.

Sincerely,

A handwritten signature in cursive script that reads "Jens Hilke".

Jens Hawkins-Hilke
Conservation Planning Biologist
Community Wildlife Program
VT Fish & Wildlife Department

AN ENDURING PLACE

Wildlife and People in the **Worcester Range** through the **Northeastern Highlands**



Produced jointly by the National Wildlife Federation and the Vermont Fish & Wildlife Department. This report was funded by State Wildlife Grant funds administered by the United States Fish & Wildlife Service and the Vermont Fish & Wildlife Department

Written by Tom Slayton

January 2012

A project of the Staying Connected Initiative



The Worcester Range/Northeastern Highlands: Introduction



As the five hikers were crossing a narrow strip of forest between two remote ponds, they heard loud noises near the far shore of the pond on their right — branches snapping and the thump of heavy footsteps. Something very large was pushing its way through the woods.

A few steps farther and they suddenly saw what had made the commotion: a huge bull moose appeared barely ten feet away. It was easily six feet tall at the shoulder, and its massive head and antlers seemed to tower above them.

The hikers quickly shed their packs and were ready to scamper into a nearby stand of saplings if necessary. But the moose paid no attention to them. Snuffling and snorting, it ambled slowly down into an adjoining wetland. And then it was gone.



Encounters like this are part of what makes life in the forested Northeast exciting and meaningful. A young girl goes hunting with her father; she doesn't bag a deer, but remembers for the rest of her life her first hunt and how it brought her closer to her dad. A party of fishermen camp beside a mountain lake and listen to the wild echoing of loons, calling through the night. A landowner finds a half-eaten rabbit carcass on his woodlot, looks up — and sees a bobcat climbing up the trunk of a maple tree. Such experiences with wildlife enrich our lives and, over time and retelling, become part of our traditional culture.

These pages offer a portrait in time of this place and its people, from the Worcester Range all the way through the Northeastern Highlands. It depicts a way of life that is closely connected to the land and to the wildlife and describes a swath of intact forest that is incredibly important to the health and well-being of both the wildlife and people who live there.

“Mountains, oceans, forests, and bogs are more than places to those who love them. They have hearts like hibernating animals, beating imperceptibly yet vitally.”

— Former state naturalist Charles Johnson, *Bogs of the Northeast*, 1985



The Worcester Range/Northeastern Highlands



We in northern New England live in the midst of a great forest — we don't normally think of ourselves as forest dwellers, but in fact, we are. The Northern Forest, an immense ecosystem that sprawls across the northeastern United States and southeastern Canada, is our home, as surely as are the man-made dwellings we reside in.

This immense forest — also known to scientists as the Northern Appalachian/Acadian Ecoregion — extends from the Tug Hill Plateau in upstate New York all the way to the Gaspé Peninsula and Nova Scotia and is roughly thirty million acres in size. It is home to about two million people and uncounted millions of birds, fish, insects, and wild animals.

Rich, diverse, and incredibly resilient, the forest is a vast environmental storehouse that encompasses a varied landscape of mountains, lakes, valleys, and streams, and a wide array of hardwood and softwood trees, native wildflowers, shrubs, and herbs. It is an important buffer against climate change and a vital filter that helps purify the region's drinking water and air.

Scattered throughout this great regional ecosystem are the houses and roads, cities and villages where those two million people live. But on either end of the great forest there are immense areas of deep, unbroken woods — the Adirondack forests on the west and the Canadian forests to the northeast. These serve as wildlife reserve areas — unfragmented woodlands where natural conditions prevail and wildlife can flourish largely undisturbed.

Located in between them are less extensive areas of undisturbed woodlands intermixed with open land, cities and towns, pastures, roads, lakes, wetlands, and so on. And though there are significant gaps in the forest cover — in places such as the Champlain Valley, for example — there are still large, relatively undisturbed tracts of land throughout the region, as well as corridors of habitat that give wildlife the freedom to live and move about.

That fact is crucially important because in order to survive, wild animals, like people, need to be able to travel freely — sometimes over very large distances. All living creatures, including human beings, must be able to move about to obtain food, water, shelter, mates — the things they need to survive and prosper.

Human beings use roads and sidewalks to move about — to go to work or to buy groceries or clothing, for example. Similarly, wild animals need to be able to move through the landscape to find what they need. And for that to happen, their habitats must be connected.

Healthy populations of animals require large areas of unbroken habitat as well as routes that link those areas. The degree to which the landscape allows animal movement to and through unbroken habitat is known to scientists as *habitat connectivity*. The health of wildlife populations depends on it.

You could think of habitat connectivity as a web of routes, largely invisible to us, woven through the landscape, over which wild creatures move to secure what they need. The needs of individual animals vary enormously from species to species. A spotted salamander may

“The springtimes come when the maple leaves unroll ‘as big as a mouse’s ear,’ the wild roses bloom; the blackberries ripen; and these things will go on, as the old New England land deeds phrase it, ‘as long as grass grows and water runs.’ It is good to know all this, for there is really nothing else.”

— Elliott Merrick,
Green Mountain Farm,
1948

The Worcester Range/Northeastern Highlands



travel six hundred feet in its annual migration to mate and lay its eggs, while a bobcat may cover more than nineteen miles a day to find food. Many migratory birds travel across entire continents. Animals may travel long distances or short, but the principle is simple and universal: in order to live, all creatures need to be able to move throughout the landscape to access the things they require to live.

Because Vermont is strategically situated, and still more than 80 percent forested, it serves as a transition zone between the immense blocks of forested habitat to the west in New York and northeast in Maine and Canada. Several key areas of unbroken forest and natural corridors that provide wildlife movement weave through and across Vermont.

Similarly, within Vermont, there are areas of forested, unfragmented habitat, interspersed with more developed areas — places with villages, highways and

smaller roads, cleared farmland, and the like. Wild animals need to be able to move easily between these habitats, and to do that, they must, of necessity, pass through the more settled areas.

One area that is recognized as an important wildlife corridor begins at the Worcester Range and stretches fifty miles to the east into Essex County, Vermont, and the largely unbroken forests of the Nulhegan Basin. In between the range and the basin, a web of connecting links of more fragmented habitat lies across the intervening townships. In some places, these links are wide — ample corridors that allow unrestricted wildlife movement. But in other places, such as Hardwick, Greensboro, Glover, and Barton, the connecting links of habitat have become quite slender, endangering the future ability of large mammals, such as bear and moose, and even some of the smaller, shyer animals, to move in a natural, beneficial way.

“I believe that all human people need close association with nature’s people.”

— George D. Aiken,
Pioneering with Wildflowers, 1968

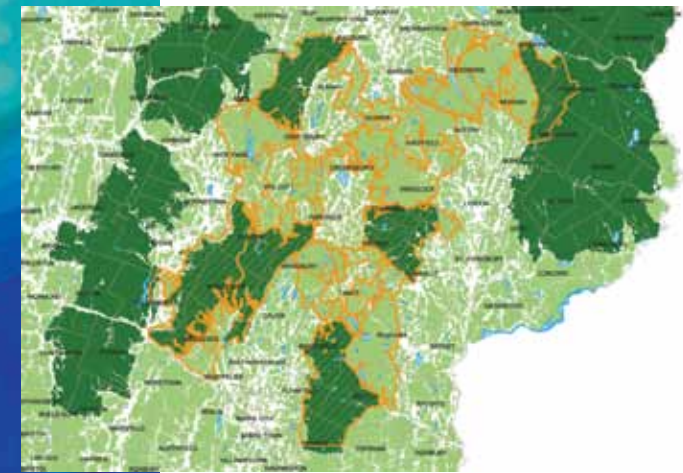
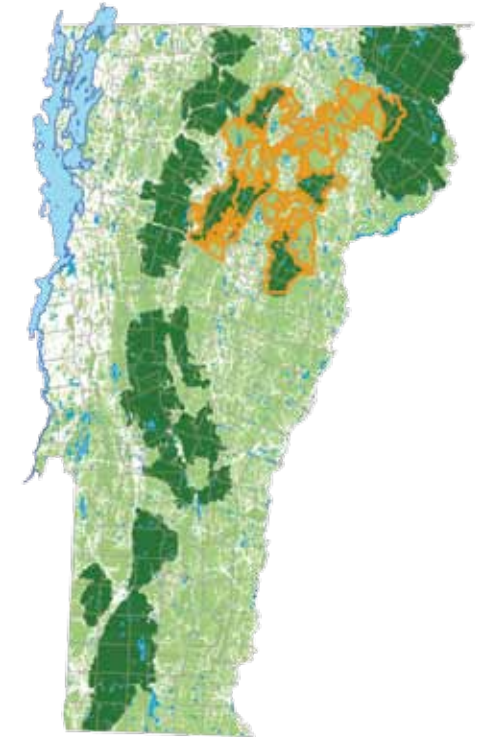
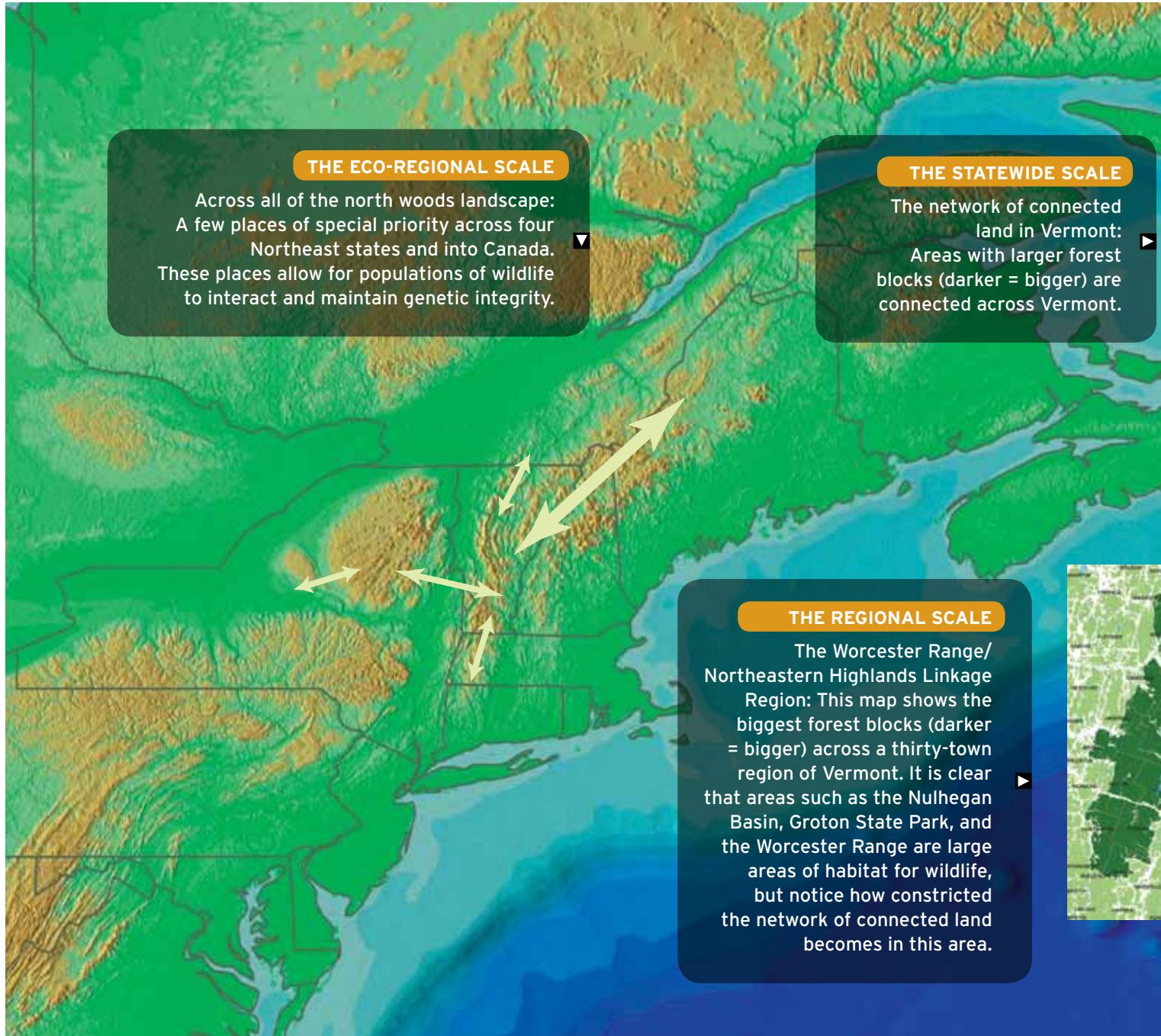
DID YOU KNOW ...





- **Bobcats** travel an average of 0.8 miles per hour and 19 miles per day
- Average home range of a male bobcat is 27 square miles and a female is 8.8 square miles
- Average home range for a **black bear** is 19,200 acres
- Average home range for a **moose** is between 1,280 and 12,800 acres
- Average home range for a **fisher** is between 4,747 and 9,600 acres
- Average home range for a **river otter** is between 15 and 30 linear miles of stream

— Vermont Fish & Wildlife Department



CONNECTIVITY at Three Scales



-  Worcester Range/Northeastern Highlands Linkage Region
-  Large forested areas (25,000 acres+)
-  Smaller forested areas
-  Developed & agricultural lands



Three generations of the Gray family on their farm in East Charleston. From left: Teri, Keith, Jordan, Jacey, Donna.

PEOPLE OF THE REGION: The Gray Family

Every day at 5 a.m., Keith Gray and his son, Jordan, walk about a hundred yards down the road to help Keith's parents, James and Donna Gray, with morning chores at their dairy farm, Gray's Hilltop Farm in East Charleston. You know you're at the 246-acre farm when the unbroken forest gives way to open fields and small clusters of buildings. The elder Grays milk some forty cows. When calves and heifers are added in, they care for roughly a hundred cattle.

Keith and Jordan spend a few hours milking and feeding the cattle and cleaning up the barn. Then, it's back to their home, where Keith cooks up a big breakfast for himself and Jordan. His wife, Teri, happily admits that Keith "likes cooking more than I do."

But Teri's plenty busy. She works as assistant town clerk and treasurer in the Charleston Town Office and keeps the books for Keith's welding and heavy-equipment repair business, and with two of their three children at home, she finds: "The job of being a mom keeps me the busiest."

After breakfast, Keith either goes out to his shop, Gray's Mobile Arc, to work on welding and repairs or gets into his truck and heads out to do on-site repairs for neighboring farmers, or others who might need his services. Seventeen-year-old Jordan heads for North Country Union High School (NCUHS) in Newport. Because he helps with farm chores, morning and evening, he has permission to come in to school late. It's a fairly common practice for Northeast Kingdom farm kids.

Jordan likes farming and is also an experienced heavy-equipment operator. Eventually he's thinking about going to Vermont Technical College in Randolph, but he doesn't want to head out for college right after graduating from high school. "I'd like to work, make some money first," he says.

In addition to helping with the dairy farm and running his welding business, Keith makes more than two hundred gallons of maple syrup. And in the summer he helps his parents with crops, corn planting, and haying. And then, of course, there's the twenty cords of wood needed to heat the house and more to fire the sugarhouse each spring.

The forest that supplies all that wood and maple sap also brings wildlife to their door, sometimes quite literally. One morning, when Teri looked out and saw a bear ambling across the lawn, she quickly hustled the children inside. Deer, wild turkeys, woodchucks, and a huge moose all pay visits. Keith believes that there was a wildlife path across their property when it was forested, and the route is still somewhat used, now that there's more open land.

Keith and Teri are making a living and raising their family on farm and forest land they know well, living within sight of Keith's parents, doing work they know and enjoy.

A large stone wall, four feet high, about as wide, and a hundred yards or more long, separates two of the Hilltop Farm fields. It is made of stone picked every year from the farm fields.

"That's my mother's project," Keith says. "It's what she works on — in her spare time."

The forest that supplies all that wood and maple sap also brings wildlife to their door.





The Linchpin: The Worcester Range



Located in north-central Vermont, the Worcester Range is a critically important environmental link. Along with the Northeastern Highlands region of Vermont, it connects the forests of the Adirondack Mountains in New York and the remote, unfragmented forest habitats of southeastern Canada.

“This is the linchpin, right here,” says Vermont wildlife biologist John Austin, his finger resting on a map of the state, squarely on the Worcester Range. “The Worcester Range is the only place that’s left in central Vermont that is large in scale and almost completely unfragmented.”

By unfragmented, biologists mean that the land is remote, undeveloped, and not divided by roads or other intrusions. The size and relative lack of heavy development of the Worcester Range is important for both the people and the wildlife that live there.

The Worcester Range is both ordinary and unique. Ordinary, because it shares many of the characteristics of other mountain ranges in Vermont, a very mountainous state; and unique, in central Vermont, because it remains almost completely wild and undeveloped.

This prominent mountain range contains several peaks more than three thousand feet high and runs roughly fifteen miles northward from Middlesex almost to Morrisville. The Worcester Range, which is approximately forty-six thousand acres in size, is the largest piece of unfragmented forest land in north-central Vermont. This fact alone makes the range unusual — and very important as a large block of uninterrupted wildlife habitat.

The main range of the Green Mountains, which lies about ten miles to the west, is several hundred feet higher than the Worcester Ranges, but is much more developed. Ski areas, major roads, and scattered houses have made incursions on the forest there. But only hiking trails and a few small logging roads penetrate the high flanks of the Worcester Ranges.

The entire range is heavily forested. Its lower elevations are thickly blanketed with a variety of mixed northern hardwoods — maple, beech, yellow and white birch, and a sampling of ash, oak, and other species of trees. Higher up, spruce, fir, and other varieties of softwoods take over.

Laced with brooks and dotted with small marshes, bogs, and seeps, the range is a lot like much of Vermont’s forested land before it was developed.

All this makes the Worcester Ranges an ideal habitat for a wide array of wildlife. From tiny salamanders and colorful wood warblers to fox, bobcat, moose, and bear, the range supports a healthy population of wild animals, providing them with unrestricted access to food, mates, winter shelter, and other necessities.

The unfragmented nature of the Worcester Range does not prevent people from using its forests for both work and recreation. On the contrary, it enhances such uses. The summits of the range are protected, but much of the lower mountainsides are traditional working forests, producing sawlogs, pulpwood, and firewood, along with maple syrup and other forest products. Over the years, the range has become increasingly popular with hikers and wildlife watchers, and has long been used by hunters, fishermen, and trappers. All these activities are important aspects of the region’s traditional culture. Human beings are, like wildlife, very much a part of the ecology of the Worcester Range.

“Man has too long forgotten that the earth was given to him for usufruct (fruitful use) alone, not for consumption, still less for profligate waste.”

— George Perkins Marsh, *Of Man and Nature*, 1864





Bob Shannon among his fly rods in his Route 100 shop.

PEOPLE OF THE REGION: Bob Shannon

Cold, clear streams mean a lot to Bob Shannon. He's been guiding trout-fishing tours for more than twenty-five years and knows that there are not many places that can match Vermont's mountain streams as brook trout habitat.

According to Shannon, some of the best trout streams in Vermont flow down from the Green Mountains and the Worcester Mountains. There are seven beautiful trout streams within minutes of his home in Stowe, he says.

An avid fisherman and hunter, he is proprietor of The Fly Rod Shop, on Route 100 between Waterbury Center and Stowe, a tackle shop from which he runs several fly-fishing and spin-fishing programs. He is also a member of the Vermont Fish and Wildlife Board, which oversees hunting and fishing policy in the state.

Trout are cold-water fish and require streams that are clean, cold, and clear to live and reproduce in. And so the unfragmented nature of the Worcester Range is a key component of the fine local trout habitat that is vital to Shannon's business and trout-fishing in central Vermont generally.

"The importance of habitat is huge," he says. "Having good habitat is vitally important to the health and conservation of all wildlife."

The cold mountain streams preferred by brook trout have an even wider environmental impact, according to Shannon, because they pour cold water into larger rivers, such as the Winooski and Lamoille, thus keeping those rivers good habitat for rainbow and brown trout — fish that can tolerate warmer water than brook trout, but still need cool-water habitat.

Conserving unbroken, healthy forests helps keep the trout streams that flow down from the mountains clean and cold. At the same time, keeping the forest intact maintains good habitat for deer, moose, bobcat, and other species. And it's not far-fetched to point out

that Vermont's tourist economy and many, many other human activities are dependent on the integrity of the forest environment in which we all live.

The fact that the Worcester Range is undeveloped and largely unfragmented is an important factor in maintaining the high quality of the mountain streams that brook trout and other creatures depend on, Shannon says. Developing the range would degrade the quality of those streams, resulting in warmer water temperatures and sediment, both of which are harmful to trout. And, of course, there would be other forms of damage done to other wildlife habitat.

He admires legendary forester and timber baron Craig Burt, who logged the forests around Mount Mansfield sustainably in the early 1900s — and helped promote the beginnings of skiing in Vermont in the 1930s.

"He understood the importance of maintaining a healthy forest for the overall health of the ecosystem," Shannon says. "You look at those streams today after a heavy rain — they still run gin-clear. There's no runoff, no sediment."

Vermont is widely known as an attractive place to hunt, fish, hike, and enjoy the outdoors, Shannon notes. Should that appeal be lost, the state's tourist economy would suffer. And so, ultimately, the health of Vermont's tourist economy is directly dependent on the continued existence of healthy forests, unspoiled vistas, and — clear trout streams.

Shannon pointed out that it has taken Vermont a century to recover from the widespread clearing of the land that left the state only about 20 percent forested in the 1800s.

"It's in our best interest for future generations, and for the state, that we look forward and protect what took one hundred years to restore," he says.

"Having good habitat is vitally important to the health and conservation of all wildlife."



Worcester Range/Northeastern Highlands

BY THE NUMBERS

Land Area: Northeastern Highlands, 1,313,700 acres (2,053 square miles); Worcester Range, 46,000 acres (72 square miles); Total Worcester Range/Northeastern Highlands, 1,359,700 acres (2,125 square miles).

Land Type: Predominately mountainous or hilly. The Worcester Range, a high and distinct chain of mountains, trends roughly northward into the Northeastern Highlands, a high, hilly plateau, dissected by broad river valleys.

Vegetation: 82 percent forested (mostly northern hardwoods and about one-third spruce-fir). Much of the remaining 18 percent is in agriculture.

Highest Elevation: Jay Peak, 3,858 feet. Other prominent mountains include (in the Worcester Range) Hunger Mountain, 3,585 feet; Hogback Mountain, 3,642 feet; and Worcester Mountain, 3,293 feet. Also, to the east, Burke Mountain, 3,267 feet and Monadnock Mountain, 3,150 feet.

Climate: Northern temperate, but on the chilly side. The average growing season is relatively short, 123-130 frost-free days. Coldest temperature ever recorded in New England was 50 degrees below zero Fahrenheit at Bloomfield in Essex County. An average of almost 90 inches of snow falls annually at St. Johnsbury.

Population: Northeastern Highlands has roughly 62,000 residents. St. Johnsbury, the largest city in the region, has about 7,600 residents living in 3,200 households.

Economy: Agriculture, recreation, forestry, manufacturing, service (including education, nonprofits, and government).

Wildlife: A diverse array of northern species, including moose (5,000 in 2005). Also black bear, white-tailed deer, bobcat, coyote, fox, fisher, Canada lynx, etc. The region abounds in bird species, including loon, wild turkey, spruce grouse, ruffed grouse, and a wide variety of passerine (migratory) birds. The Worcester Range and Northeastern Highlands areas encompass some of Vermont's most important wildlife habitat areas.

Misc.: The region includes more than 50 lakes and ponds.



The Northeastern Highlands: A Working and Wild Landscape



At the edge of the Worcester Range, and only slightly less rugged and wild, lie Vermont's Northeastern Highlands — or, as it is known locally, the Northeast Kingdom. Lying north and east of the Worcester Range, the Highlands are the least developed, most rural area of Vermont. Not only do they contain the large unfragmented areas of the Nulhegan Basin and Silvio O. Conti National Fish and Wildlife Refuge lands, but within several of its towns in Orleans and Caledonia counties are key linkages between the refuge lands and the Worcester Range.

Geologically an elevated plateau, eroded and glacially carved into a series of high, rolling hills and wide intervening river valleys, it encompasses some two thousand square miles and three Vermont counties: Caledonia, Orleans, and Essex. The countryside is 80 percent forested and much of the remaining 20 percent is open farmland. It is also known as Vermont's "Lakes Country," and it boasts more than fifty lakes and ponds, large and small, interspersed with small riverbeds, extensive marshes, bogs, and fens, and punctuated by modest granite mountains. Jay Peak, located near the northwest corner of the region, is the highest at 3,858 feet, while Burke Mountain at 3,267 feet and Monadnock Mountain at 3,150 feet anchor its eastern edge.

Like much of northern Vermont, the Northeastern Highlands are generally a region of small towns, intermittent farmland, and large swaths of forest. They become wilder and more forested the farther north and east they extend, until, in the Nulhegan Basin area and the Silvio O. Conti National Fish and Wildlife Refuge lands in Essex County, they are very nearly as deeply wooded and unfragmented as the Worcester Range.

Significantly for wildlife, the region is also the most sparsely populated part of Vermont. Most of its approximately sixty-two thousand residents live in small towns of a few hundred people. St Johnsbury, the largest community in the region, has some 7,600 inhabitants, and only a handful of the towns across the Highlands have more than a thousand residents. It is the most rural part of a very rural state.

Traditional Vermont lifestyles prevail here. Farming and forestry are important elements of the region's economy, which is also based on small manufacturing, health care, education, and tourism. Although a small minority of people in the region still farm, nearly everyone has a relative or neighbor who does, or who works in the woods, or who pursues some other land-based occupation.

It is a beautiful, largely unspoiled region where traditional outdoor sports like hunting, trapping, hiking, and (in the winter), skiing, ice fishing, and snowmobiling are actively pursued. Life can be hard here, and money is not abundant, but most residents of the region would not live anywhere else. Because it is not highly developed, and because of the traditional lifestyles and recreation that characterize the region, the landscape supports a wide array of abundant wildlife.

"I love Vermont because of her hills and valleys, her scenery and invigorating climate, but most of all because of her indomitable people."

— Calvin Coolidge, speech at Bennington, 1928



The Northeastern Highlands: A Working and Wild Landscape



The largest mammal in the Highlands, the moose, is a prominent figure on the landscape and serves as an icon for the remote, rugged character of the region. Between 1996 and 2005, the moose population of the region more than doubled — from roughly two thousand to five thousand. Because it was believed moose were on the verge of overpopulating their range in Vermont, state officials authorized the issuance of additional hunting permits to reduce the herd.

Eastern coyotes are common here and packs of them can often be heard howling on winter nights. Bobcat and fox, snowshoe hare, cottontail rabbit, red and gray squirrels, mice, voles, and other mammals are also widespread. Rare animals like Canada lynx and pine marten have been observed in this region over the past three years.

DID YOU KNOW . . .

Vermont ranks third in the nation in wildlife-related recreation (hunting, fishing, and wildlife watching), with a participation rate of 62%. More than **300,000 Vermonters and 230,000 nonresidents hunt, trap, or watch wildlife** in our state. Residents and nonresidents spend a total of **\$376 million annually** in Vermont on wildlife-related activities.



“The inhabitants of this state shall have liberty in seasonable times to hunt and fowl on the lands they hold, and on other land not enclosed, and in a like manner to fish in all boatable and other waters (not private property) under proper regulations, to be made and provided by the General Assembly.”

— Vermont Constitution

(The Vermont State Constitution is the only one that guarantees the right to hunt and fish.)



David Marvin sits among maple syrup barrels at his Morrisville business.

PEOPLE OF THE REGION: David Marvin

David Marvin, sixty-three, makes his living from the Northern Forest. He's a trained forester and a maple syrup maker — but not your average syrup maker.

For openers, Marvin has more than eleven thousand taps set on his home farm on the side of Butternut Mountain in Johnson. His Vermont Maple Sugar Co., a multimillion-dollar operation, fills a large industrial building just outside Morrisville, about where the Worcester Range meets the Northeastern Highlands.

There, Marvin employs some sixty-five Vermonters to process, package, buy, and sell maple syrup. Last year, he processed and sold more than one-half million gallons of syrup in containers of various sizes and shapes. A lot of the syrup he condenses into granules — which are like maple sugar but easier to handle and reconstitute. He buys syrup from other producers and dozens of fifty-five-gallon barrels of the stuff are stacked fifteen feet high in one end of his building.

At his home farm, sap flows down lines of tubing off Butternut Mountain and into three huge collection vats in a state-of-the-art sugarhouse. It's a high-tech operation, not your father's maple sugar-making operation, by any means.

When he graduated from the University of Vermont, some forty years ago, Marvin knew he wanted to make his living from the land, doing something related to his training as a forester. His father, the late Dr. James Marvin, had done significant maple research while teaching botany at UVM, so making maple syrup was a natural choice. His business grew from there.

But he kept his forestry skills honed, and his consulting firm today advises 250 to 300 clients on forestry matters that affect more than sixty thousand acres of Northern Forest land.

He sees the forest and the wildlife that calls it home as both threatened and enormously resilient. His concerns include the number of invasive species and diseases that threaten native plants and trees, the fragmentation of ownership patterns within the forest, and the few cut-and-develop lumberers that unscrupulously turn forest land into subdivisions for a quick profit.

"There's not just one threat to the forest," he notes. "There are several."

In recent years, Marvin has seen an increasing number of tracts of land in the Northeastern Highlands that have been scalped, laced with roads, and put on the market for housing development. He is also concerned about the loss of native forest species such as American chestnut, beech, and most recently, butternut trees to invasive diseases. "These are all due to introduced pathogens," he notes, adding that ash trees — an important species for firewood and sawlogs — will be faced with a mortal threat once the emerald ash borer arrives in Vermont. Likewise, the competition from invasive species such as buckthorn is a concern, he says.

Marvin is aware that changing ownership patterns throughout the region have begun the process of forest fragmentation, smaller parcels, and other changes that weaken the forest ecology. It is a far cry from the days when large timber companies held title to thousands of acres of Northeastern Vermont land, which they managed carefully as a working forest.

"There's not just one threat to the forest. There are several."



"We own 250 acres in Barton," he says, "and that makes us one of the largest landowners in the town!"

But there is hope, too, in Vermont's forest land. In Marvin's view, the forest environment is closely related to the human community and economy. "There's no disconnect between them at all," he says. "They can all be healthy, thrifty, and thriving, all at the same time."

He believes that it's important to respect both the human community and the natural community.

"The longer you practice this profession, the more uncertain and humble you become," he says.



A Threatened Way of Life



The traditional occupations and lifestyles of the Worcester Range and the Northeastern Highlands have played a vital role in keeping the landscape open, unspoiled, and beneficial to wildlife.

Sustainable logging benefits wildlife by keeping forest land healthy, undeveloped, and unfragmented. The Worcester Range is a perfect example of this, since the extensive forest holdings of the Meyer family have kept the eastern slopes of the range largely undeveloped (see page 25). Meanwhile, on the lower western slopes of the range, especially near Stowe, the land has been fragmented, logging is no longer a major factor, and there has been considerable real estate development.

Farms not only provide the human community with food and fiber, they also keep land open and have helped create the beautiful and scenic countryside that Vermonters value. Also, they provide “edge” habitat — areas of high biodiversity between field and forest that are important for many animals. Economically, when farms fail or foresters cannot make a decent profit on their holdings, the land all too often is subdivided and sold for housing lots and other forms of development.

In its present form, the “working landscape” of the Northeastern Highlands is an important factor in the ecological health of the region and the wild creatures living there. It is more than beautiful. In many ways, it is a finely balanced ecology that supports both its human inhabitants and the wildlife that call it home.

New Ownership Patterns, Changing Forest Economies

Change, however, has come to the deep forests of the Worcester Range and the Northeastern Highlands’ working landscape. There are now significant threats to the ecological integrity of this region.

The first threat surfaced in the 1980s and ’90s when massive changes were made in the ownership of large tracts of the forest in Essex and Orleans counties.

For decades, much of the forest of north-central Vermont was owned by large paper and timber companies that held and managed it in huge, unfragmented parcels. But in 1988, several thousand acres of forest land owned by Diamond International Corporation was put up for sale, mainly with an eye to its development value. Other timber companies later followed suit. Suddenly land that for decades had been managed for timber production was put on the market. Huge sections of the Northern Forest were, in effect, destabilized and available for development.

The state of Vermont, the Vermont Land Trust, the Vermont Nature Conservancy, the U.S. Forest Service’s Forest Legacy Program, and other public and private entities were successful in buying and protecting much of this land, in conservation actions that were approved and partially funded by the Vermont Legislature, but which were controversial. Although some of the forest land in the region is protected, more than 80 percent of it remains — and will remain — in private ownership.

“Some folks pay \$10,000 for a painting and hang it on the wall where their friends can see it, while I buy a whole mountain for that much money and it is hung up by nature where everybody can see it, and it is infinitely more handsome than any picture ever painted.”

— Joseph Battell (1839-1915), Middlebury, who donated Camel’s Hump to the State of Vermont

A Threatened Way of Life



The massive change in ownership patterns of the 1980s and '90s was only the first destabilization of the forest. The international economic trends that triggered that change are also making both farming and logging more and more economically fragile and thus affecting farm and forest land in the Worcester Range, the Northeastern Highlands, and elsewhere in Vermont.

Dairying, which makes up some 80 percent of Vermont's agricultural economy, is in serious trouble because the federal commodity milk-pricing system is not paying Vermont farmers enough for their milk. Although many farmers have found new ways of prospering — producing specialty cheeses, organic dairy products, or growing new crops such as soybeans — many farms in this region, like farms across Vermont, are struggling to stay in business. And some are losing the struggle.

At the same time, because of international competition, profit margins in the production of both sawlogs and pulpwood/firewood are now lower. And this puts much timberland in the

Worcesters and elsewhere in danger of being sold, subdivided, and developed.

Thus the working landscape that has typified northern Vermont is increasingly at risk. You can see these changes happening when a forested hillside is clear-cut, then subdivided into housing lots, then covered with houses — each positioned on its own ten acres of land in order to avoid Vermont's development laws. You can see the effect of the changes in land use on the outskirts of many villages in Northeastern Vermont, as approach roads that once crossed open fields become commercial strip zones crammed with fast-food outlets and big-box stores. Gradually, relentlessly, northern Vermont is becoming suburbanized.

As the landscape changes, due to economic pressures from outside, the traditional folkways and lifestyles of the region also change, becoming less rural, more suburban. Youngsters who once looked forward to deer camp or the opening day of trout fishing learn to play video games or entertain themselves by hanging out at the local mall. Instead of skiing or snowmobiling, people seek their exercise at the local gym, or skip it entirely and watch a sports event on television. The sale of hunting and fishing licenses has dropped by 20 percent in recent years, silent testimony to the changing lifestyles and values of Vermonters.



“Very early I began to understand that mountains are never there simply to ski and climb They shape the way I see them as metaphors for physical mastery and spiritual possibility.”

— Champion skier
Andrea Meade
Lawrence, *A Practice of Mountains*, 1980

A Threatened Way of Life



The suburbanization of Vermont may be inevitable, and suburban living has its own virtues and value. But in the process, as traditional, land-based recreations and activities decline, Vermonters' connection to the land on which they live is weakened. And with suburban sprawl, more and more wildlife routes and habitats are erased, reducing the ability of wild animals to move and connect as they need to. Not only is suburbia a bad environment for individual wild animals, it can damage the habitats they need. Thus suburbia threatens wildlife habitat, wildlife connectivity, and ultimately, wildlife itself.

These are subtle changes compared to the obvious economic difficulties being faced by farmers and foresters, but in the long run, they may prove just as profound in their implications for habitat connectivity, land ownership, and use.

Will Vermont still be Vermont if hunting and fishing die out here? Will the land still reflect traditional values and activities if farms turn into subdivisions and logging withers away because it is unprofitable?

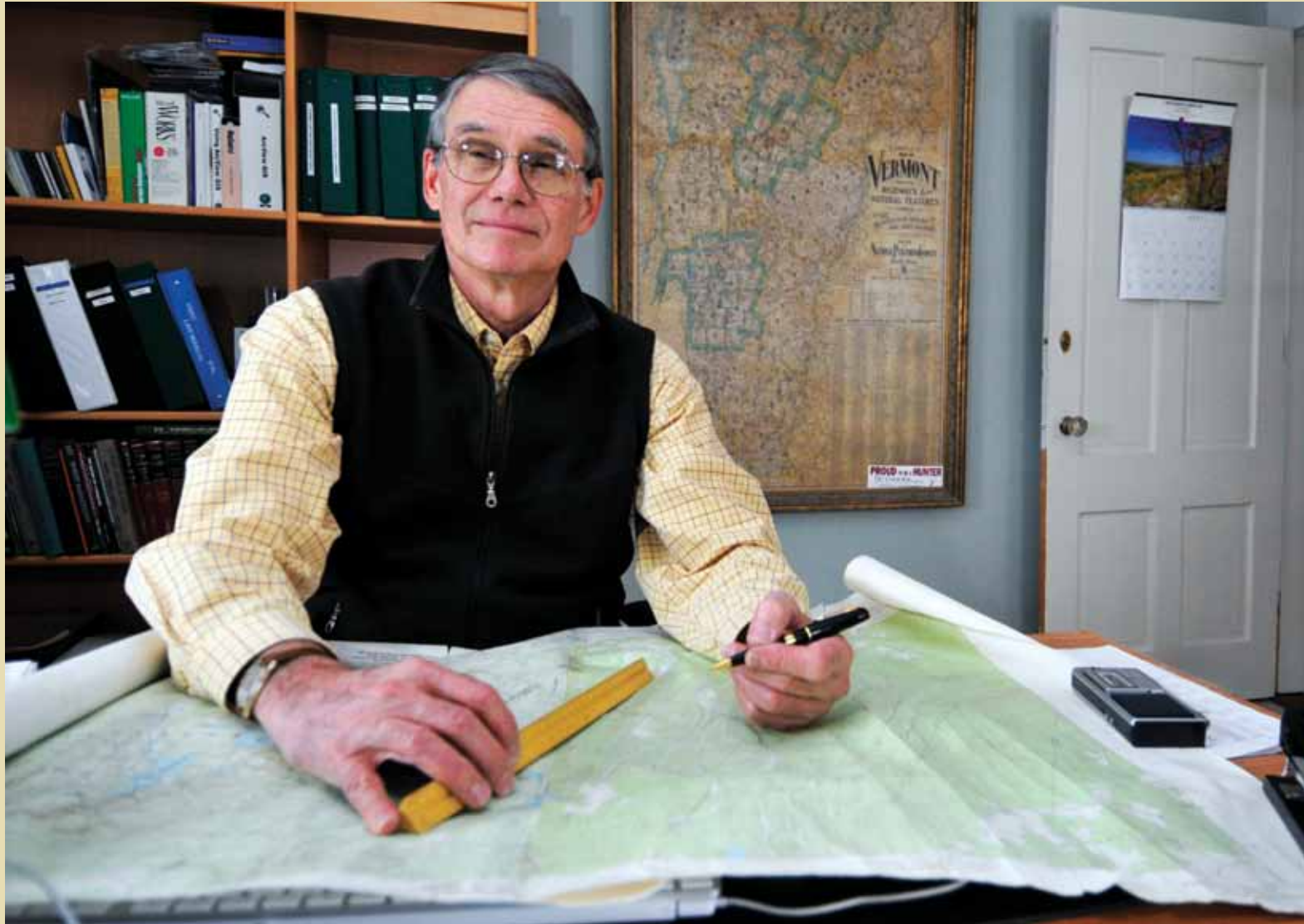
And what will happen to the moose and deer, fisher, frogs and trout, and bobcat when the woods and streams where they now roam freely are subdivided, fragmented, and crisscrossed by roads and property lines?

DID YOU KNOW . . .

Preserving farmland is an important piece of the Staying Connected Initiative. A mix of cultivated fields, orchards, meadows, and pastures complements adjacent woodland habitat, providing food and cover for wildlife such as deer, geese, wild turkey, and fox. Hayfields and other grasslands attract birds, such as bobolinks, and are a source of insects for brood-rearing songbirds. This special relationship between wildlife and agriculture, however, is being threatened as Vermont loses its farmland. Since 1978, more than **400,000 farmland acres have been converted to non-farm use**. And although we've seen an increase in diversified agriculture, the number of dairy farms has dwindled **from 3,382 in 1978 to fewer than 1,000** today.



Gradually, relentlessly, northern Vermont is becoming suburbanized.



John Meyer manages family-owned land in the Worcester Range from his Montpelier office.

PEOPLE OF THE REGION: John Meyer

Foresters see woodlands in both an ecological context and a human context. The ecological context always involves time and change. And the human context usually involves money.

"People tend to take forest lands for granted," says forester and forest owner John Meyer. "They don't realize that there are tremendous costs that have to be borne by someone."

Meyer should know. As head of Bardill Land & Lumber Co., he oversees the management of more than fifteen thousand acres of timberland that his family owns in the Worcester Range and nearby. He is familiar with both the financial and ecological ups and downs of the Northern Forest.

Right now, the financial health of privately owned forest land is shaky, primarily because the demand for local lumber is weak due to foreign competition — and because of tax uncertainty at home. Put most simply, it has become difficult to make money selling timber because it's hard to charge enough for sawlogs to pay the cost of owning the land and managing and cutting the trees.

And that, in turn, has implications for the wild and unfragmented nature of the Worcester Range. That's because, if the owners of forest land in the Worcesters and elsewhere cannot make even a small profit from the sale of timber from their lands, those lands will almost certainly be sold and developed.

Should that happen, the great environmental value of the Worcester Range — its integrity as unbroken, largely undeveloped wildlife habitat — would be lost.

"It's a challenge to keep land active and used," Meyer says. "It can only happen if we value the land for its outputs. If we don't — it'll be gone (sold and ultimately developed)."

For more than forty years, the Meyer family has owned and managed forests on and near the Worcester Range. One of the reasons much of Route 12 between Worcester and Morrisville goes through several miles of forest is that the Meyers have managed that land as timberland.

They are managing it sustainably, taking the long view. "Our focus is primarily healthy forests, healthy habitats," Meyer says. "What we like to do is cut less than our growth, so it's sustainable, in perpetuity." That, of course, benefits wildlife because it results in intact forests and good habitat connectivity.

And a healthy wildlife community, in turn, helps keep the forest itself — and the trees its owners wish to harvest — vital and healthy.

"It's good forestry," Meyer says. "Birds eat insects."

However, that sustainability rests on financial as well as ecological bases, and one big unknown is the future of Vermont's Current Use Program. Under this program, managed forest land can be taxed at rates lower than its value as real estate. In the Northeast, if land is taxed as real estate, it will sooner or later be sold and end up developed as real estate. And in fact, when all land began to be taxed at real estate values, back in the 1970s, the Meyers began selling off land to stay ahead of their tax expenses, which were being pushed higher and higher as backcountry land escalated in potential value.

But in 1978, Vermont established its Current Use Program and the taxes on farm and forest lands throughout the state were reduced to manageable levels. John Meyer puts it succinctly: "We live and die by the Current Use Program."

And so sustainable forestry needs to be sustainable economically, as well as ecologically. That's what keeps the land from being sold, sub-

"If society wants to tax undeveloped land at its development values," Meyer says, "Guess what? It will be developed."



divided, and turned into housing lots. It's a balancing act, one that requires understanding from government, as well as from landowners and citizens.

"If society wants to tax undeveloped land at its development values," Meyer says, "Guess what? It will be developed."

The Meyers work to improve their forests and to keep intact all the ecosystems that maintain a healthy forest. It's good forest management, good business, good for wildlife, and ultimately, good for Vermont.

But man is a part of the total environmental picture now. And that makes it both a complex problem — and one that's vital to the future of the Northern Forest.



Staying Connected: Why It Is Important



As noted earlier, habitat connectivity is extremely important to wild animals. Not only do individual animals need to be able to move freely to obtain food, mates, and other needs, but in addition, access to large habitat areas helps animals maintain genetic diversity and allows them the ability to migrate northward as their habitats evolve in that direction due to climate change.

Vermont's traditional landscape patterns, which intersperse villages, farms, and forests in such a way that the forest blocks are connected, help entire populations of wildlife stay genetically healthy by intermingling and interbreeding freely. When small populations of bear, for example, are isolated and cannot interbreed, they become weaker genetically and, therefore, more subject to disease. When they can travel easily across the landscape, meet other populations of bear, and breed with them, their genetic makeup is strengthened.

Habitat connectivity thus keeps not only individual animals healthy, it promotes the health of entire populations of a wide variety of animals. It is a major reason that Vermont and the Northeastern Highlands have abundant and healthy wildlife populations today.

Global climate change also poses a threat to the life of wildlife in this region. As concern for climate change has grown, the web of connectivity across the Worcester Range through the Northeastern Highlands has caught the interest of scientists and wildlife advocates. In years ahead, habitats that are now to our south will evolve northward. Plant species and habitats that prefer cooler weather — boreal forests and the like — will gradually reposition themselves to the north, generation by generation.

And with that likely change has come a question: As the habitats favored by northern species like moose and Canada lynx inexorably reposition themselves northward, what will happen to the wildlife species that depend on them?

The Vermont Fish & Wildlife Department, the National Wildlife Federation, and other concerned groups have identified the Worcester Range/Northeastern Highlands Linkage Region, along with other areas throughout New England, as a likely wildlife corridor leading to the east, across the region, and ultimately into forests in Quebec, northern Maine, and the maritime provinces. They believe that because of its orientation and its key location, the range and the region to its east would allow wildlife to migrate to new habitats over time. But this option will prevail only if the existing corridors remain open and relatively unfragmented.

As the habitats favored by northern species like moose and Canada lynx inexorably reposition themselves northward, what will happen to the wildlife species that depend on them?



Ann Ingerson and Dave Brown at their Craftsbury home.

PEOPLE OF THE REGION: Ann Ingerson and Dave Brown

Ann Ingerson and Dave Brown of Craftsbury have built their home — and their life — from the Northern Forest.

Dave is a woodworker and teacher who turns bowls and platters from native hardwoods. He built their home and most of the furniture in it from wood harvested in the forests of Craftsbury, where he and Ann live.

Ann works full time for the Wilderness Society, wrestling with knotty economic problems related to forests, energy, sustainability, and ecology. She also works with the Northern Rivers Land Trust and the Four Winds Nature Institute, a program that promotes environmental education in Vermont elementary schools.

"We're trying to find ways that the economy can work without destroying the ecosystem," Ann says.

Their life reflects their values, which were shaped by their years teaching environmental subjects at nearby Sterling College. For three decades, they have heated their home with wood cut on their own land. Ann's large garden, lambs that they raise, and the game and trout that Dave brings home from his hunting and fishing trips help defray their food costs.

"We tried raising chickens for awhile, but the foxes were too clever," Ann notes. "And we'd rather see the foxes than raise the chickens."

Both enjoy the physical work that they do to provide for themselves. "I just like the feeling of being involved in all the seasons," Dave says. He sugars with a neighbor in the spring, cuts firewood and gardens during the summer, and hunts and fishes in season.

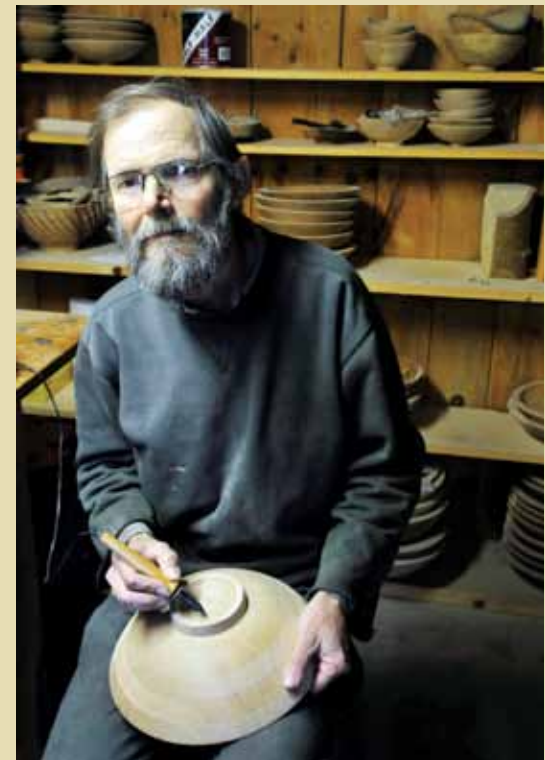
But while they enjoy their life and work, they are concerned about changes they have seen in the natural

world in the last 30 years. Ann is concerned about the loss of open lands and unbroken forests. She points out that while Vermont is known as the "most rural state in the nation," according to census figures, more and more of the state's forest land is being subdivided for houses and housing developments, and farms are all too often broken up for development. Dave adds that both fishing and hunting have deteriorated. New houses have invaded several grouse covers he used to hunt, and "they used to call the Black River 'Trout Brook,'" he says. "Now you couldn't find a trout in there."

The two are closely connected with their community. For several years, they were members of the Craftsbury Volunteer Fire Department. Ann volunteers for the Craftsbury Forest Committee, and Dave has for many years been director of the Wildbranch Writing Workshop, cosponsored each summer by *Orion* magazine and Sterling College. As he skis to the post office on winter mornings, he is greeted warmly by the neighbors he meets.

"It sounds like we're anti-people, but we're not," Ann says. "It's just that people seem to need that experience — of unbroken stretches of wild lands and forests."

"We're trying to find ways that the economy can work without destroying the ecosystem."





What Will Be Our Response?



It is important to remember that the web of habitat connectivity in our region is a natural system that already exists. We human beings don't have to build this network, but we do need to maintain and protect it.

STAYING CONNECTED is a cooperative initiative that aims to protect wildlife such as black bear, moose, bobcat, fisher, and other species from the effects of forest fragmentation and maintain habitat connectivity, region-wide. State wildlife and transportation agencies are cooperating with a dozen private organizations on the project, which is financed by grants totaling \$1.25 million from the U.S. Fish & Wildlife Service and other sources.

Specific ways of accomplishing the project's goals will be up to local people who live in or near the Worcester Range and the Northeastern Highlands. **STAYING CONNECTED** strongly endorses local control and believes each town and each landowner should make their own decisions about the best ways to protect the wildlife living nearby.

Local Decision-Making

STAYING CONNECTED hopes to build support for traditional forest uses, including sustainable forestry and logging, and recreational pursuits such as hunting, fishing, trapping, hiking, and wildlife-watching. These activities can help maintain the ecological integrity of the forest and, done sustainably, can benefit the wildlife that lives there.

A wide range of stewardship options are available to local residents. A particular town may, for example, choose an educational approach, identifying wildlife needs and then noting the value of habitat connectivity in a town plan. Another town may choose a regulatory approach by rewriting town planning and zoning laws to protect core wildlife areas and minimize commercial and residential sprawl. In every instance, local communities would make the choices.

STAYING CONNECTED believes that residents of northern Vermont value wildlife and want to keep it a daily presence in their lives. A variety of strategies will be needed to conserve and enhance connectivity within the region. Public lands and traditional private-sector economies such as sustainable timber-harvesting will both play important roles. The affection for forested lands felt by hunters, hikers, fishermen, trappers, and other outdoorspeople can generate public support for keeping forest land open and unfragmented.

It will take both understanding and work to keep the wild birds and animals of our region a presence in our lives. But the result will be deeply important to the continued vitality of the Northern Forest, to its wildlife, and to the human community that lives within it.

Staying Connected believes that residents of Northern Vermont value wildlife and want to keep it a daily presence in their lives.



For additional information about the Staying Connected Initiative
or for technical assistance from the Vermont Fish & Wildlife
Department, please contact us at

StayingConnectedInitiative@gmail.com

This report was

- Designed by RavenMark, Inc. in Montpelier, Vermont
- Printed by Villanti & Sons Printers in Milton, Vermont
- Written by Tom Slayton

Photo credits:

Covers: Adapted from photos by Neahga Leonard

Page 2: Paul Tessier

Page 3: Jeb Wallace-Brodeur; Michael Ireland

Page 4: Nina Mirabile

Page 5: Oversnap; Neagha Leonard; VT Fish & Wildlife archives

Page 6: Charles Wiley; Hogo

Page 7: Maps provided by Jens Hawkins-Hilke

Page 8 & 9: Jeb Wallace-Brodeur

Page 10: Jeb Wallace-Brodeur

Page 11: Neahga Leonard; Frank Leung; Neahga Leonard

Page 12 & 13: Jeb Wallace-Brodeur

Page 14: Pierre Cardon

Page 15: Eric Sibley; Joze Pojbic; Jeb Wallace-Brodeur

Page 16: Jeb Wallace-Brodeur

Page 17: Jeb Wallace-Brodeur; Audrey Roorda

Page 18 & 19: Jeb Wallace-Brodeur

Page 20: Jeb Wallace-Brodeur

Page 21: Jeb Wallace-Brodeur; Landslides Aerial Photography

Page 22: Landslides Aerial Photography; Steve Wright

Page 23: VT Fish & Wildlife archives; Eric Michaud; Neahga Leonard

Page 24 & 25: Jeb Wallace-Brodeur

Page 26: Laure Wilson Neish

Page 27: Harris Shiffman; Neagha Leonard

Page 28 & 29: Jeb Wallace-Brodeur

Page 30: Jeb Wallace-Brodeur

Page 31: Neahga Leonard; VT Fish & Wildlife archives



