Vol. 3, Issue 1
Winter, 2005

# FEATHERS & FIR

Mountain Birdwatch- *A Project of the Vermont Institute of Natural Science*

## FIR WAVES WASH UP NORTHEASTERN MOUNTAINS

By Elizabeth Donick

Whether you are driving through the northern Appalachians or hiking in the Adirondacks, you may have noticed the crescent-shaped patches of barren foliage high in the mountains. These gray bands appear in plain view amid a sea of dark evergreens. But what exactly are they? And how are they created?

These "fir waves" were first reported in Japan in the 1950s and referred to as dead tree stripes. Twenty years later, US scientists described similar patterns in the Northeast. Yet the phenomenon was shrouded in mystery until the 1990s, when biologist Peter Marchand set out to investigate the reasons for this patchy look. He began his research by comparing fir wave structure in New England to forests with similar characteristics being studied in Oregon.

Analysis in Oregon revealed the culprit as *Phellinus*, an unrelenting fungal glutton. Localized root infections of this microbe were killing adult mountain hemlock trees in a circular pattern. The fungus found weakness in the more mature trees partially because aging trees depleted soil nutrients over time, and thus had a diminished pool of nutrients available for absorption . Dying trees were also losing their photosynthetic capacity due to the weakness. The destruction of mature trees was followed by rapid regeneration occurring behind the front, where dead trees released large amounts of nutrients into the soil, facilitating growth.

© Steve Halasz

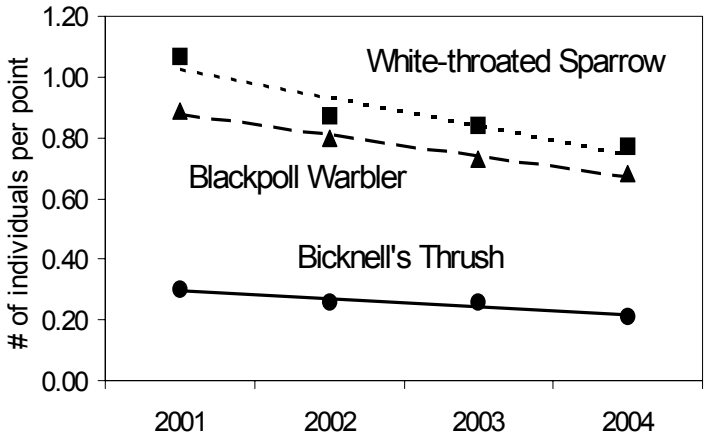
Mountain Birdwatcher Sunita Halasz contemplates fir wave dynamics on Whiteface Mountain, New York.

Marchand and his colleagues applied these findings to a study of fir waves in New Hampshire's White Mountains. As they began their study in New England, they discovered several

*(Continued on page 2)*

## BICKNELL'S THRUSH IN DECLINE

Numbers of Bicknell's Thrush have dropped on the 46 Mountain Birdwatch survey routes monitored each year since 2001. Preliminary trend analysis indicates a 9% annual decline over the four-year period. Mountain Birdwatchers detected the rare thrush by 5-minute count on approximately half of the routes in all four years. White-throated Sparrow and Blackpoll Warbler populations experienced similar trends, with annual declines of 9.9% and 8.7%, respectively. These two species remained widespread throughout the survey region, despite their reduced abundance. Short-term changes may not reflect long-term trends, however these results elevate concern for all three species. Turn to Wing Bars on page 3 for a summary of results from all routes surveyed since 2001.




Relative abundance of declining species, 2001-2004, based on 5-minute counts on the 46 routes surveyed in each year.

# Waves of Dying Trees Create Critical Bird Habitat

*(Continued from page 1)*

differences between mountain hemlock "ripples" and fir waves. First, tests revealed that New England soils contain adequate nutrients to stave off fungal infection. No root pathogens were initially found. Additionally, there was no indication of waning photosynthetic potential.

Naturally, these differences triggered further analysis, which revealed significantly fewer green needles on trees in the dieback zones compared to well-nourished trees in front of the impending wave. Furthermore, incomplete outer growth rings were present in the wood of numerous trees in the dieback zone, regardless of age. So why did trees that were still photosynthesizing lose so many needles? A hike up Mount Moosilauke on a winter morning revealed the culprit, rime ice.

Rime ice forms as wintry-cold cloud droplets blow through alpine forests and freeze instantly upon meeting chilled vegetation. This windborne ice accumulates near tops of trees and around each needle. Strong mountain winds generate swaying motions in the forest, causing collisions between adjacent trees that result in broken branches, twigs, and needles. A single squall can cause substantial structural damage to trees already brittle from ice accumulation. Tall trees tend to fall first from direct exposure, which removes shelter for smaller trees, allowing the wave to continue unimpeded.

© Kent McFarland

Fir waves on Whiteface (foreground) and Esther Mountain, New York. Other excellent examples occur on Mount Lafayette in New Hampshire and on Katahdin in Maine.

As these weather-beaten trees lose their needles, various amounts of nutrients and the tree's ability to produce them become exhausted. A weakened tree, rocking in the wind, may suffer root damage, enabling harmful pathogens to gain entry and slowly kill off the tree. The fungal pathogen identified in the White Mountain study was *Resinicium bicolor*, the presence of which also explained the incomplete growth rings.

For the individual tree, the whole process is ruinous, but the rest of the ecosystem benefits in more ways than one. The collapse of a dead trees releases nutrients stored in its wood, while the new opening in the canopy permits additional sunlight to reach the forest floor. The pulse of liberated resources allows a vast array of organisms to thrive for a period of time, until maturing trees reach sufficient height to sustain damage from wind and ice. This cycle of damage and renewal creates a wave pattern when accelerated by time-lapse photography - hence, the name fir wave.

Breeding birds thrive in the wake of a fir wave, where the forest's complex structure provides many forms of nesting cover. Dark-eyed Juncos and White-throated Sparrows tuck their cups on or near the forest floor among low shrubs and tangled debris. Yellow-bellied Flycatchers and Winter Wrens conceal their nests in the upturned roots of fallen trees. For their nests, Magnolia Warblers and Bicknell's Thrushes favor dense thickets of regenerating fir. Even a fir wave's dead trees shelter bird life. Black-backed Woodpeckers excavate nest holes in standing snags, which can later be used for nesting by Boreal Chickadees, Black-capped Chickadees, and Red-breasted Nuthatches.

So get out and explore this patchy natural phenomenon as it can be seen at many locations in New York and northern New England. Or view it from a distance and try to imagine the waves of forest succession.

---

## Mountain Meal
## Breakfast Quesadillas

4 flour tortillas (8 inch size)
2 oz Monterey Jack cheese, grated
4 tbsp sour cream
Red spruce twigs for garnish
Salsa

Warm a tortilla in a skillet for 1-2 minutes. Spoon one quarter of the salsa over half of the tortilla. Top with one quarter of the cheese, fold tortilla over the filling, and cook until salsa is heated through and the cheese has melted (2-3 minutes). Transfer quesadilla to plate, top with sour cream and garnish with spruce twigs. Enjoy!

### Salsa recipe

4 plum tomatoes, diced
1 small zucchini, diced
2/3 yellow pepper, diced
4 scallions thinly sliced
2 jalapenos, seeded and minced
2 tbsp cilantro, minced
4 tsp lime juice
½ tsp lime zest
Cayenne pepper to taste
¼ tsp salt

Stir together ingredients. Pack in a plastic container.

### Tips for the Trail

Seal salsa and sour cream in a plastic bag and chill in a stream.

Out of red spruce garnish? Sprigs of balsam fir will do.

# WING BARS: A Summary of 2004 Survey Results

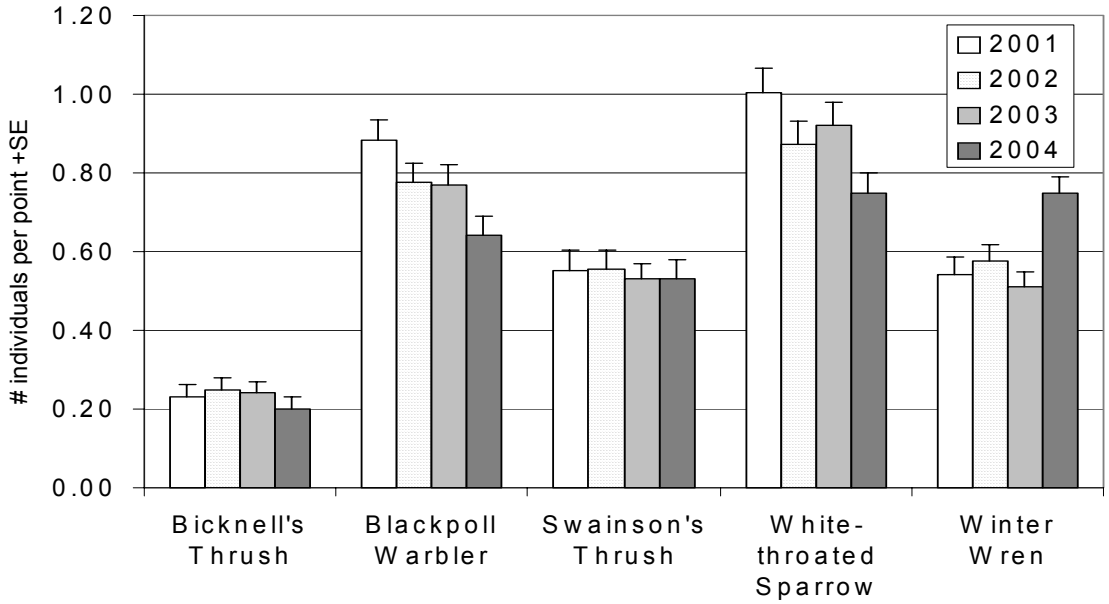
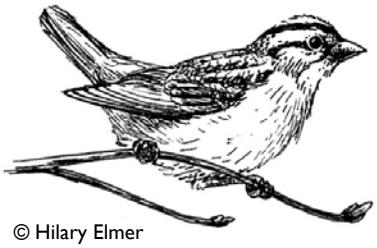



Figure 1. Relative abundance of focal species based on five-minute counts (n=112 in 2001, n=118 in 2002, n=112 in 2003, n=111 in 2004).

In 2004, over 150 Mountain Birdwatchers packed their bug juice and binoculars and headed into woods. Thirsty for adventure, they clambered through the Catskills, ascended the Adirondacks, grunted up the Greens, and walked wobbly-kneed over the Whites. When they emerged red-eyed from the hills, the dedicated volunteers had completed 111 dawn surveys, topping one hundred for the fourth consecutive year.

Many veteran observers drove home from the mountains wondering, "What happened to the White-throats?" The question sprang up from throughout the region, foretelling the year's most dramatic decline, an 18.5% decrease in White-throated Sparrows since 2003. Because the White-throat is vocal and nearly ubiquitous on northeastern mountains, its reduced abundance was evident even before the data were analyzed. However, drops of similar magnitude among Bicknell's Thrushes (-16.7%) and Blackpoll Warblers (-16.8%) escaped early notice.

For Bicknell's Thrush, the 2004 result provides the first meaningful evidence of short-term decline since regional monitoring began in 2001. The drop in numbers is especially pronounced on the 47 routes that have been surveyed in all four years (see page 1). On these routes, the average count has fallen by 9% per year.



© Hilary Elmer

White-throated Sparrows were down sharply, and missed, in 2004.

The decline in Blackpoll numbers continues a negative trend that stands in contrast to findings of the High Elevation Landbird Program. Mountain Birdwatch's sister project, carried out in New Brunswick and Nova Scotia by Bird Studies Canada, recorded large increases in Blackpoll Warbler abundance in 2004. Perhaps Blackpoll Warblers have been persuaded to head north by the White-throat's whistled song, *O sweet Canada Canada Canada Canada*. Or has a warming climate stimulated the type of range shift that has already been observed among songbirds in Europe? Only patient and persistent monitoring will tell.

A 47% jump in Winter Wren numbers, combined with stable counts of Swainson's Thrush, helped offset declines observed in other species. One of Mountain Birdwatch's long-term goals is to determine whether these mid-slope species thrive under warming conditions at the expense of upper slope and ridgetop specialists, such as Blackpoll Warbler and Bicknell's thrush. Results from 2004 are inconclusive, but consistent with the elevation and range shift hypotheses.

Complete results from 2004 will be available online beginning April 1. Visit vinsweb.org/cbd/mtn_birdwatch.html.

## Bird Puzzlers

1. What mountain bird species crushes the base of flowers to access nectar, leaving the upper flower undamaged?

2. What common mountain bird occasionally mates with the Dark-eyed Junco, producing dully marked hybrids with white outer tail feathers?

3. What familiar little bird often hides food items for later recovery and is capable of remembering thousands of hiding places?

4. What cavity-nesting species discourages predators by applying sticky conifer resin globules to the entrance of its nest?

5. What harbinger of spring eats earthworms in the morning and switches to fruit later in the day?

Answers on page 6.

## Dr. Wallace's Dissertation

George J. Wallace studied Bicknell's Thrush on Mount Mansfield in the northern Green Mountains in the 1930s. His dissertation, *Bicknell's Thrush, Its Taxonomy, Distribution, and Life History*, was completed in 1936 at the University of Michigan. It served as the definitive reference for the species for over 60 years.

"The evening is the great play time of thrushes. As the light of day retreats, these twilight-loving birds emerge from their hidden shelters, soaring in full song across the open spaces or above the woods. Sometimes they may be seen alighting upon a stump or a rock, a perfect picture of alertness, fluttering their wings tremulously as they dance and hop nervously about, perhaps uttering soft whistles or harsh screams. Singly or in pairs, these wild creatures perform mysteries under the cover of semi-darkness that will elude observation for a long time.

*"These wild creatures perform mysteries under the cover of semi-darkness that will elude observation for a long time."*

Not all these mysterious vesper activities are directly related to mating or courtship, for they continue to some degree throughout the summer; but their obvious concentration during the early part of the breeding season suggests that their major role is nuptial affairs. The part performed by each sex in these twilight scenes is an open question, but it is pertinent that incubating females always leave their mates at about this time."

## Mountain Teasers

1. What mountain region inspired nature writer John Burroughs and painter Thomas Cole?

2. The oldest ski area in New England resides on which mountain?

3. In June of 2004, how many clear days with sunshine did the White Mountains of New Hampshire see?

4. True or False? The first sunrise in the U.S. can be seen from the summit of Mount Katahdin.

5. How many years separate the first recorded ascents of Mount Marcy and Mount Washington?
a. 15
b. 65
c. 135
d. 195

Answers on page 6.

## Kyoto Protocol Takes Effect

### Bicknell's Thrush Could Benefit

The Kyoto Protocol entered into force on February 16, 2005. This international agreement to combat global warming was originally drafted in Japan in 1997. Thanks to ratification by Russia, the plan has received sufficient backing to become legally binding in the signatory countries.

Recognizing the need for strong action to combat global climate change, the Kyoto Protocol aims to reduce and stabilize greenhouse gas concentrations in the atmosphere. Specifically, the protocol sets targets to reduce emissions in developed and developing countries to at least 5 % below 1990 levels by 2012. Even though the United States has rejected the Protocol, citing problematic demands of cutting emissions, over 100 other nations have endorsed it and are now working to meet their ambitious emissions goals.

Curbing greenhouse gas emissions may be key to the long-term survival of Bicknell's Thrush and other mountain-dwelling songbirds in the Northeast. Habitat projections made by VINS biologists show that a moderate increase in summer temperature (3 to 5 ˚C) could significantly reduce or eliminate montane fir-spruce forests from the Northeast. Critical habitat in the Catskills and in the Green Mountains are at greatest risk of conversion to hardwoods. The Adirondack High Peaks and the Presidential Range are the least vulnerable to the projected effects of increasing temperatures. The recent disappearance of Bicknell's Thrush from coastal locations in Canada and from low mountains in New England may signal early effects of climate change. The pace and pattern of habitat alteration will depend on the rate of warming, lag times in forest response, and the influence of site factors such as slope, aspect, and substrate.

## IN THE SCOPE *Dendroica magnolia*

# MAGNOLIA WARBLER

Reprinted with permission from Bird of The Week from the Cornell Lab of Ornithology www.birds.cornell.edu

**Cool fact:** Around the year 1810, pioneering ornithologist Alexander Wilson observed a flock of colorful warblers in some magnolia trees in Fort Adams, Mississippi. Wilson collected one of them and gave the bird the scientific name *Sylvia magnolia* after the trees in which he first observed it. Although he and other early ornithologists called it the "Black and Yellow Warbler," "Magnolia Warbler" stuck as its common name.

The Magnolia Warblers that Wilson found in Mississippi were migrating from Central America to their northern breeding grounds. "Spruce Warbler" might be a more appropriate name because the Magnolia Warbler most often breeds in moist forests of spruce and other conifers. The breeding range extends from the Yukon Territories and British Columbia across the boreal forests of Canada to Labrador, and south to northern Minnesota, Wisconsin and Michigan, throughout New England and locally south in the Appalachians to West Virginia. The highest population densities are found in dense stands of second growth spruce and balsam fir in the northern parts of the range. Farther south in the Appalachian Mountains, Magnolia Warblers commonly breed in stands of hemlock. Rarely, they may nest in drier oak-hickory woodlands. Magnolia Warblers are tolerant of disturbed woodlands and readily use recovering clearcuts, edges, and other types of forest openings.

Although Magnolia Warblers will eat berries during inclement weather, they use less vegetable food than other *Dendroica* warblers and are normally exclusively insectivorous. They glean insects from the undersides of leaves and occasionally from bark crevices at low to middle levels of the forest. While foraging, the Magnolia Warbler frequently spreads its tail, exposing bold white patches.

A typical Magnolia Warbler's song consists of a series of six or seven musical notes with the last note higher in pitch, as "*weety, weety, weety, wee*." The song is similar to that of the Chestnut-sided Warbler but is shorter, with a less emphatic ending. It also resembles the Hooded Warbler's song, but is less rich.

Nests are flimsy constructions concealed within small conifers in a bog or overgrown clearing. They are usually located close to the trunk, from one to fifteen feet off the ground. The female does most of the assembly of small twigs, grasses, mosses, pine needles, and rootlets that make up the nest. Invariably she lines the nest with fine black rootlets. Typically, the female lays a single clutch of four eggs which is incubated for 11 to 13 days. The fledglings leave the nest after eight to ten days. The parents may continue to feed the young for an additional 25 days after fledging.

© Kent McFarland

Fall migration is protracted, lasting from late August through September. Most migrating Magnolia Warblers follow the Appalachians or the Mississippi Valley to the Gulf Coast and then fly across the Gulf of Mexico to winter in the Yucatan Peninsula and Central America. Some follow the western Gulf Coast rather than attempting the long water crossing, while others migrate through Florida and the West Indies. Spring migrants essentially follow the reverse path, although some take a more easterly route through North America than in the fall.

**Description:** Like many warblers in the genus *Dendroica*, Magnolias have strikingly different spring and fall plumages. However, all plumages share the distinctive tail pattern with a white band across the middle of the outer feathers. Males in breeding plumage have black upperparts and a black facial mask. The crown is gray, separated from the black facial mask by a white supercilium. The throat, breast, belly, and rump are bright yellow. Flanks and breast are heavily streaked with black, the streaks forming a necklace across the upper breast. The vent area and undertail coverts are white. The wings are gray with a large white wing panel.

Breeding females resemble males, but with more subdued colors. The mask is gray rather than black, the streaking on the breast and flanks is less bold, and the back is mostly olive gray with reduced amounts of black.

In the fall, males lose the black facial mask and back. The streaking of the underparts is greatly reduced and the necklace fades to a gray band. Fall females and immatures are duller than birds in breeding condition, with reduced streaking and facial markings and a gray breast band.

## MOUNTAIN BIRDWATCH DATA PUBLISHED

Data collected by Mountain Birdwatchers between 2000 and 2002 have just been published in The Wilson Bulletin, a quarterly journal of the Wilson Ornithological Society. Survey results submitted by volunteers were used to validate a predictive map of Bicknell's Thrush distribution in the northeastern United States. The paper, authored by researchers at VINS and the Antioch New England Graduate School, was selected as the lead article for Volume 117 (1). It is illustrated with a handsome painting of Bicknell's Thrush by wildlife artist, Barry Kent MacKay. Email Dan Lambert (dlambert@ vinsweb.org) for a digital or hard copy.

## Answers to Bird Puzzlers

1. Purple Finch
2. White-throated Sparrow
3. Black-capped Chickadee
4. Red-breasted Nuthatch. In order to avoid the resin, the bird dives directly through the hole.
5. American Robin

*The Red-breasted Nuthatch applies sticky resin to the rim of its nest hole. The sap deters predation by adhering to intruders. Nuthatches avoid the goo by diving directly through the hole.*

## Answers to Mtn Teasers

1. The Catskills
2. Mt. Mansfield is home to New England's oldest ski area, with trails first cut in 1934. Bromley Mountain, founded in 1936, comes in a close second.
3. A mere two days. There were 17 days of rain in June. It snowed on Mount Washington on three days.
4. False. The sun's rays strike Cadillac Mountain three minutes before they reach Mount Katahdin.
5. Darbey Field climbed Mount Washington in 1642, 195 years before Ebeneezer Emmons climbed Mount Marcy.

# The Lookout

### High Levels of Mercury Found in Mountain Birds

Groundbreaking research conducted over the past 5 years by more than 50 scientists, including VINS Conservation Biologists Chris Rimmer and Kent McFarland, have yielded surprising insights on the extent of mercury pollution across the northeastern U.S. and eastern Canada. From lakes to mountaintop forests, data were collected on air, water, fish, birds, and other wildlife at thousands of locations. The BioDiversity Research Institute (BRI) and Environment Canada, the two organizations that led this effort, presented these findings in 21 papers on mercury in a special edition of the journal Ecotoxicology on April 1, 2005. A BRI report, "Mercury Connections", was also released, distilling the papers for non-scientists.

Until this point, most studies have focused on mercury in fish and fish-eating birds in aquatic environments. These new findings show that animals in non-aquatic habitats also have elevated mercury levels. One of the project's most significant discoveries is the presence of mercury in terrestrial, mountain-dwelling songbirds like Bicknell's Thrush. VINS's data reveal that songbirds in Vermont's Green Mountains are accumulating mercury and that nearly all of it is in the toxic methyl form.

Over five years, the researchers tested 200 birds, including Bicknell's Thrush, Blackpoll Warbler, Yellow-Rumped Warbler and White-throated Sparrow. Levels were higher at Stratton Mountain, where mercury deposition also is higher. Researchers suspect that mercury is taken up by high-elevation trees. Moth caterpillars eat the leaves, and Bicknell's Thrush dines on the caterpillars.

"Mercury may already be having an insidious effect on the bird," McFarland said. "This is also a wake-up call for us as a species to reflect on how much mercury we are putting in the atmosphere. . . The thrush may be a canary in the coal mine."

"Mercury Connections" is available on the BRI website at briloon.org/mercury.

### Land Deal Conserves Critical Habitat on Lyon Mountain, NY

In January, The Lyme Timber Company and The Nature Conservancy purchased 104,000 acres in the northern Adirondack region, including over 1,600 acres of potential Bicknell's Thrush habitat on Lyon Mountain. This purchase, known as the Sable Highlands Project, includes agreements with New York State that will conserve ecologically-significant natural resources, sustain forestry jobs, preserve traditional land uses and offer new public recreational opportunities.

### VINS Releases Report on Ski Area Impacts on Bicknell's Thrush

The VINS Conservation Biology Department recently completed a landmark report that yields new insights on the impacts of ski areas on high elevation bird populations. Titled "Evaluating the Use of Vermont Ski Areas by Bicknell's Thrush: Applications for Whiteface Mountain, New York", the report summarizes 10 years of hard-won data from VINS' pioneering avian research on Stratton Mountain and Mt. Mansfield. VINS scientists studied the ecology, nesting success, and population dynamics of Bicknell's Thrush on each mountain. Studies were simultaneously conducted in areas developed for skiing and on nearby areas of undeveloped, natural forest.

Results may surprise some. Few significant differences existed in how successfully Bicknell's Thrushes used areas developed for skiing and natural forests. Nest predation rates and overall nesting success were similar, as was the survival of adults from one year to the next. There was no evidence that behavior or movements of

*(Continued on page 8)*

# ABSTRACTS

Canadian Journal of Forest Research 34(8):1784-1788, 2004
**Severe red spruce winter injury in 2003 creates unusual ecological event in the northeastern United Stated**
B.E. Lazarus, P.G. Schaberg, D.H. DeHayes, and G.J. Hawley
USDA Forest Service and the University of Vermont

Abundant winter injury to the current-year (2002) foliage of red spruce (*Picea rubens* Sarg.) became apparent in the northeastern United States in late winter of 2003. To assess the severity and extent of this damage, we measured foliar winter injury at 28 locations in Vermont and surrounding states and bud mortality at a subset of these sites. Ninety percent of all trees assessed showed some winter injury, and trees lost an average of 46% of all current-year foliage. An average of 32% of buds formed in 2002 were killed in association with winter injury. Both foliar and bud mortality increased with elevation and with crown dominance and bud mortality increased with greater foliar injury. Foliar injury in 2003 at a plantation near Colebrook, New Hampshire, was more than five times the typical levels for 9 previous years of measurement and more than twice that measured for another high-injury year. Plantation data also indicated that bud mortality in 2003 was greater than other recently reported, high-injury years. Because heavy foliar and bud losses can severely disrupt the carbon economies of trees, the 2003 winter injury event could lead to further spruce decline and mortality, particularly among dominant trees at higher elevations.


© Chris Rimmer

Canadian Journal of Forest Research 34(9): 1919-1928, 2004
**Resistance of forest songbirds to habitat perforation in a high-elevation conifer forest**
E.E. Leupin, T.E. Dickinson, and K. Martin
University of British Columbia

We examined responses of songbirds breeding in high-elevation Engelman spruce-subalpine fir forests to four perforation harvest patterns near Sicamous, British Columbia. Each treatment removes approximately 30 % of the timber volume but varied the size of openings from 10-ha clearcuts to small gaps (<0.01 ha), where individual trees were removed. Abundance and diversity of breeding songbirds were monitored over a 4-year period, including 2 years each of pre- and post-harvest conditions. Two-thirds of the original songbird assemblage consisted of mature forest species that showed only modest changes in relative abundance following harvest. Two species showed significant responses to harvesting: golden-crowned kinglet (*Regulus satrapa* Lichtenstiens) declined significantly postharvest, with the largest declines occurring in single-tree and 10-ha treatments; and dark-eyed junco (*Juco hyemalis* L.) responded positively to harvest. At high elevations, 30% volume removal allowed much of the songbird community to be accommodated immediately after harvest. Future research should address whether the apparent short-term accommodation of high-elevation birds persists across time and as more of the continuous forest cover is removed.


© Shiloh Schulte

Ecology and Society 9(1):16, 2004
**Potential Effects of Climate Change on Treeline Position in the Swedish Mountains**
J. Moen, K. Aune, L. Edenius, and A. Angerbjörns
Umeå University, Swedish University of Agricultural Sciences; Stockholm University

Climate change may strongly influence species distribution and, thus, the structure and function of ecosystems. This paper describes simulated changes in the position of the upper treeline in the Swedish mountains in response to predicted climate change. Data on predicted summer temperature changes, the current position of the treeline, and a digital elevation model were used to predict the position of the treeline over a 100-year timeframe. The results show the treeline advancing upward by 233-667 m, depending on the climate scenario used and location within the mountain chain. Such changes hypothetically caused a 75-85% reduction in treeless alpine heaths, with 60-93% of the remaining areas being scree slopes and boulder fields. For this change to occur, the migration rate of the trees would be in the order of 23-221 m $yr^{-1}$, which is well within published migration rates for wind-dispersed deciduous trees. The remaining alpine areas would be strongly fragmented. These drastic changes would influence all aspects of mountain ecosystems, including biodiversity conservation and human land-use patterns.

# THE LOOKOUT (CONT.)

*(Continued from page 6)*

thrushes differed between ski areas and natural forests, although ski trails wider than 50 meters were rarely crossed, and small or narrow habitat islands between trails were seldom used. Because the research was conducted in ski areas that have been operating for more than 40 years, these findings can not be used to predict short-term effects of ski area expansion on Bicknell's Thrush.

### AUDUBON PUBLISHES *IMPORTANT BIRD AREAS OF NEW YORK*

Habitat is the key to conservation. To facilitate the conservation of birds, the most essential habitats throughout the world are identified as Important Bird Areas (IBAs) through a partnership led by BirdLife International, with Audubon as the US partner. As part of that global effort to catalogue and protect IBAs, Audubon New York offers this book in which the 135 most important sites for birds in New York State are identified. Detailed descriptions of each site, plus information about why they were selected and suggestions for ways to help protect them are included. The future of New York's birds will depend in large part on the protection and proper management of these sites. For those who care about New York's natural heritage, this book is an essential reference.

For ordering, contact Rich Merritt at Audubon New York via email (rmerritt@audubon.org) or by calling 518-869-9731.

### SURPRISING NUMBER OF BAT DEATHS AT MID-ATLANTIC WIND FARMS

Recent surveys of wind-power facilities have revealed unanticipated impacts on bat populations. Hundreds of bat carcasses have been recovered beneath ridge-top wind farms in Pennsylvania, Tennessee, and West Virginia. The annual death toll at the three facilities is estimated to exceed 3000, far surpassing estimates of avian mortality from collision with turbines at those locations. The largest collision events have occurred at the Mountaineer Wind Energy Center in West Virginia, where eight bat species were counted among the dead during 2003, the plant's first year of operation. To date, no endangered species are known to have been killed.

Wind power has recently seen a jump in popularity and many projects are underway in this growing industry. Some states are beginning to require that a minimum percentage of power be rooted in renewable sources in order to help develop the industry. The bat deaths have alarmed and divided an environmental community that must now come to terms with unexpected effects of "clean" energy. The ongoing debate focuses on whether collisions or climate change represents the greater threat.

Meanwhile, bat researchers are trying to answer the most pressing questions. Why do bats fly into the turbines? Are they attracted to the wind farms? Can the bat's navigation system, echolocation, perceive spinning blades? Do high autumn death rates among migratory species indicate a greater risk during southward movement? Answers to these questions could enable power companies to avoid or minimize wildlife impacts while curbing greenhouse gas emissions.

# THANK YOU !!!!!

VINS is grateful for the cheerful assistance of Vermont Law School intern Elizabeth Donick. Liz researched and wrote most of this issue of "Feathers and Fir." Mountain Birdwatch is funded by the U.S. Fish and Wildlife Service through a cooperative agreement administered by Assistant Nongame Bird Coordinator and Mountain Birdwatcher, Randy Dettmers. We also receive generous support from the Stonehouse Farm Fund of the Upper Valley Community Foundation. Many thanks to

*Thanks to volunteers, funders, and cooperators who make Mountain Birdwatch possible.*

the scores of volunteers whose hard work and persistence make this program possible. We also gratefully acknowledge the organizations and agencies that support our work in a variety of ways, including: Adirondack Mountain Club, Appalachian Mountain Club, Appalachian Trail Conference, Audubon New York, Green Mountain Club, Maine Audubon, Maine Department of Inland Fisheries and Wildlife, The Nature Conservancy, NY State Breeding Bird Atlas, NY State Department of Environmental Conservation, the U.S. Forest Service, and the Wildlife Conservation Society. We are thankful for permission to conduct surveys on lands owned and/or managed by: the American Ski Corporation, the Carthusian Monastery, Essex Timber Company, LLC, the Green Mountain Club, the Maine Department of Inland Fisheries and Wildlife, the National Park Service, the NY State Department of Environmental Conservation, the U.S. Forest Service, and the Vermont Agency of Natural Resources.

VERMONT INSTITUTE OF NATURAL SCIENCE
VINS