WINTER 2009-2010

# SANCTUARY

THE JOURNAL OF THE MASSACHUSETTS AUDUBON SOCIETY

## Living on Earth

### Thirty Years at Sanctuary

# A Stroll Through the Archives

This issue of *Sanctuary* celebrates the magazine's 30th anniversary, and we've chosen to mark this milestone by republishing a collection of articles on an array of topics that the editor selected from issues long past as well as more recent.

Our anniversary issue gives me an excuse to ponder the attributes of *Sanctuary* magazine that have made it important to Mass Audubon members and many others over the years. Certainly, what distinguishes *Sanctuary* is the quality of the writing, starting with essays by longtime editor John Mitchell and extending to our many contributing writers and poets.

Among those I would particularly like to acknowledge are the current field editors, Thomas Conuel and Gayle Goddard-Taylor, and staff members who frequently contribute to the journal including naturalists Chris Leahy and Joe Choiniere, ornithologists Wayne Petersen and Simon Perkins, conservation scientist Robert Buchsbaum, and associate editor Ann Prince. Many of the Mass Audubon staff are not only wonderful birders, educators, and activists, but they also have a gift for writing. Over the years, they have inspired readers on an array of subjects from Mass Audubon priorities on Beacon Hill to the secret lives of fungi and fish. Dedicated *Sanctuary* staff also include Betty Graham, who retired after over a decade with the magazine, and current managing editor Rose Murphy.

A strength of the publication is the selection of topics and issues that educate, inform, and inspire our readers in an in-depth way. In recent years, we have written about land and stewardship issues and about specific habitats—mountains, rivers, wetlands, coastline. We have published articles about birds, of course, but also about the ecological footprint of food production and nature in the city.

Often we have been ahead of the times; back in 1984 we devoted an issue to global warming, and in the mid-1990s we covered the loss of free play. We also weigh in on the major local environmental issues of the day, such as the battle over a proposed development near Walden Pond, resolved with the creation of Walden Woods. While we have not shied away from controversy or tough issues, *Sanctuary* has also consistently provided articles that are simply inspiring stories about the pleasure that close observation and real knowledge of nature can provide.

Even in acknowledging the many wonderful facets of *Sanctuary*, we know that times have changed in ways unimaginable thirty years ago, and we are not immune to those changes. As print media seeks ways to reinvent itself, we too have to be realistic about the pressures of rising costs and changing readership. Therefore, after much consideration, starting in 2010, the magazine will be published three times during the year rather than four, and, at the same time, we will expand the content on our website.

We thank you for your continued support, which enables us to make extraordinary progress toward our shared purpose of protecting the nature of Massachusetts. Achieving this goal has become more complicated in the past thirty years but even more worthy of your sustained effort and stalwart support.

Laura Johnson, President

SANCTUARY
WINTER 2009-2010
Volume 49 Number 2

# 30th Anniversary Issue

## STAFF



*Cover: Snowy Owl in a Cornfield*
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FUNDING PROVIDED IN PART BY
MASSACHUSETTS CULTURAL COUNCIL

*Printed on recycled paper with soy-based ink.*

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*Sanctuary* is a quarterly journal dealing with natural history and the environment and is open to diverse points of view. Opinions expressed herein are those of the authors and not necessarily those of the Massachusetts Audubon Society. To respond to stories in this issue, email us at sancmag@massaudubon.org.

*Sanctuary* (ISSN 0272-8966), South Great Rd., Lincoln, MA 01773. Published quarterly. Memberships are $750 guardian; $500 patron; $250 sponsor; $150 protector; $100 contributor; $80 family plus; $70 supporter; $58 family; and $44 individual. Postmaster: send address changes to *Sanctuary*, Mass Audubon, Lincoln, MA 01773, 781-259-9500. Periodicals postage paid at Lincoln, MA, and at additional offices. Reprints of this issue are available. Write or call the publications office at Mass Audubon, Lincoln, MA 01773, 781-259-2167. Printed in the U.S.A.

# Time and the River

*Concord River circa 1905. This image, originally credited to William Brewster, an habitué of the Concord River, was actually taken by his servant and assistant, Robert A Gilbert. Gilbert went on to take many other photographs and was probably the first African American landscape photographer.*

I once knew an eighty-year-old man whose passion was Sung Dynasty vases and whose choice of exercise was kayaking on the Concord River. Over the years, he came to know the river intimately; he knew the quiet coves that the wood ducks favored and where to find the best pickerelweed beds. He also knew the location of a submerged stone wall just downstream from the North Bridge.

One quiet summer evening while he was out in his kayak, a high-speed powerboat, trailing a huge wake, sped by and swamped him. By way of revenge, the old man lured the offending vessel aground on the submerged wall, destroying the engine in the process.

The event is telling. In an age of cyberspace and cigarette boats, one wonders whether the art of knowing the waters, intimacy with a river, is now the sole province of old people in kayaks and canoes. Time and running water seem somehow inextricably bound, and, in order to understand the meaning, to read the metaphors, it is possible that you have to have aged.

World literature is filled with examples. Mark Twain wrote *Life on the Mississippi*, his account of the river he knew as a boy, when he was nearly fifty. A year later, after having gotten the particulars down, he wrote the American classic *Adventures of Huckleberry Finn*. Joseph Conrad had to retire from the sea before he could assemble *Heart of Darkness* from journal notes he had made years before on the Congo River. Norman MacLean wrote *A River Runs Through It* when he was in his seventies, haunted throughout his life, as he says, by the waters of the Big Blackfoot River, which he had known as a child. Edwin Way Teale saved his long-planned book about the Sudbury River, *A Conscious Stillness*, for the end, and in fact waited too long. He died while he was writing it.

A river, no matter how large or small, is really not any one thing. It is a compilation of waters, and the waters are a compilation of lands, of hill brooks, of dells, swamps, upland marshes, forests, bogs, and those mossy little sinks you come across on mountaintops where wood frogs and toads seem to congregate. The essence is not what you see; it lies somewhere in the surrounding hills, between water and sky, between the narrow summer banks and the wide flooded shores of spring. And the meaning of the river, in the larger sense, is obscure at best. You have to have lived through a series of years in one place to know that.

Henry Thoreau, who some would say assumed the wisdom of age before he died at forty-four, said that if you can know the local waters you can know the universe. He ranked "our muddy and abused Concord River" with the great rivers of the world—the Mississippi, the Ganges, the Nile. He saw the river as a constant lure to distant enterprise and adventure, an invitation to explore the interior of continents. Dwellers at headwaters would naturally be inclined to "follow in the trail of their waters to see the end of the matter." He was thinking of earthly territory, of course, and the sea, but, as always with Thoreau, he was also thinking of the great transcendental metaphors that are embodied in the natural world, and "what a piece of wonder a river is."

It is the natural conclusion for anyone who takes the idea of river to the uttermost ends of the earth, as Conrad phrased it. But in the end it may not necessarily be age that allows insight. I once knew a little boy who from an early age had a natural fascination with running water. One day, standing on a bridge above the roaring waters of a brook, he turned and announced to no one in particular, "All the waters of the world come together."

Thoreau would have understood. So would the old people in kayaks and canoes.

JHM

*From the September/October 1993 issue of* Sanctuary*, entitled "The Renaissance of Small Rivers." This essay won the John Burroughs Association Essay Award.*

# Why I Don't Live There Anymore

*Whatever happened to quiet evenings and still waters?*

by Thomas Conuel

The last summer on the pond was the worst. The humidity seeped from the sky like a sour mist; overhead the sun blazed in a white sky, and out on the water a small armada of powerboats and jet skis maneuvered day and night. The heat was on; some days it felt more like Miami than New England, a miasma of bad air, frayed nerves, and boorish behavior that enveloped the little beach on the pond thirty-five miles west of Boston where I once considered myself lucky to live.

When I first moved to the pond, days and nights were pleasant, especially in summer. In the early years, almost every night after work, my wife and I would swim in the cool waters, and, on nights when she felt particularly ambitious, my wife would swim across the pond to a large rock near the opposite shore and I would paddle quietly beside her.

Autumn was my favorite season. The summer people were gone, and the pond was deserted except for

## Pristine Ponds

© MASS AUDUBON STAFF

*While development has permanently altered some of the state's ponds, Mass Audubon has its share of positive stories about saving them as well. Lower Spectacle Pond was an unspoiled 100-acre pond in the Berkshires that was part of an unprotected 900-acre tract containing old-growth hemlocks, cold-water streams, meadows, ravines, and rich woodlands. For more than 150 years, Lower Spectacle Pond and the surrounding land were owned by the same family, more recently in two undivided interests. Mass Audubon had been working cooperatively with the state Department of Conservation & Recreation (DCR) for several years to protect all 900 acres. When a prospective developer began to aggressively pursue interests held by both sides of the family, Mass Audubon moved swiftly and boldly to secure the remaining half-undivided interest—the critical first step in ensuring its long-term preservation. Now owned by DCR, Lower Spectacle Pond will always be clear, quiet, and undeveloped.*

those few of us who lived there year-round. In the mornings, after my run, I would take a cup of coffee to the dock and watch the mist rise from the water. Some mornings I would walk down to the dock as the sun poked above the hills to the east and surprise a great blue heron, and every autumn an osprey came through on its fall migration and would stay for weeks as Indian summer stretched into November.

November and December were dark and gray, even dismal. Ice locked the pond by the New Year; the turtles and muskrats and waterfowl vanished. The ice fishermen came then, but they were few and confined their sport mostly to weekends. They also provided handy information on the thickness of ice for the skaters. In the early winter there, the ice skating could be grand.

By spring, the ice would turn gray and sag with surface water before finally breaking up. Outside our windows, we would watch for the ducks and geese and the



*The interconnected ponds on the Williams property in Dudley make up about 20 acres of Mass Audubon's West Mountain Wildlife Sanctuary, an area that abounds with wildlife including black bears, bobcats, fishers, and moose. The ponds and adjoining property are protected thanks to the Williams family, whose efforts over the past 15 years added 350 acres of critical wildlife habitat to Mass Audubon's West Mountain Wildlife Sanctuary—now totaling 2,000 acres. The goal of preserving the rich biodiversity of the land surrounding West Mountain has now been achieved, and the beautiful ponds will always remain in their natural state.*

blooming of the forsythia, and, sometime in May, I would take the canoe out for a trial run. Shortly thereafter, it would be time for the first swim, and then summer would come again.

Sometime in the middle of the 1980s, all that began to change.

There were four year-round homes on our road and four summer houses. Our street maintained a small dock and raft for use of its residents. There was an understanding that nobody in any of the homes would hog our small beach or dock. The communal beach and dock functioned well. But it gradually stopped working.

First came the powerboats. One new owner of the year-round homes tethered a powerboat to the dock. It leaked oil and gasoline into the swimming area. When we came out for a swim, we needed to wade beyond the rainbow sheen of gasoline before putting our faces in the water. Our two year old couldn't do that. Next, another neighbor decided that since Jones had a powerboat anchored at the dock, he'd do the same. Only his was even bigger and noisier than boat number one. Then there were two. A third wouldn't make any difference. Powerboat owner number one gave his brother, a resident of a nearby town, permission to tie up his powerboat at the dock. The tiny beach adjoining the dock had once been a safe haven for canoe launching. Now there wasn't room. Swimming was difficult: the oil and gas fouled the water, and we had to be constantly on alert for a powerboat entering or leaving the dock.

It is against the law to run a powerboat near a swimming area, but constant reminders produced little change. Powerboat owners, I concluded, think the burden of safety is on the rest of us and that we should either watch out or get out.

When the jet skis arrived, they made the powerboat owners seem like paragons of moderation. Powerboats, it can be argued, have some uses; jet skis have none except to allow their owners to show off by doing wheelies across the water. They are the most useless, offensive, and potentially dangerous motorized vehicles on the water. Jet skis attract the young, and at that time there were no regulations governing their use. They require little skill, minimum dexterity, and they make lots of noise. Young males love them.

One evening when we were swimming near the dock with our two year old, a jet ski lurched out of control and spun crazily toward us. We jumped back, pulling our son away as the machine slid to a stop several feet away. We remonstrated with the operator, who looked at us as if we had three heads each and green hair. Whoever heard of telling someone you can't operate your jet ski in a swimming area near young children? "Get a life," he snarled at us as he roared off.

"Why is it," my wife commented, "that you never see nice grandmothers on those machines?"

Once the unwritten rules that had governed our beach and small section of pond were breached by the powerboat owners and the jet ski crew, little bursts of anarchy became the norm. The pond became a regional hangout. Jets skis and powerboats roared up and down, turning the water to foam and shattering the quiet evenings. My wife no longer swam across the pond; even with a canoe beside her it was too dangerous. Motorized mania had taken over. Slowly, we stopped caring about our little beach. Now that is was fouled with oil and gas, we used it less, and as we, and a neighbor who also owned a canoe, used it less, we lost more control. The powerboating neighbors held parties; their friends, and friends of friends, now dominated the area. The beach became littered; the roadside forsythia glistened with beer cans.

One summer it came to a head for several of the families on the street—loud voices trading insults on a sunny morning, recriminations, calls to the police, petty vandalism. But we were spared all that. We had given up. We put the house on the market and moved to the hills, far from any body of water. It's better this way, we told each other; the pond was too crowded, the swimming was no good, and any other lake might be the same.

Which was all very true; but on days when the wind is from the northwest and the first hint of autumn is in the air, I find myself at evening listening for the sound of big birds flying across the tangerine sky, and I miss the pond and remember it for the quiet times.

> Some mornings I would walk down to the dock as the sun poked above the hills to the east and surprise a great blue heron, and every autumn an osprey came through on its fall migration and would stay for weeks as Indian summer stretched into November.

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*Thomas Conuel is a field editor for* Sanctuary *magazine*

*From the July/August 1994 issue of* Sanctuary *entitled "Machine in the Garden." This poignant account of the loss of a quiet place was used in a college sociology course. The piece was chosen not so much for the natural history, but because the story is basically an account of the failure of the democratic process and community cooperation.*

# Transcripts from the Trial of Humanity

## Council of All Beings vs *Homo sapiens*

*Depositions from the Witnesses for the Prosecution*

**Opening Argument**




MAY IT PLEASE THE COURT

Your honor, members of the jury, I represent the Council of All Beings. It is my intention today to lay out for you the particulars of this unique and remarkable case. But, in order to do so, I would request that you willingly suspend your powers of disbelief and imagine for one moment that the entire history of the earth is but a single day.

Put the case that in the obscure first hours before dawn of that singular day, life, in the form of self-replicating molecules, finally appears in the warm seas that cover the earth. For the next few hours, these primitive life-forms, these mere chains of genetic material, evolve into the myriad and fantastical forms that prepare the way for our own existence. At sunrise the hordes of trilobites, then the starfish, snails, amphibians, and sharks. Toward midday, the insects and reptiles, and then, in the afternoon, the great lumbering beasts of the Jurassic, followed by birds and turtles, marsupials, and then toward dusk, dolphins, whales, and the great mammals of the Cenozoic.

The world, your Honor, is a green paradise, a world characterized by a lush and verdant plant cover and populated with diverse and abundant animal life, so rich and so complex in its interrelationships one would suppose that it could never be undone. It is a bright animated planet in an otherwise lifeless universe.

But, your Honor, members of the jury, those of you in the gallery, put the case that in the last thirty seconds of the last minute of the last hour of that bright day, there appears on the African savannah a small bipedal primate. Over the next few seconds, this creature overruns the earth in such vast numbers that its biomass becomes greater than that of any other living entity on earth save for the swarms of krill that populate the waters of the southern oceans. And now, in the last few seconds before an uncertain midnight, that upright mammal, swelled now not only in numbers, but also by an arrogance unmatched in the history of the world, is in the process of transforming that once-living planet into a dull and lifeless rock where only a few of the most enduring species will survive.

It is my intention today to demonstrate to you the irrefutable guilt, the accountability, blame, the unequivocal culpability of that avaricious bipedal primate for the destruction of as-yet-uncounted numbers of fellow species of the planet earth. I will prove that through greed, through indifference, ignorance, and in some cases downright cruelty, the defendant did cause the extinction of some of the finest jewels of creation, beings that were the end result of millennia of slow evolution.

Now, because of the behavior of this single species, the future is in question.

I must warn you that later in this trial, when you hear the argument for the defense, you will no doubt learn

that there have been periods of vast extinctions before in the history of the world, the most notable of which was the great dying at the end of the Cretaceous period when those ill-named "terrible lizards," the dinosaurs, disappeared from the planet. You will hear that, all told, there have been five such great dyings over the 3.8 billion-year span of life on earth. But I must tell you that never in history have extinctions occurred so fast and at such an all-encompassing rate. And never before, during the aeons of life on earth, has a single species been responsible for the extinction of another.

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In order to make my case today, I will concentrate on one example, the recent history of species on the North American continent. Although close to home, North America is by no means the best example. In the Mediterranean Basin and in Africa, between 1600 and 1900, which in the scale of geologic time is a barely measurable period, vast sections of forest disappeared, resulting in the extinction of untold numbers of known, as well as unknown, species—or so it is believed. No one knows for certain because no one was counting.

In our time, in the tropical rain forests of the world in particular, things are moving even faster. We are losing approximately one acre of forest every second, resulting in the extinction of innumerable species. No one knows how many, your Honor, because this world, this vast and splendid tapestry of life, is only partly explored; as many as 90 percent of living species are as yet unrecorded. And yet, as you hear this brief testimony, that is to say in the period of no more than one hour, any number of species of plants, of insects, of reptiles, amphibians, birds, and mammals may be extinguished forever from planet Earth.

I would remind you that at the root of this mass extinction is a deep and unremitting vanity, an arrogance so ingrained in the defendant, so much a part of its makeup, that it is perhaps incapable of understanding—in spite of its purported ability to reason—that it is a biological entity and, as such, is subject to biological law. What I mean to say, your Honor, is that the ultimate endangered species is the defendant itself.

Time and the laws of life are ruthless taskmasters. They cut out what does not fit, and in time—in a very short time in the scheme of things, unless we today choose to convict—they will eliminate this transgressor through natural processes. The defendant, as you will see from the evidence I intend to introduce, is imperious, haughty, and domineering—but not invincible. Its technology does not, cannot, and will not deliver it from natural laws.

Already, if you examine the evidence of history, you can see the beginning of the defendant's demise. Other plants and animals are the source of life for this curious bipedal species. They feed it, they provide the clothing it uses to cover its body, they are the substance of the medicines it uses to cure its diseases. They add texture and diversity to the fabric of its existence. They are the source of its recreation, they stabilize the ecosystems upon which it depends; they preserve within their genes the variety of genetic material of the small range of plants and animals the species uses to survive. And yet, in spite of this total dependence, in spite of the fact that the species could not survive a single day without its associated plants and animals, the defendant continues in its ruthless course of mass destruction.

In a certain manner, we need not judge here today. The species has already convicted itself. Biology will have its revenge.

*From the November/December 1993 issue of* Sanctuary *entitled "Transcripts From a Trial: Council of All Beings vs* Homo sapiens*." This diatribe is the preface to the "evidence" submitted at the trial of humanity by the animal community. The issue itself was a great success. Among other things, it was used in school plays and even in church services. In one of these, parishioners were assigned the names of extinct animals and left the church when their name was called out. The church was nearly empty at the end of the service.*

# Life in the Great Forest

*Deep in the boreal forest, where the wild things are, it's actually quite tame.*

by Cliff Hauptman

There are forests and there are forests. In my experience, most of them are imposters. The deciduous forest, for example, that gentle and familiar environment of oak and maple and hickory, is not "forest"; it is merely "woods." When I was growing up, we took walks in the woods. We found things in the woods. We got lost in the woods. Occasionally, an animal wandered out of the woods and, finding itself on unsafe ground, beat a hasty retreat back into the woods. We were as unlikely to call our woods forest as we were to call it desert.

Then there are rainforests in all their forms. When the sweat on your body never dries and there are as many hummingbirds as butterflies and both compete in prevalence with the number of orchid varieties, yet all three are put to shame by the unfathomable quantity of ants, that is rainforest. Or jungle. Or coastal tropical hardwood.

The real forest, the great forest, the place where Goldilocks met her bears, where Hansel and Gretel were captured by the witch, and where Peter met his wolf, is the conifer forest. Often called the boreal forest, or taiga, it is the circumpolar stretch of vast, dark, evergreen fastness separating our familiar woods from the barren tundra far to the north.

A friend of mine, Steve Roderick, spent time in the forest near the city of Saint Petersburg in Russia this past summer as part of a team of scientists studying the role these forests play in the global carbon cycle. By measuring the deadwood with its specified tracts, the team attempted to estimate the biomass of woody debris in the taiga of northern Russia. This is not unlike emptying your sneakers after a day at Nauset Beach on Cape Cod and attempting to extrapolate from that accumulation the total mass of sand on the East Coast. But that is beside the point.

Eager to get a sense of the legendary forest of ancient folklore, I badgered Steve for details. The details were sparse: very tall spruces, no understory, bark beetles, woodpeckers, and mushrooms—except at the edges. To get to the study area, the team walked along an old logging road. There, sunlight penetrated and an understory of blueberries and birches had established itself. Steve said that there were also marshy areas in the forest where moose lived.

Edges, we have known for a long time, are the keys to diversity. The interface of environments creates a zone of biodiversity that is often greater than the mere sum of its original elements. Where dense woodlands are penetrated by a stream, for example, there is a marginal ecosystem of new plant, insect, prey, and predator species that occurred neither in the stream nor the forest. The marginal ecosystem is different from one that would occur had the stream crossed a meadow or the woods been dampened instead by a vernal pool.

The deep forest, though, the edgeless interior of the pure environment, is quite uniform and spare.

The deep forest, though, the edgeless interior of the pure environment, is quite uniform and spare. Conifers, comprising the firs, spruces, and pines, are dominant, closing off the canopy, blocking the light, and making it impossible for an understory to establish itself. The floor of the forest is nearly as open and clean as the floor of a furnished and carpeted room—except, of course, for the mushrooms.

Given a little rain around the latter part of the summer, the uniform blanket of cast-off needles on the forest floor suddenly becomes noticeably more lumpy as, overnight, the fruiting bodies of fungi first lift and then break through the matted litter. The statistics associated with these outcroppings are astounding. In the spring of 1992, three scientists in the Upper Peninsula of Michigan near the town of Crystal Falls discovered a single fungus that spread over an area of thirty-eight acres. The mushrooms were recognized as *Armillaria bulbosa*. Like most fungi, the bulk of the organism lay in the soil and along the trunks of dead trees as thin, white, threadlike hyphae, which bundle themselves into more visible stringy aggregations called rhizomorphs that then spread out beneath the forest floor in search of sustenance. The fungi feed on dead wood and are held at bay by toxins produced by living trees. Lying dormant, sometimes for years, among the roots of the live trees, they wait until the trees begin to die and the toxins to dissipate. If you look closely at the trunks of the dead trees in the forest, you will see the lacy-white strands of fungus traced upon them.

Shortly after the announcements of the giant fungus in Michigan, two other scientists in the state of Washington broke the news of their discovery of a still larger fungus. That one, an *Armillaria ostoyae*, spread over 1,500 acres near the town of Glenwood in the

© LARRY ELY

southern part of the state. What the deep interiors of forests lack in biodiversity, they more than make up for in biomass. The smaller of the two fungi is estimated to weigh as much as a blue whale.

With plant species in the deep forest limited mostly to trees, it is not surprising that the bark beetles are the most prominent insects. I have a small branch, about one inch in diameter, that I cut from a three-inch section of a dead pine I found in the forest. Engraved upon its surface is the work of a family of bark beetles—a father, a mother, and about forty of their offspring. The resulting work of art is the source of endless pleasure.

The male beetle starts the design by boring straight in through the bark of the tree. When he hits the point at which the inner bark meets the outermost layer of wood, he stops and chews out a small chamber. There he waits. Eventually, with luck, a female joins him in the chamber, entering through the hole he initially made. There they mate, and the indecorous male leaves, exiting through the same hole. The female then chews a straight tunnel, along the interface between the bark and the wood, and cuts little nicks along its length at close and regular intervals. In each niche, she lays one egg. Then she bores up through the bark at the far end of the tunnel and flies away.



When the eggs hatch, each tiny larva starts to chew its way outward from the original tunnel its mother cut, again staying along the bark and wood interface. Carefully steering courses between the chewing sounds of their neighbors on each side, the larvae avoid crossing each others' paths. As they progress, they grow, and the tunnels they make increase in diameter. Then, all at once, they stop their progress and pupate. After emerging as adult beetles, they bore up through the bark and fly off to new trees to mate.

The result of that process is a design that looks a bit like the image of a centipede carved in the wood: a long body, somewhat enlarged at one end where the mating chamber was, and the legs, carved by the youngsters, radiating away in all directions.

Controlling the potentially devastating proliferation of bark beetles in a balanced deep-forest environment are the woodpeckers, the only predators equipped to penetrate their havens. Besides those insects, the deep forest offers little more than conifer seeds for such inhabitants as grosbeaks and crossbills. Rodents manage to get by on the seeds, buds, and mushrooms, and owls eke out a living on the rodents.

By and large, the deep forest of our imaginations, the locale of some of the world's most enduring folk tales and myths, is really quite tame. Whereas, in an acre of rainforest or jungle, you can easily find hundreds of species of plants, in the northern forest, a couple dozen could be a challenge. Yet, within this planet's vast and tranquil forests lie strands of nature's web that adjoin, like searching rhizomorphs, the entire fragile system. We ought to know by now that the health and security of a biomass of this magnitude is vital to our own survival. The forests' lack of diversity makes them no less essential.

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*Cliff Hauptman writes on natural history topics and is author of several books including* Basic Freshwater Fishing *a*nd How to Fly-Fish.

*From the January/February 1994 issue of* Sanctuary *entitled "Whither the Woods of New England?" This is a well-written account of the real nature of the forest.*

# The Legion of Night

*Moth hunting in the Massachusetts pine barrens.*

by William G. Scheller

Dale Schweitzer stopped to paint another tree. He wasn't daubing on colors, although the sticky wet swaths he left behind later showed up dark and shiny in our flashlight beams. This was moth bait. Paintbrush in one hand, plastic bucket in another, Schweitzer was walking a narrow bicycle path through Plymouth's Myles Standish State Forest, systematically applying moth bait to the pitch pines.

© LAUREL MOLK

*Harris's three-spot*

Moth bait is an evil-looking concoction made of molasses, rotten fruit, brown sugar, and beer. You add to it each time you use it, like sourdough starter; Schweitzer has had this batch going for five years. The idea is to keep up the fermentation so that the stuff doesn't just smell and taste good but also provides the makings of a lepidoptera happy hour. Like a drunken sailor, a moth that gets preoccupied with Schweitzer's bait can easily be shanghaied.

We had come to Myles Standish at dusk this Friday night, Dale Schweitzer, Henry Woolsey, and I, to collect specimens of several uncommon moth species that frequent the Plymouth pine barrens. Schweitzer—bearded, serious, talkative yet not voluble—is a curator at Harvard's Museum of Comparative Zoology; Woolsey is a plant ecologist with the Massachusetts Natural Heritage and Endangered Species Program and has a special interest in lepidoptera. Both were intrigued by the prospects in this state forest, which is believed to harbor 28 rare moth species—9 confirmed and 19 suspected. On the way down in the car, there had been some talk of adjusting the balance that night to 11 and 17.

The woods got darker as we walked the bike path, stopping every few feet while Schweitzer smeared bait on a pine. "This is the only extensive area I know of in New England with this type of habitat," he said, as we reached the denser stands of trees and began to retrace our steps. "This particular part of the forest caught my eye because the pine growth is thin, with plenty of scrub oak in between. Farther along, where the trees get thicker, we probably wouldn't have had much luck, although some of the *Catocala*s might go in there on a hot night."

*Catocala* was a genus we heard a good deal of that night; we collected several specimens of the Gerhard's underwing (*Catocala herodias gerhardi)*, although the elusive jar underwing (*Catocala jair)*—a hoped-for "suspected" species in these barrens—failed to show up. "They're established on Long Island," Schweitzer said. "They should be able to fly to Plymouth." But only once has the jair underwing been documented in New England. A larva was taken on the Yale campus in New Haven by a lepidopterist working there at the time. His name was Dale Schweitzer.

Once the trees were baited, we went back to the road where we had parked the car. We got out Henry's bag of peanuts and opened our beer; Schweitzer lit a cigar. ("They keep the mosquitoes away, but you can't smoke them when you go out to check the bait.") At this point, we could as well have been three good old boys fishing for bullheads at night. But we also had to tend the trap, which was set up near the car and running off the battery.

A moth trap is a wooden-framed box with wire mesh sides and a small opening on top. In the opening sits a clear, plastic funnel, and in the funnel stand two tall sheets of plexiglass, intersecting at right angles, with a fluorescent black light running along the center. Moths gather around the light, are stymied by the baffles, and, since gravity works better than a moth's ability to hover, sink slowly through the funnel and into the box.

Dale Schweitzer knelt down alongside the trap and aimed his flashlight beam into the box. The air was thick with insects; spend time near a black light on an August night in a pine barrens and you have to learn to inhale insects. Once a rare *Catocala* Schweitzer was hunting flew into his mouth.

"Don't open it yet, Dale," Woolsey warned. "Somebody's on the door."

"Who's this on top, next to your beer?"

"Keep the light on that little thing."

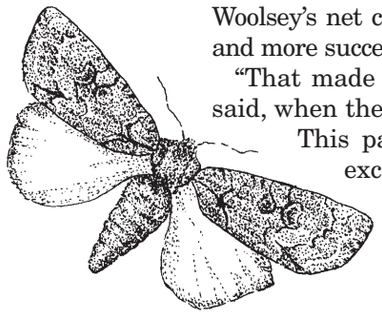
"Over here?"

"Yeah, that's a *Crambidia*. There are a couple of *Crambidia*s that are supposed to be endemic to the New Jersey Pine Barrens, and that looks like one of them."

When the subject is moths, "rare" does not mean what it does to the student of large endangered mammals. Big animals are rare as individuals; a species of moth may, and will, exist in the millions, yet be found only at selected sites. These sites, for many species, are few and far

between, and Myles Standish is one of them

Lepidopterists talk about the Jersey barrens the way trout fishermen talk about the Battenkill. The several species of pine and scrub oak offered to feeding larvae there make it the mother of all pine barrens for moth collectors. But there is a very long list of uncommon lepidoptera native to Massachusetts, and Myles Standish State Forest has about half of them.



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*Barrens dagger*

Schweitzer was still at the trap. "There's a wetland around here, Henry." His flashlight and his practiced eye had caught a water boatman and several other aquatic insects attracted to the black light. "It can't be more than a few hundred yards away."

"The 'topo' doesn't show one."

"Well, these guys haven't flown far. It's right down there, I'd guess, in that hollow."

An hour had gone by; the first Gerhard's underwing had been taken at the trap. The stars were out now and it was time to check the bait. Schweitzer parceled out nets, flashlights, and two kinds of jars: empty ones for taking moths alive and larger jelly jars with cyanide packed in the bottoms. He led the way down the dark bike path.

It was not a very good night for moths. On one tree, the light picked up a small congregation of copper underwings (*Amphipyra pyramidoides*), a common variety, gathered at the bait. No need to bother with the jars. "Baiting is unpredictable," Schweitzer said. "Sometimes it works, sometimes it doesn't. Usually, on a good night in a habitat like this, virtually every tree will have a *Catocala*."

"I don't know, Dale," Woolsey said in the dark. "If I were a *Catocala*, I'd be out tonight." Soon afterwards, a lone specimen of a coastal plain variety, a beloved underwing (*C. ilia),* appeared on a baited pine. Schweitzer took it in a cyanide jar in a single, deft, one-handed move, his fingers bringing the poised lid down as soon as the moth was in the jar.

"See how they jump right into Dale's jar," Woolsey said. "You just have to be able to anticipate where they're going to go."

Woolsey turned his light on the jar. "Wait," Schweitzer said. "If that's a female, I want it alive. " It was a female, and so we transferred it to a live jar. It revived, having only made brief contact with the cyanide. (A friend of Schweitzer's wanted eggs, and the moth will be brought home to deposit them in a paper bag.) Several other *Catocala* females were also collected live.

At this time, whip-poor-wills were calling down in the hollow. As Schweitzer's flashlight beam searched the next baited tree, he saw a moth alighting. His net came down quickly, around the moth and against the asphalt path.

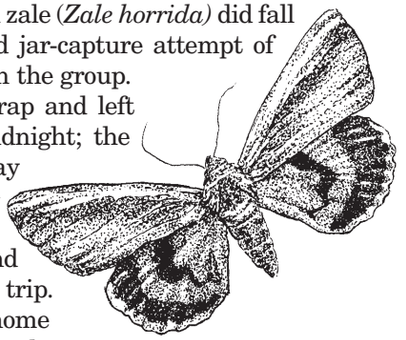
"That's *Acronicta albarufa*. It's only the second of the species I've ever collected, and I took the first right around here." He lifted the net carefully as he brought the live jar in close (another female, another planned attempt at rearing larvae), but *A. albarufa,* common name barrens dagger, had other ideas and took for the open air. Just as swiftly, Woolsey's net came down around it, and a more cautious, and more successful, transfer began.

"That made it worth coming down here," Schweitzer said, when the lid was safely on the jar.

This pas de deux with nets was the only real excitement of the bait check, though, and we headed back to the trap to see what the light had accomplished. Many species that won't respond to bait will be drawn in by the light; it will also attract moths that might normally enjoy molasses and beer but are not hungry when they pick up its scent. (As for what most adult moths normally eat, Schweitzer says, "If you ever find that one out, publish a paper on it.")

The black light trap is more consistent, especially if the weather is warm and there is not much competition from the moon. On this night, both of these requirements have been met, but the pickings could surely have been better. Still, the trap yielded another Gerhard's underwing, with its velvety salmon-and-black pattern at the center of its back, and two of the rare Harris's three-spot (*Harrisimemna trisignata)*, a purple-and-green highlighted moth that Schweitzer has taken on fewer than a dozen occasions. A gypsy moth appeared and was instantly dispatched, by foot rather than cyanide.

There was time for one more walk around the bait path. No barrens dagger danced toward the flashlight on this inspection, but a horrid zale (*Zale horrida)* did fall to the first one-handed jar-capture attempt of the non-entomologist in the group.



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*Gerhard's underwing*

We packed up the trap and left Myles Standish at midnight; the best moth hours lay ahead, after one a.m., but Cambridge was over an hour away and this was no tenting trip. Dale Schweitzer drove home with a barrens dagger and the other breeding specimens in paper bags at his side, and with two somnolent assistants slumped alongside and in the back seat. Behind us, in the dark pine barrens, creatures plentiful, yet paradoxically rare, lapped undisturbed at the dregs of their grog.

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*William G. Scheller is the author of more than thirty books, including several written in connection with public television documentaries and National Geographic Society book division.*

*From the October 1983 issue of* Sanctuary*, entitled "Massachusetts Pine Barrens." National Geographic contacted the author of this story after publication for more on the subject. After seeing this story,* National Geographic Traveler *hired the author for a series of assignments.*

# The Scourge of Suburbia

*Cats kill as many as two million birds each year in Massachusetts.*

by Paul Karr



*Eastern towhee*

Ah, the humble house cat: companion, cuddler, playmate, free spirit, the very embodiment of home and hearth—a blameless life of naps and meals and play.

Well, not exactly. Cats are, in fact, highly efficient killers, the product of millions of years of evolution. Their eyes have evolved to give them superb vision in very low light; their whiskers allow them to quickly read the shape of their prey and place a killing bite on the neck, even in near darkness. Their sense of smell is excellent, and they have an uncanny ability to quietly stalk their prey and sharp retractable claws for snagging them once they've pounced. The renowned English zoologist Desmond Morris suggests in his book *Catwatching* that cats are so good at killing that most of the time there is no need to hunt, and they have evolved spare time—most of which they spend sleeping.

This heritage—a history of solitary cold-blooded stalking and killing—hasn't been forgotten in the few thousand years that cats have spent with humans. That's especially true of those escaped, stray, or simply raised-in-the-wild beasts known as feral cats, which hunt to stay alive, not just for fun as house cats do. Think about it: If 60 million cats are out there hunting in America's streets, parks, and woods—and they are having any kind of success at all—cats must kill a great number of birds and small mammals.

All house cats in this country are exotic, having evolved in Africa and the Near East from an ancient family of tree-climbing mammals. It's generally agreed that the cats were eventually domesticated in Egypt about 3,500 years ago. Domestic cats made their way to Rome during the heyday of the Roman Empire, and thence to the rest of Europe and England, although they experienced some hard times during the Middle Ages at the hands of certain Christians, who believed they were evil and burned them alive. Cats were first brought over to North America by English settlers in colonial times, though some claim that Maine coon cats were actually here first, having been brought over by Vikings who explored the New World some 600 years ago.

One reason for cats' success is the fact they are friendly companions that don't require constant attention. But, on the practical side, cats' uncanny ability to seek out and kill small rodents has forever endeared them to human populations, whose survival has been directly dependent on the ability to store grain. Rats and mice eat lots of grain. And cats, it was soon discovered, eat lots of mice and rats; no further feeding required. City dwellers, townspeople, farmers, and even sea captains rapidly came to realize that keeping a good supply of cats on hand was critical to keeping a good supply of food on hand. And getting a good supply of cats wasn't



*Chipping sparrow*

hard. Once you had two, you'd soon have more.

Domestic cats haven't lost the urge to kill, no matter how well they're fed. That's because, says Desmond Morris, "The urge to hunt is independent of the urge to eat. Cats hunt for the sake of hunting." It's in the blood. This is why house cats will often play with a ball or string for hours; deprived of the opportunity to hunt outdoors, they must hunt something, even if it's your unsuspecting fingers or feet.

The most desperate hunters of all are feral cats. Counting the number of feral cats at large in the United States is difficult, but in 1986 the Humane Society tried by surveying pet shelters. The best the Humane Society could do was to estimate that there were 11 to 19 million stray and feral cats in the country at the time. In 1990 the Pet Food Institute guessed that there were about 60 million cats all told in the United States, which suggests that about one-quarter of US cats are stray or feral. Desmond Morris offers similar numbers in *Catwatching*.

Feral cats tend to accumulate in cities for many of the same reasons that people do—the lure of food outweighs the tough life. Several recent studies in urban areas have noted that urban cats tend to form small colonies or dens; New York City's Central Park and other major city parks in the East have had such colonies for decades. These groups apparently hunt, eat, and breed together with some degree of community and cooperation, which is unusual, for one of cats' most distinctive traits is their solitary territorial nature. Individual cats may roam over areas of up to 175 acres in the country, and they very rarely hunt in packs as dogs do—although their cousins, the lions, commonly form bands, known as prides. Yet, in the city, strays feed peacefully, side by side.

Feral cats are not friendly. In fact, they are ruthless. Some studies of oceanic islands off the coast of Africa and New Zealand have found that unchecked feral cat colonies devastated wildlife populations, particularly those of birds. At least two studies of feral cats' hunting habits have been conducted here in the United States. A 1941 study at a military base in Oklahoma found that rats, rabbits, and other mammals made up 54 percent of the wild cat's diet; large insects like grasshoppers about 25 percent; and birds about 4 percent. The rest of their diet was made up of odds and ends such as garbage and lizards.

A second study, conducted over the decade 1940 to 1950 in the farm country of Sacramento, California, reached similar conclusions. Rodents made up over 50 percent of the cats' daily kills, and birds about 25 percent—mostly large, heavier game birds such as

## Cat Control

The increase in the popularity of house cats as pets has led some US cities to attempt to legislate controls on cats, or at least on their owners.

One such attempt took place in Syracuse, New York, where, according to *The New York Times*, the city planning commission proposed a rule banning ownership of more than three cats.

"Few ideas have moved toward oblivion faster," the newspaper reported.

Residents are determined to protect their right to own cats in spite of the fact that there are thousands of stray cats in the city, many of which are the offspring of innocent homebound tabbies.

There are a few things you can do to help keep cats from destroying wildlife—without resorting to town ordinances.

1. Have your cat neutered. Cats are notorious producers, and not all kittens end up as pets. Feral cats generally cause more damage to wildlife than household pets do.
2. Keep your cat in the house. Cats adapt readily to almost any environment.
3. Keep the cat on a tether when it's outside.
4. If it's a free-range cat, try the traditional collar and bell.

pheasants and ducks. Seasons made a difference in cats' hunting habits, too. Mammals were more likely to be hunted in fall and winter, when they were hibernating or more sedentary; birds, insects, and fish were likely to be hunted in spring and summer.

Given the high number of domestic cats in the world, researchers have wondered for some years now whether all these mild-mannered hunters are bagging sizeable amounts of wildlife once we let them out the front door. Edward Howe Forbush, Massachusetts' prolific turn-of-the-century state ornithologist, published a paper on this subject in 1916 titled, "The Domestic Cat: bird killer, mouser, and destroyer of wildlife." He took a dim view of cats.

Forbush relates the results of a questionnaire he'd sent to four hundred cat owners in the state. "A mature cat in good hunting grounds will catch about 50 birds a year," he writes conclusively. He reports various experts' estimates of total statewide bird kills: 2 million in Massachusetts, said one fisheries and game official; 3.5 million in New York State; 2.5 million in Illinois. From Boston, he reports that a cat "had 14 birds laid out for its young one morning before breakfast"; from Concord, a cat was reported to kill "10 birds a day." Forbush's survey revealed that robins and sparrows were by far the most frequently killed birds in the state; bluebirds and catbirds also suffered over fifty kills in the year Forbush studied. Also noted are various catastrophes (no pun intended) such as the tern colony that established itself in 1907 near the Monomoy lighthouse off Cape Cod, only to be raided and decimated by feral cats shortly thereafter.

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*White-throated sparrow*

Birds weren't the only victims. Forbush guesses, from what his correspondents told him in surveys, that cats kill significant numbers of insects, mice, and "commercially valuable" small mammals such as bats, rabbits, and squirrels. "Hundreds roam about the country towns," he writes, and "cities are overrun by vagrant cats."

More recently, Peter Churcher and John Lawton, two biologists in England, tried to figure out just how much killing domestic cats were doing. Their method was simple, though not for the queasy: the owners of all the seventy-seven cats in a single village promised to collect the remains of their cats' kills for an entire year and also watch for kills that were completely eaten. At the end of the year, Churcher and Lawton tallied up their results. As expected, small mammals made up the majority of these cats' diets—64 percent. Birds accounted for the other 36 percent. Some of the cats didn't hunt anything, but others made up for them by killing up to eight birds or mammals every month.

The biologists then counted the sparrow population in the village; they discovered that between a third and a half of all sparrows killed in the village over a year were killed by cats. "The figure was staggering," they wrote in *Natural History* magazine, and then added to the concern by stating flatly that "domestic cats kill at least twenty million birds a year in Britain…the delightful, well-fed, domestic cat may be the major killer of small birds and mammals in urban and suburban environments."

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*Paul Karr has authored or edited more than twenty-five guidebooks to New England, Canada, and Europe, as well as writing articles for* Sierra *and* Sports Illustrated*, among other publications. He lives in New York City.*

*From the September/October 1991 issue of* Sanctuary*, entitled "Alien Invasions." This is one of our enduring controversial stories. Lots of mail resulted from this piece, most of it favorable, even from self-confessed cat owners.*

# Bird of Passage

*Song becomes landscape*

by Joe Choiniere

There had been a windy perplexity about that April—an aeolian spring—blustery day after day, with little warmth or calm, and few of spring's customary fanfares of birds, butterflies, and wildflowers. Today's contrariety was the song of a bird—a hermit thrush playing with the wind—perhaps bound for Canada, at the advance of migration, testing its voice in the forests of Wachusett Meadow Wildlife Sanctuary. I sought the notes, following upstream along a freshet of sound that gushed headlong down the hillside.

The hermit thrush's song is rarefied forest; it is contrived of phrases akin to an elevator ride up and down through the woodland canopy layers. A clear, pure tone introduces each flutelike phrase, which is repeated twice or thrice higher on the musical scale, then begun again, after a drop that leaves you breathless, on lower notes. Heard from afar, hermits evoke a feeling of forest—the ethereal dimensionality of trees, the glowing-coal latency of the spring forest floor. The song draws you low into the leaf litter's carbon reservoir, then lifts you high into the aspiring canopy. When, somewhere, deep within the wood, a hermit thrush begins its song, there is no option but to listen; and, perhaps, follow.

The song draws you low into the leaf litter's carbon reservoir, then lifts you high into the aspiring canopy. When, somewhere, deep within the wood, a hermit thrush begins its song, there is no option but to listen; and, perhaps, follow.

I view hermit thrushes as birds of passage. But the word passage can mean a journey, a process, a way through, or a musical phrase, and often these meanings are realized by the action of the passage itself. Hermits that arrive in May take passage overland and sing until early autumn; but most of the April hermit thrushes here are silent migrants; they will sing in forests farther north. But, occasionally, an April thrush sings, as was the case with the bird I found, perched behind a glacial boulder.

Its song evoked, for me, a haunting sense of the land in the dreamworld of creation.

The thrush's vocal prism bends clear tones into diverse and complex musical phrases. In fact, thrush song has been lauded for its technical acoustical affectations; it has been called a "musical microcosm of notes sounded simultaneously" and judged "the highest summit in the evolution of animal music so far known to us."

There are infinities of sounds within the thrush's song that humans do not hear—as many as a hundred hidden notes. Perhaps this aspect of thrush song mirrors the forest ecosystem itself, full of species that humans are able to see and hear but full also of unheard and unseen complexities we have yet to understand.

The clear note that begins each phrase of the hermit thrush is well sustained on one pitch and is perhaps more pure in frequency than any other known bird note. Birders often learn to distinguish the hermit's song from other New England thrush songs by this one clear note. I suspect that the tones used in the delicate phrases that follow the introductory note are pentatonically arranged. It is not the octave that is altered in the scale's set of notes since most musical scales double the vibrations of their beginning tone; it is the intervals chosen in between the octave's beginning and ending that provide the framework for the diversity of the sound. American Indian, Celtic, Tibetan, and Polynesian musicians, among others, use this scale—as do a lot of wind chimes.

Thrush song also excels in its harmonic qualities. The paired valve syrinx, the bird's musical apparatus, positioned within the throat, allows for two notes to be played at once and modulated to create harmonic sound qualities that are flutelike (or, rather, flutes crudely imitate thrushes). The veery, a thrush of wet forests, has a song so fifelike that it is easy to hear the paired notes twine as they are emitted, a heard helix of sorts. Purse your lips in a way that allows a slurred downward whistle to emit from two openings and whistle into a mailing tube. The sound created is interesting, but imagine if you could vary parts of this apparatus at will and whim—the diameter and the length of the tube, and the timing and pitch of the emissions of sound from the two openings. At best, you might still be only 10 percent of a thrush! The combination of phrasing and harmonic



*Hermit thrush*

qualities led Charles Hartshorne, in his survey of birdsong, *Born to Sing*, to rate the hermit thrush among the highest of all birds worldwide in song quality and quantity.

When two hermits sing simultaneously, it is an incomparable forest treat. Dualities have a way of showing you things, those inevitable and inescapable balancing acts the universe forces on us with its protruding and contrasting themes. When I heard a second hermit on that April day, I hurried to find the place where the two songs met; perchance in just the right way—wondering whether the voices would cancel, augment, or perhaps even transform one another somehow by their meeting. It was, of course, a rainbows-end chase, although I was heedful of Carl Sandburg's warning that "bright vocabularies are transient as rainbows." I realized that the thrush voices could not be located at any one point, like the meeting of pond ripples from two dropped stones. I found no super-thrush song that day, only forest.

Hermits articulate the sanctuary seasons with two presences, one moment they're in the canopy, another they're in the humus of the forest floor. They sweep away autumn in a late, last, feathery swish; occasionally they are found somewhere in these hills in milder winters; and they pipe spring northward with a flowing passage into summer's song, ending with a rustling search in November's dried leaves. They are part of the ever-changing forest and, like the forest, they are always in passage.

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*Joe Choiniere is property manager at Wachusett Meadow and Broad Meadow Brook wildlife sanctuaries.*

*From the May/June 2000 issue of* Sanctuary *entitled "Music of Birds." When it first came out, this essay was very much appreciated, as much for the writing as the information.*

# A Little Night Music

*A short guide to cricket listening*

by Chris Leahy

My introduction to the sword-bearer conehead and his relatives came one starry night in August during my delightfully aimless boyhood. Following a fruitless but pleasant search for a barn owl that probably never existed except in our imaginations, we (five, seasoned, twelve-year-old explorers) decided to have an illegal parent-defying swim in the nearby quarry.

As I lay drying on a slab of granite still warm from the day's sun, my mind drifted from the babble of my friends and fixed on a loud repetitive "voice"—for that is what it seemed to me—saying with unmistakable clarity over and over again: *na-ked, na-ked, na-ked, na-ked*…. Since we were indeed naked, this struck me as at least amusingly coincidental and at best proof positive of the supernatural. When I whistled for silence and drew attention to the twangy singsong, there was little agreement about what the probable space aliens were trying to tell us. Punky thought they were saying *ba-con, ba-con, ba-con… (perhaps they were hungry)*. Keithy, a budding geologist, insisted that *it* wasn't saying *anything*, just making a noise like *ka-zink, ka-zink*…. But everyone agreed that we had never heard the sound before and that it was an important mystery well worth getting to the bottom of.

Despite our banter about extraterrestrials, we knew that the sound came from an insect, a "cricket" of some kind, and we began to guess that the reason it was unfamiliar had to do with the place (a scrubby heathland near the quarry), the season, and the fact that it was nighttime. Since we had no flashlight, we decided to go home and check the books.

The insect field guides that we had readily at hand didn't get us very far, though we did learn that there are indeed crickets that "sing" only at night. We also found out that the one thing everyone "knows" about cricket music—that it is made by rubbing hind legs together—is utterly false. Most species rub their forewings together. Due to the inevitable space limitations of insect guides, we found few descriptions of individual species' sounds: certainly nothing that approached the distinctiveness of *na-ked, na-ked*. For this level of detail, we had to ask my father if we could look in the locked bookcase where my grandfather's ancient, rare, and "scientific" nature tomes were immured to protect them from book lice and peanut butter. And there we found in A.P. Morse's classic 1920 *Manual of the Orthoptera of New England* all one could possibly want to know about the local stridulating insects.

Orthoptera is an order of insects that comprises the grasshoppers and crickets as well as the mantises, walking sticks, and cockroaches. The first two groups contain about a hundred New England species, which occupy a full spectrum of habitats from seaside dunes to alpine scree and from swamp-side burrows to treetops. Though not exactly beautiful to look at, they come in a diverting array of shapes and sizes, and often bear curious accoutrements such as gigantic ovipositors. Most species are primarily herbivorous, and, since some are abundant, they not only consume stupendous quantities of plant matter but also in turn provide a major source of food for birds and other insectivores. In short, they are important and fascinating insects in many ways; and yet for most people one trait elevates them far above the common realm of "bugs"—their prowess as musicians.

The basic *whys* and *hows* of cricket music (though astonishing in their very existence) are not hard to describe. Like male birds, male crickets "sing" for two reasons: to proclaim and defend a breeding territory from other males and to attract a mate. As noted, the forewings are the main stridulating instruments. Under magnification, one can see that one wing edge bears a small "file," or "comb," consisting of a row of tiny teeth, while the other holds a scraper. These are rubbed against each other rapidly with the wings raised in such a way as to form a resonating chamber like the body of a cello. One of the miracles of cricket music, which—like the flight of a 747—remains implausible even after it is explained, is the incredibly loud volume of the sounds made by some of these featherweight creatures.

A great advantage to cricket listening as a pastime is that it is best done during the softest nights of the year from August through October. (Successful listening can also occur by day, but night forays tend to include more species—and certainly more magic.) The late season of the insect fiddlers results from the fact that most overwinter in the egg stage and spend the spring and early summer passing through a series of nymphal instars; only with the acquisition of adult wings after the final molt do they come into possession of their noise-making apparatus. The tempo of the calls is linked to the metabolism of the insects, which in turn responds to changes in temperature. One of the subtle melancholy touches of fall is the progressive slowing of the night concert until, one especially frosty November evening, the last fiddler falls silent.

A first experience with cricket listening is likely to be




a bit disorienting—too many sounds coming from too many places; and it's hard at times to tell the oboes from the clarinets. The following short primer on some of our commonest species and their repertoires may help you get your acoustical and taxonomic bearings.

Field crickets, especially the common black crickets, are familiar by sight and sound to everyone. The northern spring field cricket overwinters as a nymph and gets its adult wings as early as April. It is the only stridulating insect you're likely to hear before July; it turns the program over to the northern fall field cricket in midsummer. Both species make the classic, steady, cheerful cricket *chirp*.

Ground crickets look like "baby" field crickets, and by midsummer lawns and fields are sometimes alive with them. There are six superficially identical species in New England, and two or more are often present in one place, which can make it difficult to untangle their sounds. Individually, these crickets make fine high trills and tinkling notes, but collectively they are the shimmering sounds of the summer atmosphere. The gentle ringing begins in July and becomes absorbed in our consciousness so quickly that most people are astonished when this pervasive background music is pointed out.

Meadow grasshoppers and coneheads are grass green, implausibly elongate creatures that cling cryptically to grass stems—at least one species in every summer field. The female coneheads wield impressive ovipositors, hence the name of one of our commonest species, the sword-bearer conehead; males make a rapid pulsing series of lisps: *tsip-tsip-tsip-tsip-tsip…* (about ten per second). A typical meadow grasshopper phrase could be rendered as *zzzzzzzzzzz-zit-zit-zit-zit-zzzzzzzzzzz….* Before you can hear it, you usually have to mentally gather up all the ground-cricket noise and put it to one side, listening for what's left.

Katydids include the northern true katydid, arguably the most impressive of local orthopterans: large, bright green (rarely pink!), and the loudest by far of our native stridulators. *Katydid* isn't even close, but a more literal rendering given in some texts as *xr* also fails to capture the effect. It's a bit like Darth Vader's light sword being whipped around in two- and three-beat syncopation. The effect is enhanced by the fact that katydids form small colonies in the tops of trees and often get a kind of jam session going as the males respond to each other's rasping bleats. To say that the sound can be deafening is an exaggeration, but not a great one.

Tree crickets, once discovered, tend to become favorites. These spectral beings, slight and pale almost to transparency, look like they might be made of spun glass. Of their shrilling calls, Hawthorne said, "If moonlight could be heard, it would sound like that." The males of several species sing duets alternating rich pulsing syllables. The two parts take on different qualities depending on their position in relation to the listener but blend into what sounds like a single utterance. If you let yourself get lost in the sound, it seems to become more articulate and it's easy to imagine that you are hearing a voice from another realm—commenting on your state of undress or your longing for breakfast.

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*Chris Leahy holds the Gerard A. Bertrand Chair of Natural History and Field Ornithology at Mass Audubon.*

*From the summer 2003 issue of* Sanctuary *entitled "The World of Night." This piece is vintage Chris Leahy, who has been writing natural history essays for* Sanctuary *since its inception.*

# Whatever Wal-Mart Wants, Wal-Mart Gets

*What is a small town to do when a multi-billion dollar company moves in?*

by Martin Laine

Where does the world's largest retailer build its stores? The answer: anywhere it wants. That, at least, seems to be the case with Wal-Mart, the retailing discount chain founded by Sam Walton with just a single store in Bentonville, Arkansas, in 1962. Walton's philosophy was simple—give the public the merchandise it's after cheaper than anyone else. It worked, and the rest of the Wal-Mart story reads like a Horatio Alger tale gone amok, with the now-familiar strip malls and their boxlike buildings sprouting up all over the American landscape and beyond. By the time he died in 1992, Sam Walton had amassed the greatest personal fortune in US history, up to that time.

Today, the Wal-Mart empire continues to grow and is diversifying into groceries (Wal-Mart Supercenters), with almost 3,000 stores nationwide; is moving into Canada, Mexico, and Brazil; this year it is planning a move into England; and is offering even deeper discounts through Sam's Clubs and Bud's Discount City. The company reported nearly $140 billion in earnings in 1999, more than the next three largest retailers combined.

Outwardly, Wal-Mart tries to project a friendly folksy

## Saved from Development

© TERRY BLUNT

*While rural areas are often vulnerable to large-scale retail development, many important wild parcels in Massachusetts have been saved. This sixty-acre sandplain in Greenfield was once targeted as a big box site; but, as a result of quick action by a collaboration of groups including Friends of Wissatinnewag, the Valley Land Fund, the Massachusetts Department of Conservation and Recreation, and the US Fish and Wildlife Service, the property was purchased and then permanently protected through a conservation easement. A sacred Native American site, it also has special natural features such as a hornbeam-hickory forest, a glacial outwash plain, igneous pillow lava, and insect fossils. Now owned by the Friends of Wissatinnewag, the site is on the National Register of Historic Places as well as being in the viewshed of the Great Falls Discovery Center across the Connecticut River in Turners Falls.*

image. As customers enter a store, they are met by friendly greeters who steer them toward the best bargains. Some stores make space available for bake sales and other events by local organizations. Local students are among those hired to work at the stores, and the company awards scholarships.

But, despite this good neighbor policy, not everyone welcomes the news that Wal-Mart is coming to town. This has been particularly true of Massachusetts, where citizen opposition succeeded in blocking the construction of proposed Wal-Marts in two communities, Westford and Greenfield. Wal-Mart opponents elsewhere have not been so successful, and stores have eventually opened despite their protests.

From its headquarters in Bentonville, Arkansas, the chain moved first into the South and Midwest and did not reach New England until 1991, when four stores opened in southern New Hampshire, along the Massachusetts border. New stores in Maine quickly followed, and it was not until 1993 that the first Wal-Mart opened in Massachusetts, in Fairhaven. The initial reaction was favorable. The business community regarded the new stores as a way to jump-start the local economy. Consumers saw an opportunity to buy goods at considerable savings.

During these years, the Wal-Mart empire was growing at a dizzying pace, with a new store opening somewhere at a rate of one every other day, but, as this inexorable growth continued, a darker sinister side emerged.

In the spring of 1993, Wal-Mart announced plans to build a store in Greenfield. At the time, the town's Main Street area had suffered from a prolonged period of a poor economy. Much of the historic downtown section was deserted. Many employers had left the area or gone out of business altogether.

Some welcomed the news, hoping the new strip mall would bring a much-needed boost. Others were not so sure just what would happen. In many communities, the opening of a Wal-Mart had spelled the end for many businesses that could not compete with the chain's cut-rate practices. And in many communities the businesses that suffered were not just the small local stores but such other retail giants as Sears and JC Penney. In Greenfield, people began to express the view that the new Wal-Mart would be the end of their few remaining businesses downtown.

Other people were alarmed by the sheer size of the project. The plans called for a 120,000-square-foot store on a sixty-one acre site—bigger than the entire downtown area. And the company projected that the mall would attract 8,000 customers a day, nearly half the population of the town, all traveling along a single two-lane road.

Before the company could break ground, it needed a number of permits and approval from town boards, including a crucial zone change from industrial to commercial. Opponents of the new mall used this permitting process to voice their complaints. The question became so controversial that a referendum was held to give the town council a sense of the community's opinion. The town voted overwhelmingly against the zone change. Town council made it official some weeks later, and Wal-Mart was effectively barred from the town.

At about the same time, citizens of Westford were facing a similar situation. Again, Wal-Mart was held at bay, this time because of concerns about the increase in traffic and objections that the store would be out of place in the upscale community.

In 1993, rumors began to circulate that a major development was being proposed for a piece of old farmland known as the Levine farm in Lunenburg. The drumlinlike property was a local landmark that had been farmed since the colonists first settled there in the eighteenth century. It had ceased to be an active dairy farm in the 1960s when the main barn burned down, and the hillside offered a spectacular view of the surrounding countryside; hawk watchers would regularly gather there during the seasonal migrations. The land had been put under an agricultural preservation restriction, and many in the community thought the hill was safe from development. However, when the question was put to town government, it was decided that the town could not afford to purchase it and so the property was sold to Wal-Mart.

As in Greenfield and Westford, the proposed strip mall generated considerable opposition. There were those who objected to the location on the scenic hillside. There were others who felt such a development was inconsistent with the rural character of the town, and, when the plans were finally submitted to various town boards, it became apparent just how inconsistent the development was. Before breaking ground, Wal-Mart would have to get dozens of permits and approvals. Opponents were heartened; all it would take was one of these to stop the project, as had happened in Greenfield.

The biggest stumbling block was the lack of a sewer system in Lunenburg. This had been a controversy in the town for some years, long before Wal-Mart appeared on the scene. With no town sewer system, every building relied on a septic system to manage its wastewater. In parts of town where many homes had been built in the 1950s and 1960s, inadequate septic systems were threatening to pollute the groundwater supply. Builders complained that few new homes could be built because their lots could not meet the perc-test requirements. Wal-Mart faced an even thornier problem. Tests showed the hill to be mostly solid rock. This would mean blasting just to construct the buildings, and there was no way that a septic system could be built on the site.

Undaunted, Wal-Mart soon came up with a plan.

The store would be located just one mile from the Fitchburg city line, where there was already an existing sewer line. Wal-Mart, along with two local developers, would bear the full cost of designing and building a sewer line from the mall to the nearest Fitchburg sewer line, a half-million-dollar project. Once the line was

completed, Wal-Mart would turn it over to the town, cost free. There had already been plans made to construct sewer lines through the most critical parts of the town. This new line would provide the start to an expanded system in the town.

Town officials began to look at the project in a new light. Sensing this, opponents wanted the question of whether or not Wal-Mart should be allowed to build to be put into a referendum as in Greenfield. Town officials did not permit a referendum. Wal-Mart got the go-ahead.

There were problems from the start. More blasting was needed than originally thought. People nearby complained of damage from the blasts. The huge mound that was built up was subject to serious erosion problems. Promised landscaping didn't take place except for a few token plantings. A new and more dangerous intersection was created. But the biggest shock to residents was just how extensive the strip mall was.

Now, six years after the store's opening, most people have become accustomed to it. Former opponents even shop there, and there is a new threat on the horizon. A Wal-Mart has been proposed for neighboring Leominster, just seven miles from the Lunenburg store. Wal-Mart already has a reputation for consolidating stores that are too close by. Many residents are worried that they will wind up with a big deserted mall on their formerly beloved hilltop.

Greenfield is worried, too. There have been reports that Wal-Mart will make another try for building in the town.

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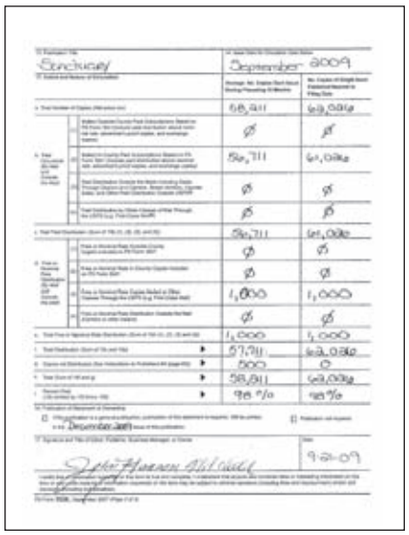
*Martin Laine lives in Lunenburg and teaches at the Shirley Middle School.*

*From the September/October 2000 issue of* Sanctuary *entitled "Ecology and Economy." Small town battles against big box stores have become commonplace since the events in this story took place. At the same time, many that were built on formerly wild land now sit empty.*


Statement of Ownership, Management, and Circulation
POSTAL SERVICE (All Periodicals Publications Except Requester Publications)

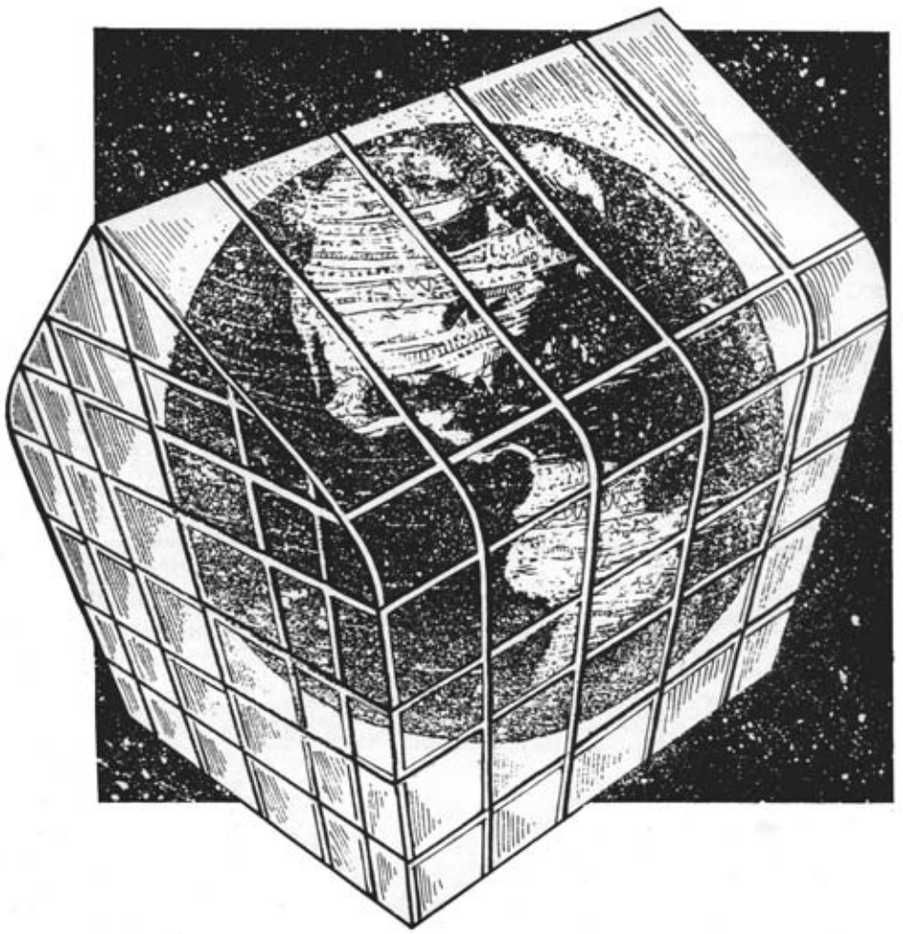
Sanctuary
Quarterly
408 South Great Road
Lincoln, MA 01773
N/A
Mass Audubon
408 South Great Road, Lincoln, MA 01773
John H. Mitchell, Mass Audubon
408 South Great Road, Lincoln, MA 01773
Mass Audubon
Nonprofit Organization
No Stockholders
N/A


Sanctuary
September 2009
68,911
58,711
1,000
57,711
500
58,911
98 %
December 2009
9-21-09

# Cutting Carbon

*The view from 1989*

by Alex Wilson



Suppose for a minute that you live in a beautiful house overlooking the ocean. The view is gorgeous, but the cliff is eroding and your property value is dropping. Experts tell you that in ten or twenty years the edge of the cliff will probably be right up to the house. You'll lose everything, your life investment. Now suppose someone comes along and tells you that the erosion can be stopped or at least slowed down. In the process of halting the erosion, your property will look more beautiful, boosting its value. Furthermore, this person will actually pay you to solve the problem!

Sound too good to be true? It probably is for a house on a cliff. But the situation could serve as a metaphor for global warming and the best measure to reverse it: cutting back on fossil-fuel use.

If we are to succeed in halting a predicted planetary temperature rise and its multifarious effects, we had better begin curtailing our use of fossil fuels. Some of the necessary measures, such as reforestation and replacement of inefficient equipment, may be expensive in the short term. But with most measures, we will realize not only tremendous environmental returns but also substantial long-term economic gains. We would reduce the costs of owning a house, operating a car, buying a manufactured product. We would help balance the federal trade deficit. And we would reduce the high costs of pollution mitigation and land reclamation associated with fossil-fuel use.

There are two basic ways to reduce the use of fossil fuels: conserving energy and substituting environmentally benign energy sources. From a least-cost standpoint, conserving energy is almost always less expensive than producing new energy—any type of new energy. That's the place to start to reduce fossil-fuel use—whether on a national level or at home. Energy conservation strategies can range from changes in lifestyle to construction of more energy-efficient houses. For example, each gallon of gasoline burned in your car produces about twenty pounds of carbon dioxide—about one pound per mile if the car gets 20 miles per gallon.

Commuting to work on a bicycle several days a week in good weather, walking, or carpooling can reduce your contribution to global warming substantially. Bicycle commuting five miles each way, 3 days per week, saves half a ton of carbon dioxide each year. The same is true of air travel. Each passenger-mile in a commercial airliner produces about a half-pound of carbon dioxide, so if you can combine business trips to avoid one 2,000-mile round-trip each year, you will save a half-ton of carbon dioxide.

On an individual basis, none of these strategies may seem very significant compared with the billion of tons of carbon dioxide produced worldwide each year from fossil fuels. But, when the combined savings from actions of a significant portion of our population are added up, the result could be significant.

Even more important than careful planning and changes in lifestyle are improvements in energy efficiency.

Upgrading your refrigerator to an energy-efficient model will result in the production of many fewer tons of carbon dioxide over the refrigerator's twenty-year lifespan, assuming coal-generated electricity. Doubling your car mileage from twenty miles per gallon to forty will produce 2.5 fewer tons of carbon dioxide per year if you drive 10,000 miles. Replacing standard insulated glass windows with low-emissivity windows throughout an average-sized Massachusetts house using oil heat will make a difference of three-quarters of a ton of carbon dioxide per year. And during new construction, upgrading the energy efficiency from conventional practices to an energy-efficiency package will result in the generation of five fewer tons of carbon dioxide per year.

The remarkable thing about these energy-efficiency measures is that most pay for themselves through economic savings, without even considering the benefits relative to global warming. Furthermore, carbon dioxide is not the only combustion product we should avoid pumping into the air. A reduction in fossil-fuel use will also cut down on nitrous oxide and sulfur dioxide emissions that cause acid rain, along with hydrocarbon production, which contributes to ozone production and smog.

It is rare indeed that such a significant problem—as global warming appears to be—offers such positive solutions, not necessarily easy, but at least positive. Efforts to reduce fossil-fuel consumption will improve our economy, protect scenic wild areas, and reduce acid rain and smog—while cutting our emissions of carbon dioxide into the atmosphere.

Support for conservation and renewable energy is even more important today than it was during the days of the energy shortage. We need vigorous weatherization programs, energy-efficiency standards, and funding for expanded research and development on renewable energy sources. But we don't need to wait to take action. In fact, it's clear that we cannot afford to wait.

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*Alex Wilson is a free-lance writer based in Brattleboro, Vermont.*

*This story appeared in the September 1989 issue, "Warming Trends." Clearly prescient, it is memorable for the enduring metaphor at the beginning of the article. The original 1989 title of this story is now in common usage, and the story predates the 1997 Kyoto Protocol, in which developed nations agreed to limit their greenhouse gas emissions.*

# Family Programs

**BERKSHIRE SANCTUARIES**
*Lenox, 413-637-0320*
**Bird Banding Demonstration**
*January 9—10 a.m.-noon*

**BOSTON NATURE CENTER**
*Mattapan, 617-983-8500*
**Birding for Beginners**
*March 13—10-11:30 a.m.*

**BROAD MEADOW BROOK**
*Worcester, 508-753-6087*
**Looking and Listening for Owls**
*January 23—6:30 to 8:30 p.m.*

**BROADMOOR**
*South Natick, 508-655-2296*
**Owl Festival**
Live Owls: *February 6—3-4:15 p.m.*
Owl Prowl: *February 6—4:30-6 p.m.*

**CONNECTICUT RIVER VALLEY**
*Easthampton, 413-584-3009*
**Owl Moon**
*January 23—5-7 p.m.*
**Animal Tracking**
*January 20, February 20—10-11:30 a.m.*

**DRUMLIN FARM**
*Lincoln, 781-259-2206*
**Fireside Fables**
*January 13—1-2:30 p.m.*
*January 21—3:30-5 p.m.*
All ages welcome
**Afternoon Chores and S'mores**
*January 14—3:30-5 p.m.*
*January 22—3:30-5 p.m.*
For children ages 4 or older,
no backpack babies please
**For the Birds**
*January 13—10-11:30 a.m.*
All ages welcome

**HABITAT**
*Belmont, 617-489-5050*
**Bald Eagles and Snowy Owls Field Trip**
*January 30—8 a.m-2 p.m.*

**IPSWICH RIVER**
*Topsfield, 978-887-9264*
**Family Fun Hikes**
*December 29, 30, 31—1-3 p.m.*
**Groundhog Day Celebration**
*January 31—noon-4 p.m.*

**JOPPA FLATS**
*Newburyport, 978-462-9998*
**Merrimack River Eagle Festival**
*February 13—8:30 a.m.- 4 p.m.*

**MOOSE HILL**
*Sharon, 781-784-5691*
**Tap a Tree**
*February 7—1-2:30 p.m.*

**VISUAL ARTS CENTER**
*Canton, 781-821-8853*
**Metal Art**
*January 10—2-4 p.m.*

**WACHUSETT MEADOW**
*Princeton, 978-464-2712*
**Winter Open House**
*Saturday, January 23—1-4 p.m.*
Snow date: *January 24*

*Call the individual sanctuaries for more information, fees, and to register.*
For a full listing of Mass Audubon programs and events, visit our online catalog at www.massaudubon.org/programs.

Mass Audubon
*Protecting the Nature of Massachusetts*

# Calling All Backyard Bird Feeders!

Participate in Mass Audubon's annual Focus on Feeders Weekend—fun for novice and experienced birders alike! **During the weekend of February 6 and 7, 2010**, we ask that you note the quantity and diversity of birds visiting your feeder.

**Get your camera ready!** We will award prizes in several categories for wildlife photographs submitted with results. Wildlife photos need not be limited to birds; amateur photographers only. All photos become the property of Mass Audubon.

Ask others to join the fun, since the value of the bird data collected increases with the number of participants. All participants will be entered into a prize drawing. Report forms are also available on our website at www.massaudubon.org/focus.

**Last year's winning photograph:**
***Cardinal in the Snow***
**by David Parish**

**Report your results online at**
***www.massaudubon.org/focus***

***STEP 1:*** During the weekend of February 6 and 7, check your feeders periodically and note the number of each species in view **at any one time**. At the end of the weekend, record the maximum number of birds observed **at any one time** for each species listed below.

***STEP 2:*** Report your observations to Mass Audubon by **February 28, 2010**
Online at www.massaudubon.org/focus OR
Mail this report form to:
Mass Audubon/Focus on Feeders
208 South Great Road
Lincoln, MA 01773

*Mail photo submissions to the address above. Include your name/address.*

Name _____
Street _____
Town _____ State _____ Zip _____
County _____ Email _____
How many bird feeders do you have? _____
How many months of the year do you feed birds? _____
What type of feed do you use? Mixed Seed ____ Sunflower ____
Thistle ____ Suet ____ Other _____
Have you ever visited a Mass Audubon wildlife sanctuary? _____
Have you ever taken a Mass Audubon birding program? _____
Are you a Mass Audubon member? _____

**Please e-mail me when results appear on the website.**
**Here's my e-mail address:** _____

- ❒ American Crow
- ❒ American Goldfinch
- ❒ American Robin
- ❒ American Tree Sparrow
- ❒ Black-capped Chickadee
- ❒ Blue Jay
- ❒ Carolina Wren
- ❒ Dark-eyed Junco
- ❒ Downy Woodpecker
- ❒ Evening Grosbeak
- ❒ European Starling
- ❒ House Finch
- ❒ House (English) Sparrow
- ❒ Mourning Dove
- ❒ Northern Cardinal
- ❒ Northern Flicker
- ❒ Northern Mockingbird
- ❒ Pine Siskin
- ❒ Purple Finch
- ❒ Red-bellied Woodpecker
- ❒ Red-breasted Nuthatch
- ❒ Rock Pigeon
- ❒ Song Sparrow
- ❒ Tufted Titmouse
- ❒ White-breasted Nuthatch
- ❒ White-throated Sparrow
- ❒ Other Species: _____ _____

*To save resources, 2010 results and photo contest winners will appear on our website. If you prefer to receive results by mail, please send a stamped, self-addressed envelope to Mass Audubon at the address above.*

**Please report your observations to Mass Audubon by February 28, 2010.**

# SCHOOL VACATION WEEK PROGRAMS

**BOSTON NATURE CENTER**
*Mattapan, 617-983-8500*
**Winter Works!**
*February 16-19*

**BROAD MEADOW BROOK**
*Worcester, 508-753-6087*
**School Vacation Week**
*February 15-19—9 a.m.-3 p.m.*

**BROADMOOR**
*South Natick, 508-655-2296*
**School Vacation Week**
*February 16-19—9 a.m.-3 p.m.*

**CONNECTICUT RIVER VALLEY**
*Easthampton, 413-584-3009*
**School Vacation Week**
*February 16-19—9 a.m.-3 p.m.*

**DRUMLIN FARM**
*Lincoln, 781-259-2200*
**School Vacation Week**
*February 15-19*

**HABITAT**
*Belmont, 617-489-5050*
**February School Vacation Week**
Winter Wonderland:
*February 16—9 a.m.-3:30 p.m.*
Wonderful Wildlife:
*February 17—9 a.m.-3:30 p.m.*
Finding Your Way:
*February 18—9 a.m.-3:30 p.m.*
Secrets of the Past:
*February 19—9 a.m.-3:30 p.m.*
For children in grades K-5
**March Exploration Week**
Winter Wonderland:
*March 15—9 a.m.-3:30 p.m.*
Tracks and Traces:
*March 16—9 a.m.-3:30 p.m.*
Sweet Sap:
*March 17—9 a.m.-3:30 p.m.*
Finding Your Way:
*March 18—9 a.m.-3:30 p.m.*
Secrets of the Past:
*March 19—9 a.m.-3:30 p.m.*
For children in grades K-5

**IPSWICH RIVER**
*Topsfield, 978-887-9264*
**February Vacation Adventure Days**
*February 16-19*
For children in grades K-5; children can register for individual days or all 4 days

**MOOSE HILL**
*Sharon, 781-784-5691*
**February Vacation Days**
*February 15-19*

**SOUTH SHORE**
*Marshfield, 781-837-9400*
**February Vacation Adventures**
*February 16-19*
For children ages 5-10

**VISUAL ARTS CENTER**
*Canton, 781-821-8853*
**The Galápagos Islands**
*February 15-19—9 a.m.-3 p.m.*
For children ages 7-12

**WACHUSETT MEADOW**
*Princeton, 978-464-2712*
**School Vacation Week**
*February 16-19—9 a.m.– 3 p.m.*

**WELLFLEET BAY**
*South Wellfleet, 508-349-2615*
**February Vacation Adventures**
*February 15-19*
Chickadees Group:
*Morning Only—9 a.m.-12:30 p.m.*
*Afternoon Only—1 p.m.-3 p.m.*
*Full Day—9 a.m.-3 p.m.*
For children in preschool and Kindergarten; must be age 4 by September 1, 2009
Coyotes Group:
*Full day only—9 a.m.-3 p.m.*
For children in grades 1–5

Call the individual sanctuaries for more information, fees, and to register.

# MAPLE SUGARING PROGRAMS

**BLUE HILLS**
*Milton, 617-333-0690*
**Maple Sugar Days**
*March 13 and 14—10 a.m.-4 p.m.*

**DRUMLIN FARM**
*Lincoln, 781-259-2206*
**Backyard Sugaring**
*February 6—1-4 p.m.*
**Pancake Breakfast**
*March 13 and 14—9 a.m.-1 p.m.*

**HABITAT**
*Belmont, 617-489-5050*
**Sugaring Celebration**
*March 13*
Session 1: *10 a.m.-noon*
Session 2: *1-3 p.m.*

**IPSWICH RIVER**
*Topsfield, 978-887-9264*
**School and Scout Tours**
*February 23-March 12*
**Family Tours**
*February 27, 28, March 6, 13, and 14*

**MOOSE HILL**
*Sharon, 781-784-5691*
**Maple Sugaring Festival**
Session 1: *March 14—11, 11:15, 11:30, 11:45 a.m., 12:30, 12:45, 1, 1:15, 1:30, 1:45, 2, 2:15, 2:30, 2:45, and 3 p.m.*
Session 2: March 20—11, 11:15, 11:30, 11:45 a.m., 12:30, 12:45, 1, 1:15, 1:30, 1:45, 2, 2:15, 2:30, 2:45, and 3 p.m.
Session 3: *March 21—11, 11:15, 11:30, 11:45 a.m., 12:30, 12:45, 1, 1:15, 1:30, 1:45, 2, 2:15, 2:30, 2:45, and 3 p.m.*
**Weekday Maple Sugar Tours for Schools and Groups**
*Programs offered late February through late March*

*Call the individual sanctuaries for more information, fees, and to register.*

For a full listing of Mass Audubon programs and events,
visit our online catalog at www.massaudubon.org/programs.

Mass Audubon Tours
supporting conservation here and abroad

# Natural History Travel

**Traveling with Mass Audubon supports conservation in Massachusetts and abroad. Join us!**

## 2010 International Birding and Nature Trips

**Uganda—East Africa Birding Safari and Mountain Gorilla Trek:**
February 9-18, with Chris Leahy
**Best Birding in Belize:**
February 27-March 6, with David Larson
**Botswana—Birds and Wildlife of Southern Africa:**
March 21-April 2, with Wayne Petersen
**Bhutan—Birding and Beyond:**
March 23-April 9, with Bill Gette
**Galápagos:**
April 2-11, with Sue MacCallum
**Northern Greece:**
April 19-30, with Elissa Landre
**Natural Wonders of Mongolia:**
May 22-June 7, with Chris Leahy
**Montana's Prairie Spring:**
June 5-13, with Wayne Petersen

## US Tours

**Gay Head to Chappaquiddick—A Martha's Vineyard Weekend:**
January 15-17
Cosponsored by Drumlin Farm and Ipswich River
*For more information, contact Drumlin Farm, 781-259-2206, or Ipswich River, 978-887-9264*

**Rhode Island Birding Weekend:**
January 23-24, 2010, with Bill Gette and David Larson
*For more information, contact Joppa Flats, 978-462-9998*
**Leaders' Choice Getaway:**
February 25-26, 2010, with Bill Gette and David Weaver
*For more information, contact Joppa Flats, 978-462-9998*
**Wildlife Photography in Venice, Florida:**
February 27-March 2, with Bob Speare and Joy Marzolf
*For more information, contact Visual Arts Center, 781-821-8853*
**Birding the South Texas Coast and Lower Rio Grande Valley:**
March 13-21, with René Laubach and Bob Prescott
Cosponsored by Berkshires Sanctuaries and Wellfleet Bay
*For more information, contact Berkshire Sanctuaries, 413-637-0320, or Wellfleet Bay, 508-349-2615*
**Nantucket Island Weekend:**
March 19-21
Cosponsored by Ipswich River and South Shore Sanctuaries
*For more information, contact Ipswich River, 978-887-9264, or South Shore Sanctuaries, 781-837-9400*
**New Mexico—Rio Grande Lowlands to Rocky Mountain Highlands:**
April 21-29, with René Laubach and Bob Prescott
Cosponsored by Berkshire Sanctuaries and Wellfleet Bay
*For more information, contact Berkshire Sanctuaries, 413-637-0320, or Wellfleet Bay, 508-349-2615*

**For detailed itineraries, email: travel@massaudubon.org or call 800-289-9504**

# Birding Programs

**BERKSHIRE SANCTUARIES**
*Lenox, 413-637-0320*
**Eagles at Quabbin**
*January 23—8:30 a.m.-4 p.m.*

**BLUE HILLS**
*Milton, 617-333-0690*
**Winter Raptors**
February 6 or 13—9 a.m.-5 p.m.

**BROAD MEADOW BROOK**
*Worcester, 508-753-6087*
**Birding by Ear**
*Every Wednesday from March 24-April 28—7-8:30 p.m.*

**BROADMOOR**
*South Natick, 508-655-2296*
**Owl Prowl Adventures**
*January 23—7-8:30 p.m.*

**CONNECTICUT RIVER VALLEY**
*Easthampton, 413-584-3009*
**Winter Ducks in the Valley**
*March 13—10 a.m.-2 p.m.*
**Dance of the American Woodcock**
*March 20—6:30-8:30 p.m.*

**DRUMLIN FARM**
*Lincoln, 781-259-2206*
**In Search of Winter Raptors**
*January 16—9 a.m.-5:30 p.m.*
**Mission Possible**
*February 20—7 a.m.-5 p.m.*

**IPSWICH RIVER**
*Topsfield, 978-887-9264*
**Eagles and Owls**
*January 10, February 7—8 a.m.-noon*

**JOPPA FLATS**
*Newburyport, 978-462-9998*
**Wednesday-Morning Birding**
*Every Wednesday—9:30 a.m.-12:30 p.m.*
**Superbowl of Birding VII**
*January 30*
Log on to: www.massaudubon.org/superbowl for more information.

**SOUTH SHORE**
*Marshfield, 781-837-9400*
**Owls and Omelets: Birding and Breakfast**
*January 16—5:30 a.m.*

**WACHUSETT MEADOW**
*Princeton, 978-464-2712*
**Owl Prowl**
*February 20—5-7 p.m.*

**WELLFLEET BAY**
*South Wellfleet, 508-349-2615*
**Birding Cape Cod**
*Every Friday from February-May—9 a.m.-noon*

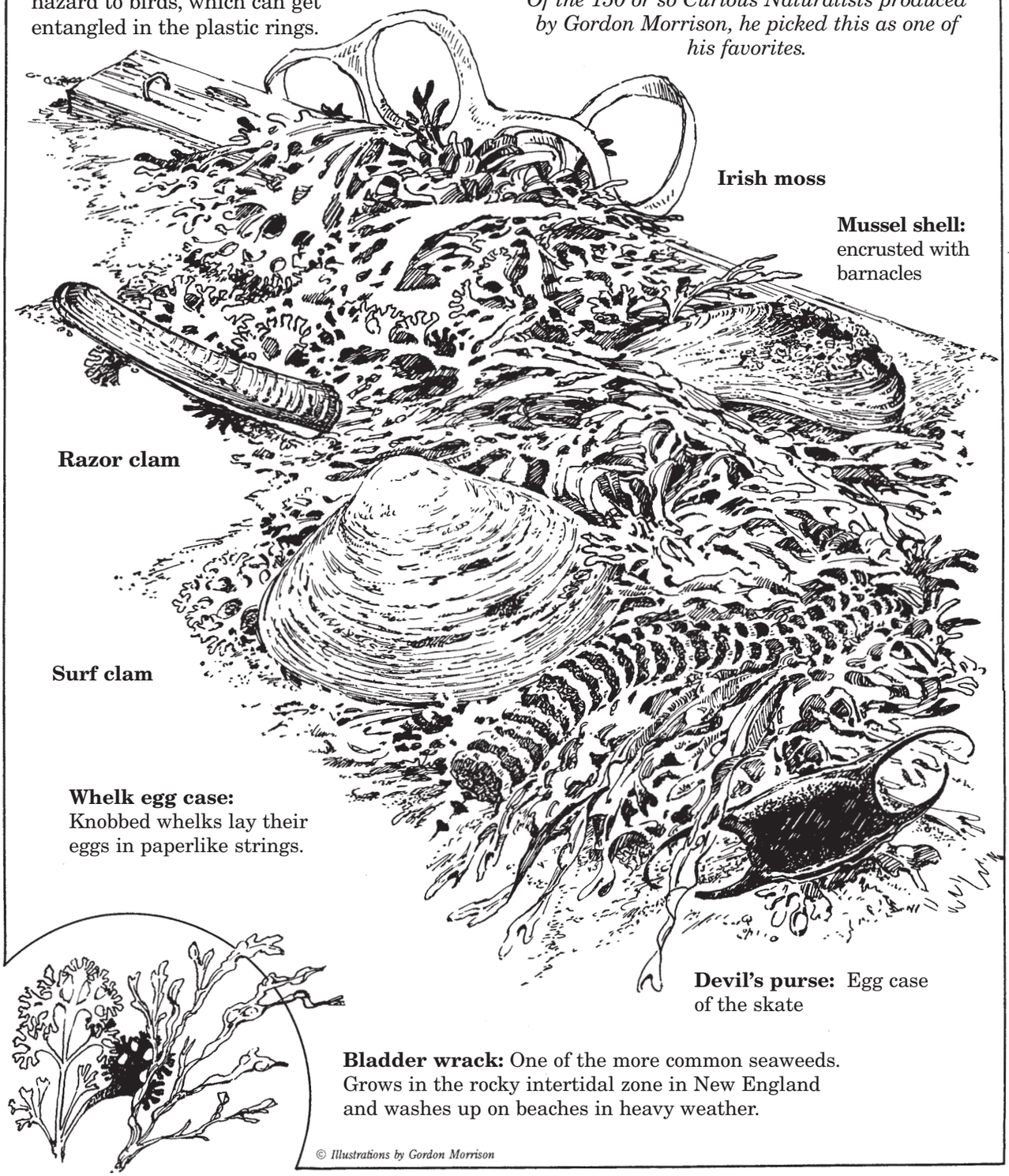
*Call the individual sanctuaries for more information, fees, and to register.*
For a full listing of Mass Audubon programs and events, visit our online catalog at www.massaudubon.org/programs.

## Curious Naturalist

### Illustrated by Gordon Morrison

**Life in the Wrack Line**: Below are some of the more common signs of life that can be found in the wrack lines washed up on coastal beaches.

*Of the 150 or so Curious Naturalists produced by Gordon Morrison, he picked this as one of his favorites.*



# Outdoor Almanac ▲ Winter 2009-2010



## January 2010

**January 3** Watch for fox tracks in fresh snow.

**January 6** Depth of the natural year; very little activity. This was the traditional hunger season of the Eastern Woodland Indians.

**January 13** Observe your shrubs and fruit trees after the first snows. Nipped-off twigs with ragged edges are a sign of deer. Rabbits chew the twigs off cleanly.

**January 14** Look for the bright stems of red osier dogwood along stone walls and roadsides, like Spanish dancers against the snow.

**January 15** New moon.

**January 19** A general warming trend known as the January thaw occurs about this time. Watch for flights of bees and listen for the chirp of spring peepers.

**January 28** Great horned owls begin to nest about this time. Listen for their hooting from deeper woods.

**January 30** Full moon. The Hunger Moon.

## February 2010

**February 2** Groundhog Day. In Europe, the remaining days of cold were forecast on this day by the emergence of hibernating badgers or bears, not by groundhogs.

**February 5** If there is a snowmelt, look for traces of tunnels dug by voles and shrews.

**February 11** Skunks emerge to mate about this time of year. Listen for their fights and squabbles late at night.

**February 13** Starlings begin their spring whistling about this time. Listen also for the spring songs of chickadees and titmice.

**February 14** New moon.

**February 17** On warm sunny days, look for signs of snowfleas at the bases of tree trunks. They look like a sprinkling of pepper on the snow.

**February 20** Purple finches begin singing their spring songs.

**February 24** Maple sap begins running. Watch for little icicles at the tips of sugar maple twigs.

**February 28** Full moon. The Snow Moon.

## March 2010

**March 5** On warm days watch for flights of mourning cloak butterflies, among the few hibernating insects.

**March 9** Salamander migrations begin about this time. Watch for them crossing roads in wooded areas on the first warm rainy nights.

**March 12** Pussy willows are fuzzed out.

**March 14** Woodcock nuptial flights begin about this time, as the snow melts back in open fields. Listen for the *peent* call and the whistle of wings.

**March 15** New moon.

**March 16** Skunk cabbages have emerged in wet areas by this date.

**March 19** Red-winged blackbirds are back. Watch also for flights of grackles and cowbirds.