

# MASSACHUSETTS WILDLIFE

No. 4, 2013

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**Inside This Issue:  
Old-growth, Forestry,  
and Waterfowling**



# Connecting Children to Nature through Art and Science

Every youngster should participate in the Junior Duck Stamp Conservation and Design Program. Its purpose is to teach 'Conservation through the Arts' and its redesigned arts and science curriculum sparks youth interest in habitat conservation and careers in natural resources through science, art, math, and technology. Aimed at students in grades 5-8, with suggested adaptations for younger and older audiences, the curriculum encourages students to engage with their natural world and develop a deeper appreciation of natural resources. Students create a waterfowl drawing or painting and submit it to the state contest. Each receives a certificate of appreciation, and the top 100 receive additional awards. These top artworks go on tour across the Commonwealth, and the entry judged Best of Show tours with a national exhibit. The artwork that takes first place nationally graces that year's Junior Duck Stamp. You can download the JDS curriculum at [www.fws.gov/juniorduck/curriculum.html](http://www.fws.gov/juniorduck/curriculum.html). To learn more about how you can become involved in this program contact Pam Landry, Massachusetts Junior Duck Stamp Coordinator, at [pam.landry@state.ma.us](mailto:pam.landry@state.ma.us) or 508-389-6310.



*Congratulations to Xiaomei Chen! Her acrylic painting of a Northern Pintail drake was selected as Best of Show in Massachusetts for the 2013 JDS Contest.*

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# MASSACHUSETTS WILDLIFE

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## FEATURES

### THE WORKING FOREST & HUNTERS: A SYMBIOTIC RELATIONSHIP

— Tom Wansleben

*Hunters rarely consider the many benefits provided to themselves and our wildlife resources by those who own working forest lands and those who make a living harvesting our renewable forestry resources ...*

4

### DUCK HUNTING REVISITED

— Don Hultman

*After spending his life in the heartland of American duck hunting, a former refuge manager discovers modest but equally satisfying waterfowl hunting opportunities on a Wildlife Management Area in western Massachusetts ...*

11

### OLD-GROWTH ON WACHUSETT MOUNTAIN

— Joe Choiniere

*Protected by rocky slopes and camouflaged by the results of a harsh environment, an ancient ecological treasure was overlooked and undiscovered for centuries until a local naturalist's persistence got the experts into action ...*

16

### OLDEST OF THE OLD: BLACK GUM

— John Scanlon

*The oldest living tree known to exist in Massachusetts isn't part of an old-growth forest, but it stands on a DFW-owned Wildlife Management Area where anyone is welcome to visit. Just don't forget your compass ...*

34

**On the Cover:** Forest Monarch: An old-growth Eastern hemlock, *Tsuga canadensis*, rises majestically above the forest floor on the upper slopes of Mt. Wachusett. Its deeply furrowed bark and heavy, gnarly, oft-broken upper limbs attest to the roughly 300 years of storm and wind events it has endured. The surviving green canopy, spreading horizontally, creates a vague resemblance to a head of broccoli, hence the reason "broccoli top" is often used as an indicator of old-growth trees. Captured digitally with a Nikon FX camera at 32mm on tripod, with slow-sync off-camera fill flash. Photo © Bill Byrne

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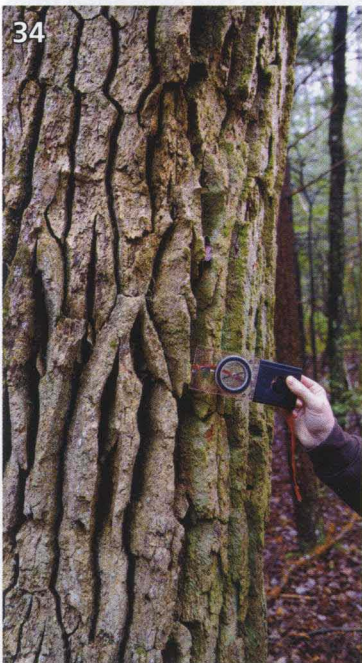
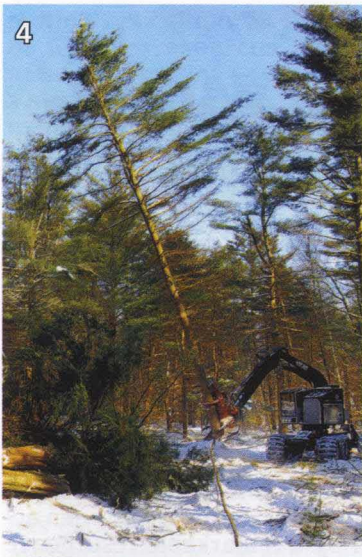
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# Forest Management and Wildlife

Visitors to Massachusetts are especially taken by the beauty and character of the New England landscape. For many, the nature of the Bay State's landscape is not what they expected, given that the Commonwealth is one of the most densely populated industrial states in the country. To our visitors, Massachusetts very much appears to be exactly what it is: cities within a forest. Forest dominates the landscape just as it did when the Pilgrims landed in Plymouth in 1620.

The pre-colonial forest did not exist in a static state. Natural disturbances, particularly wildfire, hurricanes, and other high-energy storms (i.e., the recent western Massachusetts tornado and Super Storm Sandy), beaver cutting and flooding, and infestations of insects and diseases were all impacting forest age and composition then, as most still do today. Furthermore, the native peoples routinely used fire to enhance the abundance and availability of game (especially deer), promote the growth of fruits (blueberries and raspberries), and create clearings and fields for cultivation of corn, squash, pumpkins, and beans; and thus had been managing forest habitats for thousands of years before European arrival. All these forest perturbations resulted in the creation and development of a diversity of natural communities dependent upon and driven by the dynamics of periodic natural and human disturbance of the forest.

By 1800, European colonization and settlement had converted most of Massachu-

setts' forestlands to farmland for pasture and cultivated crops. Then, in the early 1800s, Massachusetts started to shift from an agricultural, commodity-based economy to an industrial-based economy. By the mid-1800s, farming was in decline in the Commonwealth as employment in mills and factories provided an economic alternative to farming. Farming also started shifting to the more fertile Midwest, and large numbers of Massachusetts property owners simply stopped farming.

The farm abandonment and consequent reforestation that occurred has been accompanied by a remarkable resurgence in our wildlife resources. At the core of this resurgence has been the restoration of wildlife habitats in combination with the development of widespread public (and hence, political) support for wildlife conservation as the twentieth century began.

In the late 1800s, when the term 'conservation' came into use, it referred to the 'wise and sustainable use' of economically valuable natural resources (timber, fish, game, topsoil) through the implementation of protective measures for forests and wildlife. Today, the concept of conservation has expanded from primarily utilitarian values to maintaining ecosystem renewability. This is a much more esoteric concept and it has created some misunderstanding and confusion concerning proactive conservation management of fish and wildlife resources. Anti-hunting advocates have constantly misused the term 'conservation' in pro-





moting opposition to the management of wildlife resources. More recently, anti-forest-cutting advocates have taken a similar tack in opposing forest harvest management measures. As has been the case with hunting, the anti-cutting advocates have been actively promoting a no-resource-use preservationist agenda that they mislabel 'conservation/environmental protection.'

The fact of the matter is that we actually need to increase forest cutting if we are to sustain the diversity of our natural flora and fauna as we know it today; otherwise, the progression toward a homogeneous landscape limited to mature forests and suburban yards will increasingly limit biological diversity in Massachusetts. The Division of Fisheries and Wildlife (DFW) has established landscape goals for the Massachusetts forest landscape that seek to maintain 15%-20% of it as early-successional young forest (there is less than 5% today), 65%-75% as mid-successional (large pole and saw timber) forest, and 10%-15% as late-successional (mature/old-growth) forest. These goals were publicly reviewed in the summer of 2010 when the Fisheries and Wildlife Board held informational meetings in western, central, and eastern Massachusetts seeking input and comment on forest management to sustain biodiversity. All oral and written comments were supportive of the DFW's landscape forest management goals.

Nearly 80% of the forestland in Massachusetts is privately owned. Achievement of conservation and biodiversity goals will, to a large extent, depend on the development of sustainable forest management practices that avoid the massive landscape-level clearing of the past when virtually all the merchantable trees were cut in a generation. Complicating achieving this very difficult goal is the fact that there is an increasing reluctance to cutting on publicly owned woodlands. Consequently, to help achieve our goals for sustaining the Commonwealth's biological diversity, our agency has undertaken the following actions:

- 1) Developed a comprehensive, 750-page wildlife conservation plan;
- 2) Implemented an upland habitat management program;
- 3) Established a private landowner habitat incentive forest management program;
- 4) Increased funding for land acquisition



and habitat protection (200,000 acres of land are now under DFW ownership and management).

5) Developed statewide maps delineating habitat for species listed under the provisions of the Massachusetts Endangered Species Act. Under the provisions of the Act, an activity that may impact a listed species requires DFW approval of appropriate mitigation measures. In most cases, the mitigation is achieved through habitat protection and management.

Given the history of human and natural factors influencing our landscape, it is evident that the diversity and richness of our native plants and animals has always been and will be driven by the dynamics of forest disturbance. In the absence of disturbance, whether natural or human, grassland, meadow, old-field, and shrub/brush communities that are essential to many of our plant and animal populations would become very scarce. In light of the necessity to control wildfires, as well as the apparently inevitable decline in the economic viability of our traditional farms (there are now less than 100 dairy farms in Massachusetts), the practice of proven conservation and management measures in the stewardship of forestlands – both public and private – will be necessary to sustain our state's rich biodiversity.

A handwritten signature in blue ink that reads "Wayne F. MacCallum". The signature is written in a cursive, flowing style.

Wayne F. MacCallum, Director



# The Working Forest & Hunters: A Symbiotic Relationship

by Tom Wansleben

**“It’s no coincidence that working woodlands have a number of factors that make them ideally suitable for those who hunt.”**

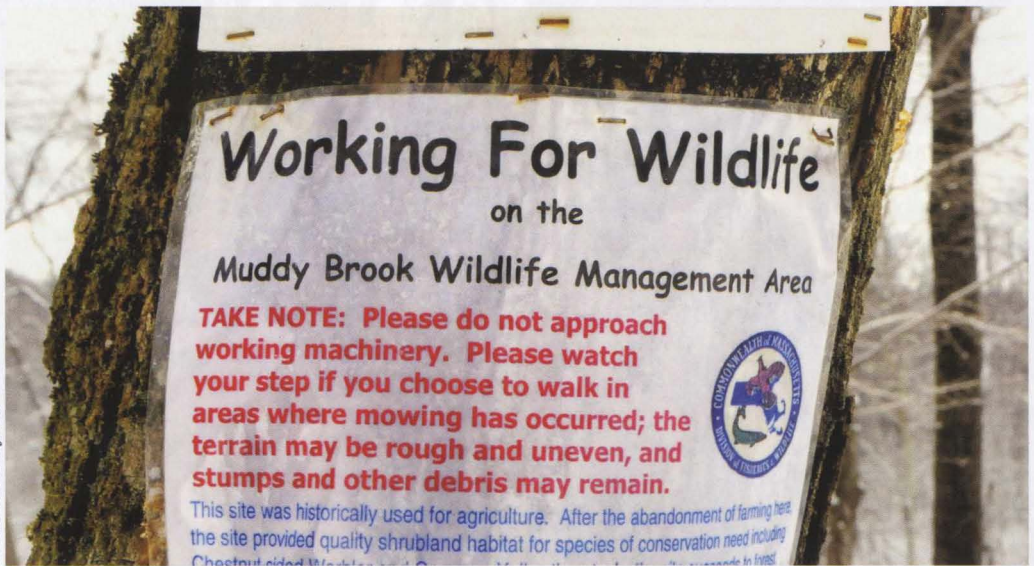
The logger’s thick French Canadian accent made it difficult to understand if he was angry that I had walked onto his job site or excited just to see another person. But the moment he raised his hands up above his head with fingers splayed out, our failure to communicate ended abruptly; he was making the universal sign for a big whitetail buck! Now this logger was a master at forest charades because I could tell from his exuberant motions that he had seen this deer only moments ago. It was dumb luck that I happened to wander down his skid road. I was a 17-year-old kid who hadn’t seen a deer all season, and now, knowing that a big buck was nearby, meant I had a chance of success no matter how small. The logger pointed me in the right direction and I was off.

That was close to 20 years ago and I never did get that buck. But that moment surfaces back into my mind every time I see a skidder, hear a chainsaw or sometimes even a French Canadian accent; a great memory all thanks to a logger and also a landowner who was engaged in forest management. I didn’t realize it then, but I would come to appreciate how the many facets of forest management played an important role in my 20+ years of hunting and observing wildlife in New England.

Many of us take to the woods year round to scout, hunt, and hopefully harvest a variety of game species. Much of the land that we choose to hunt on has an owner who has provided us, as hunters, with an invaluable resource that is often







*The Division of Fisheries and Wildlife conducts various timber harvesting operations on many of its properties to enhance wildlife habitat and improve public access.*

overlooked and under-appreciated. When I look back at many of the lands I have hunted, my favorites in terms of abundance of game, aesthetics, and overall enjoyment are almost always working timberlands. It's no coincidence that working woodlands have a number of factors that make them ideally suitable for those who hunt. Let me give a few solid reasons why.

Let's start initially with something that is easily recognizable by most people: the woods roads and log landings. The roads include anything from a temporary skidder track to a maintained, permanent woods road on which you could drive a car. The log landing is a cleared area, anywhere from less than a ¼ acre up to 2 acres in size, where the cut trees are piled, processed, and then trucked off to the mill. A good forester lays out these roads in order to efficiently move machinery and harvested trees throughout the woodlot, and they can provide the same efficiency of travel for a hunter who needs to cover a lot of ground.

*While rarely appreciated, woods roads created for logging operations (left) provide hunters with easy, efficient access, and wildlife (such as these wild turkeys) with travel lanes, insect-rich openings for feeding, and unobstructed views for strutting and other activities.*

Taking advantage of the woods roads on the land you hunt can allow you to discover new remote hunting grounds, avoid other hunters (most of whom never hunt more than a mile from their cars), and can significantly cut the time spent hiking to and from your tree stand or blind. It can all add up to a few extra valuable minutes of sleep or help ensure you're home in time to pick up the kids. If you're like me and always running late, stepping foot on that woods road that leads back to your truck – especially as the light of day is quickly fading – is a big relief and confidence booster.

My deer scouting always begins with an examination of the local woods roads on the property I'm hunting. In the fall when the whitetail breeding season or rut kicks in, the first evidence I always come across is a fresh scrape line that always follows one of these woods roads. A whitetail buck paws the ground until it clears a small area of bare soil, then urinates on the spot. That's a scrape; it's how bucks mark their territory and communicate with other deer in the area. Deer utilize roads in much the same way as us: to move quickly and unobstructed through the woods. Examining this information can yield valuable insights into what stage of the breeding season the deer are in, which in turn can dictate where you may







want to set up your stand and maximize your hunting efforts.

Fast forward six months to the spring and the woods roads and landings are now covered in grass and other succulent greens that provide great foraging opportunities for those deer that made it through the winter. And just like in the fall when I am scouting for deer, these roads are the first place my spring turkey season scouting begins. Wild turkeys love to forage for insects in grassy woods roads and landings; these features also provide the occasional bare spot that turkeys cannot resist turning into a dust bath.

The unobstructed views provided within the roads and landings also offer ideal settings for the flamboyant toms (male turkeys) to puff up and “strut their stuff” in front of hens that utilize these locations on their daily travels. Here feathers, droppings, and tracks easily stick out, helping to answer the hunter’s questions of where are they going and what are they doing. It’s no coincidence that roads and landings provide some of the best setup spots for matching wits with a big spring gobbler. Knowing this info on the parcel you hunt can mean the difference between a good hunting season and a great hunting season.

One of many examples of how a woods road created for forest management purposes helped me initiate a perfect hunt occurred this past fall. I was scouting some unfamiliar but promising looking wetlands one morning, and watched as numerous flocks of ducks flew in to feed at the distant, shallow end of this particular marsh. I knew that’s where I had to be in the morning. Normally I would have used my kayak, but this was going to be a long paddle, in new territory, in the dark: Experience told me it was going to take a lot of time.

Being a field biologist, I knew that I should at least look at an aerial photo map to see if a more efficient access alternative could be located. You guessed it; there was a woods road that would bring me within walking distance of all those

ducks. I immediately went to task and got permission from the landowner to use the road. Although I was only allowed foot access, it saved me over an hour of time, and because I had to hike to the spot, I was provided with the fun challenge of picking out a light yet effective decoy setup. In the end I was treated to a spectacular waterfowl hunting experience; all thanks to a woods road that was created for forestry purposes.

Now not all roads and landings are created equal. A poorly constructed road can quickly become a creek during heavy rain events, resulting in significant rutting, erosion, and the carrying of sediments and pollutants into streams and wetlands. Most people don’t realize this, but the primary cause of erosion in timber harvesting operations is not from the loss of tree cover, but from poorly planned roads that did not incorporate Best Management Practices (BMPs). The state Department of Conservation & Recreation (DCR) has recently revised its Forestry Best Management Practices Manual. The manual presents solid advice and regulations that protect soil and water resources during forestry operations.

Why does this matter to wildlife? Well, an eroded road doesn’t grow the grass and other greens on which deer and turkeys like to forage, plus it pollutes the seeps from which they often drink. BMPs also encourage buffer strips of intact forest bordering streams and other wetlands in order to trap and prevent sediment from entering these vulnerable habitats. These buffer areas provide the thick cover and subsequent terrain that naturally funnel deer and other game, offering perfect spots to set up tree stands or ground blinds.

The roads and landings for the most part are an aspect of forestry that we can easily recognize on the ground, but one thing many of us often don’t recognize or pick up on in the woods is the actual forest management practices that have taken place and how those actions have benefited the health and well-being of both game and non-game wildlife that inhabits the property and beyond. In the simplest sense, foresters manipulate light levels through the harvesting of trees to either enhance the growth of existing trees or to allow for successful regener-

*A buck rub in the foreground hints at the relationship between deer and logging. Bucks typically make their rubs and scrapes along woods roads, and all deer will readily forage on felled treetops whenever that resource is available.*





*In the decade or so following a major forest cut, a dense profusion of young growth provides abundant browse for moose and deer, as well as essential habitat for young-forest species such as ruffed grouse and New England cottontail.*

ation of new trees. For example, timber stand improvement and crop tree release practices that encourage the growth of big healthy trees such as oak and hickory also enhance the ability of these trees to create an abundant mast crop (acorns and hickory nuts). And just like lots of humans, lots of wildlife loves mixed nuts. Abundant food resources like these can carry wildlife through the lean winter months or the rigors of migration, which in turn can help to maintain healthy populations and improve hunting and wildlife viewing opportunities. Large trees also provide critical den and nesting sites for species such as gray squirrel, wood duck, fisher, raccoon, and barred owl.

The winter of 2011-2012 offered a perfect example of how management for big healthy trees can impact hunting opportunities. That winter it was pretty much snowless in my neck of the woods, but the preceding fall there was an abundant crop

of acorns and beech nuts. While scouting for turkeys the following spring, I was initially having trouble locating them in the green fields. What I soon discovered was that they were sticking to the woods—and for good reason: The area I was hunting was a professionally managed woodlot in which one particular forest stand was dominated by mature red oaks that had dropped so many acorns the previous fall that the turkeys had been feeding in there all winter long!

While my hunting buddies complained that they weren't seeing as many turkeys in the fields, I already had a bird in the freezer. There were so many turkeys that I directed my neighbor to this same location where his 14 year old grandson harvested a huge tom turkey on Mother's Day. If that property hadn't been under the management of a good forester those oaks probably would have been long gone, and with them the critical



food source that not only the turkeys needed, but other wildlife as well. But the greatest loss would have been the memories of that young hunter and future conservationist who was feeling on top of the world because a forester managed a great stand of healthy oaks.

Over the years many of our woodlands have suffered from high-grade harvesting. "High grading" is the cutting of all the largest, most commercially valuable trees for maximum, one-time profit, leaving only poorly formed, low value trees behind. It is an unsustainable practice that results in forest habitats that are left impoverished in terms of both commercial and wildlife values. Professional forestry, in contrast, typically promotes healthy trees of all sizes and species that in turn provide abundant food resources and habitat for wildlife; the option for the landowner to conduct regular, sustainable, and profitable timber harvests; and very good hunting opportunities. Obtaining the assistance of a professional licensed forester is the best way to ensure the health of your woodlot and the wildlife we all enjoy seeing and hunting. To find a licensed forester and other natural resource professionals in your area visit the UMass Forest Conservation Program website at [www.masswoods.net](http://www.masswoods.net).

Timber harvest aimed at tree regeneration such as group selection harvests and clear cuts (and yes, under professional guidance clear cuts are very acceptable) can create the dense patches of shrubs, forbs, and saplings on which moose, deer, and upland game such as ruffed grouse, rabbits, and other early successional species thrive. During one of my not so proudest moments in the woods I once had to retreat hastily from a vicious female ruffed grouse that was hell bent at keeping me away from the five chicks she had recently fledged. Now granted this was no ordinary woods chicken, but from my view (other than looking for a path of retreat!) what really helped these young birds from egg to full flight was more than an overprotective mother, it was the ideal habitat created through professional forestry.

Here's how that ideal habitat was created: The forester had conducted a group selection harvest. Under this management practice, all the trees in groups or patches of 1/2-2 acres are cut, leaving uncut

patches in between. Five years later, an immense amount of dense tree regeneration grows within the harvested sections. These stem-dense habitats provide the food and cover that grouse and a plethora of other wildlife species from songbirds to native bees benefit. Anyone who hunts upland birds like grouse and woodcock knows that active forest management is crucial for creating this habitat.

Timber harvests, especially in the winter where the treetops and branches (or "slash") is left on the ground, provide a cornucopia of tops and fresh branches on which deer and moose capitalize. Talk to any logger and they will tell you that the sound of a chainsaw is like the dinner bell to deer in the winter. Two winters ago I was inspecting a timber harvest that had recently been completed on one of the properties I manage. The harvest was an intermediate thinning with most of the trees cut being of firewood quality. The machinery used in this instance left all the treetops and limbs on site.

A recent snowfall had just blanketed the ground in a white carpet, and as I looked around I saw deer tracks everywhere. I even saw four does that day. Now I had been on this piece of land quite often and occasionally I would see some deer sign, but nothing to the extent that I witnessed that day. These deer were coming for the young, nutritious branches and buds left as slash, a feast that was normally out of reach 40 feet in the air, but through the result of timber harvesting was now an all you can eat buffet.

As a natural resource manager, I know that overabundant deer populations are causing ecological havoc in some areas. I've seen abundantly sprouting oak saplings entirely eliminated as they became fodder for a local, high-density deer herd that seemed to have eaten every single shoot in the area except for the beech. This is where the symbiotic relationship between hunter and forest landowner begins.

A symbiotic relationship is one in which both members of the relationship benefit from their association. The landowner who has a professionally managed woodlot provides a place to hunt, access through infrastructure, and abundant wildlife through his forest management. The hunter assists the landowner by helping to control the size (or more specif-



ically, the density) of the local deer herd, which in turn helps promote successful timber regeneration and lessens the foraging impacts of deer on other native plants. Hunters obtain the opportunity to enjoy healthy outdoor recreation and superb, entirely natural, organic meat, while the landowner obtains assistance to help keep the local deer herd in balance and protect the future timber potential of his forest; a real win-win. Just as forested lands provide critical ecosystem services for people (e.g., clean air, clean water, carbon storage), the small percentage of people who hunt provide a critical service to the forest by helping keep deer numbers at a level the woods can tolerate.

But the best relationship concerned hunters can have with our forest landowners and good forestry is not so apparent, yet extremely important. We often take for granted that someone else has to pay the taxes and pay for the management of the land we hunt on, yet there are ways we can help. We as hunters and users of private land need to support and promote federal, state, and local programs that provide technical and financial assistance to private landowners to help them obtain professional forestry assistance so they can grow healthy trees and create high quality wildlife habitat. We also need to support and maintain our forest products industry, which includes sawmills and loggers; after all, you need people who can cut and process the wood. And finally we need to support efforts to keep work-

ing forestlands around forever through conservation easements and other land protection efforts. It is critical that we support a sustainable wood products industry as hunters and non-hunters alike. In a world that is becoming more urbanized with more people who neither understand forestry nor hunting, it's imperative for all of us to realize how much we depend on working forests for the many great experiences we've had, either missing a perfect shot at a ruffed grouse, tracking the monster buck of a lifetime, or introducing your child to the great outdoors. After all, working forests are a local, sustainable resource that's good for people, good for wildlife, and great for hunting. 

*Tom Wansleben lives in Keene, NH and is the Stewardship Biologist at Mount Grace Land Conservation Trust in Athol MA. In addition to having oversight on 5000 acres of private conservation restriction property, Tom manages over 1400 acres of land for multiple uses including forestry, wildlife habitat and public recreation. He is a natural resource management professional with a Bachelor's degree in Natural Sciences and a Master's in Conservation Biology; and is also a professional member of the Forest Guild. When he's not creating wildlife habitat or planning the next timber harvest, Tom is passionate about being outdoors feeding healthy addictions like waterfowl, turkey and deer hunting along with fly fishing any chance he can.*





# Duck Hunting Revisited

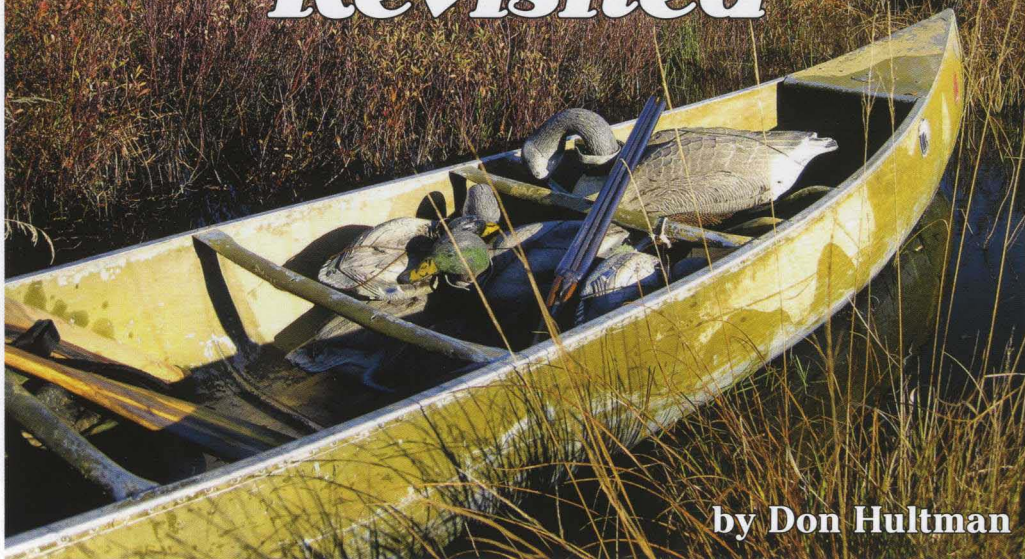


Photo © Don Hultman

by Don Hultman

**Western Massachusetts will never be a nationally recognized location for spectacular waterfowl hunting, but a newly arrived hunter who has experience with such a location happily discovers equal enjoyment at a local Wildlife Management Area.**

I went duck hunting on Monday, October 14, 2013, the opening day in western Massachusetts. I wasn't really planning on duck hunting in my new home state. After all, western Massachusetts is not exactly a waterfowl hot spot due to distance from the coast, the heavily wooded topography, and a general lack of sizable marshes.

And I was spoiled. I had moved from a small hobby farm overlooking one of the great waterfowl areas in the country along the Upper Mississippi River in Wisconsin, what some people affectionately call America's Flyway. The river and the 240,000-acre, 261-mile-long Upper Mississippi River National Wildlife and Fish Refuge is the heart of one of the continent's great waterfowl highways.

The place is lousy with ducks, geese, and tundra swans in the fall.

But upon moving here last December to be close to my wife's family, I noticed in the atlas a state wildlife management area or WMA about 6 miles from home that seemed promising, or at least wet. So I finally got around to scouting the Fisk Meadows WMA on foot a few days before the opener.

Massachusetts is blessed with a stunning network of 222 WMAs across the state. Along with Wildlife Conservation Easements, many state forests and parks, and other conservation lands, they offer hunting, fishing, and wildlife viewing within a short distance of nearly every resident. Such areas are priceless gems in an increasingly crowded world.

Photo © Bill Byrne





*The centerpiece of the Fisk Meadows Wildlife Management Area is a large, beaver-enhanced wetland that can be kayaked or canoed. Like all WMAs, it is always open to the public for wildlife viewing, hunting, and other forms of outdoor recreation.*

The Fisk Meadows WMA now totals 1,145 acres and its centerpiece is a 90-acre or so beaver-enhanced impoundment on

Dead Branch Creek. The creek marsh is flanked by hills of eastern hemlock, white pine, and mixed northern hardwoods.





The water was deep enough to float a canoe and there was enough vegetation near open water for hiding canoe and hunter. I saw a few wood ducks and hooded mergansers and heard some Canada geese. The scouting trip awakened my duck hunting bug and I decided I might as well give it a try.

I first hunted ducks when I was 15 in wetland-rich Minnesota where I was born and raised. Back then it was a matter of a parent dropping me and a friend off in the pre-dawn darkness, tromping around the marshy end of a shallow lake all day with only a shotgun and lunch, and being picked up after sunset with perhaps a duck, merganser, or coot. After so many years of duck hunting, my passion for the sport seems a permanent condition that comes to life as days shorten and colors change. I just have to be out there.

Of course my equipment was not ready-to-go. The biggest challenge was rigging a way to carry the canoe on my small sport utility vehicle, since four-wheel-drive and clearance was a must on the steep and rocky half-mile long access road to the water. I had been using a 1996 Volkswagen GTI for canoe outings the past few years since it had a more-or-less permanent roof rack from my wife's kayaking days, so I never got around to buying racks for the SUV. But some two-by-fours lashed to the roof rails of the SUV would work

for this short-distance outing until manufactured rails arrived

I used the same Grumman canoe I bought new as a senior in high school with cash saved from a part-time job at a small neighborhood, or "mom and pop," grocery store. At 75 cents an hour it took a long time to save the \$250 needed. I can still flip the canoe up and onto my shoulders and then up on the car rack, but it certainly is much harder, and less smooth, than it used to be. Except for the camouflage paint job I gave the canoe so many years ago, it seems to be weathering the aging process a bit better than me. I have too many moving parts, a canoe has none.

The canoe has been such a good and reliable partner on so many hunts. The craft's cold aluminum is in sharp contrast to the warmth and fondness I feel toward it. A friend of mine who is also a canoe enthusiast says in understated sarcasm that aluminum canoes are great for storage. Thank goodness, since this one is always ready no matter how long it has been ignored.

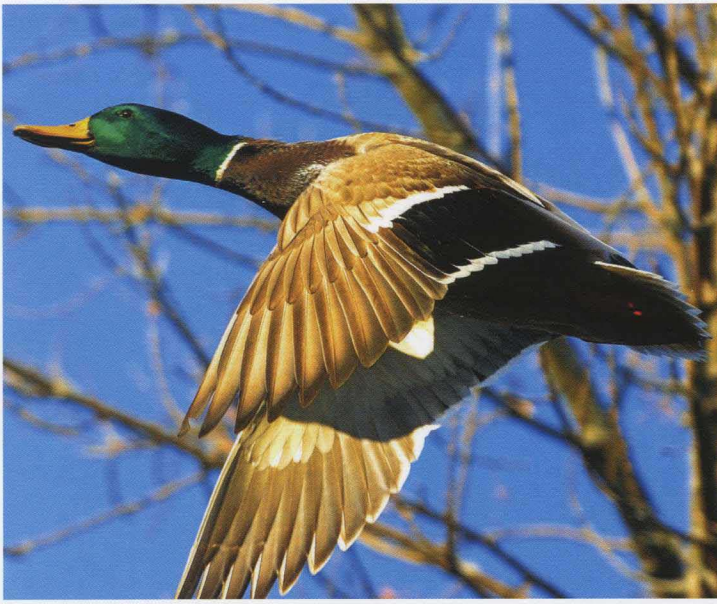
Also ready is the side-by-side double-barreled 12 gauge shotgun purchased about the same time as the canoe. The walnut stock is scratched and the bluing on barrel and receiver is fading to silver, but its simplicity and reliability remain appealing. Like old friends, the canoe

Photo © Bill Byrne



Photo © Bill Byrne





but out of my range of confidence. I seem to watch ducks over decoys more than shoot ducks over decoys.

But it was a memorable morning none-the-less thanks to the marsh magic that duck hunters know and love.

A beaver startled the heck out of me as I pushed out from shore in the dark, slapping its tail a couple of times to voice its alarm over the intrusion. After sunrise a pair of river otters came cruising through just outside the decoys. They reared-up out of the water to get a better look at the oversized

and shotgun are just comfortable to be around.

I arrived at the WMA in the dark at 5:45 A.M. and was the only one there. I wasn't sure if that was a blessing or a sign of duckless skies to come. It turned out to be a mix of both. One other party of two in a canoe did arrive after I was set-up, and they paddled silently past to the north end of the marsh.

In the end, I bagged no birds during the morning hunt, not that I didn't have chances. At sunrise I decided the decoys were not set-up right so while out making adjustments a flock of six Canada geese flew right over my gun-less self.

Later I shot at one of three wood ducks zigzagging over the decoys, but missed it cleanly. A few other wood ducks were seen, a few more geese, and a lone ring-necked duck zoomed overhead

and lifeless plastic birds, snorted a few times and moved on, only to return an hour later for another look. One never tires of seeing otter or beaver moving effortlessly through water.

About twenty crows mobbed an owl or something in the forest, a kingfisher fished, a long-billed marsh wren worked around my "blind," and a female hooded merganser swam through the decoys.



Photos © Bill Byrne



*A wood duck drake and a blue-winged teal make for a colorful bag, but all thanks to “marsh magic,” a hunt can be successful even when no ducks are downed.*




Photo © by David Scarpitti

The morning sun cleared a light fog and lit up a breath-taking fall panorama.

Henry David Thoreau once wrote: “We need the tonic of wildness – to wade sometimes in the marshes where the bittern and meadow hen lurk, and hear the booming of the snipe; to smell the whispering sedge where only some wilder and more solitary fowl builds their nest.”

And so for the 46<sup>th</sup> year I was again immersed in the sights, sounds, and smells

of the marsh at dawn. I felt grateful, at peace, and home again. 

*Don Hultman is a recently retired refuge manager who spent 30 years with the U.S. Fish and Wildlife Service in Minnesota, Michigan, North Dakota, Montana, and Wisconsin. He lives in Williamsburg with his wife, daughter, two cats, and a gracefully aging Labrador retriever. Besides hunting, he enjoys fishing, bird watching, camping, and gardening.*



# OLD GROWTH ON WACHUSETT MOUNTAIN

by Joe Choiniere

Overlooked and undiscovered until 1995, this unique wildlife resource somehow escaped the axes and saws of our ancestors. Today it is known to contain some of the oldest trees ever recorded in the Commonwealth and you can go and see them for yourself...

Old-growth forests take time. The most needed condition is to be left alone – uncut, uncleared, unchanged by humans – for centuries. Such forests still exist, almost inconceivably, on Wachusett Mountain, a 2,000-foot monadnock close to the center of our populous state that, encompassed by the Wachusett Mountain State Reservation, has long been owned by the people of Massachusetts. Ancient forests wrap around the top of the mountain and extend downslope in a broad ring crossed by numerous trails that highlight and showcase the diversity of this primeval realm.

Nowhere am I more aware of these primal forests than when hiking along the Semuhenna Trail. Just north of where Semuhenna begins, at the trail's southern junction with Harrington Trail, great trees loom from the rising slope, appearing as old as the granite to which they cling. Lichens and mosses cloak tree and rock profusely, lending to a feel of wildness and oldness. A gentle shelf and dip in the terrain at the bottom of the mountain's slope here allows an unparalleled view within and into this forest. The diversity is palpable: from the high canopy to ground layers, ancient tree to seedling, life and death together in fallen dead trees nursing quickly ascending young saplings, lichens and mosses cloaking trees to their highest reaches.

Once, caught in a sudden shower of rain, I watched raindrops redirected as they fell through the forest canopy, spattering in all directions off leaves and twigs, until

they reached the forest floor so gently as to not cause erosion or runoff. What forest conducts its rainfall like a beautiful symphony? Could this really be original, uncut forest? How did the mountain avoid the ax and saw? And having survived until now, can this forest and its trees be conserved forever?

Looking at how much of our state is forested, it seems unbelievable that almost all the woods around us today are second growth. They have sprung up in the past 50-150 years on lands that were historically cleared for agriculture and other human use. Almost all of Massachusetts had been cleared of its original forests by the start of the 19th century, but as farms were abandoned in favor of Industrial Revolution jobs or more fertile, easily tillable lands to the west, the trees returned. Given our ample rainfall and growing season, trees will cover almost any ground in our area. Left to natural forces, cleared areas begin to regrow forest almost immediately, gradually changing from old field, to shrublands, to young forest, and finally to mature forest.

Of the 5 million acres that make up Massachusetts, an estimated 3 million acres (63%) are currently forested. The

*Right, the author admires an ancient red oak growing along the Semuhenna Trail. Due to the harsh environmental conditions on the mountain, few of its old-growth trees have achieved this classic towering stature.*







vast majority of these forested lands have been cut or logged at some point since colonial settlement. A 2006 study published in *Northeastern Naturalist* reported the total area of old-growth in the state at “453 ha, in 33 stands that range from 1.2 to 80.9 ha in size,” [The ha, or hectare, is equal to about 2.47 acres, hence there are 1,119 acres of old-growth forest in Massachusetts.] and noted this represented “only 0.1 percent of the total forest area in Massachusetts.”

Much of this remnant old-growth forest acreage, almost all of which is located west of the Connecticut River, was first identified by Bob Leverett, the guru of old-growth forest discovery in the eastern United States. Leverett has spent many years finding and inventorying old-growth forests and educating the public, scientists, and foresters about them. It was he who recognized characteristics of Massachusetts forest stands that resembled, not in size, but quality, old-growth forest habitats he had observed in his youth in the southern Appalachians. When Wachusett’s old-growth came to light in 1995, it was Leverett’s contacts, experience, and involvement that led to its verification and documentation by scientists experienced in delineating eastern old-growth forests.

## DEFINING THE TERM

Forests, especially old-growth forests, vary greatly in age, composition, tree species diversity, density of growth, and ground layers. They grow in places where elevation, aspect, climate, moisture conditions, length of growing season, and soils can vary greatly as well. All of these factors can affect the maximum height and diameter trees can achieve, their growth rates, and even the shapes of their crowns. And over time, forests are subject to disruptive, sometimes cataclysmic natural events – storms, insect infestations, fires, drought, etc. – that can reduce the average age composition of their trees dramatically.

As old-growth forest research has blossomed in the past 30 years, “old-growth” has entered the lexicon of scientific and legal terminology. Although an easy definition for it is “forest undisturbed by humans,” some scientists argue that “old-growth” is not the ideal term for

this habitat and have offered alternative names, such as “original forest.”

Lee Frelich, a University of Minnesota forest ecologist, uses the term “primary forest” and defines it concisely as “never been logged.” Since all other forest is secondary forest, this term makes sense to me. It is easy to explain and allows for forests leveled by natural disturbances (and perhaps lacking old trees in their current state) to still be valued as recognized examples of their kind.

As Frelich says, “All forest that has never been logged was burned or blew down many times over thousands or tens of thousands of years; disturbance is integral to primary forest.” And that’s a salient point: Depending upon latitude, our primary forests have been on the landscape for thousands of years; since after the last glaciations, in the case of Wachusett. There has been time for these forests to grow not for just the 300-plus years the oldest trees represent, but for 300 years before that, and perhaps back to when a prehistoric storm leveled the forest and it regenerated, maybe multiple times.

With apologies to those who prefer other terms, I will use “old-growth” within this article, mostly because it is the term in most common usage. But I hope readers will remember “primary forest”: woods that have never been logged. Whatever we call them, because of their rarity, old-growth forests in Massachusetts and other states need delineation, inventory, and above all, conservation. While a bill is pending before the state legislature to provide permanent, statutory protection for these rare and irreplaceable sites on state lands, Massachusetts has already protected old-growth on state lands through several policies and plans, including the Department of Conservation and Recreation’s (DCR) Old-growth Policy and statewide Landscape Designations that provide protection for old-growth forests on all DCR-owned lands; a Resource Management and Protection Plan for Wachusett Mountain; and Forest Management Guidelines that conserve this resource on all Division of Fisheries and Wildlife-owned properties. These official documents have formally enshrined the term “old-growth” in state conservation history.





*The late Gordon Brownell, shown here with a highly convoluted Mt. Wachusett pitch pine, became convinced that the mountain's forests were ancient and deserving of conservation, and through his persistence, ensured the initiation of the research, discovery, and protection that followed.*

## UNDISCOVERED TREASURE

Before 1995, no one recognized the age, quantity, and quality of the "Great Hill's" woodlands. (Wajusett is the local Native American name for the mountain, loosely interpreted as "the place of the great hill.") The historical presence of a summit hotel, the busy network of roads and trails, and the relatively isolated and surrounded position of the mountain within residential communities contributed to no one suspecting it to have old-growth forests; no one, that is, until Westminster resident Gordon Brownell came along.

Brownell's experience on the mountain was extensive, both on and off-trail, and during all seasons. He had become aware of the presence of old-growth in other areas of the state through the efforts of Bob Leverett in the late 1980s and early 1990s. So when, in 1993, the Wachusett

Mountain Ski Area, a private corporation which leases a portion of the mountain for their ski trails, proposed a large expansion (including an entirely new summit-to-base trail excising existing forest) Gordon was concerned. He was used to seeing trees all around the mountain that he was sure were old. Fortunately he knew where to go with his concerns – to Donna Brownell, his wife and the co-founder of WEST, Watchdogs for an Environmentally Safe Town, a Westminster-based environmental organization. The persistent Wachusett trees were now under the watchful eye of two very persistent people.

WEST and Jay McCaffrey of the Massachusetts Chapter of the Sierra Club had been reviewing an Environmental Notification Form and subsequent Draft Environmental Impact Report associated with the ski area's proposed expansion during the public comment period for the project. Donna insisted that Wachu-





*A proposed expansion of the Wachusett Mountain Ski Area helped initiate the discovery and protection of the old-growth forest on the mountain. Today, skiers exit the highest chairlift just 60 yards from the edge of the old-growth forest.*

sett's forests and wildlife be examined during this review. She asked the DFW for help and now-retired State Botanist Paul Somers went to look for rare plants. He was familiar with high-altitude, old-growth forests in Tennessee, saw indications that old-growth was present on Wachusett, and encouraged Donna to follow up with old-growth experts Leverett and MassAudubon botanist Peter Dunwiddie. Her insistence was needed: Leverett was very doubtful when Donna first called him in May 1995 and asked if he would check out this forest.

"I was certainly skeptical," Leverett says, remembering that phone call. But he agreed to take a look and hiked off into the forest with his son Rob on Memorial Day weekend while Donna sat and chatted with Leverett's first wife, Johnnie (now deceased), at the Oxbow lookout after a walk up the Old Indian Trail together.

Leverett's pessimism had been replaced with optimism after his walk in the forest. Donna remembers him returning from the forest waving his arms. "You've got old-growth!"

Donna also contacted Dunwiddie, who had worked with Leverett on describing some of the old-growth in western Massachusetts in the early 1990s. Dunwiddie organized a delineation excursion team in short order and scribed a transect directly across the proposed ski trail in forest extending 500 feet east from the junction of the West Side and Old Indian trails to an existing ski run. His results on the ages of eight trees sampled were unbelievable, ranging easily into the 300-year range, and the general ecology appeared to support an old-growth designation. In his concise report, Dunwiddie concluded: "The stand of trees examined in this visit is dominated by individuals





Photo © Bill Byrne

ecology of the forests in keeping with designation as old-growth, but the local human settlement history supported that designation as well.

“The extent of the cleared land on Mt. Wachusett is easily delineated,” Cogbill wrote, “by either property boundaries of the pastures, stone walls still easily found today, or nineteenth century pictures [in this case, postcards]. All evidence shows an abrupt edge to the farm pastures that extend up to the ‘toe’ of the steep boulder slopes around the ‘waist’ of the mountain.”

This was the first time that I had seen historical evidence combined with biological evidence to document old-growth forest. Cogbill’s research into the settlement of the slopes of the mountain proved that its upper reaches had never been cut or cleared.

With Cogbill’s verification of old-growth and his estimate of 85 acres of it in at least four different areas, the state Department of Environmental Management (now the DCR) hired Harvard Forest ecologists to review Cogbill’s report, asking them to “conduct additional field reconnaissance to assess the extent and general age ... of suspected old-growth forest areas; and make recommendations for further, more detailed studies.”

Harvard Forest conducted their field studies in the early summer of 1996. In a final report released that August, they validated and highly praised Cogbill’s methods and historical and ecological findings. In addition, their research indicated that old-growth extended completely around the mountain, far outside the leased ski area boundary. David Orwig, co-author of the report, remembers: “I was most surprised that the old-growth forest had not been ‘discovered’ earlier, as there was quite a bit of it, all around the upper elevations of the mountain, despite heavy visitation annually for well over 100 years.”

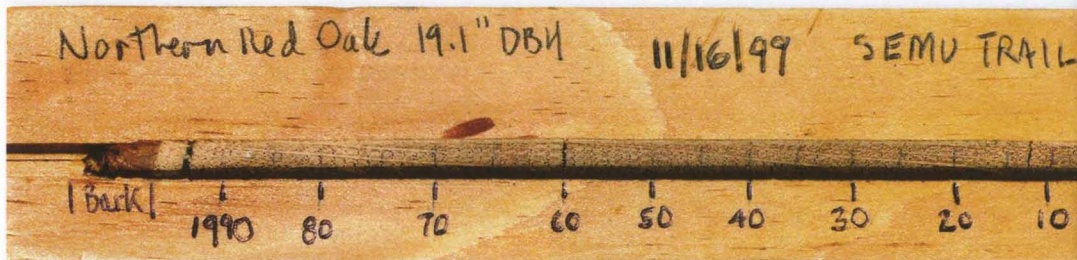
With every study of the mountain in this very short period of time, the size, extent, age, and importance of its old-growth forest had increased. In their proposal for further research on the mountain, the Harvard Forest authors stated that “[t]hese trees contain lengthy records of growth in their annual rings and therefore provide important insight into past events including frequency and

that frequently exceed 200 years of age and occasionally 300 years of age,” and also that “...the age data gathered from Mt. Wachusett are fairly unequivocal in suggesting that this stand would qualify as old-growth under most definitions used in deciduous forests in the eastern United States.”

As part of the team that day, I remember the magical and fractal quality of the forest only minutes after we stepped off-trail – large trees continually emerged as we moved ahead amongst thick ground covers and deep humus and dead wood; the forest seemed endless, the amount of space in the forest exponential. Dunwidie’s preliminary documentation work was enough to establish that a more complete survey was needed.

The ski area, as required by the Secretary of Environmental Affairs, hired a forest ecologist, Charles Cogbill, to examine the forest in more detail in 1995, and the results of his work, released in a March 1996 cover report by the ski area’s environmental consultants, made it clear that not only were the biology and





intensity of natural disturbances, and general climate information.”

While the scientists worked on documenting the ecological uniqueness of Wachusett, WEST, along with the Massachusetts Chapter of the Sierra Club and MassAudubon, spearheaded environmental-organization advocacy for old-growth protection on the mountain, urging state environmental officials to permanently protect the forest. Meetings of the Wachusett Mountain Advisory Council drew huge crowds. Among the protectors of the forest were Native Americans from all over New England. Their presence was deeply, spiritually powerful, as the mountain was a sacred site long before European settlement.

At an elders’ walk I guided on the Old Indian Trail on the mountain in 1997, one elder, upon seeing the trees, commented that “when we learn to take care of old people, we will learn to take care of old trees. They are all one in the same.” I thought of all the footsteps that had walked the mountain that day as a blessing. Since that time, annual drumming ceremonies on the mountain have maintained the very important original connection of the Native Americans as caretakers of the mountain and its forests.

The old-growth was officially protected by DCR in 1999 – several years after the ski area’s expansion plans were scaled down to affect only a portion of the lower slopes of the mountain – when a Resource Management and Protection Plan for the state reservation was completed. Harvard Forest also analyzed trees located on a proposed ski trail that would have required tree clearing in an area Cogbill had identified as the “dovetail”: a small area of uncertain human use located between two known pastures. Results were again unequivocal: old-growth. As Orwig wrote in the report, “[t]he forest

was comprised of red oak, sugar maple, white ash ... sampled trees ranged from 12 to 31 inches in diameter and one-third of the trees were older than 200 years, including a dominant red oak that was 285 years old.”

Further work done by Harvard Forest, included in the mountain’s Resource Management and Protection Plan, established an “Old-growth Administrative Area” around the mountain. The area of known old-growth has since been expanded, however, and now extends further west to include my favorite places along the Semuhenna Trail. These western stands of old-growth forest are remarkably far from the original summit-cone-area forests, and again, Gordon Brownell was involved in their discovery. After he showed this area to me, my colleague Frank Shea and I proposed 125+/- more acres of old-growth for consideration in 2002.

These areas stretched west down the Harrington Trail and included many trees we aged at well over 200 years. They were studied and added by Harvard Forest in 2004, hence the total area of documented old-growth on the mountain is now almost 300 acres. (In 2012, protection of the old-growth at Wachusett and other DCR properties was reaffirmed when the DCR issued “Landscape Designations” that include recognition and protective guidelines for old-growth.)

## AGING THE OLD

One might wonder how scientists could study Wachusett’s trees and obtain age and other information without causing the very damage they sought to prevent: tree cutting. The qualitative observations that led Brownell to suspect old-growth, and Leverett to verify the presence of old-growth, are useful techniques and criteria we will return to later. But scientists require quantitative, objective data, and



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Photos © Bill Byrne

*Left, the tool most commonly used to age trees is the increment borer, a hand-powered, hollow drill that extracts a cross-sectional core of the tree and allows its annual rings to be counted for aging (above) and other purposes.*

the world," he reflects. "There were two or three that were 320 years old in 1996, so they are now 336-plus. The oldest tree I found

taking increment cores is the favored way to age and document old-growth trees. An increment borer is a hand-powered, hollow drill that allows forest ecologists to extract a soda straw-shaped core extending from the tree's bark to the center of the tree (if they aim well). This technique does not harm the tree.

Anyone who has ever counted tree rings on a stump will understand the technique. The increment core allows the same counting of the annual rings, but without cutting down the tree. It provides a small cross-section of the tree that can be mounted, carefully sanded, and then examined. Thanks to our temperate climate and the tree's alternating annual growth and dormancy periods, it's fairly easy to see and measure annual incremental growth in these cores, although the annuli of some species are more distinct than others.

Harvard Forest ecologist Orwig has cored and aged more Wachusett trees than anyone, and from his work established, first and foremost, some amazing ages. "Turns out that the red oaks in that section are the oldest known anywhere in

was a yellow birch on the eastern talus slope, which was 370 years old in 1996, so again, now it is 386-plus, one of the oldest known."

That's a birth date of 1627 or earlier! Some of these ages have reset the longevity bar for certain species. No one knew red oaks attained ages over 325 as routinely as they do on Wachusett. Keep in mind also that the ages obtained from cores are only the minimum ages: The tree took a few years to reach the height of the core sample, and often scientists either miss the center of the tree or encounter a hollow core (heart rot), so many years may be missed. Although these missing years can be quantified with some accuracy, it is customary to count only actual rings.

But it's not just the age of individual trees that can be divined in the rings. The relative rates of growth over time, especially when the number of trees sampled is large, can offer interesting evidence about past climate and forest history. Edward Cook, a researcher with the Columbia University Tree-Ring Laboratory of the Lamont-Doherty Earth Ob-



servatory, relied on some of the red oak cores from Wachusett for cross-dating. This attempts to match known tree ring chronologies with the ring patterns in the posts and beams of ancient buildings. Cook and a colleague sampled many of Wachusett's red oaks for "use in climate reconstruction in New England and also for dating early historical structures in the greater Boston area. [The latter was supported by the Society for the Preservation of New England Antiquities.] Dating the early buildings would probably not have been possible without the Wachusett Mountain oak tree-ring data."

Imagine a 150-year-old oak tree cut down in the year 1725 for use in the frame of a building in the Boston area. Just like the living trees at Wachusett, that beam cross section has growth rings that can be obtained for examination with a coring tool. Those growth rings cannot, however, be ascribed to exact years as can those in the living tree core, where the year of coring is the first growth ring just under the bark. But the patterns of growth, the thinner and thicker rings representing growth conditions over the years, could be the same in this beam oak as they are in the Wachusett oak cores if

both lived in the same region and were subjected to the same climate events.

If the beam and the living tree cores overlap in time, the yearly patterns of growth from the living tree core can be matched up with or cross-dated to the beam core, establishing known calendar years for the section of the beam core. Once this is done, it's easy to count from the ring of a known year to get a sense of when the timber was cut and used in the building. It's a remarkable and elegant technique; Ponderosa pines have helped date ancient Native American structures in the southwest. Here, it's local, and illustrates that Wachusett is a repository of historical information, a living laboratory, and museum of infinite value.

The most important aspect of the Wachusett old-growth red oaks may be their very existence. David Stahle, Director of the National Tree Ring Laboratory at University of Arkansas, is a Wachusett enthusiast. "The most important contribution of the ancient red oaks on Wachusett Mountain may very well be the proof of concept they provided for the continued survival of original old-growth forest on non-commercial sites in the heavily and long settled northeastern United States."

*It must be remembered that old-growth forest is not composed entirely of old-growth trees: it is a mixed-age population that includes young and middle-aged trees as well as ancients, all of which are part of a larger community of plant species and soil organisms. The polypody fern (also known as "rockcap fern" for obvious reasons) shown here is one of the species found on Wachusett.*





he says. "Now we can seek out other old-growth red oak forest remnants in the region like those at Wachusett Mountain."

## HINTS IN BARK AND CANOPY

Most old-growth is not discovered by extracting tree cores. Coring is done to verify age. Preliminary investigation usually relies on qualitative factors, visual hints provided by old-growth forest and ancient trees that anyone can learn to recognize. It's the quality and character of the trees and forests that allow naturalists and ecologists to recognize them. David Orwig, for instance, first saw the quality of Wachusett's forest before he measured it: "I remember vividly my first visit to the mountain in 1995, a cold, foggy November morning. At the time the ski area was considering putting in an additional ski trail and it was slated to wind right through the heart of the hardwood area near Old Indian Trail. Someone asked me what I thought and I told them that the area was definitely old based on the tree forms, bark patterns, and site conditions – and I was excited to learn more."

The morphology (form and structure) of ancient trees and old-growth forest differs from that of younger trees and secondary forest, and with some training and experience, it isn't all that difficult to distinguish their basic features. Given the rarity of old-growth, however, few people have seen enough of it to recognize the bark patterns and tree forms that indicate its presence. Wider knowledge of these traits would help the interested public to identify and enjoy old-growth forests like Wachusett's.

If your view, like my own once upon a time, is that old-growth is composed of huge trees and should resemble California's towering redwood stands or the giant cove hardwoods of the Smoky Mountains, you need to adjust your search image! Much of Wachusett's old-growth forest clings to steep, rocky slopes and bedrock ledges; extracts its nutrients from a thin layer of sparse, miserly soil; and faces fierce weather conditions and a relatively short growing season. Most of the trees max out around 30 inches in diameter and 60 feet in height. It is undoubtedly due to their

relatively small size that they evaded notice and discovery for so long. In a very few places, however, at the bottom of steep slopes, sheltered from strong winds and ice, on level ground where soil builds and nutrients collect in what are known as colluvial processes – and where, perhaps, a trickling stream, spring, or seep provides water – some ancient trees can reach 42 inches in diameter and 80 feet in height, magnificent in their presence. (One such place is along the Semuhenna Trail; more on this later.)

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## Wachusett's Oldest Trees

Based on ring counts from multiple coring studies (1996-2004) these are the oldest examples of trees currently known to be living on Mt. Wachusett. Ages are adjusted to 2013. Keep in mind that these are minimum ages; actual ages could be greater.

TREE	AGE
Yellow Birch	386
Northern Red Oak	336
Eastern Hemlock	285
White Ash	256
Black Birch	255
Pignut Hickory	253
American Beech	252
Pitch Pine	229
Red Maple	228
Sugar Maple	225
White Pine	198
Shagbark Hickory	197
Hop-hornbeam	183





Two kinds of morphology that can help us recognize old-growth – bark and canopy – are created by the tendency for older trees to top out at an equilibrium height, and then continue to grow slowly in girth around trunks, boles, and limbs without increasing in height. This slow growth allows the bark to become almost an ecosystem of its own. The bark of ancient, slow-growing trees is often so radically different from faster growing, younger specimens of the same species that ecologists have coined the term “cryptic bark” to describe it. Though not an exact science, the presence of cryptic bark in various developmental stages on some trees can be a first clue that one has entered ancient forest.

Orwig uses the general bark appearance of trees to improve the efficiency of any search for old-growth individuals and stands. “For me,” he says, “the bark growth sequence [young to old] is smooth, then rough, then platy, then platy with sloughed-off smooth sections. This last trait is one I always look for; it has led me to find very old oaks over the years.”

Another example of a species that develops cryptic bark is yellow birch. Most of us readily recognize the characteristic curly bark of younger specimens. But old yellow birches are unidentifiable to the uninitiated: one must look high in the canopy for the telltale curly golden bark that every scout knows is flammable even when drenched by rain. It’s very easy to look at the bark characteristics of the ancient yellow birches on Wachusett and think they are sugar maples, a mistake anyone, even a forester or scientist, can make at least once. Based on the bark, I once mistook an ancient red oak for a chestnut oak – and I know my oaks.

One old yellow birch along the Harrington trail sports exposed roots that extend in all directions for over 35 feet, and cryptic bark, perhaps aided in development by years of hikers touching it as they passed. This last and slowest stage of bark growth is exceptionally beautiful: Celtic-patterned with rune-like raised and indented swirls and spirals.

As limbs enlarge in girth, but not appreciably in height, the canopies of old-growth trees tend to develop a characteristic silhouette, what is still best described qualitatively as a “broccoli top.” Some forest ecologists call it a can-

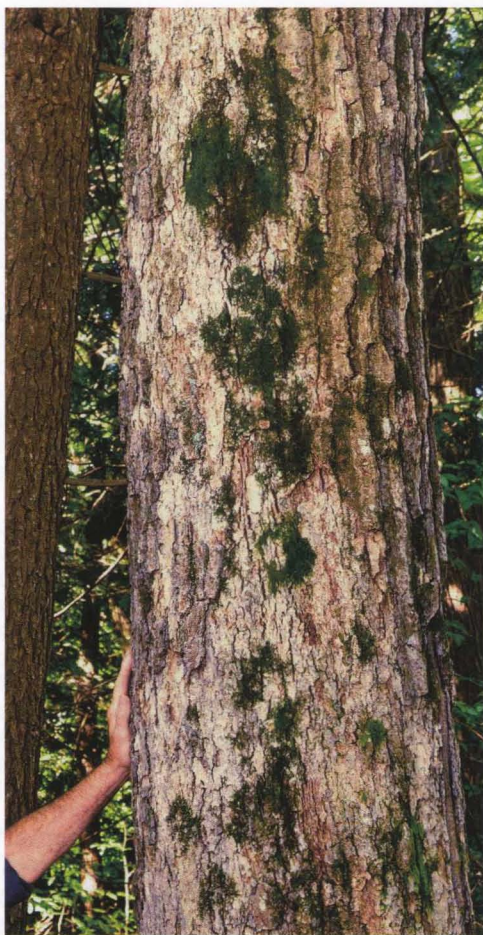


Photo © Bill Byrne

*The appearance of the bark can be a good clue that you are looking at a very old tree. Above, red oak bark slowly begins to lose its typically elongate, fissured appearance (still present on the upper right of this trunk) at about 200 years of age, taking on a much flatter, patchy, smoother look. Right, the bark of an ancient yellow birch develops Celtic-patterning with rune-like raised and indented swirls and spirals that are not present on younger trees.*

delabra. (The hemlock on the cover is a good example.) It’s what happens when horizontal and huge upper limbs try to sprout and re-sprout vertically, but are knocked back over and over again by wind and the elements (and perhaps, in some cases, by gnawing porcupines). It was just such a candelabra that prompted my MassAudubon colleague, Heidi



Ricci, to ask, “Isn’t that an old-growth tree?” as we hiked down the proposed ski area expansion site one afternoon. It was an immense yellow birch that, due to the steep angle of the slope, allowed us to view its huge, horizontal-limbed canopy at eye height. This tree, which Dunwiddie age-estimated (the tree was mostly hollow with 180 rings) at over 300 years old, was later decimated by the ice storm of December 2008. I measured the upper horizontal leader as it lay on the ground at 26 inches in diameter!

Neil Pederson, in a 2010 article in *Natural Areas Journal*, External Characteris-

tics of Old Trees in the Eastern Deciduous Forest, sums it up: “Architecture of tree crowns can also be a good indicator of old age in eastern deciduous forest trees. Thick, large, and “gnarled” branches have long been known as indicators of older trees. These crown architecture traits likely reflect a tree that has endured numerous disturbance events.”

We have discussed the characteristics of old, individual trees, but it is important to remember that old-growth forests, as with human societies, are not composed only of ancient ones; they are communities of all ages and exist within





# WACHUSETT MOUNTAIN OLD-GROWTH FOREST

## Legend



DCR Old-Growth  
Administrative  
Boundary



Hiking Trail



Park Headquarters  
& Visitors Center

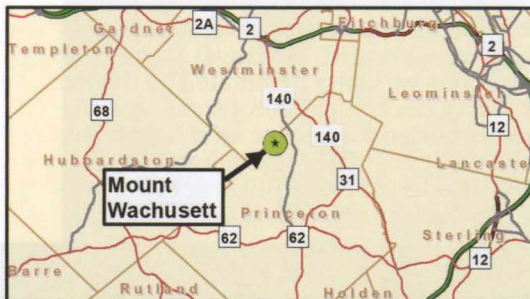
### Roads



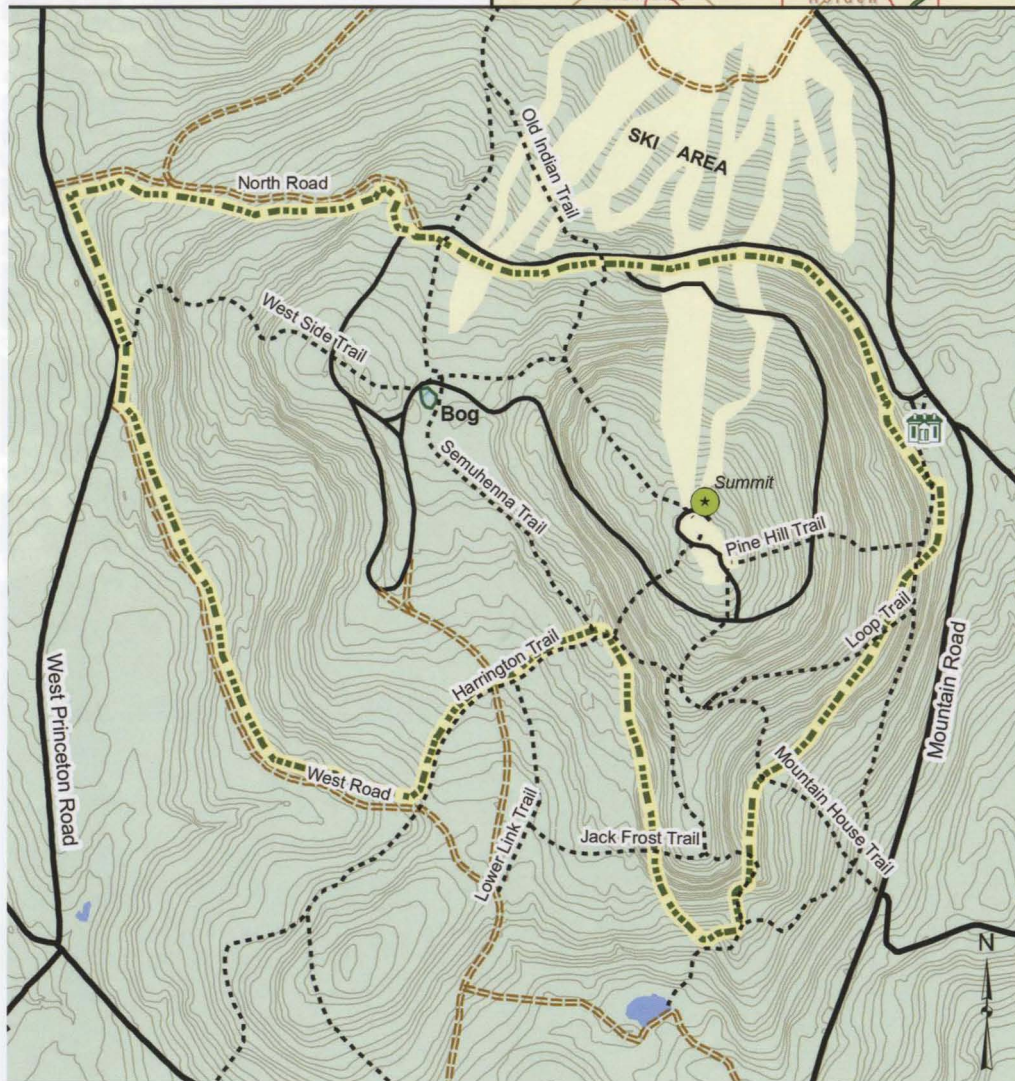
Paved



Unpaved



2013, Massachusetts Division Fisheries and Wildlife





an ecological context, complete with their accompanying fungi, mammals, birds, insects, ferns, shrubs, wildflowers, and other organisms. The very oldest individuals in both forests and human communities comprise only a small percentage of the entire population. Many others fall into the middle age range of their species, and the very young are present and necessary as well. That is the way with ancient forests: They are composed of a range of ages, not just the old and hoary.

## PAST AND FUTURE

We can now understand how Wachusett's forests escaped notice, but how did they escape the axe? First, these forests are mostly perched on steep and rugged topography. It would have been obvious to settlers that the area had little to no agricultural value, hence settlement on the lower reaches of the mountain was late compared to that on most land in the towns further east. Second, when settlement did occur on the lower slopes, the land was poor enough that the struggling farmers had no motivation to push their already marginal fields further up steeper, even rockier slopes. Finally, since the trees were stunted and gnarled by the land and climate, and also on challenging slopes, they had limited value as lumber and hence there was no incentive to log them.

Although the Summit House and cart road were popular early on, little was done to the forest except where the uppermost pastures of adjacent farms surrounded the mountain. As a result, when the state (originally county) park encompassing Wachusett Mountain was established in 1896, it took over a mountain still cloaked in forests. Roads and ski trails invaded these a bit, but wholesale clearing never really happened. The persistence of the forest on Wachusett is miraculous, although it turns out that almost every stand of old-growth forest in Massachusetts has its own story and "magic wands" that led to protection. It is that persistence of both mountains and of old-growth forests that attracts people to mountaintops for inspiration, solace, and clarity of thought.

Can these ancient forests continue to persist? Certainly larger and already protected sites such as Wachusett can

fare better for the future, particularly if surrounding forests are protected to provide essential, insulating buffers to weather effects, development, and pollution. As Lee Frelich's primary forest definition points out, even a storm ravaged old-growth forest remains a primary forest and will regenerate with time. But there are two other threats that loom larger than tree-downing storms: introduced exotic invasive insects and climate change.

There are probably hundreds of exotic insects with the potential to alter, seriously disrupt, or even destroy our forests. Most, thankfully, will never be introduced. Others, unfortunately, are already here. The hemlock wooly adelgid (HWA) is one. This tiny creature is a serious threat to eastern hemlock trees, and therefore has the potential to drastically change Wachusett's hemlock-dominated forest stands.

Orwig has studied its effects on forests in New England, and has concerns: "The habitat type that hemlock forms is more distinct in that the loss of hemlock will lead to more direct and indirect influences on the mountain. If HWA wipes out hemlock on the mountain, birch will play a strong role [in reforestation], both black and yellow, but in combination with red oak and both red and sugar maple, since they are already in the overstory providing seed and seedlings." HWA has already invaded the reservation, so time may be running out to enjoy the mountain's hemlock gems.

The Asian Long-horned Beetle (ALB), another introduced pest currently quarantined in the Worcester area and the subject of a massive federal eradication effort, is another threat. It would be particularly devastating to maples and birches. Based on current evidence, Orwig says that "...if left uncontrolled, ALB can readily disperse into natural forest landscapes and alter the makeup of North America's hardwood forest region."

Human-induced climate change, now the subject of much ecological prediction and concern, will lead to changes in the species composition of the mountain's old-growth forests, with species intolerant of warmer conditions dwindling or disappearing altogether. Orwig offers the red spruce as a good example: "The climate-change question for old-growth is





Photo © Bill Byrne

*“One old yellow birch along the Harrington trail sports exposed roots that extend in all directions for over 35 feet, and cryptic bark, perhaps aided in development by years of hikers touching it as they passed.”*



of course more challenging; certainly the red spruce band on the northwest slope of the mountain is at risk with warmer temperatures as it is already relegated to a small patch with nowhere to go.”

## SEE FOR YOURSELF

Given the rarity of old-growth and the present and potential dangers to it, some suggest that we should keep its locations secret and discourage public visitation. I do not agree. Wachusett’s old-growth was protected because lots of people were already aware of Massachusetts’ old-growth, thanks to Leverett’s early 1990s old-growth walks at other sites around the state. People will protect what they learn about, connect with, enjoy, and come to love. So I am happy to describe places along trails where readers can visit old-growth forests at Wachusett. Please stay on trails, however, as the ecosystem, especially on steep slopes, is fragile and easily damaged and can take many years to recover. Talk to Wachusett Mountain State Reservation staff for guidance as well.

In general, old-growth forest is crossed by hiking trails that ascend the mountain on all sides, and will be located between 1,700 and 1,900 feet of elevation. The summit of the mountain was cleared early on and remains so. Good examples of various forests can be seen along the High Meadow, Jack Frost, Harrington, Link, and Mountain House trails.

The Semuhenna Trail, starting from its lowest-elevation crossing of the auto road, is my first choice for an old-growth adventure. It begins in second-growth but mature hemlock and hardwood forest. Within a short hike south and uphill, one senses a change in the forest, some-

*Many of the ancient hemlocks on Wachusett have developed a “coke bottle” silhouette: a widening of the trunk several feet above ground level.*

Photo © Bill Byrne

thing I once heard Leverett call “passing through the veil.” I’ll get in trouble for saying it this way, but the forest just *feels* older. It’s hard to quantify: there are bigger (and one would conclude, older) trees, but also less of a monoculture, more diversity in the size and age of the trees.

Although the shady, acidic humus of hemlock forests is not noted for producing thick and diverse groundcover, gaps within the forest where older trees have fallen bring in sunlight and a rush of green in seedling hemlocks and much hobblebush (a viburnum family shrub with showy white flowers in early spring and deep red foliage in fall). Across this small patch of forest one sees the older ski runs that were installed before its discovery, and the hiking trail itself has a lot of surface erosion and resultant widening. Nowhere is it more clear how fragile Wachusett old-growth can be, so close to development. Despite its fragility, this patch houses some of the oldest hemlocks on the mountain, some over 300 years





old. You can recognize these ancients by their coke bottle-shaped trunks and enlarged and gnarled upper branches. (Remember candelabra – or broccoli tops.) Exposed “soils,” mineral gray and leached, are interrupted by the constant presence of bedrock. These trees cling to an almost impossibly infertile location.

The ledges open out more as you move uphill and the trail crosses West Side Trail. (A short hike to the left brings one to the junction of Old Indian Trail and West Side Trail, where north and west of the intersection and on up the mountain all the forest is undisturbed.) Semuhenna crosses the auto road and then enters into dwarfed conifer woods next to, then behind, the small water feature known as the “bog.” These woods contain diminutive trees by previous standards, barely 30 feet tall. An upturned hemlock root system stands across from a hemlock similar to the 300-year-old ancients we passed earlier. It is similar in gnarled appearance, but shorter; still an ancient tree.



Photo © Bill Byrne

A break into the open again reveals gnarled, short-statured pitch pine – the reddish-barked pine everyone who visits Cape Cod recognizes – growing here, slowly, on open ledges. Its presence is possibly a sign of earlier fire, which can favor this species. According to Orwig, a recent master’s thesis documented specimens from 200-220 years old, with the eldest being the second-oldest pitch pine known in Massachusetts. Despite its age, this tree has a diameter of less than 9 inches and is about 8 feet tall; yet another clear indication of the harsh and infertile environment these trees must suffer, cope with, survive. Touching branches with the pine, sitting in swales in the bedrock in moister humus, are hemlocks. The scene presents a remarkable tableau, an aspiring of two tree species somewhat dissimilar in ecology and habitat requirements, having a natural argument of sorts that neither seems to have won.

Beyond the opening, the trail skirts more conifer forest with white pine and eastern hemlock, again stunted by the shallow soils and strong winds. Intermittent stream courses run left to right down small gaps in the terrain. A rather sudden changeover to deciduous woods surprises one near where the trail turns due south. Exposed steep slopes fall away to the west and right-hand side of the trail, and uphill the slopes become steeper and steeper as one moves along. Great oak boles and canopies are visible via vignettes, but the presence of shade-tolerant American beech, with its dense foliage from ground to treetop, closes the view now and then. The beeches set this scene on fire in late fall when the leaves take on their fiery golden shades, and eventually turn bronze and cling to the trees long into the winter. Several large red oaks crowd the trail.

This deciduous zone has a complicated history of disturbance. The large and straight black cherries in a flat bench on the left were dated to about 1939, inviting their association with the severe forest effects of the 1938 hurricane. After the storm broke up the canopy, providing

*“The beeches set this scene on fire in late fall when the leaves take on their fiery golden shades, and eventually turn bronze and cling to the trees long into the winter.” This specimen appears to have beech bark disease.*



an opportunity for young growth, the black cherries sprouted from seeds left within the forest by birds that had fed on cherries elsewhere. Everywhere are signs of disturbance in the many different ages of the beech trees and groupings of dead, light gray beech boles likely killed by beech bark disease, a fungus infection spread by an insect.

All these are parts of a dynamic forest matrix. Even the demise of a single tree can create an opening in the forest canopy, as did a massive live red oak that tore free of the base of the ledges and cliffs in a windstorm in 2004 and laid itself down, stretching 85 feet to almost touch the Semuhenna Trail. I encountered it on a walk with Gordon Brownell, the man responsible for the discovery and protection of this forest. I could feel the tears welling; to lose such a giant in a single fell blow certainly caught my emotions as well as his. An immense opening of blue sky, once filled with the branches of the tree's canopy, helped explain how the fallen tree would allow for change in the forest structure.

The mighty oak's bole, as it decayed, would provide habitat for a series of ecological associations among fungi and other decomposers, eventually leading to its subsidence into the ground, perhaps with the seedlings of other trees growing in its rich, broken down humus. Later that day we found three immense hemlocks growing about 10 feet apart in a dead-straight, downhill line. It took Brownell no time at all to see this circumstance as one of a nurse tree, fallen and long gone, which had figured greatly in the lives of these 250-year-old triplets: They had sprouted on its decaying trunk. Perhaps the long lost tree was a mighty giant 600 years ago. That was it: full circle.

Whenever a large tree falls, like the giant that extended from cliff to trail, a huge rush of activity takes place on the forest floor. Still primary forest, a succession of hay scented fern, brambles, and the sprouts and seedlings of ancient forest trees all vie for space and grow in the newly found sunlight. In about 25, or perhaps a few more years, the canopy will close again, and new trees will build in age and character.

With the emerging view of a three-and-a-half-foot diameter standing red oak along a small stream parallel to the trail, we have arrived where I began this



Photo © Bill Byrne

essay, at the place described in my first paragraph. This one oak says much about Wachusett: its cypress-like, buttressed root flares appear as rock, not wood, supporting the weight of the canopy 90 feet above in the fierce winds that course over the west side's exposed slopes. All discussion of history, protection, and science can, for a moment, be set aside in the shade of this forest monarch. Call it old-growth, primary, or original forest, whatever your preference, but rejoice in the sheer presence of this forest. An extraordinary resource exists that was once thought to not exist: There is old-growth forest on Mt. Wachusett! Enjoy, appreciate, and be thankful for this place; these woods have been on a long journey.

*Joe Choiniere and his wife Donna, also a naturalist, live in Hubbardston and spend spare time exploring the geology and natural history of their area. Joe has worked with the Massachusetts Audubon Society in central Massachusetts for over 35 years. His articles appear regularly in Mass Audubon's Sanctuary magazine. The author would like to dedicate this article to Gordon Brownell, who passed away on February 13, 2012. A month before his passing he was awarded a lifetime certificate from the Eastern Native Tree Society, cosigned by eight state and private organizations, recognizing the pivotal role Gordon played in the discovery and conservation of Wachusett's old-growth forest.*



# *The Bay State's Oldest Tree:* *Black Gum*

by John Scanlon, DFW Habitat Program Leader

If you're looking for an interesting hike this winter, consider a visit the northwest portion of the DFW's Oakham Wildlife Management Area. You will soon find yourself in an extensive, forested swamp dominated mostly by red maple, red spruce, and Eastern hemlock. The view-blocking trees and the level landscape make it easy to lose your sense of direction here (so be sure and have a compass with you if it's a cloudy day), but if you wander around a bit you will soon encounter an occasional black gum tree, *Nyssa sylvatica*. Most will be found along the wetland/upland edge because black gum likes it somewhat wet, but not too wet. When you find them, take a close look: it turns out that a few of these black gums are among the oldest individual trees known to exist in Massachusetts.

These ancient trees were discovered a decade or so ago by USDA botanist Tom Rawinski, who lives adjacent to the WMA, while he was scouting for a place to bow hunt for deer. With the help of ecologists at the Harvard Forest, he was able to determine that the oldest of these trees began growing in this wetland before Columbus set sail in 1492! Yet these 500-plus-year-old trees are not part of an old-growth forest: Red maples adjacent to them have been cut repeatedly for firewood over the past few centuries. But because black gum is not desirable for firewood (the wood being wet, stringy, and difficult to split), these trees were continually passed over for cutting. Another factor that surely figured in their long term survival is that they are located

just high enough in the local Maynard Brook watershed to be ignored by beaver.

These very old trees are not especially large in diameter or height, and don't appear to be especially old to the untrained eye. But Rawinski recognized the distinct tree bark patterns that develop on black gum and other hardwoods toward the base of the tree once they get to be a few hundred years old. Young trees exhibit primary bark characteristics, and as they mature, they express secondary bark characteristics that are generally very familiar to us. If a hardwood tree lives long enough, however, secondary bark conditions give way to tertiary conditions that are very unfamiliar to most people.

For example, a young white or yellow birch tree has very smooth bark that holds tight to the tree bowl (primary characteristics), but a white or yellow birch that is mature enough to attract interest as firewood or timber typically has loose, peeling bark (secondary characteristics). And if a white or yellow birch reaches a couple hundred years of age, that loose, peeling, light-colored bark disappears and is re-

*USDA botanist Tom Rawinski, on right, who made the discovery, and DFW foresters Rebecca DiGirolo and John Scanlon admire the oldest tree, a black gum, currently known to exist in Massachusetts. Note how the bark is deeply fissured on one side of the base, yet relatively smooth on the other. This obvious variation is an indication of great age for this species.*









**“To me, it looks like a black gum tree has just had an intense electric shock...”**





*Fallen leaves: The black gum's short-stemmed leaves are 2-5 inches long, oval to oblong in shape, shiny on top and usually hairy below. They generally turn purple in early fall and rapidly change to a bright red, sometimes with patches of yellow.*

placed by solid, blocky patches of thick, darker colored bark (tertiary characteristics). It was these tertiary characteristics that attracted Rawinski's attention.

Anyone who has visited the old-growth forest at Mt. Wachusett can tell you that the tertiary lower bark of the yellow birch and red oak trees found there look nothing like what we typically see on the younger birch and oak that are most prevalent in Massachusetts forestlands. It is the same for black gum. At 50-100 years of age, black gum exhibits secondary bark characteristics that include relatively thin (perhaps 1 inch wide), elongate patches of bark that are typically a foot or so in length. But beyond about 200 years, these relatively thin patches are replaced by much wider and darker patches of bark roughly 2-6 inches wide, with deep fissures between the bark patches that give the surface of the tree bole a decidedly 3-dimensional look.

For the rest of us who are not well versed in primary, secondary, and tertiary tree bark characteristics, there is another way to identify black gum trees that doesn't change with age. At this time of year, when the leaves are off the branches, stand at the base of the tree and look straight up the trunk into the canopy. The largest tree branches on a black gum tend to radiate in a pronounced horizontal pattern, essentially perpendicular to the tree bole, then smaller branches radiate at nearly right angles to the larger branches, giving the entire tree canopy a pronounced zig-zag look. To me, it looks like a black

gum tree has just had an intense electric shock, and all the branches are rigid and angled in response. Black gum has vibrant, purple-to-deep red foliage in early autumn (thought to have evolved to attract birds to its early fruit), and it has become increasingly popular as a landscaping tree because it is an attractive, long-lived native.

Other common names for this interesting tree are tupelo (a Creek name meaning "swamp tree"), black tupelo, sour gum, pepperidge, and, on Martha's Vineyard, beetlebung. The latter is thought to refer to the use of this tree in making a beetle (mallet) for hammering stoppers (bungs) into barrels. The hardness of the dried wood also made it a popular choice for making wagon wheel hubs, pulleys, bowls, and mauls. Its flowers are an important source of nectar for bees, which sometimes establish hives in the hollow trunk sections common to this tree. Birds and mammals also take advantage of these hollows for nest and den sites. The gum's dark blue fruits have large, solid pits, so are not typically consumed whole by wildlife, but the thin layers of skin and flesh outside of the large pit are readily eaten by songbirds and gray squirrels. Black bears are known to consume the entire fruit.

The black gum is reported to be the longest living deciduous tree in eastern North America. Specimens in New Hampshire have been documented in the range of 700 years. Because surviving ancient gums are often isolated, located in wet terrain, and easily overlooked in forest settings, the possibility exists that older specimens are yet to be discovered in the Commonwealth. If you should stumble across a suspicious specimen displaying tertiary bark characteristics on a hike or a hunt, please let us know so it can be further investigated.



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A trio of mallard ducks take flight from a wetland in central Massachusetts. Drakes (males) sport distinctive green heads (some folks even refer to mallards as “greenheads”) but even the hens display a beautiful blue wing patch (speculum) bordered by white bars. The species, *Anas platyrhynchos*, is a favorite of hunters thanks to its relatively large size, beauty, abundance, and tasty meat. It is known to hybridize with at least 10 other waterfowl species worldwide and is also the progenitor of most of the domestic duck varieties developed to date. The mallard’s exceptional adaptability and capacity to thrive amidst high human densities (such as in city parks) has allowed it to become the most common duck found in Massachusetts. Closely related to the forest- or saltmarsh-loving American black duck, *Anas rubripes*, the prairie-evolved mallard has largely replaced the black here thanks to interbreeding and habitat alterations that favor the mallard.

Photo © by Bill Byrne

