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A Decade of Change in the Maine Woods

*An Appalachian Mountain Club ecologist
considers the progress*

David Publicover



TWELVE YEARS AGO, IN DECEMBER 2003, THE APPALACHIAN MOUNTAIN Club bought Little Lyford Pond Camps (as it was called then) and the surrounding 37,000 acres of forestland. The property, known as the Katahdin Iron Works or KIW property, marked the club's first steps on an ambitious project known as the Maine Woods Initiative (MWI). The project was described as "an innovative approach to conservation that combines outdoor recreation, resource protection, sustainable forestry and community partnerships." A feature article in the Summer/Fall 2005 issue (LVI no. 1) of *Appalachia* describes the origins of the MWI, its relationship to the history of the club in the region, our attempts to build strong relationships with local communities, and the results of our first year of ownership in the areas of forest management, ecological protection, and recreational development.

The 2005 article ended with the words, "The vision embodied in the Maine Woods Initiative is bold and far-reaching. The sons and daughters of today's AMC members will be the ones who will ultimately judge if the club does it right."

Now, as the initiative enters its second decade, is a good time to look back and ask, "How are we doing?" As a senior staff scientist with the AMC, I hold the primary responsibility for forest management planning on this property. I have had a front-row seat over the last decade observing the changes brought about by AMC ownership.

Land Ownership Has Doubled

The list of accomplishments since 2003 is impressive. Many (though not all) of these are well known to AMC members and visitors to the property:

- The AMC's land ownership has nearly doubled to about 70,000 contiguous acres with the purchase of the Roach Ponds tract in 2009 and the purchase of two tracts around Baker Mountain in January 2015.
- The AMC has set aside more than one-third of our property (nearly 24,000 acres) as permanent ecological reserves where natural processes will allow the long-term development of an older and more complex forest,

Maine native Ted Shina, a forester for Huber Resources Corporation, has been the Appalachian Mountain Club's "man on the ground" since it acquired the Katahdin Iron Works property. Here he examines an old "legacy tree." DAVE PUBLICOVER

which has been nearly totally eliminated from the regional landscape.

- The AMC's lands have been permanently protected through multiple conservation easements held by the Maine Bureau of Parks and Lands, The Nature Conservancy, and the Forest Society of Maine.
- The AMC's purchases have been part of a broader land conservation effort within the 100-Mile Wilderness. This region between Moosehead Lake and Baxter State Park encompasses about 750,000 acres—an area almost as large as the White Mountain National Forest. Since 2000, the extent of public and private conservation land in the region has more than quadrupled, from about 67,000 acres to about 300,000 acres, with additional conservation projects underway.
- The AMC has carried out extensive renovations to its historic Maine sporting camps, continuing this tradition of Maine history. This includes Little Lyford Lodge and Cabins, the acquisition and renovation of what is now known as Gorman Chairback Lodge and Cabins, and the rebuilding of Medawisla Wilderness Lodge.
- The AMC's trail system now encompasses about 125 miles of trails for hiking, cross-country skiing, snowshoeing, and mountain biking. A \$1 million grant from the Sewall Foundation will be used to expand this system even further and connect it to a broader regional trail system.
- The AMC is a well-recognized part of the local community, with an office in downtown Greenville, membership in the Moosehead Region Chamber of Commerce and other civic organizations, and involvement in several local and regional nature-based tourism initiatives.
- Through its Moosehead Area Schools Project, the AMC is offering outdoor learning experiences to every elementary school, middle school, and high school student in Piscataquis County.
- In 2015, the AMC's Maine lodges, trail crew, and land management staff will employ 15 full-time workers and about 20 seasonals, providing employment opportunities for local residents.

- Since 2004, the AMC's annual timber harvests have supplied more than 50,000 cords of wood to local mills and provided work for local logging contractors.
- In 2014, the AMC completed a verified forest carbon offset project with the California-based Climate Action Reserve on the 10,000-acre KIW ecological reserve—just the second such project in New England and only the third in the Northeast. Funds from sale of these “carbon credits” (which represent the carbon sequestered in the reserve's forest) are being reinvested in the programs and facilities on the Maine lands and helped support the AMC's purchase of the Baker Mountain tracts.
- In partnership with the U.S. Department of Agriculture Natural Resources Conservation Service, the AMC has restored 15 miles of native brook trout spawning habitat on its property.
- The AMC has made its lands available for research projects by scientists at the University of Maine and the U.S. Geological Survey, as well as by graduate students from the University of Vermont, Antioch University New England, and the State University of New York.
- The AMC contracted with retired Bowdoin College Professor of Economics and noted nature-tourism expert David Vail to conduct an economic impact analysis of the MWI. The study shows that the MWI has added roughly \$6.6 million of economic activity to Piscataquis County and \$8.6 million to Maine as a whole.
- In 2015, the AMC was awarded the Maine Governor's Conference on Tourism Leadership & Growth Award. The award recognizes a company, organization, or person that strives to grow its own business and works with others within the industry to grow tourism in Maine.
- In October 2015 the AMC received Forest Stewardship Council certification for its forest management program—meeting the FSC's detailed sustainability standards as verified by a rigorous third-party audit—when it was admitted to The Nature Conservancy's nationwide group certification.

The foundation of all of these accomplishments is the land. The land endures and its changes provide the most obvious evidence of the AMC's presence in the Maine Woods. It is by the condition of the land that the success or failure of our efforts should be judged. How has the land changed over the last decade, and how might it continue to change in the future?

Leaving Nature Alone

In the absence of such major events as a fire, hurricane, or timber harvest, changes in a forest are slow and subtle. However, if such changes are to be seen, the first place to look is in the ecological reserves. I have had the opportunity to see the changes during the past decade in the areas that we decided to leave alone.

Most of the ecological reserve lies in a single contiguous block of about 19,000 acres spanning the northern part of the KIW property and the southern part of the Roach Ponds tract. This area abuts more than 3,000 acres of the Appalachian Trail corridor. This dramatic landscape is framed by the 3,500-foot summits of Baker and Whitecap mountains—the two highest peaks between Bigelow Mountain and Katahdin. Their steep slopes stand like guardians on either side of the broad valley of the West Branch of the Pleasant River—one of the wildest river corridors in the state. The river flows through the reserve for about thirteen miles from its source in the West Branch Ponds, past Little Lyford Lodge and Cabins, and through the canyon of Gulf Hags. A separate reserve area of nearly 5,000 acres surrounds the upper Roach Ponds. This less dramatic (but no less beautiful) area is a relatively flat landscape of ponds, wetlands, and spruce forest.

Unlike wilderness areas in the western United States, which protect truly wild areas that have never heard the sound of chain saws or bulldozers, the AMC's reserves may be described as "restoration reserves." With the exception of the stunted subalpine forest at the highest elevations, the entire area has been harvested, most of it multiple times. Although the steep slopes of Baker and Whitecap mountains may have escaped harvesting for many decades (since hand crews with chain saws gave way to mechanical harvesters that can't negotiate the steep slopes), most of the area has been heavily harvested since the 1970s when the modern logging road network was constructed. One-quarter of the reserve area was clear-cut during that time.

However, the signs of the early stages of recovery can be seen wherever you look. The last round of harvesting by the previous landowner in the KIW reserve took place in 2000 and 2001, and nature can accomplish a lot in fifteen years. Stumps are becoming covered with moss, with bark sloughing off and sapwood rotting. Skid trails and landings are disappearing under a dense growth of shrubs and saplings. Piles of slash (limbs and tops of harvested trees) are decaying into the forest floor. Even roads that were easily traveled by passenger car when the AMC bought the land (but which have since been abandoned) are fading, as the bare gravel surfaces give way to grasses, perennial herbs, and alder and birch seedlings. (Harvesting in the Roach Ponds reserves continued until 2007, so the recovery process there is less advanced.) Seedlings that were head-high at the time of AMC purchase now approach 15 feet. A remeasurement of permanent plots established in 2005 shows that trees measuring between 5 and 10 inches in diameter are growing at a rate of as much as 1 inch in diameter per decade.

The most dramatic and obvious sign of nature taking charge is the work of beavers. As long as the land was commercial forest, beavers were controlled to prevent damage to logging roads. Dams along roads were removed, and ponds were drained. However, now that they have been freed from human control, the beavers have returned with a vengeance (in a good way). Several hundred feet of the former (and now abandoned) main access road into the KIW reserve now lie under water, and new or expanded beaver ponds and wetlands are evident throughout the KIW reserve. In one beaver-maintained pond, known informally as “the black hole,” a small colony of nesting great blue herons has taken up residence. (This site is easily accessible to guests, being only about a 10-minute walk inside the entrance gate to the reserve north of Little Lyford Lodge and Cabins.)

Given enough time, natural processes will erase most of the evidence of past human use. Stumps will crumble to rotten mounds, and roads become barely visible tracks through the forest. Young, fast-growing species such as aspen, white birch, and balsam fir will become less common, replaced by slower-growing long-lived species such as sugar maple, yellow birch, and spruce. The hallmarks of a mature forest (such as large old trees and large snags and downed logs) will become more common, as will the wildlife species that depend on these features (including goshawk, barred owl, pileated woodpecker, wood thrush, some warblers, and American marten). Natural disturbances such as wind, ice, and insects will continue to play a role, and patches of young forest will still be present, though much less common.



Before and after scenes of a culvert the AMC replaced beneath a former road now used for skiing. BEFORE PHOTO BY BEN NAUMANN, AFTER PHOTO BY DAVID PUBLICOVER

One need only look at the White Mountain National Forest to see how forests can recover. Areas that were devastated by the wholesale cutting and massive wildfires of the early twentieth century are now beloved wilderness. (And compared with that level of impact, the commercial harvesting that took place on the AMC land was relatively benign.) It will be at least 150 years before these heavily harvested areas fully take on the characteristics that we describe as “old growth.” However, by the time today’s young visitors are old-timers, these reserves will have become truly wild places.

Lending a Helping Hand

Although our primary approach to restoring the natural structure and functions within the ecological reserves is to leave them alone and let time run its course, some situations call for intervention to speed up the process. The AMC has undertaken several projects to enhance the recovery of natural ecosystems on the property.

In some places where the abandoned roads cross streams, there were blocked or “hanging” culverts that interrupted natural stream channels and prevented the upstream or downstream passage of fish. (A hanging culvert is one where the downstream end is above the stream channel below it. In some cases, culverts were hanging by as much as two feet, creating a small waterfall that fish can’t climb.) This was a particular problem for brook trout. The West Branch of the Pleasant River is one of the state’s highest value wild brook trout fisheries, and these blockages were preventing fish in the main stem of the river from reaching spawning habitat in the headwater streams.

For several years, the AMC has been working with the USDA Natural Resources Conservation Service, Trout Unlimited, and The Nature Conservancy to identify and correct the most problematic stream crossings, with priority given to crossings that block large amounts of upstream habitat. Culverts as big as 6 feet in diameter have been removed, the rock and gravel fill around the culverts removed, and the contours of the natural stream channel and banks restored. The banks are then stabilized with mulch to prevent erosion and allowed to naturally revegetate. Removal of six culverts within the watershed of Mountain Brook Stream reconnected nearly ten miles of headwater stream habitat to the main stem of the river. On three of the crossings, cross-country ski trail bridges were installed.

The AMC has also worked to improve stream crossings outside of the reserves, focusing on crossings of primary access roads over large streams. Beavers can block even the large culverts on these streams, creating the

potential for major washouts and soil erosion. On these crossings, culverts are being replaced with bridges or open-bottom arch culverts (because these roads are used for both recreational and timber harvesting access). The new bridges allow for the restoration of natural stream flow and are less likely to become blocked. Visitors to Gorman Chairback may notice the new bridge over Henderson Brook along Chairback Road; other bridges were installed over the outlet streams to Lucia Pond and Caribou Bog. This work will continue on the Roach Ponds property.

Steve Tatko, the MWI land manager who oversees the stream restoration work, said, "It's been great to see the changes, to see these streams running freely again, and to see small fish moving through the pools in the new channels. After a couple of years, it's hard to picture that there used to be a big old culvert there."

Another type of restoration work will use timber harvesting to restore some areas within the Roach Ponds reserves to a more natural condition. It may seem counterintuitive that cutting trees can promote ecological recovery. However, the easement that established the reserves on the Roach Ponds tract (which is held by The Nature Conservancy) allows for "restoration harvesting" under certain conditions.

Stands suitable for this type of work are plantations or "high yield" stands (those that have received intensive management treatments such as aerial herbicide spraying). These stands are generally young, even-aged, and unnaturally uniform. Harvesting will be used to promote the more rapid development of natural multiaged mixed-species stands. We estimate that there could be as many as 1,000 acres within the Roach Ponds reserves that will be suitable for this type of treatment.

The first restoration harvest was conducted in 2014 in a 50-acre red pine plantation south of First West Branch Pond. In the wake of the spruce budworm epidemic of the 1970s and 1980s, some commercial landowners "hedged their bets" by planting species that were not susceptible to the budworm. Red pine was a popular choice on the Roach Ponds tract, and there are extensive young plantations across the property. Although red pine is native to the region, it is not normally found on the sites where it was planted and the stands have not grown well. They now consist of dense monocultures of short limby trees with little to no understory vegetation. Natural succession would eventually replace the red pine with species native to the site, but this could take a century or more, during which the plantations would have limited value as habitat for native animals. Instead, the AMC harvested about half

the area of the stand in small patches of about a half-acre. In these openings, native species (spruce, fir, maple, and birch) will regenerate, giving the stand a head start toward recovering its natural composition. A second harvest ten to fifteen years from now will remove the remainder of the pine.

Other stands consist of naturally regenerated or planted spruce and fir that have been intensively managed through herbicide spraying (to suppress competing hardwood species) and thinning. Like the pine, they are very uniform, even-aged stands, but unlike the pine, they are growing well, and if not in the reserve, they would have high value for timber growth. These stands will not be removed, but will be thinned once the trees are large enough to be sold. The thinning will open up growing space for the regeneration of younger trees and will allow the remaining trees to reach larger diameters in a shorter period than if they were not thinned. In this way, harvesting will be used to give these stands a nudge toward a more mature condition, after which they will be left alone.

Carbon Offsets Generate Income

Under the terms of the conservation easement, the KIW reserve cannot be harvested for timber. But in 2009, the California-based Climate Action Reserve (CAR) started accepting forest carbon offset projects outside of California. After careful consideration of the costs and benefits, the AMC took the plunge into this emerging “ecosystem services” market.

In concept, carbon offsets are simple. They represent an action taken by one party to reduce atmospheric greenhouse gasses to balance the emissions of another party. In combination, the actions of the two parties are “carbon neutral.” Offsets can either prevent the release of greenhouse gasses (for example, by capturing methane from landfills or agricultural operations) or remove greenhouse gasses from the atmosphere (such as through forest growth).

In practice, developing a carbon offset project is complex. One important criterion is that carbon offsets must be additional to what would happen under “business as usual.” For forest projects, that means that carbon storage must exceed a calculated baseline representing the average level of carbon storage in forests across the region. The AMC’s project involved a detailed process of forest inventory, calculation, and forest growth modeling to quantify the carbon stored in the forest and expected through future growth. The calculations were then subject to a rigorous third-party audit. Only then are the credits registered, at which time they can be sold to parties wishing

to offset their emissions. AMC is also committed to a future schedule of periodic inventory and monitoring to ensure that the carbon remains stored in our forest for 100 years.

Group B—Count Me In

Forest carbon projects are not limited to reserves—they can also be developed for lands under timber management as well (in which case credits are also given for carbon stored in durable wood products). Forest carbon markets have the potential to change the economics of forest management and improve the financial benefits of practicing Aldo Leopold’s “Group B” forestry. If landowners can be compensated for “carbon friendly” management, it could reduce the extent of “baby forest” on commercial ownerships and increase the extent of older higher-volume stands with more big trees and dead wood. In addition to the climate change benefits, this shift in management would also benefit many species of wildlife as well.

A bit less than half of the AMC’s land is actively managed for timber production. AMC Senior Vice President Walter Graff has dubbed this land our “green endowment”—like a stock portfolio, it can provide a regular source of revenue that covers the costs of owning the land (such as property taxes and road maintenance) and supports MWI programs.

The AMC is no different than any other landowner in that we must balance two competing goals—growing and harvesting timber in an economically efficient and productive manner, and protecting the ecological and social values of the forest. How landowners balance those goals will depend on why they own the land. Commercial landowners will put a greater emphasis on financial return, whereas public and nonprofit landowners are likely to have a greater focus on the noneconomic values of forests.

Aldo Leopold noted the tension between these goals in his 1949 essay “The Land Ethic”:

In my own field, forestry, group A is quite content to grow trees like cabbages, with cellulose as the basic forest commodity. It feels no inhibition against violence; its ideology is agronomic. Group B, on the other hand, sees forestry as fundamentally different from agronomy because it employs natural species, and manages a natural environment rather than creating an artificial one. Group B prefers natural reproduction on principle. It worries on biotic as well as economic grounds about the loss of species like chestnut, and the

threatened loss of the white pines. It worries about a whole series of secondary forest functions: wildlife, recreation, watersheds, wilderness areas. To my mind, Group B feels the stirrings of an ecological conscience.

Leopold was ahead of his time. However, in the last few decades, many more foresters have embraced his message and recognized the ecological wisdom in his words (a wisdom that has been confirmed by a better scientific understanding of forest ecology). Forestry has undergone a transition from the agricultural model that dominated much of the twentieth century (which focused mainly on growing trees as a crop) to a more ecologically oriented model that seeks to maintain the forest as biological system. This new model uses natural disturbance patterns, and the composition and structure of natural forests, as a guide to harvesting. As an active participant in regional debates about the meaning of “sustainable forestry” during the past quarter-century, the AMC has actively encouraged the use of this new approach. Now, with our own land to manage, we have the opportunity to put theory into practice.

The natural forests in the MWI region were dominated by relatively mature stands. Large disturbances that created extensive areas of young forest (such as hurricanes and big fires) were extremely rare; most disturbances (such as wind, ice, and insects) occurred in small patches or killed only parts of the canopy. The result was a forest that was structurally complex—even “messy”—with trees of multiple sizes and ages (including very large old trees) and large volumes of dead wood. In contrast, commercial timber management across the region (including previous management on the AMC’s lands) has created a forest that is relatively young, structurally simple, and lacking the large old trees and large dead wood that provide critical habitat for many species.

Forest management on the property is guided by a forest management plan developed by the AMC and Huber Resources Corporation, our forest management consultant company. The plan sets forth a management approach that over the long term seeks to create a forest that more closely resembles complex mature natural forests, even while removing timber on a regular cycle. The approach can be summarized with a few basic principles:

- Harvest less than growth. For about the next half-century, we will on average harvest less than is growing, allowing young stands to mature and increasing the total volume of wood on the ground.

- Practice multiaged management. In every harvest (even those whose purpose is releasing younger trees from competition), we seek to leave some level of overstory. The goal is to eventually have stands with at least three age classes of trees (regeneration, middle-aged, and older) and avoid the creation of extensive areas of “baby forest.”
- Don’t cut big old trees. With limited exceptions, we don’t harvest trees over 18 inches in diameter.
- Allow for the recruitment of old trees and dead wood. Big old trees don’t live forever—if we want to maintain them in the forest we have to allow some trees to keep growing. In every harvest, some part of the oldest age class will be retained, ensuring that some trees will live out their full natural life span (and eventually become large dead trees and logs).

Beyond the constraints imposed by law, one can think of any tree that is left standing beyond the economically rational age of harvest, or any tree that is allowed to die, as the “tax you pay to the Earth.” This “tax” is a voluntary sacrifice of economic return for ecological or aesthetic purposes. Because of our mission, the AMC is willing to pay a much higher tax to the Earth than are purely commercial landowners. We did not invent this approach. To some degree, it is similar to how forests have been managed in the White Mountain National Forest and other public lands for decades, and many nonprofit and noncommercial private landowners are taking a similar approach.

Managing a forest has been a tremendous education for the AMC. We have learned how much our long-term goals are constrained in the short term by the current condition of our forest, and what compromises have to be made to balance our ecological goals with economic reality. We have also gained an appreciation for issues that face all landowners, such as the year-to-year influence of weather and markets.

Huber forester Ted Shina has been our “man on the ground” since we acquired the KIW property, responsible for planning and overseeing our timber harvests. It is his job to translate the goals and approaches set forth in the management plan into on-the-ground results. As Ted said, “Working with AMC has been both very rewarding and occasionally challenging. As a forester and a Mainer, I commend AMC for trying to ‘do it all’ on their lands. Certainly I have to consider many more things than I would in a purely

commercial harvest—not many landowners have to worry about the effects of harvesting noise on guests at sporting camps! I’ve gained a real appreciation for their approach to managing a forest. At the same time, I think I’ve taught them a few things about what is biologically and economically realistic, and they’ve been open to adjusting their approach where necessary. Some stands don’t have much that is worth retaining, and in order to have an economically viable harvest, you pretty much have to harvest the entire overstory. However, where the forest gives us more options, I think we can be very proud of the work we have done together, and I think most visitors would be pretty happy with the way things look. I am proud to be associated with their stewardship.”

The Road Ahead

Given the condition of the forests we have inherited from previous owners, it will be many decades before our lands resemble the mature forests in the national forest or a well-tended private woodlot. However, with ten years of experience behind us, the road to getting to that condition has become clearer. A decade of recovery in the KIW ecological reserve has already created noticeable changes, and the Roach Ponds reserves are starting down the path to recovery. However, even in areas where we have conducted timber harvests, the differences between our land and surrounding commercial forest can be seen—in the greater number of mature trees remaining after harvest; no-harvest buffers left along streams, ponds, and recreational trails; and other ways in which the “tax to the Earth” is being reinvested in ecological health and aesthetic quality.

It’s not possible to observe changes in the forest in a single visit. However, just as you can watch the rapid growth of a young tree planted in your yard over years, visitors who return will be able to see the changes. With each passing decade, the reserves will be a little bit wilder, and the managed lands will come a bit closer to resembling the natural forests that once existed. One need only look to the White Mountain National Forest to understand the changes that are possible with a century of natural recovery and careful management. We are starting much later, but we are traveling the same road.

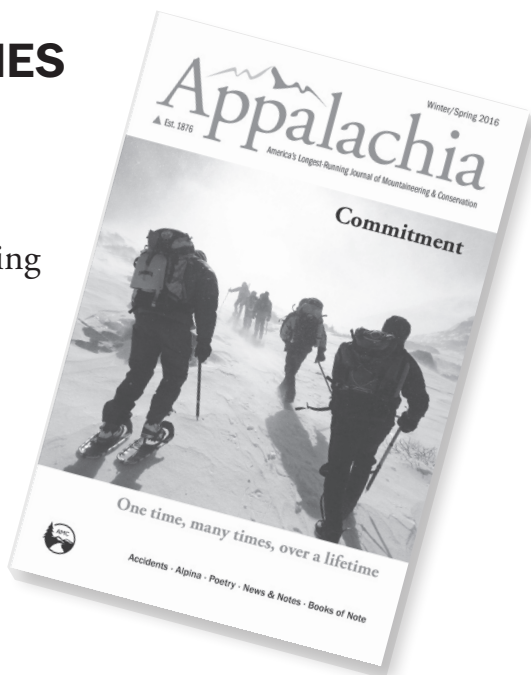
DAVID PUBLICOVER is a senior staff scientist and assistant director of research for the AMC.

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