



American Forest Foundation

Hidden in Plain Sight:

**FAMILY-OWNED WOODLANDS ARE KEY TO
PROTECTING AND IMPROVING WILDLIFE HABITATS
IN THE NORTHEASTERN U.S.**

Message from

TOM MARTIN, PRESIDENT AND CEO OF THE AMERICAN FOREST FOUNDATION



Traveling throughout the Northeast, one is struck by the forests you see everywhere; it's feels like a defining feature. In fact, this region is the most forested region in the country. Quietly producing an array of goods and services, these forests are loved, yet too often overlooked. At first glance, the forests seem healthy and productive; after all, there are trees everywhere. But the forests are not sufficiently diverse to provide

resilient wildlife habitat now and into the future. Fortunately, AFF's research has unveiled a hidden opportunity for individuals and families to take stewardship actions to improve wildlife habitat on their land to the benefit of us all. Importantly the impact of these actions is powerful and its results can be measured.

The overwhelming majority, or almost 51%, of forests in this region are privately owned, most by individuals and families. These woodland stewards play a vital role in the ability of forests throughout this region to produce the benefits we all derive from forests, and in some cases, this careful stewardship stretches back several generations.

Based on extensive research, AFF found that in spite of some long-standing, dedicated stewardship, for historic reasons the region's forests are largely out of balance. As a result, they are not providing the diverse array of habitats necessary for regional wildlife. Why is this? The history of forest use and conversion across this region, dating back two centuries, set in motion a dynamic that has resulted in today's lack of overall diversity. Today's woodlands are largely the same age and composition, over-representing "middle aged" forests. Healthy forests and wildlife populations need forests of all ages. For instance, young forests are good for species like the Appalachian cottontail, the American woodcock, and the bobcat; while older, more mature forests support species like the wood thrush, the northern goshawk, and the pileated woodpecker.

The good news is that the region is benefitting from some excellent, decades-old work to permanently protect forests in the region through easements and other means. That said, our analysis shows that simply keeping forests as forests is not sufficient to produce the diversity of habitat necessary for wildlife. Indeed, active stewardship is needed to help restore ecosystem balance in the region. These activities include harvesting to create young forest stands and selectively thinning mature stands to mimic older forest conditions, increasing growth on remaining trees and enhancing desired old forest amenities such as den trees and trees of different sizes. With a majority of forest in

private hands, family woodland owners are key to success.

We want to build on the excellent examples of family woodland owner stewardship throughout the region, a few of which are highlighted in this report. Fortunately, landowners in the region share the desire to do good things on their land for wildlife. AFF conducted a survey of woodland owners in the region and found that 85% of owners state that protecting and improving wildlife habitat is an important reason they own their land. What's more, 9 of every 10 landowners expressed a desire to do more for wildlife on their land, suggesting favorable conditions to stimulate landowner action.

We need to get landowners the tools they need to act on their passion. The opportunity is great, as 86% of woodland owners have not recently received professional assistance. As a result, these landowners are often unaware of ways in which they can increase habitat quality on their lands. By connecting these folks with trained professionals, we can channel their passion with new knowledge and see meaningful impact at a true landscape scale.

In order to target our work in those places where we can make the greatest difference, AFF conducted a first-of-its-kind spatial analysis identifying 30 watersheds across three forest habitat types with high-quality, family-owned woodlands, where stewardship activities can make a particularly important contribution to forests, birds and wildlife in the near future. AFF intends to focus our on-the-ground efforts in these areas, working with willing partners to reach more landowners and assist them in stewardship activities that achieve the landowner's objectives and benefit wildlife.

In this report we outline a set of recommendations designed to overcome barriers and improve the ability of family owners to implement these activities on the ground. They include policy changes that will make stewardship affordable, as well as more targeted work through partnerships to develop and implement landscape-scale projects in the three priority forest habitats identified in the report. Finally, we want to align markets with these conservation activities to help finance restoration.

The forests of the northeastern United States are an incredible asset to the people of the region and nation. Our work summarized in this report shows that we have a real opportunity to enhance the value of these forests and the wildlife that depend upon them; in order to do so, we need to engage the individuals and families who represent the largest forest ownership group. Through this work, we can help ensure these forests provide healthy, resilient wildlife habitat across the landscape both now and long into the future. Fortunately, we can now see the conservation solution that has been hiding in plain sight.

Executive Summary



Nearly two-thirds of the 13-state northeast region that stretches from Maine to West Virginia¹ is blanketed by woods, making it the most heavily forested area of the country. These woods are home to hundreds of species of birds, fish, amphibians and mammals, many of which are dependent on healthy, diverse woodlands for their habitats.



There are black bear and bobcats, red squirrels and white-tailed deer, and ruffed grouse and grosbeaks. In spite of the abundance of forestland and some excellent stewardship by many landowners throughout the region, all is not well. Hidden behind the veneer of this bucolic landscape, lie two important but often overlooked details: due to the history of land use, these forests lack overall diversity, limiting their ability to sustain healthy and diverse wildlife populations; and more than

half of these forests are owned by families and individuals, meaning that the future of sustainable wildlife populations lies in their hands.

During the 19th century, heavy clearing of forests took place for farming, shipbuilding, fuels, charcoal and development of communities, setting up a dynamic of abandonment and regrowth. Over the last century, forests have reclaimed millions of agricultural and industrial acres in the Northeast. The reestablishment of this vast forested region provides an important foundation for the array of benefits derived from sustainably managed forests.

Nonetheless, given the long-term nature of forests, we find that the majority of the forests in the region today are roughly the same

age and composition – despite the best efforts of many exemplary stewards. Because of this, northeastern forests lack the diversity in both tree species and age needed to provide healthy and sustainable wildlife populations throughout the region. While this balance can be restored through wide-spread, targeted stewardship activities, landowners throughout the region are lacking the markets, tools and resources to implement these activities on the ground.

Not only does the lack of diverse tree species, structure and age classification affect available habitats for native wildlife, but it also affects the forests' ability to



Family-owned woodlands make up more than half of the Northeast's 101 million acres of forest, which means family woodland owners have to play a key role in protecting and improving wildlife habitats and forest health across the region.

¹ The 13-state region includes: Maine, New Hampshire, Vermont, Massachusetts, New York, Rhode Island, Connecticut, New Jersey, Delaware, Pennsylvania, Maryland, Virginia and West Virginia.





incredible, hidden opportunities that are often overlooked.

The spatial analysis focused on more than 27 million acres of forest in three important habitat types across the Northeast, and revealed that more than 11 million of those acres are owned by families and individuals.

What does this analysis really show? With 40% of these acres in family ownership, the solution is hiding in plain sight. To target initial focal areas, the analysis also pointed to hidden opportunities in 30 key watersheds, where significant amounts of intact and high-quality family-owned woods

respond to looming threats, like insects and disease, and an uncertain climate future.

Moreover, this decline in forest health is occurring at the same time low-grade forest-product markets in the Northeast are shifting and shrinking. That makes it difficult for small landowners who need to harvest trees to improve habitat conditions and subsequently reinvest any income gained back into the land for further improvements.

These habitat issues create critical challenges for wildlife. The U.S. Fish and Wildlife Service reports that there are now 37 wildlife species at risk of extinction in the region, 13 of which are dependent on healthy forest habitat to survive (Elowe, 2016). An additional 23 have been identified as birds and mammals of concern (Anderson, et al., 2013).

What's more, healthy northeastern forests are also important to the regional economy. The timber industry and wildlife-

AFF's state-of-the-art spatial analysis shows that northeast forests are out of balance. But it also identifies both the watersheds where strategically engaging family woodland owners will produce the most benefits *and* the specific types of stewardship activities that are needed.

related outdoor recreation both contribute billions annually to the regional economy (USFWS 2014; AFPA, 2015).

Given the importance of wildlife in the region, and given the role that family woodland owners can play in protecting and enhancing wildlife habitats, the American Forest Foundation set out to find solutions. AFF commissioned a state-of-the-art spatial analysis, as well as a survey of northeast family woodland owners.

What we found are some

remain. To complement the existing efforts of many family woodland stewards, if even more landowners are given the essential tools to manage significant amounts of this land, important progress to protect wildlife can be made.

Family woodland owners throughout the region can implement practices that benefit wildlife, and they should be encouraged to do so. However, with limited resources available to reach and assist landowners, AFF and our partners can use the results

Key Findings

Northeastern forests have tremendous potential, but are imbalanced and unable to fully support wildlife.

- The 13-state northeastern U.S. is the most heavily forested region of the country, with two-thirds of the land — more than **100 million** acres — covered in forests.
- More than half the forests of the region are owned by families and individuals.
- But the forests are currently out of balance; they are not providing the diverse array of habitats that wildlife in the region need.
- According to the U.S. FWS, there are **37** species at risk, **13** of which depend on forests, and an additional **23** species of great concern.

AFF's spatial analysis finds the solution is hiding in plain sight.

- More than **11 million** acres of important habitat types are owned by families and individuals, meaning family woodland owners are a key part of the conservation solution.
- AFF's analysis identified **30** watersheds with high-quality family woodlands, where stewardship activities can make a particularly important contribution in the near future.
- Both the target and surrounding watersheds have an unhealthy shortage of early- and late-successional forests, differing from historic conditions by **17** and **32%**, respectively. Stewardship can restore these conditions.

Family woodland owners are willing to help, but we need to increase access to the right stewardship tools.

- Protecting and improving wildlife habitat are important reasons to own their land (**85%**).
- A large majority of family owners are concerned about the loss of wildlife habitats (**77%**) and want to take steps to protect them.
- Fewer than half, however, are managing to protect wildlife habitats on an ongoing basis, and **9 of 10** landowners acknowledge that they could do more on their land.
- Family woodland owners who consult with a natural resource professional do more than twice as much to protect and improve wildlife habitats through active stewardship.

² For purposes of this report, at-risk species are wildlife that are already listed as threatened or endangered, or are candidates for listing. Species of concern are birds and mammals that are locally in decline or are indicators of the health of the surrounding forest ecosystem.



of this analysis to target increased effort in areas that have the greatest potential impact for protecting wildlife habitats and improving forest health. The 30 targeted watersheds that emerged from the analysis are great places to start.

To take it one step further, the analysis also illustrates that the only way to rebalance our forests is through active stewardship. Building on successful efforts to promote permanent land protection through conservation easements, the critical next step is to work with landowners to implement key practices on their land. Both the target and

surrounding watersheds have an unhealthy shortage of early- and late-successional forests, differing from historic conditions by 17 and 32%, respectively. These



forest types are critically important for many wildlife species that are already at risk or in decline.

It is not enough, however, to simply know where the problems are and what kinds of activities are needed to fix them. AFF and others also need to know more about family woodland owners' attitudes as well as wildlife-related activities that are completed, planned or under consideration to augment the impact at a landscape scale.

To find out, AFF conducted a survey of more than 20,000 northeast family woodland owners in early 2016, with more than 1,400 respondents. It found that a large majority say protecting and improving wildlife habitats are important reasons they own their land (85%), and that they are concerned about the loss of wildlife habitats (77%). Yet fewer than half of Northeast family owners are managing for wildlife habitats on an ongoing basis, and nine out of 10 acknowledge that they could do more on their land.

Why aren't they doing more? The most common reasons given are concerns about government red tape –



whether real or perceived, costs to implement activities and uncertainty about what to do. Those barriers are not insurmountable, though. In fact, the survey shows that providing family landowners with information and connecting them with natural resource professionals are the keys to breaking down barriers and helping them protect and improve wildlife habitats on their land through active stewardship. Indeed, landowners who work with professionals implement more than twice as many habitat improvements than those who have not yet interacted with professionals.

Based on the spatial analysis and landowner survey, AFF recommends three strategies to help overcome family woodland owners' barriers and improve wildlife habitats throughout northeast woodlands in a way that is both consistent with and complementary to existing state Forest Action Plan and Wildlife Action Plan efforts:

1. Promote forest policies, state and federal technical assistance, and markets that help Northeast family woodland owners keep their woods as woods, while simultaneously improving their health and sustainability.
2. Increase woodland owner access to professionals, improve training and education for natural resource professionals and expand inter-agency collaboration.
3. Work with northeast regional and local partners to develop landscape-scale projects for reaching out to and engaging family woodland owners in the three priority forest habitats.

Northeastern Family Woodlands –

OPPORTUNITIES HIDDEN IN PLAIN SIGHT

No area of the United States is more heavily forested than the 13-state Northeast region that stretches from Maine to West Virginia. Nearly two-thirds of the region – more than 100 million acres in all – is blanketed by woods.

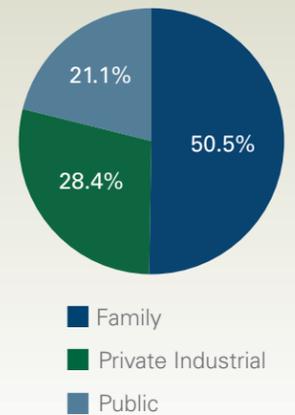
Not surprisingly, a wide variety of forest types can be found in an area that extends from the Canadian border to the central Appalachians. There are spruce, hemlock and fir boreal forests across the White Mountains and

Adirondack peaks. Oak-dominated woodlands populate the piedmont and lower elevations along the Northeast and Mid-Atlantic seaboard. And oak-pine forests and pine plantations can be found in the Appalachians from Virginia and West Virginia up into Pennsylvania and New Jersey.

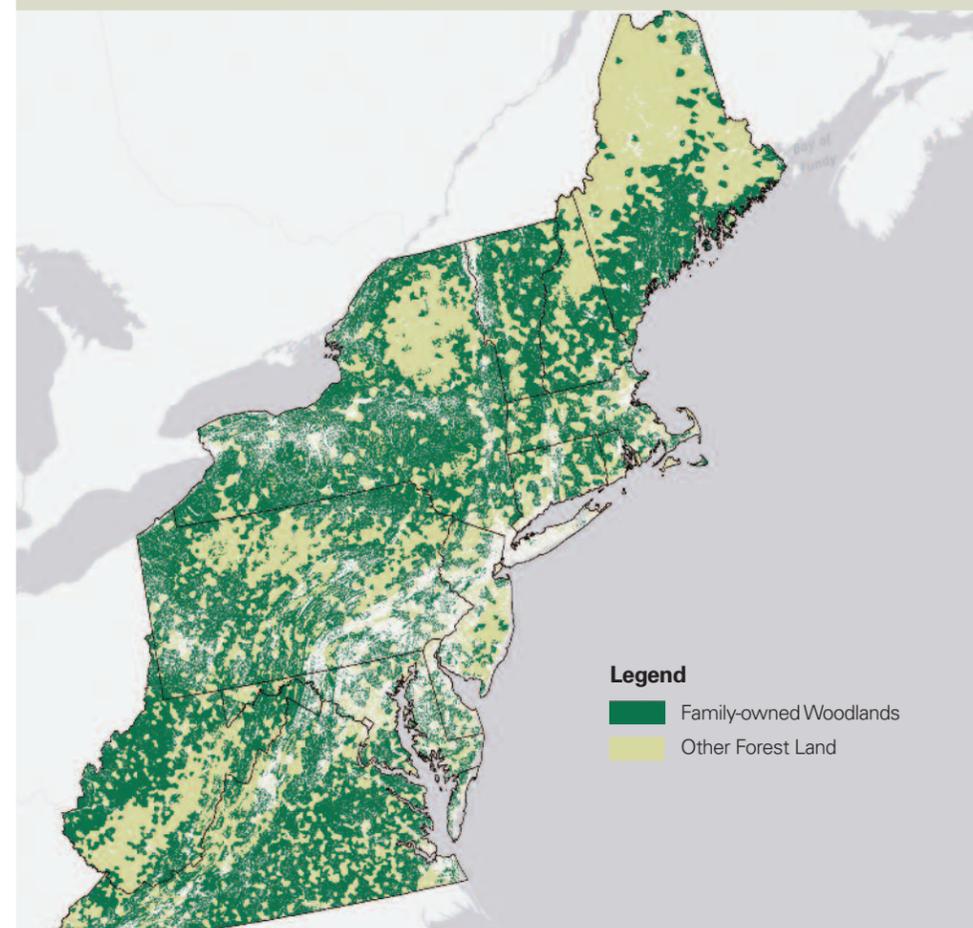
Yet these are not all big, company-owned forests. Nor are they mostly state and national forests. In fact, more than half of the Northeast's woods – 51.0 million acres – is owned by families

WOODLAND BY OWNERSHIP

(FIGURE 1)



FOREST OWNERSHIP IN THE 13 NORTHEASTERN STATES



Legend
■ Family-owned Woodlands
■ Other Forest Land

and individuals, typically in plots averaging about 50 acres (Butler, et al., 2016).

On industrial, public and family lands alike, these woods are home to hundreds of species of birds, fish, amphibians and mammals. There are black bear and bobcats, red squirrels and white-tailed deer, ruffed grouse and grosbeaks, and brook trout and yellow perch. Many of these are dependent on healthy, diverse woodlands for their habitats.

HOW WELL IS THE NORTHEAST CURRENTLY SUPPORTING WILDLIFE?

A good financial adviser will tell you that diversifying your investments guards against risks associated with changing market conditions. A good doctor will tell you that a balanced diet along with exercise is the best way to prevent sickness and



have contributed to unhealthy forest conditions that are more susceptible to drought, insects and a changing climate – and less capable of providing the habitats needed by native fish and wildlife.

For example, according to the U.S. Fish and Wildlife Service, there are now 37 wildlife species that are at risk of extinction in the region, 13 of which are dependent on healthy forest habitats to survive (Elowe, 2016). An additional 23 have been identified as birds and mammals of concern in three priority forest habitat types (Anderson, et al., 2013).

Moreover, the decline in forest health is occurring at the same time low-grade forest-product markets in the Northeast are shifting and shrinking, which makes it difficult for small landowners to depend on timber as a source of income. For example, in New England, the recent loss of hemlock and white pine pulpwood mills as a result of media markets shifting away from paper products has left a huge hole

in landowners' ability to afford stewardship practices (Figure 2). Without those revenues, family landowners may not have the resources needed to invest in activities that will improve forest health and wildlife habitats. Worse still, the lack of markets and revenues could create incentives for some family landowners to subdivide and sell their woodlands, which would magnify the challenges associated with providing diverse and healthy wildlife habitats in northeast woods.

NORTHEASTERN FORESTS GENERATE GREAT VALUE.

Not only does enhancing wildlife habitats support the inherent value of declining species, but it also supports a strong, rural-based regional economy. It's not surprising that wildlife-related outdoor recreation contributes more than \$27 billion annually to the local and regional economy, with a little more than half of that coming from hunting- and fishing-related expenditures (USFWS, 2014) (Table 1). Wildlife watching alone

TABLE 1

Economic Impact of Wildlife-Related Recreation by State in 2011 (\$ thousands)			
State	Total Expenditures	Hunting and Fishing	Wildlife Watching
Connecticut	\$1,701,961	\$767,258	\$934,703
Delaware	\$325,374	\$155,586	\$169,788
Maine	\$1,417,258	\$618,404	\$798,854
Maryland	\$1,303,595	\$820,174	\$483,421
Massachusetts	\$1,961,405	\$683,507	\$1,277,898
New Hampshire	\$553,507	\$272,317	\$281,190
New Jersey	\$2,294,691	\$1,308,413	\$986,278
New York	\$9,166,012	\$5,014,223	\$4,151,789
Pennsylvania	\$2,793,977	\$1,523,089	\$1,270,888
Rhode Island	\$360,420	\$159,940	\$200,480
Vermont	\$744,040	\$455,533	\$288,507
Virginia	\$3,542,179	\$2,583,572	\$958,607
West Virginia	\$1,200,485	\$874,707	\$325,778
NE Total	\$27,364,904	\$15,236,723	\$12,128,181

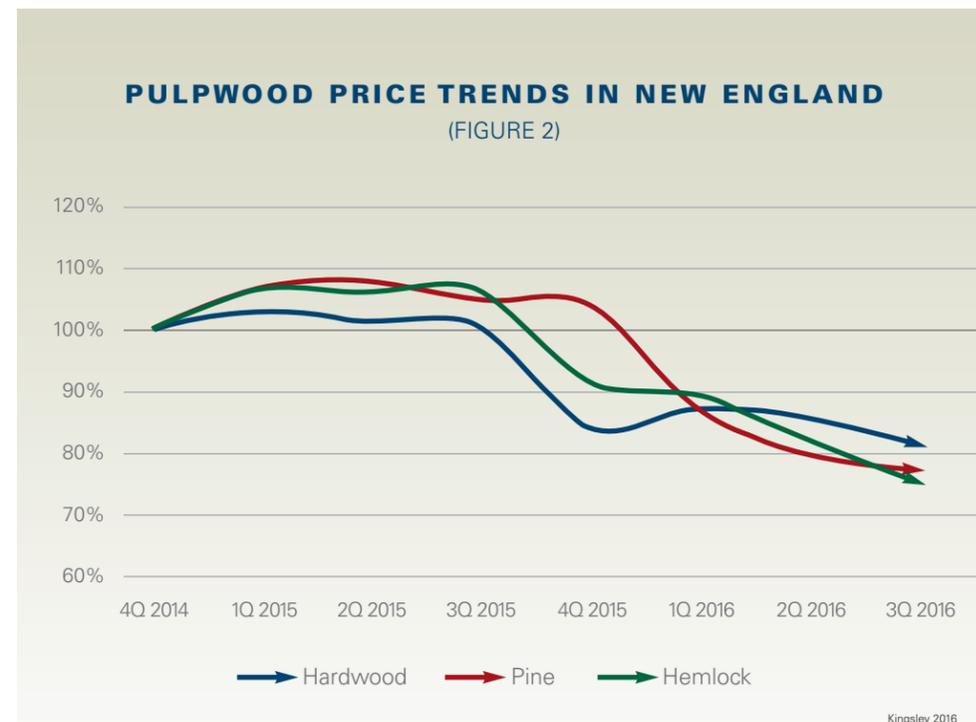
Wildlife-related recreation in northeast woodlands is a major economic driver, contributing more than \$27 billion annually to the regional economy.

disease – and that eating fast food at every meal, every day, is neither healthy nor sustainable.

Unfortunately, forests in the Northeast are no longer diverse or balanced. Several centuries of clearing trees for farming, shipbuilding and development of communities has robbed many Northeast forests of the diversity in both tree species and age classification that is needed to be healthy and sustainable for wildlife and, ultimately, us.

By the mid-1800s, only about 30% of the Northeast was forested. But as farms were abandoned in the latter 1800s and early 1900s, the forests came back and reached a peak in the 1950s. Since that time, however, urban and suburban expansion has been a leading cause of declining forest cover (Drummond, 2010). Despite efforts

from the existing network of exemplary land stewards, these trends, combined with a lack of widespread active stewardship,



Unhealthy forest conditions have put 37 wildlife species at risk of extinction in the Northeast. But there are solutions, and family forest landowners must play a lead role.





contributes more than \$12 billion annually, creates nearly 245,000 jobs and generates almost \$1.9 billion in state and local tax revenues (USFWS Addendum, 2014).

And while traditional forest-product markets are currently in a state of decline, they still contribute substantially to the regional economy – and certainly could do more. As of 2015, a conservative estimate concludes the timber industry employed more than 182,000 workers with a payroll in excess of \$10 billion and a total value of industry shipments greater than \$46 billion (AFPA, 2015). In addition, an estimated 64% of all timber removals in the region come from family woodlands (USDA, 2016). Non-timber products like maple syrup, which produced nearly \$50 million in Vermont alone in 2013, are also important to the Northeast's economy (Shifley, et al., 2016).

Not only are the northeast forests a major economic driver in the region, but the health of those forests also plays an important role in protecting drinking water quality

for an estimated 30 million people who live there (Barnes, et al., 2009).

REVEALING UNRECOGNIZED CONSERVATION SOLUTIONS.

There are solutions, indeed hidden opportunities, that will help address at least some of the issues affecting forest health and wildlife habitats in the Northeast, and new state-of-the-art research and survey data show that family woodlands can – and

must – play a lead role. With that in mind, AFF identified three priority forest types across the 13-state region that provide habitats for the greatest number of birds and mammals, including, in particular, those that are of special concern, based on data aggregated from natural heritage programs and state Wildlife Action Plans. By focusing on species of concern, the analysis is ensuring that a broad suite of species is included that are indicative of healthy ecosystems more generally. Those habitat types are:

- Acadian Low Elevation Spruce-Fir-Hardwood Forest
- Appalachian (Hemlock) Northern Hardwood Forest
- Central Appalachian Pine-Oak Rocky Woodland

A spatial analysis was then performed, the first of its kind in the region, to identify watersheds in each forest type where engaging family woodland owners in active stewardship to improve wildlife habitats would have the greatest benefits.

Three Forest Habitat Types and Associated Species of Concern	
Acadian Low Elevation Spruce-Fir	American three-toed woodpecker, bay-breasted warbler, black-backed woodpecker, boreal chickadee, cape may warbler, gray jay, olive-sided flycatcher, red crossbill
Appalachian (Hemlock)-Northern Hardwood Forest	brown creeper, Canada warbler, northern goshawk, Allegheny woodrat, Indiana bat, southern rock vole, southern water shrew, Virginia northern flying squirrel
Central Appalachian Pine-Oak Rocky Woodland	cerulean warbler, peregrine falcon, eastern whip-poor-will, Allegheny woodrat, Appalachian cottontail, eastern small-footed bat, Kittatiny red-backed vole, long-tailed shrew, northern bat, southern flying squirrel

It's a Family Affair

When Art and Barbara Eve purchased their 360 acres in 1973, it was a cut-over property in Massachusetts that was going to provide space for their family's recreation. But as they began to learn more about their land and woods, they recognized its potential for helping wildlife in the area.

So, they reached out to a forester and developed a management plan that would create good habitats for birds and other wildlife, while also growing quality timber that would allow them to cover their wildlife management costs.

First, they created a six-acre forest opening and pruned some overgrown wild apple trees to provide habitats for bluebirds and other grassland birds. They also removed vines, cleared trails, set up birdhouses and improved drainage areas.

A few years later, they conducted select harvests to create better conditions for regenerating red oak, while also thinning some woods to promote black cherry, another important species for wildlife.

Soon the family partnered with Foresters for the Birds, a program to improve habitats for declining songbird species that is a joint effort of the state Department of Conservation and Recreation's (DCR) Forest Stewardship Program and the Massachusetts Audubon Society. They were so successful in diversifying their woods and providing more of the trees that songbirds need, that their land was selected as a demonstration site to help educate other landowners on best practices for bird habitats.

Their woods were also certified in 2003 by the Forest Stewardship Council, the Mass Forest Alliance and the American Tree Farm System, as a way to showcase their sustainability efforts and add value to their timber. In fact, one harvest of pulpwood (low-quality pine and some hardwoods) was able to be shipped up to a Maine pulp mill because of their certification. Unfortunately, Northeast timber markets have been declining for several years.



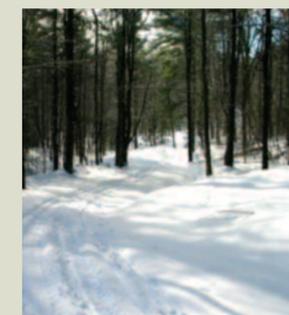
FOREST CERTIFICATION

Forest certification programs require woodland owners to abide by a set of management standards that ensure their woods are being managed to provide values like clean water and wildlife habitat, among others. Certification programs, like the American Tree Farm System, a third-party audited certification system for family woodland owners, also tell consumers and companies that your forest is sustainable, well-managed, and helping the environment.



During the summer of 2016, the family was working on creating mid-height brushy habitat to offer cover for nesting songbirds and safety from predators. The project would include two patch cuts of between two and five acres and some selective cutting of low-quality timber, which would encourage regeneration on an additional ten acres. But when it came time to harvest, they could not find a logger or a mill that was interested in buying the wood. Without a buyer, the family did not have the funds to pay for the project and had to put it on hold.

The Eve-Cowles clan, recently awarded 2016 Regional Outstanding Tree Farmers of the Year, now includes children, in-laws and grandchildren. They, remain passionate about their land and will continue to be good stewards by improving wildlife habitats where they can, promoting the importance of markets and helping other landowners with forest conservation.



Finding the Hidden Opportunities

The American Forest Foundation’s state-of-the-art spatial analysis identifies 30 watersheds in the 13-state Northeast region where increasing the number of family landowners who are practicing active stewardship in their woods can play a significant role in protecting birds and wildlife.

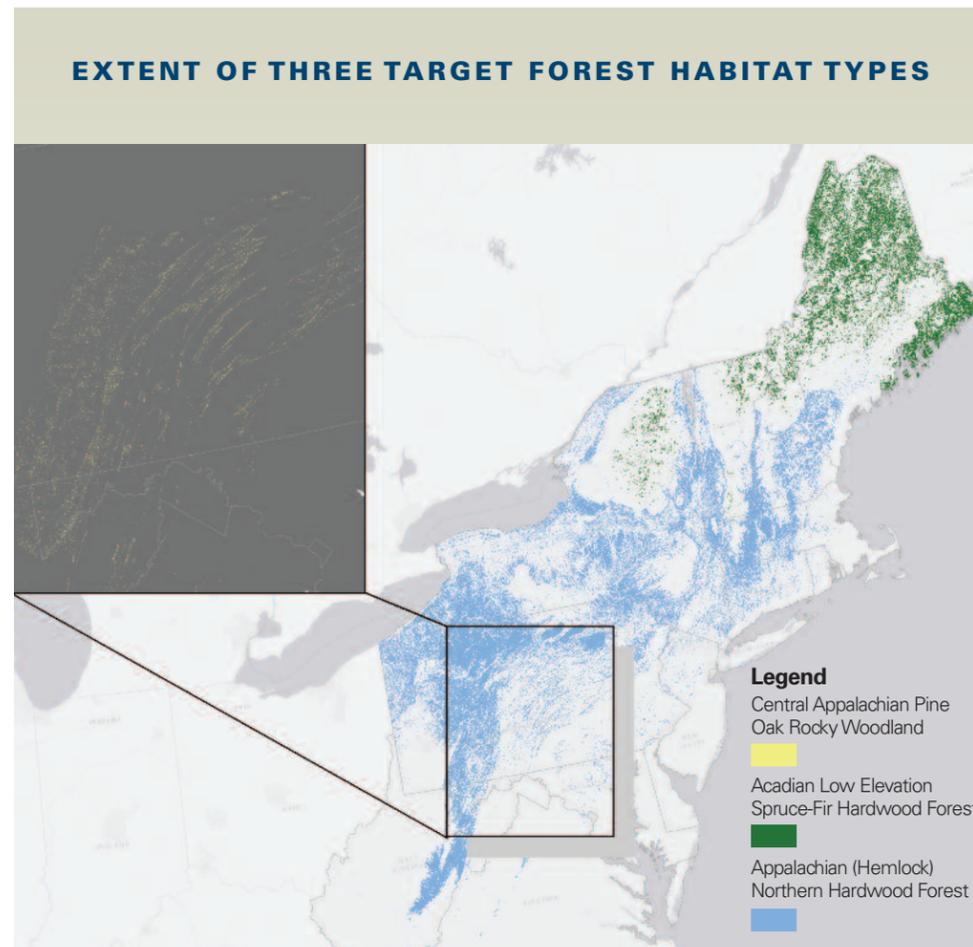
AFF worked with science-based nonprofit Manomet on the first phase of the analysis, which was conducted on a watershed basis across the region. It examined the three targeted forest habitat types – Acadian Low-Elevation Spruce-Fir-Hardwood Forest, Appalachian (Hemlock) Northern Hardwood Forest and Central Appalachian Pine-Oak Rocky Woodland – to identify family woodlands that have important innate qualities: both high ecological integrity and resilience. This unique approach targets the hidden opportunities – high-quality landscapes where engaging family woodland owners in active stewardship will produce the greatest benefits.

For this analysis, **ecological integrity** is defined according to the Northeast Index of Ecological Integrity developed by researchers at UMass, where ecological integrity is the ability of an area (e.g., local site or landscape) to sustain important ecological functions over the long term. This is measured by examining a combination of many different natural and human-related variables including, for example, temperature, soil type and quality, development patterns and road networks.

Areas of resilience were identified using data from The

Nature Conservancy’s Resilient Sites for Terrestrial Conservation project. Lands that are **resilient** are those that have the capacity to recover from disturbance and stress, measured as a combination of landscape connectedness and complexity. Areas that have a variety of geophysical sites

(moisture, topographical and elevational gradients) have greater complexity and, therefore, can better respond to changing conditions and provide diverse opportunities for wildlife over the long term. Areas that are highly connected provide corridors that enable wildlife to move and



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disperse as their needs change, as well as allow water to move unimpeded across the landscape. The combination of complexity and connectedness increases resilience.

The spatial analysis focused on more than 27 million acres of forest in three habitat types across the Northeast and discovered that 11.5 million acres, or 40%, are family-owned woodlands. The key to our conservation solution was hiding in plain sight: the stewardship of family woodland owners.

Most of that family acreage – 10.1 million acres – is in the Northern Hardwood (Hemlock) habitat. The Acadian Low Elevation

TABLE 2

Habitat Type	Total Habitat Area	Habitat in Family Forest	Family Forest Habitat in Top 25% Ecological Integrity WITH Above-Average Resilience
Acadian Low Elevation Spruce-Fir-Hardwood	5,522,962	1,153,106	94,647
Central Appalachian Pine-Oak Rocky Woodland	566,284	211,650	19,251
Northern Hardwood (Hemlock)	20,994,503	10,193,864	1,458,734
TOTALS	27,083,749	11,558,620	1,572,632

“ We must conserve the forests, not by disuse, but by use, making them more valuable at the same time that we use them. ”

Theodore Roosevelt
August 6, 1912

Spruce-Fir-Hardwood (1.15 million acres) and Central Appalachian Pine-Oak Rocky Woodland (212,000 acres) are considerably smaller. Of the total acreage in all three habitats, nearly 1.6 million acres, owned by an estimated 30,000 families or individuals, are in the top 25% for ecological integrity and above-average resilience (Table 2).

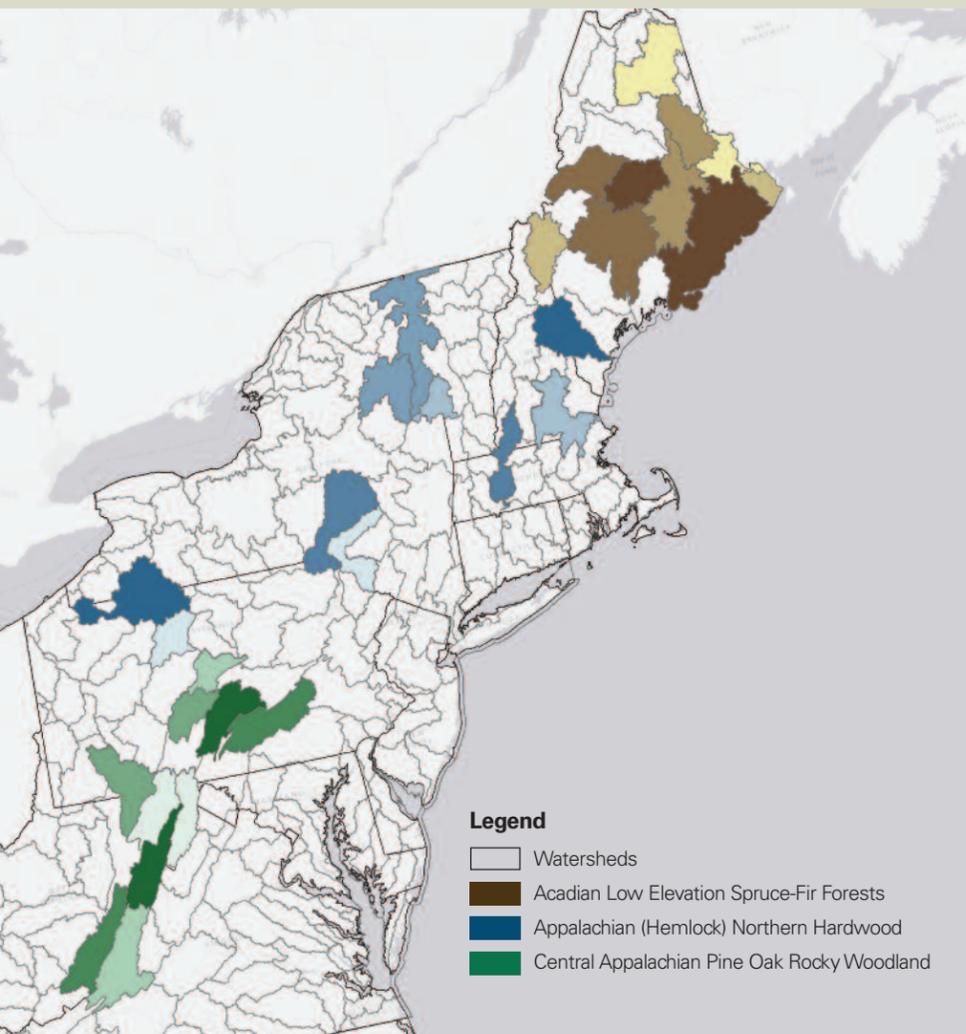
The spatial analysis also identified 30 target watersheds, 10 in each habitat type, that have the most family-owned acreage with high ecological integrity and above-average resilience where

stewardship investments will have the greatest impact. However, even though forests in the target watersheds generally have higher innate landscape qualities than in the surrounding watersheds, that doesn’t necessarily mean they are healthy and meeting the needs of native wildlife. As described in more detail below, a subsequent analysis by Appalachian Conservation, LLC shows that not only is there a significant shortage of early and late-successional forest, both across the Northeast and in the target watersheds, but there is also much less than existed in the past.³



³While late-successional forest qualities can be created by managing for complex forest stand structure, for purposes of this Report, forest age is our best proxy –given data availability– of this habitat component.

AFF'S 10 TARGET WATERSHEDS IN EACH OF THE 3 FOREST HABITAT TYPES



Legend
 Watersheds
 Acadian Low Elevation Spruce-Fir Forests
 Appalachian (Hemlock) Northern Hardwood
 Central Appalachian Pine Oak Rocky Woodland

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Those are indicators of forests that are out of balance and where active stewardship can make a difference.

Additionally, all three forest habitat types are at risk of looming threats from invasive pests and pathogens and an uncertain climate future – indicating active stewardship can help regional forests adapt to these disturbances, too.

As a complement to important landowner engagement work occurring throughout the region, AFF will focus first on engaging family landowners in the 30 target watersheds, followed by expansion into surrounding watersheds. By doing so, AFF and other public and private conservation partners can ensure that their resources are invested strategically in areas that have the greatest potential for protecting wildlife and improving forest health across the Northeast.

There are many tools for accomplishing those goals. For example, conservation easements help ensure that wooded land stays wooded, which is both important for wildlife and something that northeast family woodland owners already care a lot about (See Figure 6). As the data that follows demonstrates, however, more active woodland management by family owners is also needed to ensure that forest-dependent wildlife have the diverse array of habitats they need.

The 30 targeted watersheds are the Northeast’s “hidden opportunities” where family woodland owners can make the biggest difference by taking steps to protect and improve wildlife habitats in their woods.

Managing for (Wildlife) Success

Kurt Woltersdorf’s interest in owning and improving woodlands began at a young age. When Kurt was just 14 years old, he purchased his first property with money he had earned selling newspapers. While only three quarters of an acre, it excited him to have a slice of land he could call his own.

In the mid-1990s, Kurt took the next step when he and his wife purchased 235 acres in southern Maine. He knew that the land wasn’t in very good shape and that it wouldn’t support the birds and wildlife they both loved. He also knew that since the area was already under intense pressure for development, he could play an important role in protecting the land and restoring it to its historic natural state for wildlife.

Kurt had heard that New England cottontail rabbit populations were plummeting and that, with a little work, his land could provide ideal habitat. He researched long-term protection options like conservation easements, but while he saw the value in permanent protection, he chose to focus his time and resources on actively working the land to improve cottontail habitat.

When he joined the Small Woodland Owners Association of Maine (SWOAM), Kurt learned that the Natural Resources Conservation Service (NRCS), part of the U.S. Department of Agriculture, was offering meetings with wildlife biologists and cost-share assistance for cottontail habitat improvement. He set up a meeting with the agency’s biologist, who recommended a series of clearings and patch cuts to create early-successional habitat – or young forests – that are ideal for cottontails. With funding assistance from NRCS, he was able to implement the plan.

While Kurt was conducting his cottontail habitat work, he posted “No Trapping” signs along a brook on the property. Soon after, beavers reappeared and began to thrive, followed by ducks. Kurt now sees a wide variety of wildlife on his land, including falcons, Wilson’s snipes, spotted turtles and more. In 2016, he was able to hunt and take his first large deer in almost eight years. Like cottontails, deer thrive in early-successional habitat, so through Kurt’s cottontail work, he directly contributed to the deer habitat on his property as well.

Although New England cottontail rabbits are still under stress in the Northeast, the efforts of land managers and private forest landowners like Kurt have helped increase its numbers and keep it off the federal threatened and endangered species list.



Kurt continues to actively manage his land and think about the best options for permanent protection in the future. What is most important to him is that his land continues to provide for the critters and birds of Maine today and long into the future.

NORTHERN HARDWOOD (HEMLOCK) FOREST

By far the largest of the three habitat types studied is the Northern Hardwood (Hemlock) forest, with nearly 21 million acres, more than 10 million acres of which is family owned, running from West Virginia to southern Maine. It is home not only to black bear, gray fox, ruffed grouse and an array of warblers, but also to eight bird and mammal species of concern.

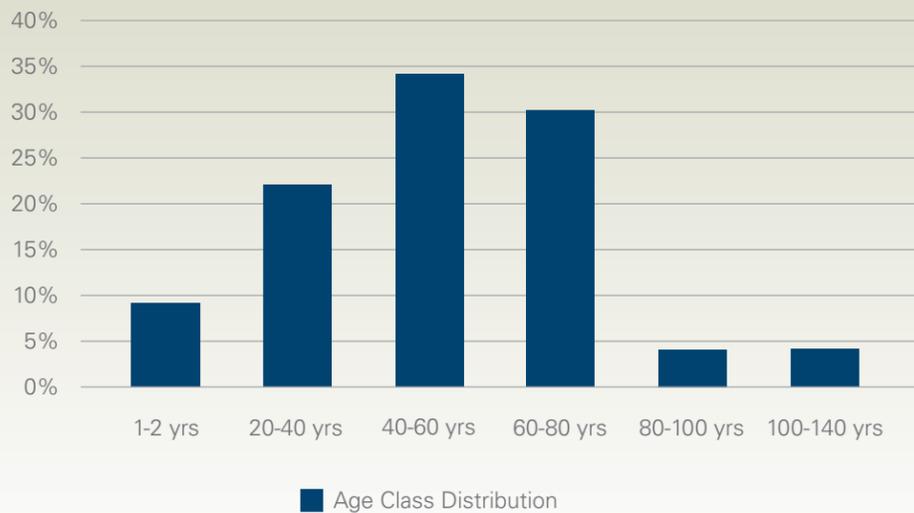
As shown in Figure 3, the age-class distribution of Northern Hardwood (Hemlock) habitat is unbalanced, a condition that signifies forests that are less resilient to drought, insects and a changing climate, as well as providing inadequate habitats for the birds and wildlife that depend on it for food, shelter and reproducing. Nearly two-thirds of this habitat – 64% – is between 40 and 80 years old, while only 9% is

in an early-successional stage (<20 years) and less than 1% is in a late-successional stage (>100 years), both of which are needed for healthy wildlife habitats. In fact, only 4% of the trees in these forests are older than 80 years.

The 10 target watersheds in this habitat type have nearly 4.3 million acres of family woodlands, of which more than 550,000 acres meet the criteria for high ecological integrity and above-average resilience. As described above, however, that does not mean these woods are all in good shape. In fact, an AFF analysis found that early-successional forests in those watersheds depart from historic conditions by 12.9% and late-successional forests by 27.4%, which is indicative of forest ecosystems that aren't meeting the needs of native wildlife and that need further evaluation and active stewardship to restore balance.⁴

NORTHERN HARDWOOD (HEMLOCK) FOREST

(FIGURE 3)



ACADIAN LOW ELEVATION SPRUCE-FIR-HARDWOOD

The spatial analysis identified more than 5.5 million acres of Low-Level Spruce-Fir-Hardwood forest, 1.1 million acres of which is family owned, which go from Maine to northern New Hampshire and Vermont and into the Adirondacks in northeastern New York. Wildlife native to these woods includes moose, fishers and ruby-crowned kinglets. There are eight species of concern that depend on this habitat type as well.

As in the Northern Hardwood (Hemlock) forests, the Acadian Low Elevation forests have an imbalanced and unnatural age range. More than three-quarters of the trees are between 40 and 80 years old, while just 2% are less than 20 years old and only 1% are over 100 years old (Figure 2). This concentration of trees in the 40- to 80-year age range is unsuitable for birds and wildlife that depend on early- and late-successional forest to survive.

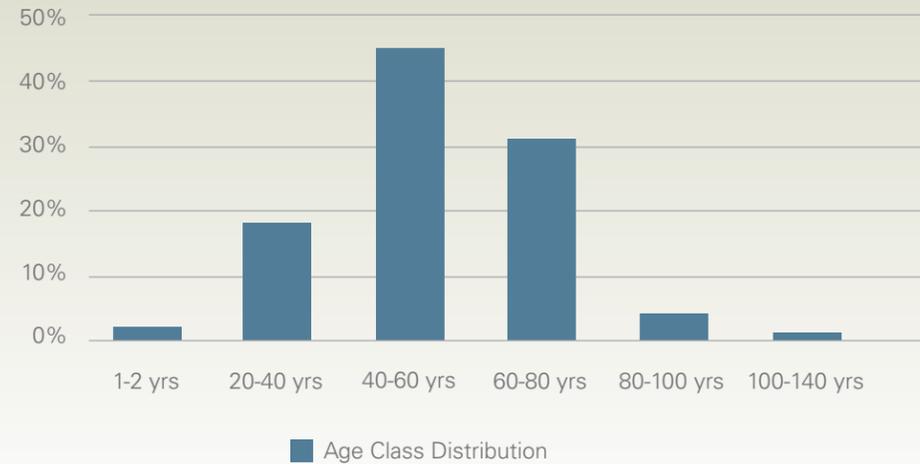
The 10 target watersheds in this habitat type have nearly 3.5 million acres of family forest, of which more than 65,000 acres meet the criteria for high ecological integrity and above-average resilience. As elsewhere, however, early-successional forests in these watersheds have departed from historic conditions by 17.7% and the late-successional forests in these watersheds are off by 31.9%.

CENTRAL APPALACHIAN PINE-OAK ROCKY WOODLAND FOREST

The 211,000 acres of family woodlands in the Pine-Oak Rocky Woodland habitat identified in the

ACADIAN LOW-ELEVATION SPRUCE-FIR-HARDWOOD FOREST

(FIGURE 4)



spatial analysis stretch from West Virginia to southern Maine, although the bulk of it is along the Virginia-West Virginia border and up into south-central Pennsylvania. Bobcats, pine warblers and scarlet tanagers live there, along with 10 bird and mammal species of concern.

The age-class distribution in the Pine-Oak Rocky Woodland habitat is the most unbalanced of the three habitat types. More than two-thirds of this habitat – 68% – is between 40 and 80 years old, while only 3% is in an early-successional stage and just 2% is in a late-successional stage.

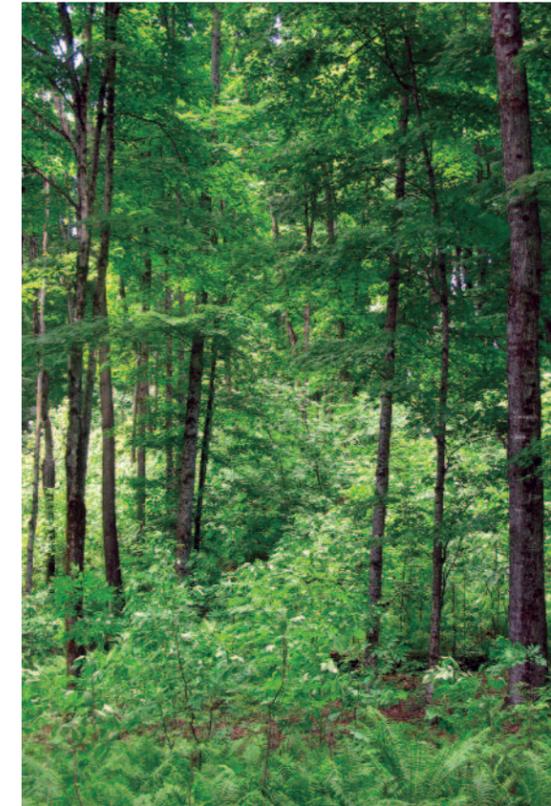
Moreover, there are fewer forests here than in the other two habitat types that meet the standard for high ecological integrity and above-average resilience. Of the nearly 3.4 million acres of family forest in the 10 target watersheds, just over 10,000 acres meet the criteria. In addition, both early- and late-successional forests in these 10 watersheds show the greatest departure from historic forest conditions, with early-successional

forests departing from historic conditions by 19.4% and late-successional forests by 38.1%.

LOTS OF WORK TO BE DONE

The spatial analysis shows clearly that forests in the Northeast are out of balance, which is a problem for birds and other wildlife that depend on those forests for survival. As these forests recover from land-use history of years long gone by, our analysis shows that family woodland owners are well

positioned to play a key role in the solution, and identifies 30 targeted watersheds – indeed – hidden opportunities, where working with landowners with high-value woods is the priority for improving wildlife habitats and forest health.



CENTRAL APPALACHIAN PINE-OAK ROCKY WOODLAND

(FIGURE 5)



⁴ Departure conditions are based on best available data, developed by LandFire. Estimated reference conditions are Biophysical Settings models that represent the vegetation that may have been dominant on the landscape prior to Euro-American settlement and is based on both the current biophysical environment and an approximation of the historical disturbance regime. <https://www.landfire.gov/NationalProductDescriptions20.php>

How Imbalanced Are Our Forests?



of the watershed's total area – more than 150,000 wooded acres – is owned by families and individuals, which means that their actions can significantly impact wildlife habitats and forest health. It is located in central Pennsylvania, is part of the Susquehanna River Basin and has nearly 850 different streams that eventually flow into the Chesapeake Bay. The watershed is home to species like the wood thrush, scarlet tanager, cerulean warbler, bobcat and Appalachian cottontail.

While relatively unthreatened by development or conversion (indeed, the forest cover grew by 10% in a recent five-year period), this watershed nonetheless lacks the variety of habitat components necessary to support important wildlife species.

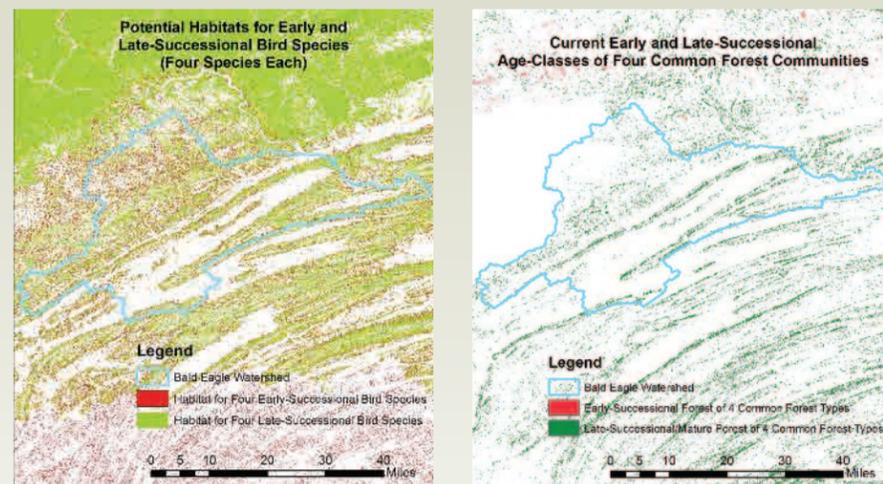
For example, the Bald Eagle Watershed has almost no available early-successional habitats. These

AFF's assessment didn't just identify the watersheds where family woodland owners can make the biggest difference for wildlife. It also dug deeper to examine the current condition of the forests in both the 30 targets and 90 surrounding watersheds that are part of the three priority habitat types in the Northeast. By learning more about the specific challenges in each watershed, AFF and others will be better positioned to recommend the kinds of stewardship activities that will produce the most wildlife habitat benefits and rebalance the forests.

To accomplish that goal, a Report Card was generated for each watershed based on a statistical analysis of more than 50 different wildlife and forest health characteristics that are indicators of age-class diversity, structural diversity, species diversity, landscape diversity and the watershed's departure from historic conditions.

The best way to illustrate the results is to explore how the Report Card works in a single watershed. The nearly 500,000-acre Bald Eagle Watershed is one of the target watersheds in the Central Appalachian Pine-Oak Rocky Woodland habitat. Nearly one-third

A COMPARISON OF POTENTIAL HABITAT FOR EARLY/LATE-SUCCESSIONAL BIRDS AND CURRENT FOREST AGE CLASSES WITHIN THE BALD EAGLE WATERSHEDS



Map Created January 6, 2017 by Scott Bearer, Appalachian Conservation, LLC. National GAP data was used for 4 early-successional bird species (ALFL AMWO, AMRE, CSWA) and 4 mature/late-successional species (BLBW, BTBW, SCTA, WOTH). 2012 Landfire EVT data was used to determine early and late-successional stages of 4 common forest types (Cent. App. Dry Oak, Appalachian Northern Hardwood, NE Interior Dry-Mesic Oak, Laurentian-Acadian Northern Hardwood).

“ The Appalachian Mountains Joint Venture (AMJV) is working with American Bird Conservancy, Indiana University of PA, PA Game Commission, PA Bureau of Forestry, and other regional and local partners in the Bald Eagle watershed to restore habitat for cerulean and golden-winged warblers. A key strategy in this effort is engaging family woodland owners in Bald Eagle and beyond. We look forward to partnering with the American Forest Foundation to more effectively reach and engage woodland owners in this important stewardship work. ”

Todd Fearer, AMJV Coordinator



are more open areas, which have young trees, shrubs and forbs that are important for wildlife like the Appalachian cottontail. This watershed also has very little late-successional habitat, which is characterized by trees that are 80 to 100 years or older. Late-successional habitat has more complex structure and diversity, and provides critical nesting sites and food for species like the wood thrush. However, based on potential wildlife species ranges, the Bald Eagle Watershed could have significantly more early- and late-successional habitat than is there today.

Not surprisingly, there is far less of both early-successional and late-successional habitat in the watershed than there was historically – by 24% and 36%, respectively.

The spatial analysis allows us to do this same kind of site-specific analysis in watersheds across the Northeast – finding those hidden

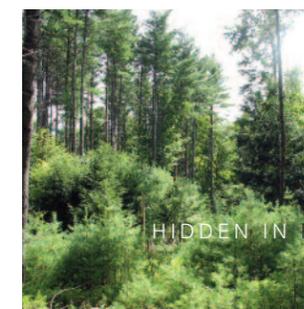
Bald Eagle Target Watershed	Early-successional Habitat	Late-successional Habitat
Current Habitat	0.01%	1.6%
Potential Habitat	52%	49%
Departure from Historic Condition	24%	36%

opportunities where family landowners can make the most difference, as well as identifying the kind of stewardship activities that are needed.

While the goal is not to achieve potential or historic levels, these data show that the Bald Eagle Watershed, like many other watersheds in the region, is drastically unbalanced and provides inadequate wildlife habitats. Active stewardship can restore that balance.

Take for example, the 2,000-acre American Tree Farm System-certified Beartown Tree Farm, which is located in the heart of the Bald Eagle Watershed.

Owned by Susan Benedict, her family and her brothers, Beartown Tree Farm is continually managed to provide several-acre stands of both young forest and large canopy gaps, as well as reserves of mature, older forests. It's a priority for Susan and her family to actively provide this diverse habitat for all kinds of native, local wildlife.



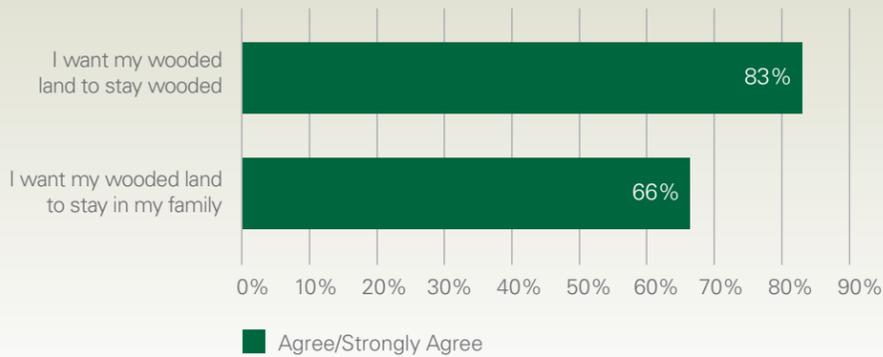
HIDDEN IN PLAIN SIGHT 19

Northeast Family Woodland Owners:

WILLING AND MOTIVATED, BUT MORE IS NEEDED

CARING ABOUT THEIR LAND

(FIGURE 6)



conduct a survey of family woodland owners with 10 or more acres in the 13-state Northeast region. The four-page survey was mailed to 20,000 family owners, and 1,454 surveys were completed and returned between February 10 and March 9, 2016.

FAMILIES AND WILDLIFE: A MATCH MADE IN WOODLANDS

Northeast family woodland owners care deeply about their land, so it is not surprising that they show little inclination to develop or sell it. More than eight in 10 want their land to stay wooded, and 66% want it to stay in their family (Figure 6).

To explore those questions, AFF commissioned Fors Marsh Group, an applied research firm, to

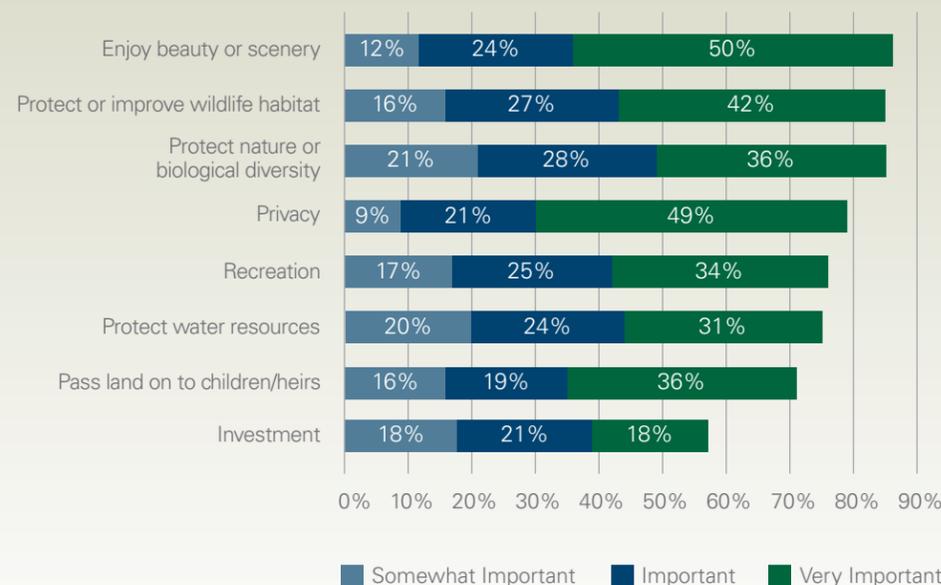
AFF's research showed where in the Northeast family owners can make a difference, as well as the specific habitat issues that need to be addressed in both the target and surrounding watersheds.

There are many unanswered questions, however, about how Northeast family landowners think about, and what they are doing in, their woods:

- Why do they own their land?
- What issues do they care about?
- What are their forest-management priorities?
- Have they taken steps to actively manage for wildlife in the past, and do they plan to do so in the future?
- Are there significant barriers that are preventing them from taking action?

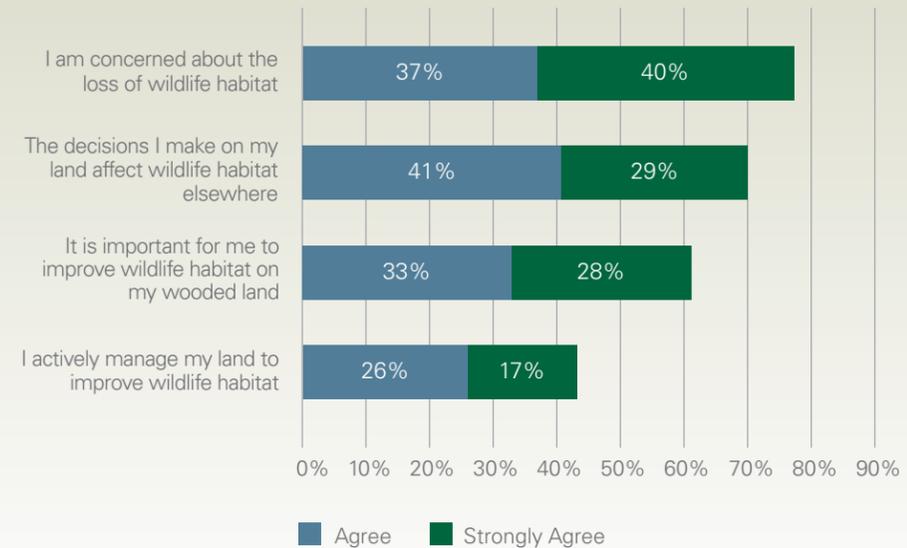
REASONS FOR OWNING WOODLANDS

(FIGURE 7)



FAMILY WOODLAND OWNERS AND WILDLIFE HABITAT

(FIGURE 8)



Moreover, most Northeast family woodland owners are primarily interested in owning their land for wildlife, scenery and recreation, and less so for investment purposes. As Figure 7 shows, a substantial majority – 85% – say that protecting or improving wildlife habitats and protecting nature or biological diversity, are important reasons they own their land. Their interest in protecting wildlife habitats goes even deeper: 77% of family woodland owners say they are concerned about the loss of wildlife habitats (Figure 8).

While these results clearly show that most Northeast family woodland owners are motivated to implement wildlife habitat improvement activities on their land, they also show the opportunities that exist to do

more, because fewer than half are currently managing their land actively for wildlife habitats.

FAMILY WOODLAND OWNERS WANT TO BE PART OF THE SOLUTION

Not only do a strong majority (61%) of family woodland owners across the 13-state Northeast region believe that it is important to be working to improve wildlife habitats in their woods (Figure 8), but more than three-quarters of them (77%) say they had taken at least one step to do so in the 12 months prior to the survey. Those range from low-threshold activities like hanging bird boxes to higher-threshold work like planting trees, creating a forest-management plan or thinning their woods to improve wildlife habitats. Many others say

Fast Facts

About Northeast Family Forest Landowners

- **85%** say protecting and improving wildlife habitat are important reasons they own their forested land.
- **77%** say they are concerned about the loss of wildlife habitats.
- **61%** say they want to improve or enhance wildlife habitats in their woods.
- While **77%** of family forest owners engaged in one or more activities to improve wildlife habitats in 2015, fewer than half said they do so on an ongoing basis.
- Landowners who have consulted a natural resource professional are doing twice as much for wildlife – **85%** have done at least one habitat-improvement activity compared to just **44%** of those who haven't consulted a professional.
- **61%** are willing to harvest timber if it will improve wildlife habitats, and **74%** of those who consulted with a natural resource professional are willing to do so.
- **91%** acknowledge that they could still do more to improve wildlife habitats on their land.
- Red tape, costs and an uncertainty about what to do are the biggest barriers to protecting and improving wildlife habitat on family woodlands.

TABLE 3

Wildlife Improvement Activities	Done in past 12 months	Will do in next 12 months	Considering in next 12 months
Create piles of brush for wildlife shelter	40%	16%	15%
Hang bird boxes to create nesting sites	30%	13%	17%
Create clearings for nesting areas and food sources	25%	11%	20%
Thin wooded land for habitats	24%	13%	21%
Remove invasive plants that don't support local wildlife	23%	16%	23%
Plant trees for wildlife food and shelter	23%	13%	18%
Create a forest management plan that includes wildlife	16%	7%	22%
Consult a natural resource professional	14%	7%	23%

have a written management plan are at least twice as likely to be actively managing to improve wildlife habitats than those who don't talk to professionals (Figure 9).

Permanent protection through easements is one important tool for protecting habitats, but not all landowners are willing to use that tool. Moreover, easements alone are not enough to increase the rate of wildlife habitat restorations in already degraded forests like we see in much of the Northeast. For that, additional stewardship through active management is needed. One good sign, however, is that family woodland owners who placed an easement in the past year were also engaged in

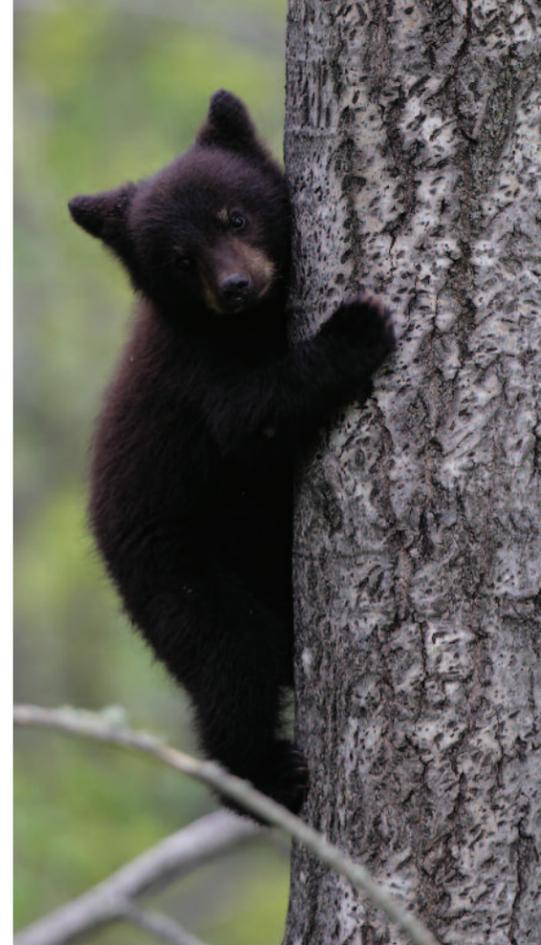


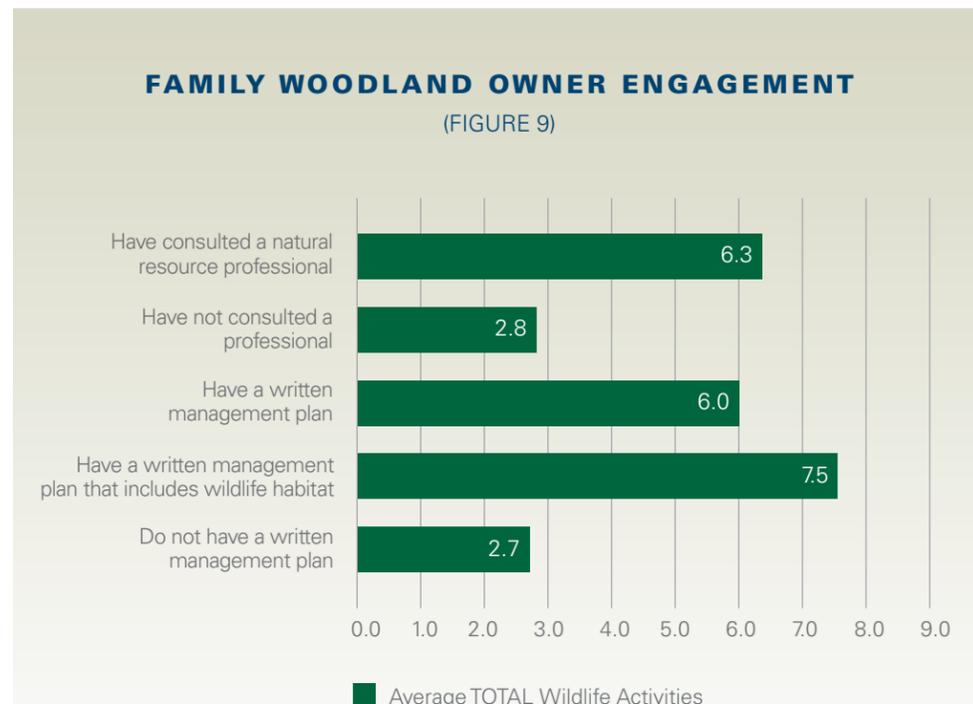
TABLE 4

Wildlife Improvement Activities	Have a conservation easement	No conservation easement
Create piles of brush for wildlife shelter	52.2%	41.4%
Hang bird boxes to create nesting sites	50.0%	27.9%
Remove invasive plants that don't support local wildlife	48.9%	22.4%
Plant trees for wildlife food and shelter	45.6%	22.4%
Create a forest management plan that includes wildlife	44.4%	16.9%
Consult a natural resource professional	43.3%	13.2%
Thin wooded land for habitats	38.9%	24.9%
Create clearings for nesting areas and food sources	38.9%	26.2%
Participate in workshops to learn more about wildlife habitats	36.7%	8.9%

To restore the wildlife habitat balance, active stewardship is needed.

they were considering or planning to take such actions in the following year (Table 3).

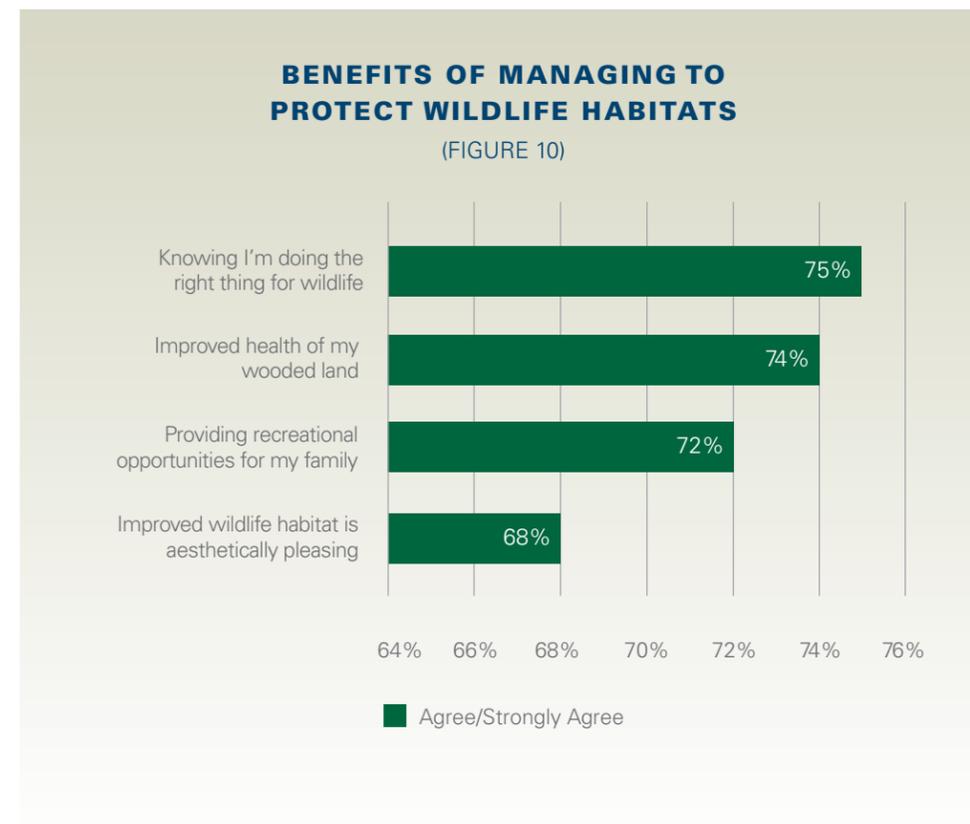
Even though most family woodland owners are taking some steps to improve wildlife habitats, most are not doing so regularly, and more than 90% admit that they could do more. In addition, very few said they had consulted with a natural resource professional (14%) or had a written management plan that includes wildlife (16%) in the prior year (Table 3). That is important because the survey shows that family woodland owners who interact with professionals or who



active stewardship for wildlife habitats at a substantially higher rate than those who did not have an easement (Table 4).

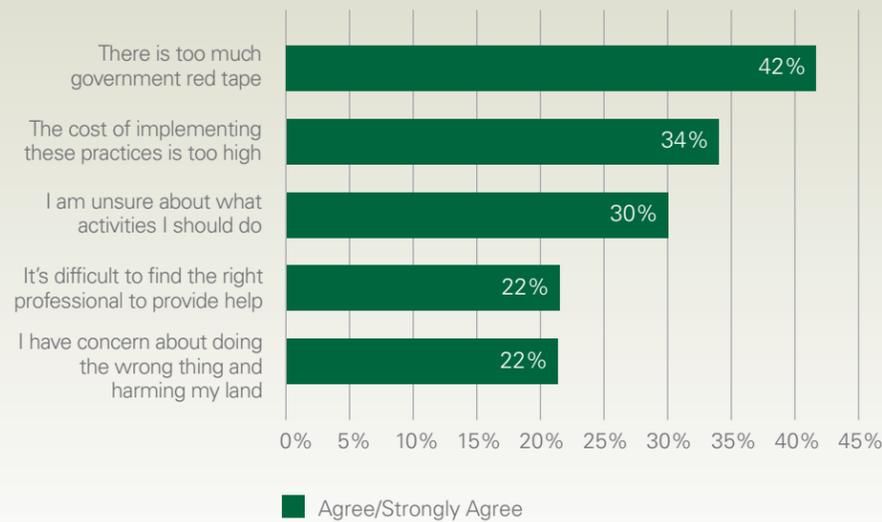
HOW CAN WE GET MORE FAMILY WOODLAND OWNERS MANAGING FOR WILDLIFE?

Northeast family forest owners say that there are many benefits of actively stewarding their land for wildlife, including recreational opportunities for their families (hiking, hunting or fishing), improving forest health and validating their interest in doing the right thing (Figure 10). Yet there is a gap between what they know they can and should do and what they are actually doing on an ongoing basis. Many landowners say it is because of concerns



BARRIERS TO LANDOWNER ACTION TO PROTECT WILDLIFE HABITATS

(FIGURE 11)



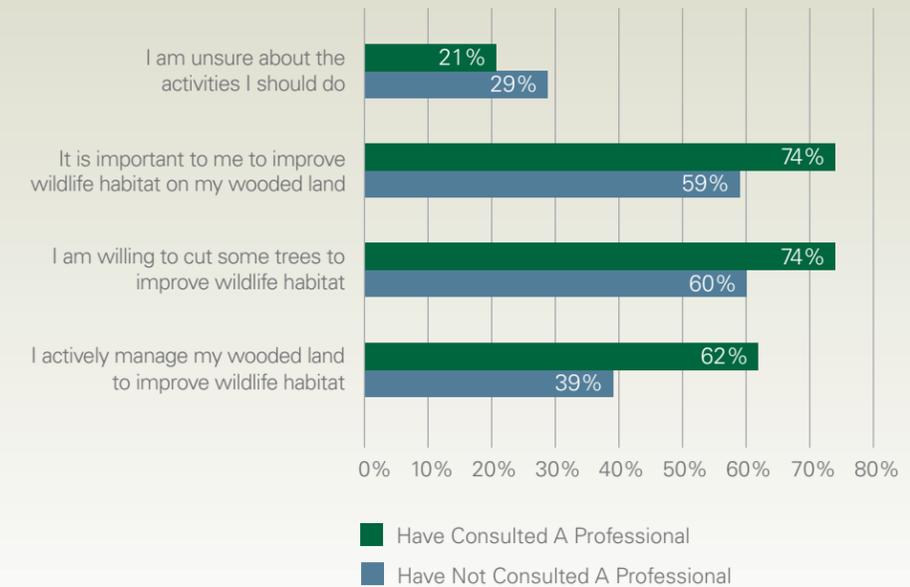
In addition, those who have consulted with a professional are less likely to be unsure or confused about what to do. They are also more likely to recognize the importance of improving wildlife habitats and to actively manage for wildlife on an ongoing basis, including a willingness to cut trees if it will improve wildlife habitats on their land (Figure 13).

Indeed, the opportunity to work with family woodland owners to enhance and promote wildlife habitats is tremendous, if given the right set of tools and resources to get the job done.



CONSULTING A PROFESSIONAL IS GOOD FOR WILDLIFE

(FIGURE 13)



about government (42%)⁵, high costs (34%) and uncertainty about what to do (30%) (Figure 11).

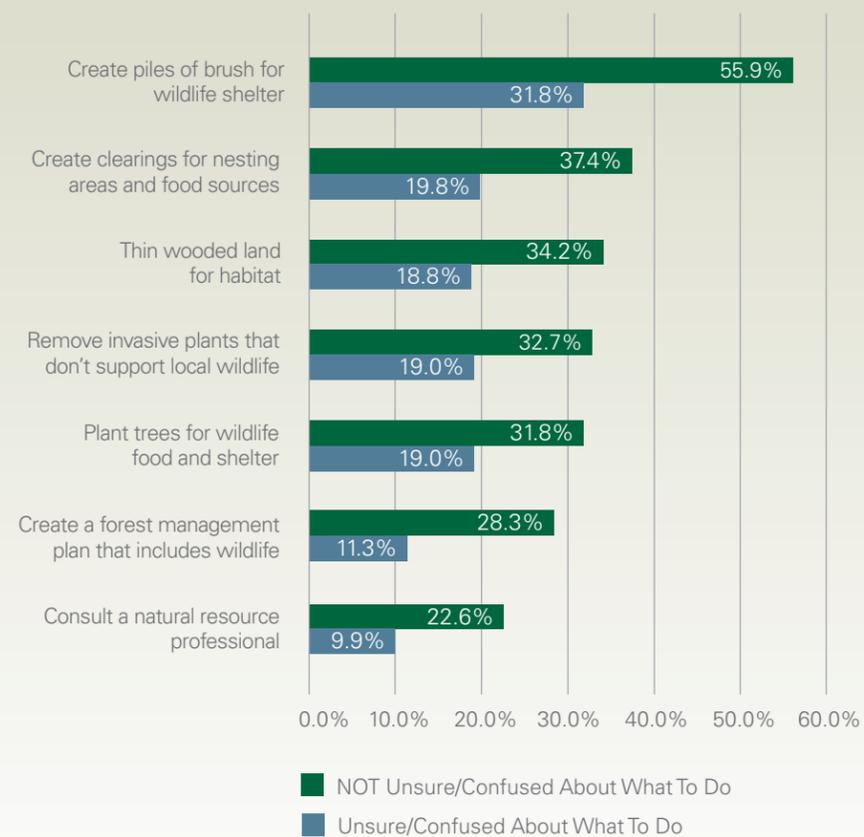
Those barriers are not insurmountable. On the contrary, they create opportunities to provide family landowners with information and technical support about the kinds of activities they can implement to protect and improve wildlife habitats on their land, as well as help in navigating through any red tape in order to get the work done.

In short, providing family forest owners with information and connecting them with natural-resource professionals are the keys, even the catalysts, to action.

For example, the more certain family landowners are about what to do to improve wildlife habitats in their woods, the more likely they are to take those steps (Figure 12).

MORE CERTAINTY MEANS MORE ACTIVITY TO PROTECT WILDLIFE

(FIGURE 12)



Providing family landowners with information and connecting them with natural resource professionals are the keys to breaking down barriers and helping them protect and improve wildlife habitats on their land.



⁵The regional woodland owner survey did not further specify the "red tape" issues that concerned landowners. We also do not know, but can certainly anticipate, that many of these issues may be a result of uncertainty (another listed barrier) or confusion.



Going Professional



Pat and Dan Stone purchased their 132 acres of woods in Vermont in 2012. Pat has family roots in the state, and Dan has a hobby of woodworking. Together, they hoped the property would provide an escape from city living.

They were looking for more than just a peaceful reprieve, though. Pat and Dan wanted to care for the land and improve habitats where wildlife could live and nest, but soon realized they lacked knowledge on how to best care for their land. They had heard horror stories about landowners who had received bad advice and were determined to find someone they could trust for professional expertise.

After extensive research, they met – and hired – Kathy Beland and her business partner Frank Hudson, long-time foresters with extensive experience in managing forests for wildlife. After exploring the

property with the Stones, Kathy and Frank found that even though it hadn't been managed since the 1930s, the land had good soil and, with a little work, the potential to provide ideal habitats for birds and other wildlife.

Although they were surprised to learn that a properly designed timber harvest could actually be good for birds and wildlife, the Stones worked with the Kathy and Frank to write a management plan both to remove invasive species that were choking out the native plant life and, eventually, include a harvest.



Kathy also told Pat and Dan that they were prime candidates to join the Vermont Tree Farm System, which would recognize their commitment to conservation and provide them with a community of other landowners and trusted professionals.

Through Kathy, an active member of the Vermont Tree Farm Committee, the Stones learned about a new project called Woods, Wildlife and Warblers, a joint effort among Vermont Tree Farm, the American Forest Foundation and Audubon Vermont to help landowners improve bird and wildlife habitats across southern Vermont. Dan and Pat jumped at the opportunity and signed up for a bird habitat assessment with an Audubon Vermont biologist.



The assessment confirmed much of what the Stones had learned from Kathy and Frank – their land had great potential for bird habitat and the harvest plan that Kathy and Frank had outlined would help get them there.

The Stones are grateful for the people they have met and the expert guidance they have received. They hope other landowners will see the benefits of working with professionals and take steps to get involved, too. They're looking forward to many years of active stewardship where they can make a difference for the birds of Vermont.



Recommendations

Our in-depth assessment of northeast forests shows not only the opportunity to provide tremendous impact, but it also reveals what needs to be done to fix the problem and why family-owned woodlands are the key.

Better yet, our survey of family woodland owners in the region shows that they are willing to play a lead role in protecting and improving wildlife habitats in their woods. They will need better information and technical support from natural resource professionals, however, to overcome concerns about the uncertainties, costs and perceived or real red tape associated with active stewardship.

AFF recommends three strategies to help overcome those barriers and improve wildlife habitats on family-owned woodlands in the Northeast in a way that is both consistent with and complements existing Forest Action Plans and Wildlife Action Plans prepared by each state:

1. Promote forest policies, state and federal technical assistance and markets that help northeast family woodland owners keep their woods as woods, while simultaneously rebalancing the forest and improving wildlife habitats.
2. Increase woodland owner access to professionals, improve training and education for natural-resource professionals and expand inter-agency collaboration.
3. Work with northeast regional and local partners to develop landscape-scale projects for

reaching out to and engaging family woodland owners in the three priority forest habitats.

1. **Promote forest policies, including tax policy, state and federal technical assistance and markets that help northeast family woodland owners keep their woods as woods, while simultaneously improving the woods' health and sustainability.**

The landowner survey shows that most family woodland owners want their land to stay wooded (83%), and that they want to protect wildlife habitats (85%). A variety of market and policy factors, however, are making both goals increasingly difficult for some owners.

For example, the market for low-grade timber products has declined precipitously over the past three years. That means family landowners who want to implement specific stewardship treatments may not even be able to break even on the project. Moreover, the lack of certain markets reduces family landowners' income for other non-revenue-generating wildlife-improvement projects, while also creating a perverse incentive to subdivide or sell their land.



There are programs and policies that can help.

State and federal programs, such as the U.S. Forest Service Forest Stewardship Program, provide landowners with much-needed boots-on-the-ground technical assistance. As we know from survey data, landowners will complete more than twice as many wildlife-related activities under the guidance of a natural resource professional. Advocating for maintaining, and even strengthening, these programs will ensure more habitat improvements are implemented.

The Natural Resources Conservation Service (NRCS) provides cost-share funding to eligible landowners for priority stewardship activities. Over the last decade, these programs experienced significant improvements that better enable woodland owners to participate. However, there are three key issues that need to be addressed to ensure these programs can impact the wildlife issues highlighted in this Report. First, not

“ State forestry agencies across the Northeast recognize the importance of engaging family woodland owners to promote healthy forests for wildlife habitat and other values. That’s why we’re excited



to partner with the American Forest Foundation, the Vermont Tree Farm Committee and Audubon Vermont to effectively reach and engage more landowners than ever before in southern Vermont. Through this effort we are simultaneously achieving the landowners’ objectives and enhancing habitat for priority birds and other wildlife on a landscape-scale. It’s a true win-win.”

Steve Sinclair, State Forester, VT Department of Forests, Parks and Recreation



all wildlife-related forest practices are eligible for support. Secondly, streamlining the paperwork and process for landowner participation is essential, as all too often landowners need tremendous assistance completing the required paperwork, taking NRCS staff away from what they do best. Lastly, due to the wide range of their current responsibilities, some NRCS staff lack the training and support to understand the benefits and financial costs of wildlife-related forest practices.

There are also annual property tax programs in most of the 13 northeast states that value woodlands at their current (not best) use, which allows landowners to be fairly assessed on their wooded land. The most successful of these programs are tiered so that they provide higher tax incentives for certain voluntary options, ranging from just keeping the land wooded, to requiring a

forest management plan, to providing recreational public access. These tax programs have been shown to have a greater effect on landowners’ ability to keep their woods as woods than any other tax policy.

Federal taxes can also make or break a landowner’s ability to keep their woods and manage it for wildlife habitat. While economics are not a top reason landowners own their woods, if the economics don’t work, it’s much harder for a landowner to afford ongoing stewardship. For example, estate taxes can have a significant impact on a landowner’s ability to pass intact, sustainably managed woodlands to the next generation. Federal tax policy that allows landowners to deduct expenses associated with owning and stewarding their woods, such as the cost of a thinning that improves wildlife habitat, is also essential to ensuring this work is affordable.

Additionally, allowing landowners to treat wildlife-related stewardship harvests as the long-term investment it really is, just like other investments that are taxed as a capital gain, encourages landowners to retain and steward their land, rather than investing elsewhere.

In order to address shortcomings in existing policies and programs, and to promote market forces that will benefit northeast family woodland owners who want to keep their land wooded and protect or improve wildlife habitats, the following is needed:

- Opportunities for reinvigorating markets for low-grade wood products, including through the promotion of innovative wood products;
- Legislation like the Timber Innovation Act (S.2892/H.R.5628 in the 114th Congress,

expected to be reintroduced in the 115th Congress) which invests in research and technology to increase wood use, including innovative products;

- Robust federal and state programs that provide technical and financial assistance to landowners who implement stewardship activities based on measurable outcomes, especially in areas where markets are least available and in high-opportunity areas as defined in this Report, by state Forest Action Plans and companion Wildlife Action Plans;
- Strong NRCS forest-related programs in the upcoming Farm Bill legislation, including improvements to streamline and ensure necessary wildlife practices are included;

- Effective state annual tax programs that are found to best serve family woodland owners while delivering the greatest overall public benefits; and
- Federal tax policy that encourages retention of woodlands and long-term stewardship, including eliminating the estate tax burden on family woodland owners and maintaining or enhancing other federal tax policies, such as the capital gains treatment of timber income and the ability to deduct expenses related to wildlife-related stewardship.

2. Increase woodland owner access to professionals, improve training and education for natural resource professionals and expand inter-agency collaboration.

The landowner survey showed that northeast family woodland owners who consult with natural resource professionals are more actively engaged in stewardship activities that improve wildlife habitats and overall forest health. However, the survey also shows that fewer than one in four of those landowners had talked with a professional in 2015.

While foresters have made great strides in the enhancement and implementation of wildlife habitat practices, further opportunities to increase the forester knowledge base is necessary. Since research indicates wildlife habitat is of great interest to northeastern woodland owners, foresters should be prepared with the most up-to-date information through an effective technology transfer system for on-the-ground practitioners. We also know that wildlife biologists, who





typically work for state or federal agencies are the experts who are most capable of providing landowners with up-to-date wildlife information. Unfortunately, in some cases, a landowner's distrust of government agencies can be a barrier to seeking their biologists' assistance. In other cases, the wildlife experts are over-committed and have competing responsibilities.

We recommend the following strategies to overcome those barriers and increase the number of northeast family woodland owners who are working with trained foresters and wildlife professionals to protect and improve wildlife habitats in their woods:

- Work with the forestry and wildlife communities in each of the 13 northeastern states to expand on existing efforts or determine how best to educate and train the professional foresters, who typically interact more frequently with family

landowners, in wildlife management and related stewardship practices.

- Expand on-the-ground collaboration among state forestry agencies, state wildlife agencies and state NRCS offices throughout the region.
- 3. Work with Northeast regional and local partners to develop landscape-scale projects for reaching out to and engaging family woodland owners in the three priority forest habitats.**

AFF has worked for years with regional and local partners in more than a dozen geographies across the country to develop and refine targeted strategies for reaching and engaging woodland owners. Those projects involve close collaboration with the partners both to coordinate landowner contacts and provide boots-on-the-ground technical assistance.

In the Northeast, we recommend working with area

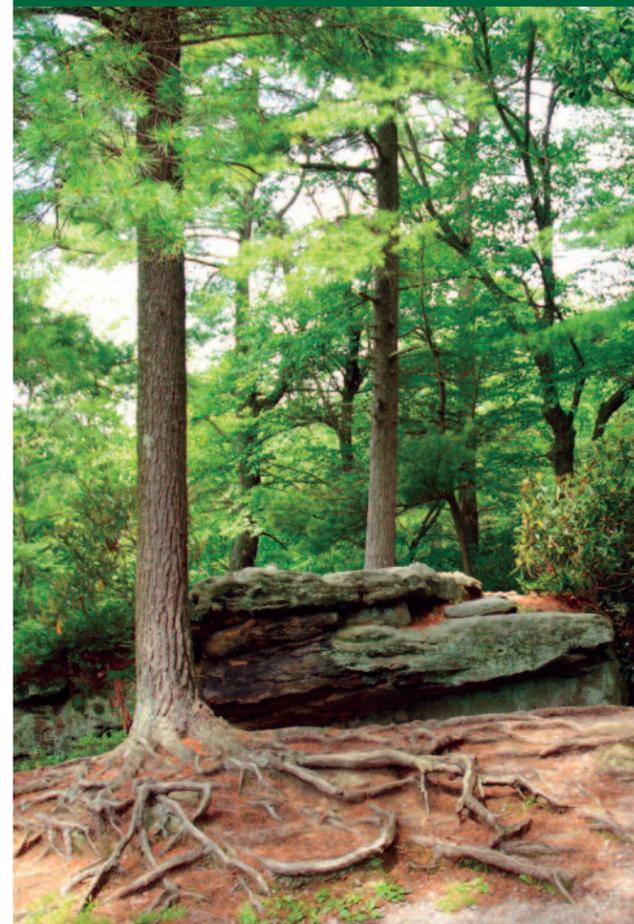
partners, including local conservation groups and state agencies, in the three priority forest habitats to:

- Identify family woodland owners in the 30 target watersheds and in surrounding watersheds;
- Develop an outreach program aimed at helping those landowners improve wildlife habitats in their woods while also meeting owners' other objectives for their land;
- Connect family owners with information and with natural resource professionals who can provide advice, planning and technical assistance; and
- Focus on restoring age-class diversity with an emphasis on increasing both early- and late-successional habitats.

It's critically important to approach these projects at a landscape scale, understanding the full conservation, social and economic context for individual landowners. In particular, wildlife species do not understand or respect parcel boundaries, so habitat improvements must be made within the context of the larger picture and understanding of what specific habitat types may be underrepresented. Furthermore, approaching projects from a landscape level allows partners to provide more nimble, site-specific recommendations for individual landowners that meet their needs and desires, particularly given social and economic considerations, while still contributing to an overarching outcome at the landscape level.

Conclusion

For some people, the Northeast means big cities like New York, Philadelphia and Boston. For others, it is winter skiing or summer at the shore. But one of the region's most defining, and perhaps under-recognized, features is the 101-million-acre blanket of woods that stretches from the Canadian border to the central Appalachians of West Virginia.



From hunting and fishing, to wood and maple syrup production, to viewing fall foliage and wildlife, the Northeast's woods remain a major economic driver. But over the past 60 years, development, declining markets and a lack of active stewardship due to inaccessible resources have created unhealthy, imbalanced forest conditions that are less resilient and a threat to native birds and wildlife.

The good news is that family woodland owners, who care for more than half of the Northeast's woods, are concerned about the loss of habitats and want to do more to help wildlife on their land. A network of woodland owners are already engaged as active stewards and looking for ways to further enhance their ongoing stewardship. In addition, AFF's spatial analysis found hidden opportunities in targeted watersheds across the region and identified the specific kinds of stewardship activities by family woodland owners that would produce the most wildlife benefits.

By working together in the 30 targeted, as well as surrounding, watersheds, AFF, its local and regional partners and state and federal agencies, can invest strategically in efforts to engage with family woodland owners. Further, focusing on recommendations to increase woodland owner access to trained professionals, while increasing market opportunities and enhancing federal and state policies and programs, will ensure woodland owners are best equipped to maintain and steward their land for years to come.

Combined with the continued landowner engagement work throughout the region, AFF and partners will ensure wildlife habitats — and thus the wildlife that depends on these woods — are enhanced, promoted and protected now and into the future.



Methods and References

SPATIAL ANALYSIS METHODS AND RESOURCES

Phase I: Identify Target Watersheds

Working with Jennifer Hushaw and Eric Walberg from Manomet, we worked to identify family-owned lands with innate qualities that would help ensure long-term stewardship would be most impactful. We started by

1. Identifying family-owned woodlands, spatial data extrapolated from National Woodland Owners Survey data by Jake Hewes and Brett Butler of the Family Forest Research Center.
2. Targeting forest habitat types that had the most species of concern associated with them, as identified in the TNC Terrestrial Habitat Guide. (www.conservationgateway.org) Once identified, these were sorted to include those habitat types with sufficient family-owned representation.
3. Further filtering family-owned forest habitat acres by looking for those with the top 25% in ecological integrity (developed by North Atlantic LCC: <http://northatlanticlcc.org/products/index-of-ecological-integrity>) and above-average resilience

(developed by TNC: www.conservationgateway.org).

4. Aggregating results to HUC-8 watershed level and identifying the top 30 watersheds, 10 in each habitat type, with the largest amount of priority acres.

Phase II: Assessing habitat quality

Working with Scott Bearer of Appalachian Conservation, LLC, we explored data from a diverse suite of tools and data repositories to identify the most relevant information across the region that would provide meaningful insight into possible management recommendations in the focal geographies. Our focus was on identifying ways to characterize habitat management protocols that enhance long-term health, sustainability, and resilience of targeted wildlife species. Bearer (*unpublished data; also see: Anderson et al. 2016*) has proposed four diversity metrics (age-class, species, structural, and landscape-level diversity) as being essential targets when planning for management to increase long-term habitat health and resilience. Generally speaking, an increase in any of these four diversity measures will likely improve overall health and resilience. In addition to these four diversity metrics, we then added a fifth metric to take advantage of Landfire's characterization of Departure from a historic range of variability (HRV).

We compiled and integrated a variety of GIS data/tools across geographies that help to quantify four critical habitat health metrics:

1. Age-class Diversity,
2. Species Diversity,
3. Structural Diversity, and
4. Landscape-level Diversity.
5. Departure from HRV

While numerous sources offered a variety of information helpful for specific regions within our study area, few were available and standardized across the entire study area. We focused on identifying spatial datasets that spanned the entire area of study (Figure 1) and provided meaningful information to help quantify each of the five diversity metrics. We identified ten data repositories that provided meaningful sources of data (Table 1). Due to sensitivities associated with some spatial data, one repository (U.S. Forest Service's Forest Inventory and Analysis data) requires a specific request be submitted to USFS-FIA personnel. We worked with USFS-FIA staff to obtain watershed specific data for snags and coarse woody debris.

From these repositories, we extracted and developed 52 spatial datasets to help characterize each of the five diversity and departure metrics (Table 2). Each of these spatial datasets required a unique series of GIS processes to produce meaningful results.



TABLE 1

Data Source	URL
Landfire Existing Vegetation Type (2012)	http://www.landfire.gov/NationalProductDescriptions21.php
Landfire Vegetation Departure (2012)	http://www.landfire.gov/NationalProductDescriptions11.php
Landfire Successional Class (2012)	http://www.landfire.gov/NationalProductDescriptions17.php
NLCD 2011 Land Cover	http://www.mrlc.gov/nlcd11_data.php
NLCD 2006 to 2011 Land Cover	http://www.mrlc.gov/nlcd11_data.php
NLCD 2011 Tree Canopy cartographic	http://www.mrlc.gov/nlcd11_data.php
TNC Northeast Resilience	http://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/terrestrial/resilience/ne/Pages/default.aspx
TNC Aquatic Resilience	http://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/freshwater/fwresilience/Pages/default.aspx
US Forest Service: Forest Inventory and Analysis Data	http://apps.fs.fed.us/Evalidator/evalidator.jsp
USGS Gap Analysis	http://gapanalysis.usgs.gov/species/data/download/

Data repositories used to identify and develop spatial analyses for the five diversity metrics.



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