

# HEALTHY FORESTS ARE MESSY FORESTS!

By *Kate Miller*

**A**s a forest ecologist with the National Park Service's Northeast Temperate Network (NETN), I have spent that past 10 years monitoring forest health in national parks across the eastern US, with much of my time spent in Acadia National Park. Information gathered through monitoring allows park managers to make good decisions about how to manage forests. With a solid decade of monitoring under our belts, we at NETN have a good understanding of the health of, and threats to, regional forests.

The good news for Acadia's forests is that they are in good condition. In fact, Acadia's forests are in better condition than many national parks south of us, which are often seriously impacted by invasive plant species or overabundance of white-tailed deer—often both. Forests in Acadia also contain significantly older forest habitat than most forests in Downeast Maine, providing regionally important habitat for species dependent on older forests, such as northern flying squirrels and birds like brown creepers.

Partially due to luck, and partially because of Acadia's Exotic Plant Management Program, forests in Acadia are largely composed of native species. Forests in Acadia are also following natural processes, another strong indicator of healthy forests. The forests affected by the 1947 fire are following expected successional patterns, where pioneer species like paper birch and big-tooth aspen are dying back and being replaced by shade-tolerant species like red spruce and red maple. Outside of the range of that fire, forests in Acadia are primarily composed of even-aged, mature spruce-fir forest, with some stands beginning to transition into late-successional forest.

The transition, which often involves the break-up of the even-aged canopy (picture blow-downs after a big storm), may appear untidy and chaotic. But it is an important part of the successional process: structural complexity is added to the forest, as from fallen branches and trunks or tipped-up root

mounds, and room is made for other trees to grow larger and taller. The end-result of this process, which we expect half or more of Acadia's forests to reach in the next century or two (barring major climatic changes), is a structurally complex old-growth forest composed primarily of red spruce, frequently over 16" in diameter, and that contains dead standing trees and fallen logs over a range of sizes and stages of decomposition. The features I described are common in one of the few remaining stands of old-growth in Acadia, along the Sluice Way Trail on Bernard Mountain.

Major threats to Acadia's forests include invasive plant species, exotic forest pests, atmospheric deposition (for example, acid rain), and climate change. While we are unsure exactly how climate change will impact forests in Acadia, we are certain that impacts will happen—if they are not already happening. In the short-term (years to decades), reducing non-climate stressors in Acadia, such as invasive plant species and exotic forest pests, is one of the best management actions park managers can take to ensure that forests are resilient for responding and adapting to a changing climate. In the long term, climate change adaptation will be necessary, and planning for this is already underway in Acadia. Beyond reduction of non-climate stressors, my primary recommendation to park managers is to take a largely hands-off approach to forest management. In other words, park managers should allow forests to develop under natural processes, such as succession and natural disturbance, and should only intervene when natural processes are disrupted by a stressor, such as overabundance of deer.

I encourage land managers, from small private landowners to land management agencies, to take a similar hands-off approach, particularly if their land is not managed for timber production. Over the years, I have observed many a well-intentioned landowner who, through trying to be a good land steward, takes actions that impair rather than

improve ecosystem health. Many of these mistakes relate to the misconception that forests need to be "cleaned up" to be healthy. My main objective in writing this article is to dispel this myth and to proclaim that healthy forests are messy! I also offer the following guidelines that I abide by on my own property and that I hope are useful for others:

**Above all else, just let it be.** Doing nothing is a perfectly acceptable approach to managing forests where timber production is not the primary objective. Nature typically does not require human intervention to be a healthy, functioning ecosystem. Allowing natural processes, such as disturbances and dying trees, to occur without human interference is good practice for northeastern forests.

**Dead wood is good wood.** While they may look messy to an untrained eye, dead and dying trees are important features of a healthy forest. As stated by Franklin et al. (1987), "At the time a tree dies, it has only partially fulfilled its potential ecological function." Dead standing trees (snags) and dead fallen wood provide crucial habitat for many species of birds, small mammals, amphibians, insects, mosses, and fungi. Dead fallen wood also provides important habitat for tree seedlings to germinate. The tip-up mounds created by downed trees provide additional regeneration sites for tree seedlings, and are important habitat for small mammals and ground-nesting birds. In fact, the winter wren, whose exuberant and melodious trills are one of the first songs of spring, is a species that specializes in nesting in the root wads of these mounds. Where possible, leave dying trees and dead wood to persist in the forest.

**Encourage native species.** Invasive species are a major threat to the health of our northern forests. Refraining from planting non-native species and removing invasive species that are already present are some of the best ways to ensure a healthy forest. On my own property, I have been



Tom Blagden

*Dead wood offers crucial habitat for both animals and many plant species, including the mosses and seedlings that bring beauty to Acadia's old-forest hiking trails.*

battling a stand of oriental bittersweet for the last five years. For more information, visit the Maine Natural Areas Program's website on invasive species in Maine: [http://www.maine.gov/dacf/mnap/features/invasive\\_plants/invasives.htm](http://www.maine.gov/dacf/mnap/features/invasive_plants/invasives.htm)

**Keep the good bugs happy and the bad bugs away.** Insect pollinators are critical to a functioning ecosystem, vital to farmers, and extremely vulnerable to pesticides. Following organic gardening practices and planting a diversity of native flowering plants can go a long way to keeping pollinators happy. More information on pollinator conservation can be found here: <http://www.xerces.org/pollinators-northeast-region/>

Exotic forest pests, which pose a big threat to several very common species in the northeast, are primarily spread by the movement of firewood. Acadia campers should be aware: out-of-state firewood is banned in Maine. For more information about specific forest pests and how to slow their spread, check out the Maine Forest Service's page: [http://maine.gov/dacf/mfs/forest\\_health/invasive\\_threats/index.htm](http://maine.gov/dacf/mfs/forest_health/invasive_threats/index.htm)

**Protect the soil.** Healthy soils are important for ensuring healthy forests. Earthworms, which are not native to the northeastern US, may be good for the garden but are not good for northern forests. Leaf litter, which supplies nutrients to plants and buffers the underlying soil from desiccation, can be quickly consumed by earthworms. Many beloved understory plants, including trout lily and trilliums, are dependent on a thick layer of leaf litter and can quickly decline after earthworm introduction. Seedlings of common tree species, including sugar maple and northern red oak, are also sensitive to earthworms. Earthworms are often used as fishing bait and may also come in compost, mulching, or other nursery material. To avoid further spread of earthworms in the northeast, put unused bait in the trash, not in the woods, and avoid dumping mulch or compost in the forest. For more information, check out the Great Lakes Worm Watch program's website: <http://www.nrri.umn.edu/worms/>

**Maintain forest buffers.** Forests can slow the movement and improve the quality of water flowing into streams, ponds,

and wetlands. Forested buffers also provide shade for streams, which improves habitat for cold-water fish species like trout. Forest buffers are important for many species of amphibians that breed in aquatic habitats but spend most of the year in upland habitats. Maintaining forest buffers adjacent to streams, ponds, and wetlands can go a long way in protecting aquatic ecosystems and the species dependent on these habitats.

Following these guidelines will promote forest health across the northeast, and I encourage interested readers to check out the links I provided to learn more about sound land stewardship. For more information on the forests in Acadia, readers can visit the NETN website ([go.nps.gov/netn](http://go.nps.gov/netn)), which offers numerous 2-page resource briefs, annual technical reports, and detailed monitoring protocols for the programs we are currently implementing in Acadia. We also have a Facebook page where we post updates from the field crews and announce public events. ✨

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