



ACADIA NP • APPALACHIAN NST • BOSTON HARBOR ISLANDS NRA • MARSH-BILLINGS-ROCKEFELLER NHP • MINUTE MAN NHP
MORRISTOWN NHP • ROOSEVELT-VANDERBILT NHS • SAINT-GAUDENS NHS • SAUGUS IRON WORKS NHS • SARATOGA NHP • WEIR FARM NHS

Got Snags? Dead Trees Provide Critical Habitat for Many Forest Dwellers

Neat or Messy? What makes a healthy forest?

To the casual observer, standing dead trees, trees that have been blown over by wind, and rotting logs on the ground in a forest can seem untidy and perhaps even a detriment to overall forest health. But when we dig a little deeper into the subjects of snags (our standing dead tree) and coarse woody debris (CWD – the fallen tree and rotting log), we find that they are actually essential components of a healthy forest that provide many services and functions. One of the oft unsung benefits of having a critical mass of snags and coarse woody debris is that they perform the free and, in the climate change era, increasingly important function of carbon sequestration. It has been shown that as much as 6 percent of the carbon stored in Northeastern forests comes in the form of dead wood. Snags and coarse woody debris not only store carbon, but provide critical habitat for wildlife and a myriad of fungi.

Snag a standing dead tree for some great habitat

Birds, small mammals, insects, and amphibians use snags for nests, nurseries, storage areas, foraging, roosting, and perching. In fact, some foresters argue that, pound-for-pound, there is more life in a dead tree than a living one. Snags are particularly important for cavity-nesting birds, with the density and size of a snag dictating what kinds of birds will reside there. When it comes to snags, size does matter: a larger diameter snag will last longer than one of a smaller diameter and provide habitat for a greater number of vertebrate species. Snags that are over a foot in diameter and at



Pileated woodpeckers create valuable cavities in snags and hollow trees that are used not only by them, but a broad array of other animals and birds. Edgeplot photo.

least 15 feet tall are often the favorite hunting perches of hawks, eagles, and owls, and are used as resting perches for swallows, Mourning Doves, and other small birds. Mice, squirrels, woodpeckers, and Blue Jays use them for food storage, and Scarlet Tanagers and flycatchers as song perches. Brown Creepers, Little Brown bats, and other small animals



2013 NETN forest crew tech Mary Short measures the diameter of a snag in Acadia National Park. This relatively small snag is still important, but will provide much less value to wildlife than one several times its size. NPS photo.

take shelter behind loose bark during the cold winter months. Larger hollow snags are especially valuable for wildlife in winter, as squirrels, raccoons, owls, and sometimes even black bear will take up residence there.

Northern Flickers, Downy, Hairy, and Pileated Woodpeckers use larger diameter snags as drumming surfaces for territorial and courtship rituals, and excavate cavities in them that are used as nesting sites. Once these so-called “primary cavity nesters” leave these sites, secondary nesters such as Wood Ducks, squirrels, wasps, and bats often move in. Both primary and secondary cavity nesters can also be avid forest insect hunters, and help to keep their populations in check. One such relationship to consider is that between the spruce budworm, woodpeckers, and ants. Budworm outbreaks can kill large numbers of spruce trees, which then become snags and foraging areas for primary and secondary cavity nesters, many of which include budworm in their diet. Eventually the snags will fall and become CWD, and some of these logs will be colonized by ant species that also may prey on the budworm and in turn, themselves become food for woodpeckers and part of a complex food-web that connects along many strands. There are over 140 different species of ants living in the Northeast, many of which that have a part of their life-cycle that relies on deadwood and that also prey on budworms. Having a healthy amount of snags and CWD in spruce-fir forests, such as in parts of Maine, could help to curb the intensity of future spruce budworm outbreaks.

Though not quite as useful, smaller diameter snags still may be used as song posts by many songbird species as they broadcast their mating songs and defend nesting territories.



Tip-ups caused by wind-thrown trees help to turnover forest soils, as well as provide ideal nesting sites for the Winter Wren. Kyle Jones photo.

CWD - technical term, critical for critters

On the ground, coarse woody debris is vital for insects, amphibians, and small mammals. This is obvious to anyone who has ever looked under a rotting log, as it often sends panicked salamanders, millipedes, and insects of many other species scurrying. The NETN forest monitoring crew keeps track of CWD volume because it can be a useful indicator of habitat availability for these life-forms. Coarse woody debris continues to be used by wildlife even as it breaks into smaller pieces (over time it is broken down by fungi, insects, microorganisms, and bacteria until becoming part of, indeed - becoming the forest soil). Coarse woody debris acts as a seed bed and mulch layer for trees, shrubs, and wildflowers, and continually nourishes them through slowly releasing nutrients. In addition, tip-up mounds caused by wind-thrown trees contribute to forest soil turnover and create important microhabitats for wildlife and vegetation such as tree seedlings and mosses.

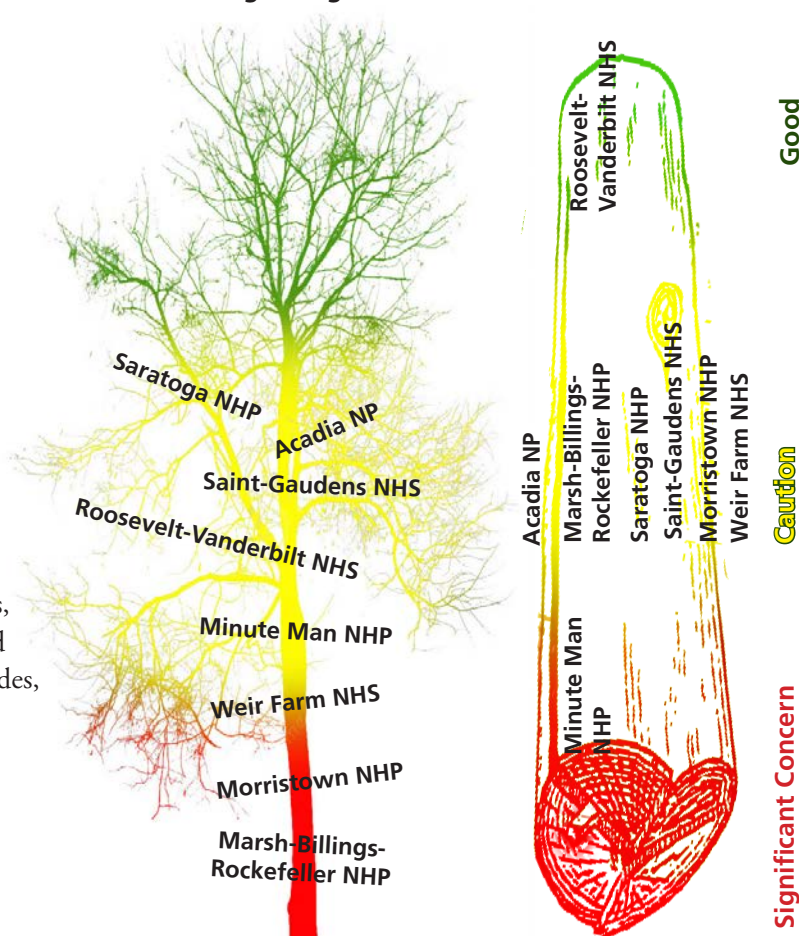
If a log happens to fall into a stream or river, it can create important aquatic habitat by ponding water that helps to store sediments. Water flowing over stream-bound logs sometimes excavates small pools that young brook trout find shelter in.

How much dead wood is enough?

Research by NETN scientists into other studies suggests that for both overall and medium-to-large snags, density should be at least 10% of overall and larger diameter live tree density. For CWD, studies have shown that dead wood volume ranges from about 20-40% of total (live and dead) wood volume in mature boreal spruce-fir stands, and about 20-28% of live tree volume in late-successional hemlock-spruce-pine and northern hardwood stands. For all forest types about 70% of the dead wood came in the form of downed CWD. As a general rule, Northeastern forests have less dead wood in them now than they did in the time before European settlement. Due to the forest history here, these critical elements of forest ecology are much too few and far between, and as the illustration on this page shows, the parks of

Snag Rating

CWD Volume



Though units of some network parks scored a "Good" on NETN's Ecological Integrity Scorecard for snag ratings, all parks ranked either "Caution" or "Significant Concern" overall, and only Roosevelt-Vanderbilt ranked "Good" for CWD. Most parks will likely remain in these categories for some time to come.

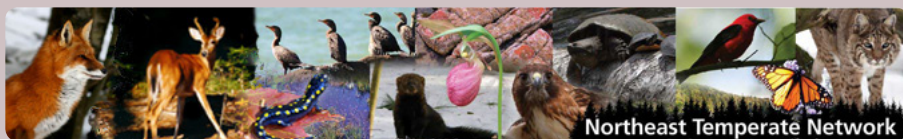
NETN are no exception. Remnant patches of old growth forests in the area and elsewhere tend to have more downed logs, snags, and other dead wood in them than managed/younger forests. These features do accumulate in forests over time, but once created they don't last forever. The average lifespan of a standing snag is about 10 years while thicker diameter CWD may last as long as 20 years. Forested systems in most network parks are relatively young, and short of management practices or large-scale weather/natural events that actively create snags and CWD ("Superstorm" Sandy downed and damaged a significant amount of trees in some parks in 2012), are likely to fall short of desired levels of these features for some time - possibly decades to centuries. Left to their own devices, and as long as management activities (like cutting snags and removing coarse woody debris) do not reduce the potential for them to develop, the network expects these features to improve with time.

For more information contact:

Kate Miller
NETN Plant Ecologist 207-288-8736 kathryn_miller@nps.gov



Northeast Temperate Network
54 Elm Street, Woodstock, Vermont 05091
802-457-3368



Northeast Temperate Network