ATTS Group

Importance of dead trees and logs

By Toso Bozic

Dead trees and fallen logs are often viewed as signs of neglect, poor forest health, fire risk, or hazards that should be removed. While dead or dying trees may pose risks in urban settings, parks, campgrounds, and other high-use areas, they play a critical ecological role in natural forests, shelterbelts, and woodlots. Dead standing trees, commonly known as snags, and fallen dead woody debris(or just fallen logs) are among the most valuable components of healthy forest ecosystems. They provide wildlife habitat, contribute to nutrient cycling, enhance biodiversity, improve soil quality, and support long-term forest regeneration.

The presence of dead trees and logs is often a sign of a functioning and naturally evolving ecosystem. Tree mortality is a normal part of forest dynamics. Windstorms, lightning, fire, insects, diseases, competition, drought, and aging all contribute to the natural cycle of tree growth and death. Dead wood reflects these ecological processes and provides valuable insights into forest health and succession. Forests that contain a range of living trees, dead standing trees, and fallen logs generally exhibit greater structural diversity and ecological complexity.

Wildlife habitat

One of the most significant ecological functions of dead trees and logs is providing habitat for a wide range of wildlife species. Numerous birds, mammals, amphibians, reptiles, and insects depend on dead wood during some stage of their life cycle. Standing dead trees offer nesting, roosting, and feeding sites for many bird species. Woodpeckers excavate cavities in dead or decaying trunks to build nests. Once abandoned, these cavities become homes for secondary cavity-nesting birds such as chickadees, nuthatches, owls, and some duck species. Small mammals including squirrels, bats, fishers, and martens also use tree cavities for shelter and protection from predators and harsh weather.

Fallen logs provide cover and refuge for amphibians, reptiles, and small mammals. Species such as salamanders, frogs, voles, and shrews often seek shelter beneath decaying logs where moisture levels remain stable and temperatures are moderated. These habitats become especially important during hot summers and cold winters. Insects are among the first organisms to colonize dead wood. Beetles, ants, termites, and numerous other invertebrates feed on decaying wood and create tunnels within it. These insects serve as an important food source for birds, mammals, and other wildlife, supporting complex food webs throughout the forest ecosystem.

Picture 1. Woodpecker cavity (L), owl nest (C) wood frog sitting on decaying log (R)

Supporting forest regeneration

Fallen logs nearby area often serve as important seedbeds for new tree seedlings. These "nurse logs" provide favorable conditions for seed germination and early plant growth. As logs decay, they retain moisture, accumulate organic matter, and create nutrient-rich growing environments. Seedlings growing on nurse logs frequently experience less competition from grasses and other vegetation than those growing directly on the forest floor. In many forest ecosystems, species such as spruce and fir commonly establish on decaying logs. The elevated surface of nurse logs can also protect young seedlings from flooding, excessive soil moisture, and some soil-borne diseases. Through this process, dead trees literally contribute to the next generation of forest growth, helping ensure forest continuity and resilience.

Nutrient cycling and soil fertility

Dead trees and logs serve as natural reservoirs of nutrients. During decomposition, nutrients stored within wood are gradually released back into the soil where they become available for uptake by plants and trees. This process is essential for maintaining soil fertility and sustaining forest productivity. Nutrients such as nitrogen, phosphorus, potassium, calcium, and magnesium are slowly recycled into the ecosystem over many years. Unlike rapid nutrient loss through burning or removal of woody material, decomposition allows nutrients to remain within the forest system. Fungi, bacteria, insects, and other decomposers break down woody tissues and convert organic matter into forms that can be utilized by plants. This natural recycling process supports healthy forest growth and reduces the need for external nutrient inputs.

Dead wood also contributes organic matter to the soil, improving soil structure, water-holding capacity, and biological activity. Rich organic soils promote healthy root development and enhance the overall vitality of forest ecosystems.

Picture 1. Insects, fungi, vires, and bacteria decompose fallen logs and return nutrients into soil

Water retention and soil protection

Decaying logs function like natural sponges within forest ecosystems. They absorb and store water during wet periods and gradually release moisture during dry conditions. This ability helps maintain soil moisture levels and creates favorable microclimates for plants, fungi, and wildlife. In drought-prone environments, dead wood can provide critical moisture reservoirs that support ecosystem health and resilience. Fallen logs also help reduce soil erosion by slowing water movement across slopes and stabilizing soil surfaces. They intercept rainfall, trap sediments, and reduce the impact of surface runoff. These functions are particularly important in riparian areas, steep terrain, and regions vulnerable to erosion. By protecting soil and conserving moisture, dead wood contributes significantly to long-term forest sustainability.

Management

Dead trees and fallen logs are essential components of healthy forest ecosystems. They provide critical habitat for wildlife, support biodiversity, recycle nutrients, improve soil fertility, enhance water retention, store carbon, and facilitate forest regeneration. The presence of dead trees and logs is often a sign of a functioning and naturally evolving ecosystem. Tree mortality is a normal part of forest dynamics. Windstorms, lightning, insects, diseases, competition, drought, and aging all contribute to the natural cycle of tree growth and death. Dead wood reflects these ecological processes and provides valuable insights into forest health and succession. Forests that contain a range of living trees, dead standing trees, and fallen logs generally exhibit greater structural diversity and ecological complexity.

Although dead trees may sometimes require removal in high-use areas for safety reasons, retaining appropriate amounts of dead wood in forests and natural landscapes is widely recognized as a best management practice. The following are some recommendations:

- Preserve standing dead trees whenever they do not pose a risk to people, infrastructure, roads, trails, campgrounds, or utility corridors
- Retain a variety of snag sizes, species, and decay classes to provide habitat for diverse wildlife species.
- Prioritize the retention of large-diameter snags, as they offer greater ecological value and persist longer in the landscape.
- Leave fallen logs and large woody debris on the forest floor whenever operationally feasible.
- Maintain a range of log sizes and decay stages to support wildlife, nutrient cycling, and soil development.
- For any shelterbelt regeneration, planting trees in understory of dead trees is strongly recommended
- Assess accumulations of dead wood in areas with elevated wildfire hazards.
- In high-risk zones adjacent to communities, critical infrastructure, and recreational facilities, selectively reduce excessive fuel loads while maintaining ecological function
- Follow local Fire Smart and forest fuel management guidelines when planning treatments
- Retain standing dead trees and fallen logs adjacent to streams, rivers, lakes, and wetlands where they contribute to aquatic habitat and bank stability.
- Avoid removing woody debris from watercourses unless it creates flooding risks or infrastructure concerns.
- Incorporate snag and coarse woody debris inventories into forest management plans
- Establish wildlife tree protection bylaws to conserve trees that are essential for supporting wildlife habitat and biodiversity

For more information:

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