ROTTEN LUCK

The Role of Downed Wood in Ecosystems

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FRASER RIVER ACTION PLAN

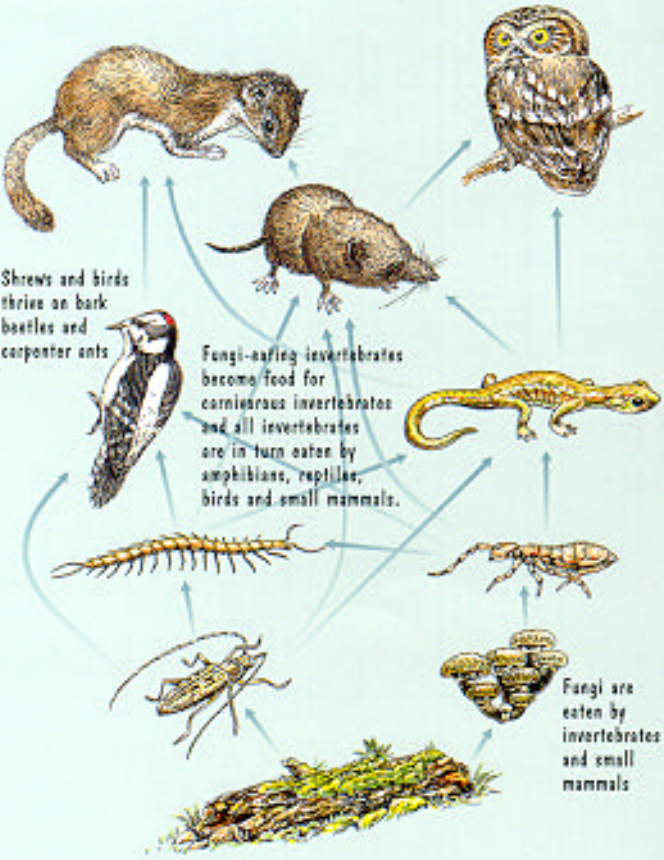
On land, downed wood has many roles...

...A source of food and energy

Wood-boring insects such as beetles and termites are first to penetrate wood. The tunnels they create open the way to invasion by bacteria and fungi that feed on the wood leading to its decay and the recycling of nutrients.

Wood-boring insects, such as spruce beetles, carry fungal spores inside, were the spores grow into fungal mycelia (thread-like strands), which colonize and feed on the wood.

In turn, the bacteria and fungi become part of a food web of many other creatures.



...A source of shelter

As well as being a source of food and energy, downed wood may be a safe place to hide from predators, or to breed, or to shelter from heat, cold and storms.

Because decaying logs are like sponges, holding lots of moisture, they are vital to the survival of amphibians like wood frogs, which breathe through moist skin surfaces.

Loose bark and cracks in decaying wood are safe hiding places for salamanders, skinks, voles, shrews and shrewmoles. Hollow logs provide shelter for bears, raccoons, weasels, hares and woodrats. Amphibians, snakes, voles and mice burrow into well rotted, disintegrating logs to nest or hide.

Logs provide safe cover and breeding sites for deer, porcupines, weasels, woodrats, winter wrens, voles and mice.

...Growing sites

In some forests, western hemlock grows almost exclusively on nurse logs.

Fallen logs are also excellent nurseries for plants. "Nurse logs" can provide greater warmth, longer snow-free periods, less competition from other plants, more moisture, and sometimes more nutrients than the surrounding forest. Soil and other organic matter that tend to gather uphill behind fallen logs also create rich, sheltered growing sites.

...Enriching and stabilizing the soil

Downed wood is a "savings account" of nutrients. As downed wood decays, nutrients are recycled back into the soil. Fallen logs also stabilize soils and reduce erosion by wind, rain and melting snow.

After wildfire, the downed wood reduces the erosive effects of water.

...Other roles

Downed wood also provides:

- places for squirrels to cache food
- lookout posts for squirrels, grouse and songbirds
- drumming sites for grouse
- preening sites for birds
- places for turtles and other reptiles to sun
- runways under the snow for mice and voles

Although benefiting the forest, downed wood may increase the fire hazard on some sites, and harbour insects and disease that affect economically important, living trees.

In streams, downed wood is important for providing habitat. Large logs help stabilize stream channels and create a series of pools and rapidly flowing water. Some birds, such as harlequin ducks, use streamside logs for breeding sites.

Large amounts of unstable logs in streams can lead to washouts of the stream channel.

Invertebrates, amphibians and fish use logs in the stream for cover and the insects and algae that live in these logs become food for many water-dwelling creatures.

Logs on floodplains help form channels and gravelbars that provide spawning and rearing habitat for fish.

Estuaries, where rivers and streams flow into the ocean, are highly productive ecosystems providing habitat for a wide variety of life.

In estuaries,

downed wood enriches the habitat for many species and along the coastline beached logs stabilize sand spits, beaches and dunes. Floating logs, however, can batter and damage estuaries and other shoreline ecosystems. In some areas where logs have been held in the water before transport, large concentrations of bark have settled to the bottom smothering bottom dwelling organisms.

On the shore, beached logs block the wind and reduce erosion of sand.

In the ocean,

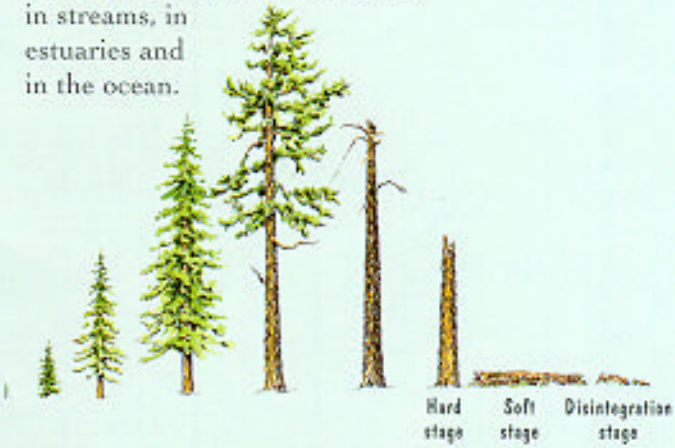
downed wood also plays an important role. Wood-eating animals quickly invade and consume water-logged driftwood that sinks to the ocean floor, and these animals in turn provide food for other bottom dwellers.

Birds use logs as perch sites.

Driftwood that remains afloat is carried out to sea to collect where currents meet. These areas are rich in zooplankton and small fish. Larger fish such as tuna follow drifting logs to find the best feeding areas.

What is Downed Wood?

When a tree dies its life is only partly over. As wood decays it continues to play an essential role in many different ecosystems – in forests, in streams, in estuaries and in the ocean.



As they decay, fallen trees, broken branches, slabs of bark and upturned roots:

- provide food
- provide shelter
- create growing sites for plants and fungi
- enrich and stabilize soils
- contribute to stream ecosystems

Downed wood is also a biological legacy – a link between present and future forests.

Life and death are interconnected. After a tree falls the downed wood left behind becomes an important habitat for many species and nutrients for the next generation.

Downed wood is created by:

aging, insects, disease, natural disturbances such as high winds, avalanches, landslides, floods, fire and by human activities such as logging.

The natural amount of downed wood in a forest depends on the climate, the site conditions, and the age of the forest. In general, downed wood is more plentiful in wetter climates and on wetter sites where trees grow more quickly.

Dry Ponderosa Pine forests have less downed wood than moist Interior Cedar-Hemlock forests.

There is great variability in natural amounts of downed wood in any ecosystem.

As forests grow older the volume of downed wood increases. However, disturbances, such as fire, leave large accumulations of downed wood – a biological legacy that becomes a part of the new forest.

Downed Wood and Forestry Practices

In the past, foresters viewed downed wood as wasteful debris, a hindrance to planting new trees, a fire hazard, and a shelter for insect and animal pests.

As we understand more about ecosystem processes, however, we are discovering that downed wood is valuable to long-term site productivity and that it provides key habitats for many plants and animals.

Forestry practices affect both the amount and the distribution of downed wood. For example:

- timber harvesting may temporarily increase downed wood on a site, but it leads to fewer fallen trees in the long-run
- growing cycles in managed forests are usually shorter than in forests left to age naturally; therefore, managing forests can reduce the supply of large, old trees that provide downed wood
- in the long-run, thinning stands reduces the amount of large downed wood

Slash burning or piling of logging slash to prepare planting sites reduces the amount or alters the distribution of downed wood.

Keep some downed wood when logging.

Keep downed wood where it does not interfere with planting new trees.

Keep downed wood in a variety of decay stages.

Large downed wood is especially important.

Keep some living trees to become downed wood in the future.

Keep downed wood scattered across the area.

Don't pile downed wood across animal trails.

In summary...

Fortunately, it is possible to manage forests in a way that will retain downed wood throughout the whole growing cycle of a forest. This kind of management ensures a supply of:

- downed wood of many species, in many stages of decay, and in many sizes
- large logs distributed across the site rather than piled and burned
- live trees and snags of many species, sizes and stages of decay to ensure a supply of downed wood in the future
- large logs in and along the sides of streams and creeks

Decisions about the best species of downed wood to keep and how much of it to retain will vary depending on the kinds and quantities that are typical of each ecosystem. In some areas, fire hazards or concerns about insects may change the recommended levels of downed wood.

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