California Forest Stewardship Coordinating Committee

FORESTLAND STEWARD

WORKING TOGETHER FOR HEALTHY FORESTS WINTER 1998

Dead and dying trees: part of a healthy forest

Richard Harris and Bill Laudenslayer

"snag" is a standing dead tree. Snags provide habitat to innumerable organisms including fungi, insects and other invertebrates, and land animals such as amphibians, reptiles, birds, and mammals.

Logs and limbs from snags are important to the forest floor and streams. As they decay, they release nutrients essential to long-term soil productivity. Down logs and limbs also provide habitat for many animals including salamanders and carpenter ants.

There is a misconception that forest "health" is negatively affected by diseased, dying and dead trees. On the contrary, their presence is an important component of natural forest ecosystems (although large quantities of these trees in some forests do suggest a decline in forest health). In this article, we suggest a few simple guidelines for managing and recruiting snags.

Why Are Snags Important?

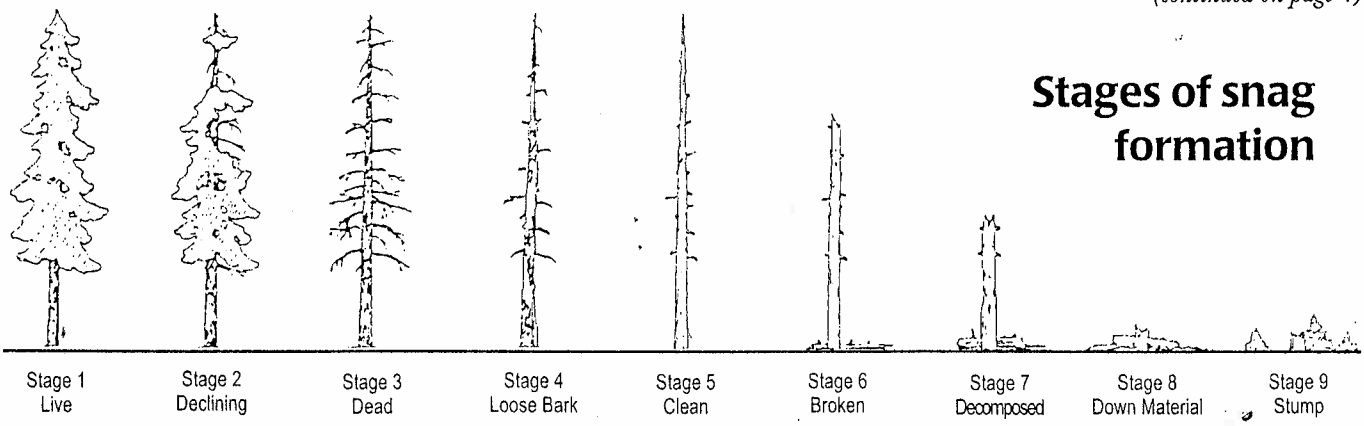
Probably the single most obvious reason for a landowner to be concerned with snags is because they provide habitat for birds. Some birds, such as sapsuckers and woodpeckers, excavate their own nests in snags (primary cavity nesters). Other birds occupy abandoned nests or natural cavities (secondary cavity nesters). These secondary nesting birds comprise up to one third of the breeding birds found in some forests.

Most cavity-nesting birds consume large quantities of insects each year. There is evidence that "biological control" by these birds can help keep populations of potentially damaging insects, such as bark beetles, below epidemic levels. Insect outbreaks often attract cavity nesting birds.

Snags are used in numerous other ways. Woodpeckers and sapsuckers communicate by "drumming" on dead branches. Squirrels and other small mammals use dying and dead trees as foraging sites, to store winter food supplies and for roosting and denning. Bats use loose bark and hollow tree trunks for roosting. A myriad of insects use dead trees as overwintering sites; some consume portions of dead trees, contributing to the decomposition process.

The death and eventual falling of

(continued on page 4)



Stages of snag formation

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Snags *(continued from page 1)*

trees provide forest openings that encourage regeneration of shrubs, trees and grasses. This leads to improved habitat for species such as deer and small mammals.

Ecology of Snags

The number of snags in a forest varies. The creation of new snags depends on agents of mortality including insects, disease and fire. Tree death in the forest is patchy, episodic and grouped reflecting the ways in which natural disturbances work.

The rate at which a dead tree deteriorates determines many of its ecological properties. Larger diameter trees persist longer than smaller ones. Decay rates also vary by species. For example, ponderosa pines generally persist longer than white fir of the same diameter. Large diameter snags appear to be more valuable because they stand longer and provide habitat for birds which require large trees to nest. It is the large trees and, consequently, large snags that are becoming more scarce in our forests.

Hard or Soft

Snags may be classified as "hard" or "soft." Hard snags are essentially sound wood while soft snags are in an advanced state of decay. Hardness depends on tree species, the nature of the decay agents and snag age. Some birds and insects may only excavate in soft snags. Others, including woodpeckers, require hard snags because of the stability they provide for nest cavities. As a snag progresses from hard to soft, pieces begin to fall to the ground. Eventually, the snag is reduced to a decomposed stump and collection of downed, decayed material–in essence, forest floor woody debris.

Each stage of deterioration has importance to certain wildlife. Early in the process when bark loosens, snags become important roosting sites for bats. Advanced stages of decay are most important for insectivorous birds and small mammals.

The successional stage of the community around the snag also influences the way in which they are used. For example, some birds will require snags in open shrub or grass communities. Others avoid snags in the open and will only use those in the closed forest.

Snag Management Guidelines

Ecological stewardship should include preservation and recruitment of snags for the benefit of wildlife and long-term soil productivity. Landowners must weigh many factors when managing for snags, including fire hazard, hazards posed to developed areas and trade-offs of productive forestland for benefits other than timber production.

There is little reason to remove soft snags from a forest provided they are not posing safety or fire hazards. Soft snags have virtually no commercial value. Hard snags will gradually turn into soft snags so if adequate hard snags are provided, and most soft snags retained, requirements for all snag-dependent species should be met.

In general, it is most beneficial to provide a wide range of snag species and size classes. Both coniferous and hardwood snags are useful to wildlife. For example, large black oak snags are extensively used by cavity-nesting birds and small mammals. Of the conifers, ponderosa pine may be preferable to white fir. Deciduous trees such as aspen, cottonwood and willow are heavily used where available.

Snags should be well-distributed because of the territorial requirements of cavity-nesting birds. Clumping of snags in small patches has been shown to benefit some species, especially pileated woodpeckers. When selecting specific trees, suitable nest trees are indicated by signs of heart rot at the heights and diameters required by the target animal. Signs of heart rot include:

- conks of heart rot fungi,
- broken branch stubs with signs of rot,
- wounds or scars resulting from fire, lightning or mechanical damage,
- discolored or soft, decayed wood revealed in samples,
- existing woodpecker holes or cavities,
- dead areas on living trees.

It is wise to consider the position of a snag in the landscape and in relation to other trees. Snags in the lower parts

of slopes surrounded by other trees are at less risk from windthrow than isolated snags on ridgetops.

It is not advisable to give general prescriptions for the number and size of snags without considering the characteristics of the stand, including stocking levels and tree species composition and requirements of target wildlife species.

Snag guidelines for particular wildlife are available (contact Extension Forestry). For example, in a ponderosa pine forest, a minimum of 14 snags/100 acres with an minimum size equal to or greater than 20 inches dbh probably provides sufficient nesting habitat for pileated woodpecker assuming large diameter live trees are present and food supplies are adequate.

Large snags can often be substituted for smaller ones to meet habitat requirements but the reverse is not true. Caution against overly general prescriptions will prevent situations in which either too many or too few snags are provided in a specific forest type on a property.

Bottom Line

Large trees are increasingly scarce in California's forests. Without management to preserve and recruit large trees that eventually become snags, important wildlife may disappear from our forests. A landowner may find it useful to work with neighbors in trying to preserve and recruit large diameter snags so that no one person shoulders too much of a burden. Even one large snag over an area of several acres can provide significant benefits.

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Seasonal Stewardship

After the storm

Storm damage can cause significant problems including:

- Safety hazards
- Economic loss and loss of forest aesthetics
- Damaged or blocked roads and culverts
- Build up of fuel which could result in future fire danger
- Potential for future loss due to increased susceptibility to insects, decay, future storm damage, etc.
- Changes in fish and wildlife habitat (some habitat may be damaged, some created).

Checklist

Identify high priority problems

❑ Immediate safety hazards to people or structures

❑ Blocked or damaged ditches, culverts, and roads (may result in road wash out, erosion, damage to water and fish habitat)

❑ Damaged trees and limbs that may fall onto roads or power lines (notify power company)

❑ Trees blocking forest access roads

Assess the damage

❑ Walk entire property–preferably with a forester (wear your hard hat)

❑ Make a simple map showing type and extent of damage (blocked roads and trails, trees with broken tops or broken limbs, fallen trees, trees severely bent over).

Determine objectives

❑ Consider salvage harvest of damaged trees.

❑ Consider retaining some storm-damaged trees and downed debris for wildlife habitat (see front page article on snags).

❑ Contact a professional consulting forester for advice.

Clean up problems

❑ At a minimum, remove hazardous debris accumulations (under 3" in diameter) within at least 100 feet of public roads and 500 feet of buildings (downed debris can result in forest fire hazard or increases in bark beetle populations).

❑ If debris will be burned, check burning regulations and obtain necessary permits.

❑ Consider pruning broken branches to reduce possibility of future decay.

❑ Leave broken limbs on trees that will be retained for wildlife habitat if they don't pose a safety hazard.

❑ Remove damaged trees when necessary and replant

Tips for creating snags

- Snags may be created from living trees if there is a shortage of safe natural snags. Created snags can be expected to last for a long period of time. Poor quality or deformed trees, such as those with broken tops or large branches, make excellent snags.
- Snags can be dangerous so locate them well away from trails, roads, buildings, and other structures.
- Select both conifers and deciduous trees for snag creation. Snag trees should be at least 14" in diameter.
- Top or girdle trees at or above the first whorl of branches, but at least 14 feet high (ideally, much higher). Smaller trees may be useful for some cavity nesters, as are stumps which are at least 3 feet high.
- A jagged top will decay faster and supply more habitat than a smooth-topped tree.
- Large branches, extending at least 2 feet out from the trunk can be cut to create foraging habitat on live trees not intended to be used as snags.
- Roosting slits and cavity starts may be added to created snags at the time of topping or girdling. However, do not put these features, or bird boxes, on existing snags.
- Roosting slits may be used by most bats and some birds. The slits should be at least 8" deep and 2" wide, and angled sharply upward into the cambium layer.
- Cavity starts all allow decay-causing fungus to enter the tree wound. These cavities may be used by flying squirrels, swallows, kestrels, and small owls. They should be at least 6" deep and 4" high. In time, as rot progresses, these cavities may be used by a large variety of cavity nesters, such as pileated woodpeckers, nuthatches, and chickadees.
- Bird boxes of varying sizes will host many species, such as wood ducks and swallows. They can be erected in most forest stands depending on target species and stand characteristics. Bird boxes, however, do not replace the need for snags.

–adapted from Backyard Forest Stewardship from the Washington State Dept of Natural Resources