

Evaluating the Dead Yellow-cedar Resource on the Tongass National Forest

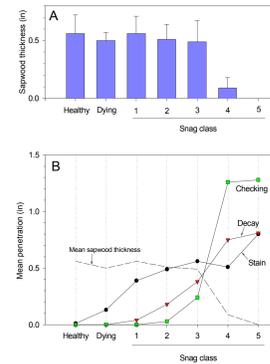
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Pattern of Deterioration

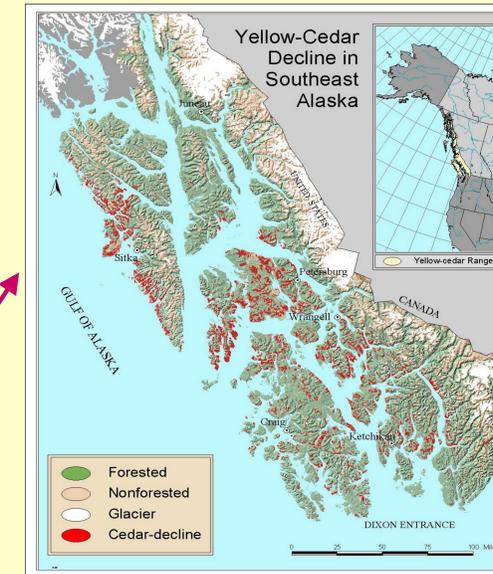
As a yellow-cedar tree dies, the sapwood is quickly colonized by stain and decay fungi. The narrow sapwood on yellow-cedar is fully colonized by fungi and insects and begins to slough away at the third snag class (see Fig. A.). Up to this stage, however, any defect factors (stain, decay, checking) are restricted to the sapwood and do not penetrate the heartwood (see Fig. B). By class 4 snags, however, the sapwood is nearly gone and the heartwood is exposed to drying checks—the most serious defect. This pattern of deterioration helps explain the high volume and grade of recovery that is yielded from the first 3 snag classes (ref. #6).



Note the decayed sapwood, but apparently unaffected heartwood, on this class 3 log.



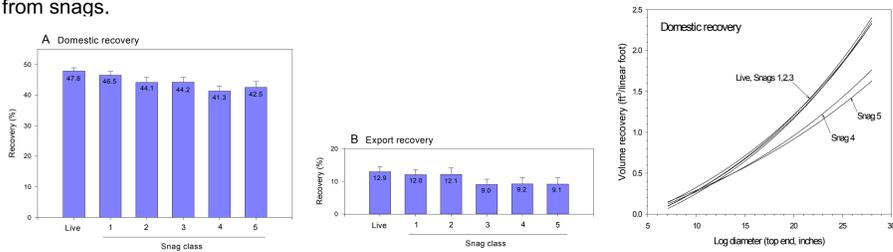
Extent of the Resource



We have documented the distribution of yellow-cedar decline from aerial surveys that we conduct annually. Dead and dying stands of yellow-cedar cover nearly 1/2 million acres in Southeast Alaska; most of the acreage is on National Forest lands (ref. #4). This information is available as a GIS layer which depicts the presence of decline. To make this layer more useful to managers, we need to classify the occurrence by volume and concentration of dead trees. We are looking for cooperators and accessible field sites to conduct a pilot test to evaluate different forms of remotely sensed images with ground plots.

Volume Recovery

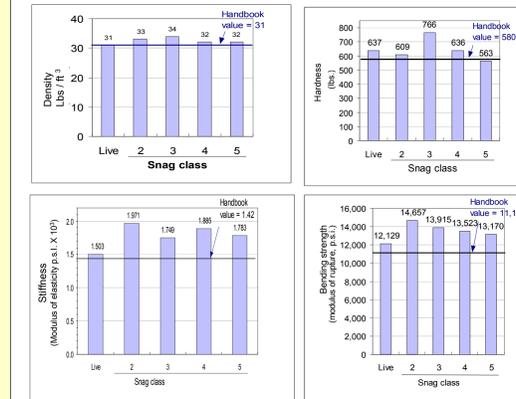
With assistance from Pacific Rim Cedar, Inc., we measured the cubic volume recovery from over 300 logs from dead and live yellow-cedar trees that were harvested near Nemo Point on Wrangell Island. This was possible by marking trees in the woods and following their logs to individual boards as they were sawn at the mill site. Each board was given a domestic and export grade. Class 4 and 5 snags yielded significantly less domestic volume than the more recent classes of snags or live trees, but the reduction was less than 15% (ref. #6). Recovery of wood meeting the more restrictive export rules was considerably lower and more variable among tree/snag classes but showed the same general pattern as domestic recovery. Generally, these results demonstrate an encouraging rate of recovery from snags.



CLASS 1 Foliage retained, 4 yrs
CLASS 2 Twigs retained, 14 yrs
CLASS 3 Secondary branches retained, 26 yrs
CLASS 4 Primary branches retained, 51 yrs
CLASS 5 Bole intact, no branches, 81 yrs

The 5-class snag system is the common link between these studies. Most declining forests have dead trees in each class, as well as surviving yellow-cedars and trees of other species. See the Hennon et al. 1990 papers (references 2 and 3) for techniques in dating time-since death for these classes.

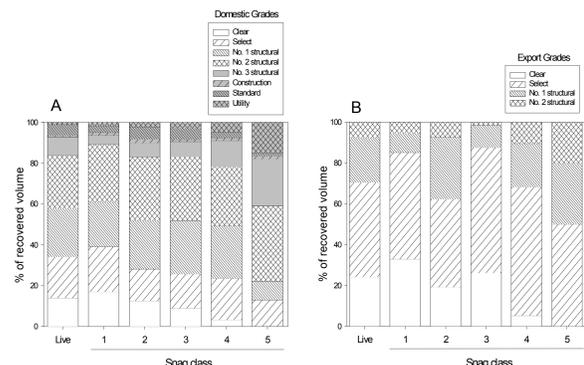
Strength Properties



Yellow-cedar is known for the strength of its wood. Results from the first phase of testing at the Forest Products Laboratory indicate no reduction in the strength properties of wood from snags, even long after death (ref. #7). Note that the "Handbook value" comes from published tests of wood from live yellow-cedar growing throughout its range. Larger sample sizes are included in the second round of sampling of dead trees from Wrangell Island; results should be available soon from David Green.

Grade Recovery

The lumber grade for recovered volume did not differ greatly by tree/snag class, but there was a trend for more of the volume recovered in poorer grades to be from the older snag classes (ref. #6). Results below are the percentage of the volume recovered in each lumber grade for each of the tree/snag classes.



A high-grade 5"x5" piece of lumber produced from a class 5 snag, dead about 80 years.

Aesthetics and Ecosystem Roles of Snags

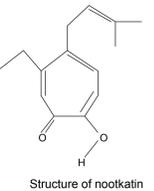
The high economic value of yellow-cedar wood can justify helicopter yarding to recover volume from these dead trees. Such a light treatment on affected sites, with the retention of green residual trees, results in a harvest that is difficult to detect visually when viewed from a distance. The ecological roles of dead yellow-cedar need to be evaluated as more of the dying stands are treated. Along with Toni DeSanto, avian ecologist at the Forestry Sciences Laboratory, we have initiated a study to determine if birds use dead yellow-cedar trees as nesting or feeding habitat. We have also established a companion study to evaluate insects associated with the snag classes, which may link to feeding by insectivorous birds.



This stand at Nemo Point on Wrangell Island was among the first trial recovery of dead yellow-cedar: snags were removed from the area inside the white line several months before this photograph was taken. Note the recent clearcut to the right.

Decay Resistance and Heartwood Chemistry

We are addressing the question of whether wood from dead yellow-cedar retains its remarkable decay resistance when used in service. This work includes laboratory and field tests on the durability of snag wood with Doug Crawford of the Forest Products Laboratory (ref. #8). Chemists Rick Kelsey and Joe Karchesy are measuring the concentration of nootkatol and other heartwood constituents from the wood of each of our snag classes to determine if these compounds are lost through time as snags remain standing in the woods.



Literature

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