



EDITOR'S  
FILE COPY

U. S. DEPARTMENT OF AGRICULTURE  
FOREST SERVICE  
PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION  
R. W. COWLIN, DIRECTOR



# *Research Note*

Number 113

Portland, Oregon

April 1955

## BEAR DAMAGE TO YOUNG DOUGLAS-FIR

By

Thomas W. Childs and Norman P. Worthington

EDITOR'S  
FILE COPY

Newly-formed sapwood of young conifers has probably been a food for bears since time immemorial, but damage to trees has only recently attracted the attention of foresters. In many localities, all stages of bear-caused wounds can be found, from fresh ones to those covered with callus. On a 3-acre clear-cut, made in 1950 in a rather open part of the 110-year-old stand of Douglas-fir on the Wind River Experimental Forest, 107 trees out of a total of 132 were found to have been wounded between 1854 and 1918. More than two-thirds of the wounds were made between 1865 and 1885--that is, when the stand was 25 to 45 years old. Many of the trees had been wounded 2 to 5 times, at intervals of 2 to 46 years.

Damage is common in numerous localities in western Oregon and Washington and is occasionally severe enough to interfere seriously with reforestation on tracts of thousands of acres. Frequency of wounding varies considerably, even in fairly uniform stands. For example, on 5 cuttings in the site III stand of large second-growth on and near the Wind River Experimental Forest, the percentages of trees with wounds varied from 14 to 44. Wounds were rare on the small areas of site IV scattered through this stand.

The worst features of bear damage are that it is most frequent in stands already seriously understocked and on the larger trees in both open and well-stocked stands, and that Douglas-fir is usually attacked in preference to associated species (table 1).

Table 1. Bear damage on the Hemlock Experimental Forest<sup>1/</sup>.

|                       | Douglas-fir |              | Other conifers |                 |
|-----------------------|-------------|--------------|----------------|-----------------|
|                       | Trees       | Trees        | Trees          | Trees           |
|                       | killed<br>% | injured<br>% | killed<br>%    | injured<br>%    |
| Well-stocked stands   |             |              |                |                 |
| 6" to 10" d.b.h.      | 6           | 13           | 0              | + <sup>2/</sup> |
| more than 10" d.b.h.  | 7           | 34           | +              | 2               |
| Poorly-stocked stands |             |              |                |                 |
| 6" to 10" d.b.h.      | 21          | 37           | 0              | 2               |
| more than 10" d.b.h.  | 0           | 83           | 2              | 6               |

<sup>1/</sup> This Experimental Forest is cooperatively maintained by the St. Regis Paper Co. and the United States Forest Service, in northwestern Grays Harbor County, Washington. The data are from a cruise made in 1949.

<sup>2/</sup> + indicates more than 0% but less than 0.5%.

Bear wounds are most common at bases of trees (fig. 1), but may occur elsewhere on the trunk (fig. 2) up to heights of 40 or 50 feet. Except for their usually greater size, they closely resemble skidding wounds. Partly-girdled trees occasionally become so badly butt-rotted that they break, but most such trees recover well even when repeatedly wounded (figs. 3 and 4).

Ring distortion in the callus layer causes some degrade of lumber cut from wounded trees, but cull associated with bear wounds at tree bases consists principally of borer tunnels and a little decay behind the face of the wound (fig. 4). This cull seldom amounts to more than 10 or 20 board feet per tree. On the Wind River cuttings, butt rot outside the face of the wound--that is, in wood formed after the injury--was found in only 7 percent of the wounded trees. On these same cuttings, butt rot was also found in 4 percent of the unwounded trees, so only about half of the cull in the wounded trees seems attributable to the wounds. Total cull from butt rot and borers combined was less than 1 percent of the board-foot volume even on the 1950 cutting, where



81 percent of the trees had been wounded. Casual observations indicate that cull under skidding wounds is comparable to that under bear wounds, but that decay becomes considerably more extensive under wounds on the middle or upper portions of the trunk.

Serious damage to young Douglas-firs by bears appears to consist principally of killing by complete girdling. Where girdling is only partial, damage to the tree is usually slight.



Figure 1. Bear wound 3 years old at base of 10-inch Douglas-fir. This tree will probably recover with little decay or retardation of growth.

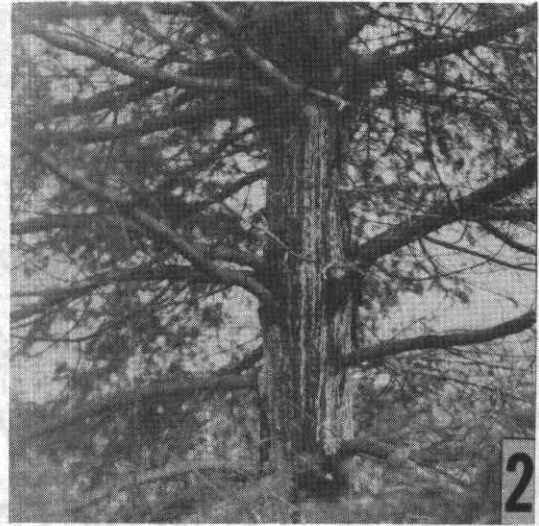


Figure 2. Bear wound about 6 feet from ground on a 14-inch Douglas-fir. This tree has been completely girdled and will soon die.

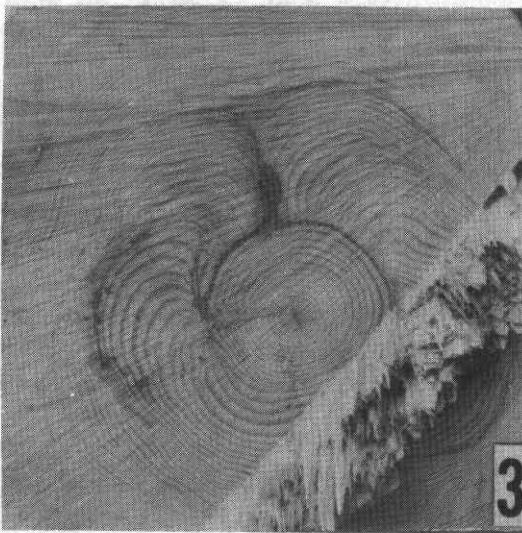


Figure 3. Stump-cut of 110-year-old Douglas-fir with bear wound 90 years old and a smaller one 75 years old.

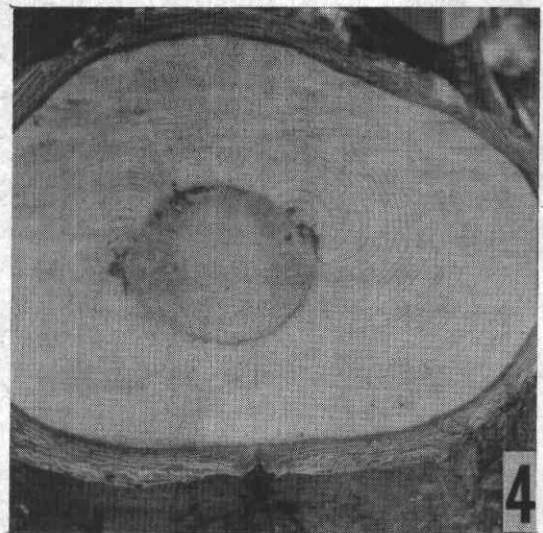


Figure 4. Smoothed stump of 110-year-old Douglas-fir with bear wounds 66 and 67 years old. Although almost completely girdled, this tree recovered rapidly and contained only a little cull.