

GIRDLING TOOL EVALUATION

In June 1997, the Missoula Technology and Development Center (MTDC) and Leonard Roeber of the Boise National Forest's Idaho City Ranger District conducted a field evaluation of four different tree girdlers. Two hand tools and two power tools were used in this evaluation. The girdlers included: a hand ax, a prototype two-handed cutting tool fashioned from a leaf-spring by Chuck Frank of the Wasatch-Cache National Forest's Evanston Ranger District, a commercially available power girdler with a rotary cutting head (the Li'l Beaver), and a standard chain saw. An experienced timber crew working in the steep terrain of Idaho's Sawtooth Mountains conducted the evaluation.

The evaluation site was a plot of mixed Douglas-fir and ponderosa pine. Mistletoe was in many of the trees. The trees to be girdled varied greatly in diameter. The bark thickness varied as well. The weather had not yet turned hot and the moisture in the tree's outer layers allowed the bark to be easily removed. The bigger trees had many relatively large-diameter limbs below the girdling kerf (cut). These limbs had to be removed to kill the tree. The terrain was relatively steep and the underbrush was thick in places, making it difficult to get around. These factors caused large variations in the time required to complete the girdling project.

The crew was divided into teams of two persons. One person operated the girdling tool while the other used a

stopwatch and recorded progress on a clipboard. The operator and recorder switched positions throughout the 2-day test. Teams traded equipment to ensure that many different operators tried each girdling device.

The crews worked hard, completely covering the designated test plot in 2 days. They noted that if this hadn't been an evaluation, they would have felled most of the smaller trees rather than girdling them. They were an experienced timber crew and they definitely preferred using the chain saws rather than the other tools.

Crews were instructed to write up their comments and observations. A debriefing was conducted at the end of the session.



TOOLS EVALUATED

Hand Ax

A single-edged hand ax with an 11½-inch handle and 3-inch blade (Figure 6).



Figure 6—Hand ax.

Leaf-Spring Tree Girdler

A prototype two-handed cutting tool fabricated from an automobile leaf-spring with a 9½-inch blade, chisel tip,

and 12-inch handle (Figure 7). This tool, designed by Chuck Frank of the Wasatch-Cache National Forest's Evanston Ranger District, was submitted as an employee suggestion.



Figure 7—The leaf-spring tree girdler.

Li'l Beaver Power Girdler

A gasoline-powered girdler with a backpack power unit, flexible driveshaft, and semiconical cutting head that straps to the operator's forearm (Figure 8).



Figure 8—The Li'l Beaver Power Girdler.

Chain Saw

Standard commercial timber operation machine—Stihl 044 with 24-inch bar. Operators make an upper and lower cut completely around the tree (Figure 9), then use their chain-tightening tool (scrench) to remove bark from the kerf.

The kerf was 2 inches wide, and 1½ inches deep on all large trees. The cambium layer was cut through on small trees. All trees were delimited below the kerf.

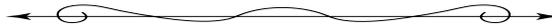


Figure 9—Chain saws are commonly used as girdling tools.



MISCELLANEOUS OPERATING NOTES

One of the Li'l Beavers experienced carburetor problems throughout the first day. The machine would not rev up to the proper cutting speed and did not perform as well as the other Li'l Beaver. The machine with carburetor problems was not used after the first day.



EVALUATION DATA

All times (in seconds) are averages to completely girdle a single tree in each size category. The sample size in all categories was 21 to 33 trees except in the category for trees 24 inches and larger. For this category, the sample size was three to five trees.

Tool	Tree Diameter	Seconds
Hand Ax	Smaller than 4 inches diameter:	22.1
	4 inches to less than 8 inches:	69.1
	8 inches to less than 12 inches:	124.6
	12 inches to less than 24 inches:	246.1
	24 inches and larger:	546.7

- Rest stops (5 minutes) every half-hour.
- Tool sharpening (30 seconds).

Tool	Tree Diameter	Seconds
Li'l Beaver	Smaller than 4 inches diameter:	23.9
	4 inches to less than 8 inches:	36.5
	8 inches to less than 12 inches:	58.5
	12 inches to less than 24 inches:	96.5
	24 inches and larger:	None

- Head must be tightened at least twice a day (15 minutes).
- Breaks will be frequent in hot weather because of engine heat transmitted to operator through the backpack—estimate about 5 minutes every half-hour.
- Fill fuel tank (5 minutes) at least three times a day.
- Sharpen head with chain saw file (15 minutes) once a day.

Tool	Tree Diameter	Seconds
Leaf-Spring Tree Girdler	Smaller than 4 inches diameter:	46.0
	4 inches to less than 8 inches:	80.4
	8 inches to less than 12 inches:	177.7
	12 inches to less than 24 inches:	354.3
	24 inches and larger:	490.0 (just one cut— not an average)

- Cutting blade must be sharpened (30 seconds) twice a day.
- Rest stops (5 minutes) every half-hour.

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Tool	Tree Diameter	Seconds
Chain Saw	Smaller than 4-inches diameter:	None
	4 inches to less than 8 inches:	44.4
	8 inches to less than 12 inches:	64.5
	12 inches to less than 24 inches:	85.7
	24 inches and larger:	132.5

- *Sharpen chain (15 minutes) at least once a day.*
- *Rest stops (5 minutes) every half-hour.*

