

# WCOST:

## *A Stump-to-Truck Cost Estimating Program for Cable Logging Young-growth Douglas-fir*

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### Abstract

WCOST is a computer program designed to estimate the stump-to-truck logging cost of cable logging young-growth Douglas-fir. The program uses data from stand inventory, cruise data, and the logging plan for the tract in question to produce detailed stump-to-truck cost estimates for specific proposed timber sales. These estimates are then used, in combination with specific landowner objectives, to assess the economic feasibility of cable logging a given area. The program output is summarized in *tabular format by harvesting component*. Input parameters also are presented in a summary table.

### General Description

WCOST integrates most of the cable-logging data that have been developed for young-growth Douglas-fir on steep terrain into a complete stump-to-truck cost estimation system. The system provides detailed cost and delay estimates for user-specified harvesting scenarios. The detailed estimates and delays are estimated by component for felling, limbing, bucking, yarding, loading, move in and out, and initial rig up and down. The detailed estimates are summarized in tabular form by

yarding machine for easy, quick comparisons. The manager, logger, or planner can use these as decision tables to evaluate and compare a variety of harvesting options.

WCOST operates on an individual-stand or harvest-block basis, providing stump-to-truck cost estimates that are specific to each stand or block. The tabular estimates can be arranged by stand or harvest block so that individual stands can be combined into a total timber-sale cost data base.

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There are two versions of WCOST in use. WCOST V1, written in Hewlett Packard<sup>1</sup> HP 9845T Basic, was made

available for public distribution and currently is being used by a number of scientists, including researchers with the Pacific Northwest Region of the National Forest System. A new, more comprehensive version (WCOST V2), written in FORTRAN, is now being programmed for use with main-frame and microcomputers.

### Cable Yarding Machine Options

WCOST V1 produces cost estimates for three cable yarders rigged in the following uphill configurations: Washington Skylok 78 rigged as a running skyline; Koller K-300 rigged as a shotgun; and the Island Jones rigged with a haulback. These cable yarders as rigged reflect most of the conditions a logger would encounter on steep terrain. Of course, in practice there are many yarding machines to choose from, so the equipment choices incorporated in WCOST are not exclusive.

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## Stand Input Parameters

The following data are required for stump-to-truck cost estimation: (1) arithmetic average cut tree diameter, in inches; (2) volume removed per acre, in ft<sup>3</sup>; (3) average slope yarding distance, in feet; (4) yarder type (three to select from); (5) rigging span length, in feet; and (6) round-trip mileage for moving. These items can be obtained from inventory and cruise data and the logging plan for the tract in question.

## Systems Requirements

Version V1 of WCOST is available for Hewlett Packard HP 9845T desktop computers with HP 9845T BASIC, 64K RAM, and printer. Version V1 also is available for AT&T PC 6300 and compatible microcomputers. WCOST V2 will include several addi-

tional pieces of equipment: the Skagit SJ-2 yarder, the Peewee yarder, the West Coast yarder, a Skagit GU 10 prebunching winch, and the Shield Bantam yarder swinging from pre-bunched decks.

## Cost and Contact

The computer program described is available on request with the understanding the U.S. Department of Agriculture cannot assure its accuracy, completeness, reliability, or suitability for any other purpose than that reported. The recipient may not assert any proprietary rights thereto nor represent it to anyone as other than a Government-produced computer program. For cost information, write: Chris B. LeDoux, USDA Forest Service, Northeastern Forest Experiment Station, P.O. Box 4360, Morgantown,

WV 26505. Send a blank certified Hewlett Packard data cartridge. BASIC source code of Version 1 is also available for the AT&T PC 6300 microcomputer.

## Literature Cited

Fight, Roger D.; LeDoux, Chris B.; Ortman, Tom L. 1984. Logging Costs for Management Planning for Young-growth Coast Douglas-fir. Gen. Tech. Rep. PNW-176. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. 10p.

LeDoux, Chris B.; Fight, R.D.; Ortman, T.L. 1986. Stump-to-Truck Cable Logging Cost Equations for Young-growth Douglas-fir. Western Journal of Applied Forestry. (1): 19-21.

| D.b.h.<br>(inches) | Cubic feet per acre |       |       |       |       |        |
|--------------------|---------------------|-------|-------|-------|-------|--------|
|                    | 500                 | 1,000 | 1,500 | 2,000 | 5,000 | 10,000 |
|                    | ----- Dollars ----- |       |       |       |       |        |
| 6                  | 723                 | 663   | 630   | 606   | 546   | 535    |
| 8                  | 608                 | 549   | 518   | 497   | 445   | 435    |
| 10                 | 519                 | 462   | 433   | 413   | 368   | 359    |
| 12                 | 448                 | 392   | 364   | 345   | 307   | 298    |
| 14                 | 391                 | 337   | 309   | 291   | 257   | 249    |
| 16                 | 347                 | 293   | 266   | 249   | 218   | 210    |
| 18                 | 433                 | 332   | 289   | 264   | 220   | 208    |
| 20                 | 397                 | 296   | 254   | 230   | 189   | 177    |
| 22                 | 375                 | 274   | 233   | 209   | 170   | 158    |
| 24                 | 366                 | 266   | 225   | 201   | 162   | 151    |

Figure 1. Estimated stump-to-truck logging costs with delay for the Igland Jones yarder from a typical program run.