

Database Code: TD012

Title:Dimensions, cover, volumes, mass and nutrient stores of Coarse Woody Debris (bark and wood from logs, snags, and stumps) from forests plots in the western United States and Mexico, 1977 to 2005

Abstract:

These data provide an inventory of the mass and nutrients stored within various forest types by coarse woody debris (CWD). CWD inventoried includes standing dead trees (>10 cm diameter at breast height) and dead and downed wood (>10 cm large end and >1 long). The majority of measurements are from permanent sample plots associated with the Andrews LTER permanent sample plots network. This includes clusters of plots at and near the H. J. Andrews Experimental Forest (OR), Cascade Head Experimental Forest (OR), Mount Rainier National Park (WA), Olympic National Park (WA), and Fraser Experimental Forest (CO). There are also data from plots in the Yucatan in Mexico; however, the live tree data for these plots is not available. The species of CWD inventoried are primarily those found in the Pacific Northwest; the dominants being Douglas-fir, western hemlock, mountain hemlock, western redcedar, Pacific silver fir, noble fir, lodgepole pine, ponderosa pine, sitka spruce, and Englemann spruce. The majority of measurements were made in the 1975 to 1995 period; however plots are periodically remeasured and the intent to eventually remeasure all the plots except those in Mexico. In each plot measurements of log and snag dimensions (length and diameters), as well as decay class and species were recorded in the stands (td01201 file). These dimension data are combined with data on density and nutrient content for each species and decay class (td01202 file) and plot area and slope (td01203 file) to calculate CWD volume, cover, biomass and nutrient storage (td01204 file). When data on density and nutrient concentrations is not known, a list of substitutions is used (td01206). The adjust tree diameters if measurements are taken at the base of the dead tree, taper regressions are used (td01205).

Keywords:Biomass;Coarse woody debris;Coarse woody debris - terrestrial;Decay classes;Decomposition;Log measurements;Logs;Mass;Nutrients;Snags;Woody debris;Inorganic nutrients;Organic matter;biomass;decay rates;decomposition;inorganic nutrients;nutrients;woody debris;coarse woody debris;organic matter;terrestrial ecosystems;logs;

Date data commenced:1977-07-01

Date data terminated:2005-08-31

Principal Investigator:Mark E. Harmon

List of Entities:

- 1. Field dimension data
2. Density and Nutrient Concentration Data
3. Plot Area and Slope Correction File
4. Summaries for Volume, Mass, Cover, and Nutrients
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6. Lookup table for substitution species used by CWD program to produce summaries in Entity 4

1. Field dimension data

Attribute List:

Table with 9 columns: Attribute Name, Field, Null, Length, Data Type, Range, Min, Max, Units. Rows include DATACODE, CARDTYPE, STUDYID, YEAR, MONTH, STAND, PLOT, LOGNUM, SPECIES, and DECAY.

POSITION	F	N	char(1)	enum			
DIAM1A	F	N	numeric(3,0)	range	1.0000	900.0000	cm
DIAM1B	F	Y	numeric(3,0)	range	1.0000	550.0000	cm
DIAM2A	F	Y	numeric(3,0)	range	1.0000	300.0000	cm
DIAM2B	F	Y	numeric(3,0)	range	1.0000	155.0000	cm
DIAM3A	F	Y	numeric(3,0)	range	1.0000	550.0000	cm
DIAM3B	F	Y	numeric(3,0)	range	1.0000	161.0000	cm
LENGTH	F	N	numeric(5,1)	range	0.0000	84.0000	m
BARKCOV	F	Y	numeric(3,0)	range	0.0000	100.0000	%
HOLLOW	F	Y	char(3)	enum			
CWDSRCE	F	Y	char(1)	enum			
STDIAMCORR	F	Y	numeric(3,0)	range	1.0000	30.0000	cm

2. Density and Nutrient Concentration Data

Attribute List:

DATACODE	F	N	char(5)	freetext			
CARDTYPE	F	N	numeric(1,0)	range	2.0000	2.0000	number
STUDYID	T	N	char(4)	enum			
SPECIES	T	N	char(4)	taxa			
POSITION	T	N	char(1)	enum			
DECAY	T	N	char(1)	enum			
WDENSITY	F	N	numeric(7,3)	range	0.0000	0.8140	g/cm3
WOOD_N	F	N	numeric(7,0)	range	230.0000	6960.0000	ppm
WOOD_P	F	N	numeric(7,0)	range	15.0000	460.0000	ppm
WOOD_K	F	Y	numeric(7,0)	range	90.0000	26180.0000	ppm
WOOD_CA	F	Y	numeric(7,0)	range	625.0000	47580.0000	ppm
WOOD_MG	F	N	numeric(7,2)	range	70.0000	2040.0000	ppm
WOOD_MN	F	Y	numeric(7,2)	range	0.0000	529.0000	ppm
WOOD_NA	F	Y	numeric(7,2)	range	0.0000	193.0000	ppm
WOOD_S	F	Y	numeric(7,2)	range	0.0000	0.0000	ppm
BDENSITY	F	N	numeric(7,3)	range	0.0000	0.8140	g/cm3
BARKC	F	Y	numeric(3,0)	range	0.0000	100.0000	%
BARKT	F	N	numeric(4,0)	range	0.0000	18.0000	%
BARK_N	F	N	numeric(7,0)	range	230.0000	6960.0000	ppm
BARK_P	F	N	numeric(7,0)	range	15.0000	460.0000	ppm

BARK_K	F	Y	numeric(7,0)	range	90.0000	26180.0000	ppm
BARK_CA	F	Y	numeric(7,0)	range	625.0000	47580.0000	ppm
BARK_MG	F	N	numeric(7,2)	range	70.0000	2040.0000	ppm
BARK_MN	F	Y	numeric(7,2)	range	0.0000	529.0000	ppm
BARK_NA	F	Y	numeric(7,2)	range	0.0000	193.0000	ppm
BARK_S	F	Y	numeric(7,2)	range	0.0000	0.0000	ppm
SOURCE	F	Y	char(15)	freetext			

3. Plot Area and Slope Correction File

Attribute List:

DATACODE	F	N	char(5)	freetext			
CARDTYPE	F	N	numeric(1,0)	range	3.0000	3.0000	number
STUDYID	T	N	char(4)	enum			
STAND	T	N	char(5)	place			
PLOT	T	N	char(4)	freetext			
AREA	F	N	numeric(5,0)	range	400.0000	4100.0000	m2
SLOPE	F	Y	numeric(3,0)	range	0.0000	110.0000	%
SLOPECORR	F	N	char(1)	enum			
EST_YEAR	F	Y	numeric(4,0)	range			YYYY

4. Summaries for Volume, Mass, Cover, and Nutrients

Attribute List:

DATACODE	F	N	char(5)	freetext			
CARDTYPE	F	N	numeric(1,0)	range	4.0000	4.0000	number
STUDYID	T	N	char(4)	enum			
STAND	T	N	char(5)	place			
PLOT	T	N	char(4)	freetext			
YEAR	T	N	numeric(4,0)	range			YYYY
SPECIES	T	Y	char(4)	taxa			
DECAY	T	Y	char(1)	enum			
POSITION	T	Y	char(1)	enum			
WVOL	F	Y	numeric(12,5)	range	0.0000	7603.2998	m3/ha
BVOL	F	Y	numeric(12,5)	range	0.0000	2382.3000	m3/ha
TVOL	F	Y	numeric(12,5)	range	0.0000	9985.5996	m3/ha
WMASS	F	Y	numeric(12,5)	range	0.0000	2554.7000	megag/ha
BMASS	F	Y	numeric(12,5)	range	0.0000	1405.5000	megag/ha

TMASS	F	Y	numeric(12,5)	range	0.0000	3960.2000	megag/ha
PCOVER	F	Y	numeric(12,5)	range	0.0000	36.0000	%
SURFAREA	F	Y	numeric(12,5)	range	0.0000	14456.2998	m2/ha
N	F	Y	numeric(12,5)	range	0.0000	3886.8999	kg/ha
P	F	Y	numeric(12,5)	range	0.0000	278.5000	kg/ha
K	F	Y	numeric(12,5)	range	0.0000	5308.1001	kg/ha
CA	F	Y	numeric(12,5)	range	0.0000	10615.4004	kg/ha
MG	F	Y	numeric(12,5)	range	0.0000	1161.4000	kg/ha
MN	F	Y	numeric(12,5)	range	0.0000	241.3000	kg/ha
NA	F	Y	numeric(12,5)	range	0.0000	64.5000	kg/ha
S	F	Y	numeric(12,5)	range	0.0000	0.0000	kg/ha

5. Regressions of Stump Diameter on DBH and Stump Height

Attribute List:

DATACODE	F	N	char(5)	freetext			
CARDTYPE	F	N	numeric(1,0)	range	5.0000	5.0000	number
SPECIES	T	N	char(4)	taxa			
COEFF	F	N	numeric(5,3)	range	0.0000	1.0000	number
RSQUARE	F	Y	numeric(5,3)	range	0.0000	1.0000	number
NSTUMPS	F	Y	numeric(3,0)	range	3.0000	300.0000	number
MINDIAM	F	Y	numeric(3,0)	range	5.0000	50.0000	cm
MAXDIAM	F	Y	numeric(3,0)	range	40.0000	300.0000	cm

6. Lookup table for substitution species used by CWD program to produce summaries in Entity 4

Attribute List:

DATACODE	F	N	char(5)	freetext			
CARDTYPE	F	N	numeric(1,0)	range	6.0000	6.0000	number
STUDYID	T	N	char(4)	enum			
SPECIES	T	N	char(4)	taxa			
DECAY	T	N	char(1)	enum			
SUBSTID	F	N	char(4)	enum			
SUBSP	F	N	char(4)	taxa			
SUBDECAY	F	N	char(1)	enum			

Attributes Definitions:

AREA

Area of the plot sampled in the stand

BARK_CA

Calcium in bark in parts per million

BARK_K

Potassium in bark in parts per million

BARK_MG

Magnesium in bark in parts per million

BARK_MN

Manganese in bark in parts per million

BARK_N

Nitrogen in bark in parts per million

BARK_NA

Sodium in bark in parts per million

BARK_P

Phosphorus in bark in parts per million

BARK_S

Sulfur in bark in parts per million

BARKC

Bark cover for the decay class

BARKCOV

Bark cover for log or snag, not always estimated. where it is missing it can be taken from the TD01202 file

BARKT

Bark thickness, a mean for the given species

BDENSITY

Density of the tissue (wood)

BMASS

Mass bark of a log or snag or blob

BVOL

Volume of bark in log or snag

CA

Calcium stored (kg/ha)

CARDTYPE

Cardtype number

COEFF

Regression coefficient (b) for $\text{stump_diam} = \text{dbh} + b \cdot \text{dbh}(1.38 - \text{stump_height})$

CWDSRCE

Source of CWD, natural causes (n) or thinning (t)

DATACODE

Data set code

DECAY

Decay class of log or snag

DIAM1A

1st diameter at end #1. diameter at base of snag usually taken at breast level

DIAM1B

2nd diameter at end #1, this is usually height of elliptical pieces

DIAM2A

1st diameter at midpoint, this is horizontal dimension or width of elliptical pieces

DIAM2B

2nd diameter at midpoint, usually vertical or height for elliptical pieces

DIAM3A

1st diameter at end #2. diameter at top of snag, estimated by diameter base and length using a taper of 2cm/m

DIAM3B

2nd diameter at end #2, usually used on elliptical pieces and represents height or vertical dimension

EST_YEAR

Establishment year

HOLLOW

Is log hollow? 1=no, -1=yes

K

Potassium stored (kg/ha)

LENGTH

Length of log estimated from ref. stand maps. the visually estimated height of the snag, or in some cases height actually measured

LOGNUM

of log or snag in subplot=#9601-9642 had densities

MAXDIAM

Max diam of stump

MG

Magnesium stored (kg/ha)

MINDIAM

Min diam of stump

MN

Manganese stored (kg/ha)

MONTH

Month of sampling

N

Nitrogen stored (kg/ha)

NA

Sodium stored (kg/ha)

NSTUMPS

Nr of stumps in regression

P

Phosphorous stored (kg/ha)

PCOVER

Projected cover of a log or snag or blob

PLOT

Plot number

POSITION

Position of piece (l=log s=snag b=blob)

RSQUARE

R square for regression (based on tv030, format 4 data)

S

Sulfur stored (kg/ha)

SLOPE

Slope of plot

SLOPECORR

Slope correction indicator, 0 = no slope corr needed, 1 = slope corr needed

SOURCE

Literature and databases used in compiling this table are given in supplemental information for this database

SPECIES

Species code according to Garrison et al., 1972

STAND

Stand name

STDIAMCORR

Diameter correction to get original stump diameter in some records WRE studyid (add to diam1a)

STUDYID

Individual studyid within overall project

SUBDECAY

Decay class of substitution species

SUBSP

Substitution species code according to garrison

SUBSTID

Studyid of substitution species

SURFAREA

Total surface area of a log or snag or blob

TMASS

Total mass of a log or snag or blob

TVOL

Total for a log or snag or blob

WMASS

Mass of wood in a log or snag or blob

WOOD_CA

Calcium in wood in parts per million

WOOD_K

Potassium in wood in parts per million

WOOD_MG

Magnesium in wood in parts per million

WOOD_MN

Manganese in wood in parts per million

WOOD_N

Nitrogen content in wood in parts per million

WOOD_NA

Sodium in wood in parts per million

WOOD_P

Phosphorus in wood in parts per million

WOOD_S

Sulfur in wood in parts per million

WVOL

Volume of wood in log or snag

YEAR

Year of sampling

Enumerated Domains:

Enumerated Domain for Attribute: CWDSRCE

N	Logs or snags that died of natural causes and are from the new stand
NC	Cut stumps from the new stand
NT	Logs that were thinned from the new stand

Enumerated Domain for Attribute: DECAY

Unknown decay class

1	Freshly killed; sound log with fine twigs present
2	Beginning to decompose; twigs falling off; bark cover intact
3	Partially decayed; bark and sapwood sloughing off; many branches have fallen

off

- 4 Very decayed; unable to support itself; branch stubs can be moved by hand indicating wood decayed to center.
- 5 Extremely decayed; cross-section elliptical; embedded in forest floor; wood structure largely gone

Enumerated Domain for Attribute: HOLLOW

- 1 Log hollow
- 1 Log not hollow

Enumerated Domain for Attribute: POSITION

- B Blob- a pile around a snag
- L Log; indicates piece was horizontal
- P Stump
- S Snag; indicates piece was standing dead

Enumerated Domain for Attribute: STUDYID

- ALCO Alder-conifer plots at cascade head
- DFGY Douglas fir growth and yield
- ESSA Early succession synthesis area
- HSGY Hemlock-spruce growth and yield
- ILTER Watershed 2 and Hagan block LTER transects (tree data)
- MEX Mexico study near puerto morelos, quintana roo
- MHGY Mountain hemlock growth and yield
- MISC Miscellaneous reference stands
- MRRS Mt Rainier reference stands
- NFGY Noble fir growth and yield
- OHJA H.J. Andrews reference stands
- PPGY Ponderosa pine growth and yield
- RMRS Rocky Mtn. reference stands
- SQNP Sequoia national Park reference stands
- STPB St. Petersburg study
- WRE Wind river carbon study (Jack Janisch)

Enumerated Domain for Attribute: DECAY

- Unknown decay class
- 1 Freshly killed; sound log with fine twigs present
- 2 Beginning to decompose; twigs falling off; bark cover intact
- 3 Partially decayed; bark and sapwood sloughing off; many branches have fallen off
- 4 Very decayed; unable to support itself; branch stubs can be moved by hand indicating wood decayed to center.

5 Extremely decayed; cross-section elliptical; embedded in forest floor; wood structure largely gone

Enumerated Domain for Attribute: POSITION

B Blob- a pile around a snag
L Log; indicates piece was horizontal
P Stump
S Snag; indicates piece was standing dead

Enumerated Domain for Attribute: STUDYID

ALCO Alder-conifer plots at cascade head
DFGY Douglas fir growth and yield
ESSA Early succession synthesis area
HSGY Hemlock-spruce growth and yield
LTER Watershed 2 and Hagan block LTER transects (tree data)
MEX Mexico study near puerto morelos, quintana roo
MHGY Mountain hemlock growth and yield
MISC Miscellaneous reference stands
MRRS Mt Rainier reference stands
NFGY Noble fir growth and yield
OHJA H.J. Andrews reference stands
PPGY Ponderosa pine growth and yield
RMRS Rocky Mtn. reference stands
SQNP Sequoia national Park reference stands
STPB St. Petersburg study
WRE Wind river carbon study (Jack Janisch)

Enumerated Domain for Attribute: SLOPECORR

0 No slope correction needed
1 Slope correction needed

Enumerated Domain for Attribute: STUDYID

ALCO Alder-conifer plots at cascade head
DFGY Douglas fir growth and yield
ESSA Early succession synthesis area
HSGY Hemlock-spruce growth and yield
LTER Watershed 2 and Hagan block LTER transects (tree data)
MEX Mexico study near puerto morelos, quintana roo
MHGY Mountain hemlock growth and yield

MISC	Miscellaneous reference stands
MRRS	Mt Rainier reference stands
NFGY	Noble fir growth and yield
OHJA	H.J. Andrews reference stands
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Enumerated Domain for Attribute: DECAY

	Unknown decay class
1	Freshly killed; sound log with fine twigs present
2	Beginning to decompose; twigs falling off; bark cover intact
3	Partially decayed;bark and sapwood sloughing off; many brnaches have fallen off
4	Very decayed; unable to support itself; branch stubs can be moved by hand id icating wood decayed to center.
5	Extremely decayed; cross-section elliptical; embedded in forest floor; wood structure largely gone

Enumerated Domain for Attribute: POSITION

B	Blob- a pile around a snag
L	Log; indicates piece was horizonatal
P	Stump
S	Snag; indicates piece was standing dead

Enumerated Domain for Attribute: STUDYID

ALCO	Alder-conifer plots at cascade head
DFGY	Douglas fir growth and yield
ESSA	Early succession synthesis area
HSGY	Hemlock-spruce growth and yield
LTER	Watershed 2 and Hagan block LTER transects (tree data)
MEX	Mexico study near puerto morelos, quintana roo
MHGY	Mountain hemlock growth and yield
MISC	Miscellaneous reference stands
MRRS	Mt Rainier reference stands
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RMRS	Rocky Mtn. reference stands
SQNP	Sequoia national Park reference stands
STPB	St. Petersburg study
WRE	Wind river carbon study (Jack Janisch)

Enumerated Domain for Attribute: DECAY

	Unknown decay class
1	Freshly killed; sound log with fine twigs present
2	Beginning to decompose; twigs falling off; bark cover intact
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5	Extremely decayed; cross-section elliptical; embedded in forest floor; wood structure largely gone

Enumerated Domain for Attribute: STUDYID

ALCO	Alder-conifer plots at cascade head
DFGY	Douglas fir growth and yield
ESSA	Early succession synthesis area
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RMRS	Rocky Mtn. reference stands
SQNP	Sequoia national Park reference stands
STPB	St. Petersburg study
WRE	Wind river carbon study (Jack Janisch)

Enumerated Domain for Attribute: SUBDECAY

	Unknown decay class
1	Freshly killed; sound log with fine twigs present
2	Beginning to decompose; twigs falling off; bark cover intact
3	Partially decayed;bark and sapwood sloughing off; many brnaches have fallen off
4	Very decayed; unable to support itself; branch stubs can be moved by hand id icating wood decayed to center.

5

Extremely decayed; cross-section elliptical; embedded in forest floor; wood structure largely gone

Enumerated Domain for Attribute: SUBSTID

ALCO	Alder-conifer plots at cascade head
DFGY	Douglas fir growth and yield
ESSA	Early succession synthesis area
HSGY	Hemlock-spruce growth and yield
LTER	Watershed 2 and Hagan block LTER transects (tree data)
MEX	Mexico study near puerto morelos, quintana roo
MHGY	Mountain hemlock growth and yield
MISC	Miscellaneous reference stands
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NFGY	Noble fir growth and yield
OHJA	H.J. Andrews reference stands
PPGY	Ponderosa pine growth and yield
RMRS	Rocky Mtn. reference stands
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