Database Code: TD017

Title: Comparison of terrestrial versus aquatic decomposition rates of logs at the Andrews Experimental Forest, 1985 to 2015

Abstract:

The data collected from this study describe the decomposition of small logs (20-30 cm diameter, 2 m length) in a stream channel to those on an adjacent upland site at the H. J. Andrews Experimental Forest. The stream is a 3rd order above the junction of Lookout Creek and Mack Creek. Three species of trees are being examined: Douglas-fir, western hemlock, and red alder. Data collection started in 1985 and is scheduled to continue to 2050. Periodically a subset of logs is resampled to determine changes in volume, bark cover, density, and nutrient stores. The last set of samples was collected in 2005. Logs ranging in diameter between 20 and 30 cm of a length of 2 m were cut out of live trees of the three species. Logs were placed by hand along a skid road at the terrestrial site. A cable system was used to place log randomly along a stream reach. The location of logs in the stream is noted when they are sampled. The length and diameter as well as bark cover of each sampled log is noted at the time of sampling (td01701). Six cross-sections are removed with a chainsaw. The thickness of the tissue types is noted (inner bark, outer bark, sapwood, and heartwood) and are described in td01702. Samples of each tissue type are taken to determine their moisture content (water mass/dry mass) and density (dry mass/green volume). Density is derived from dry mass and volume as determined via dimensional measurements. Dimensional data, volumes, masses, density, and moisture content are documented in the td01703 table. The volume of logs and tissue types, the total mass, and proportional mass of the tissue types as well as moisture contents is derived from the data in the other data tables and is stored in the td01704 table.

Keywords: Coarse woody debris;Decay;Decomposition;Geomorphology;Logs;Woody debris;Inorganic nutrients;Organic matter;geomorphology;decay rates;decomposition;inorganic nutrients;woody debris;coarse woody debris;organic matter;logs;

Date data commenced:1985-06-04

Date data terminated:2015-06-16

Principal Investigator: Mark E. Harmon

List of Entities:

1. Log Descriptions Including Length, Diameters, Bark Cover

2. Radial Thickness Of Tissue Types

3. Sample Dimensions, Weights, Density, and Moisture Contents

4. Log Volumes, Tissue Volumes, Total Mass, Proportional Mass

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1. Log Descriptions Including Length, Diameters, Bark Cover

Attribute List:

DBCODE	N	N	char(5)	freetext			
ENTITY	N	N	numeric(1,0)	range	1.0000	1.0000	number
STUDYID	N	N	char(3)	place			
YEAR	Y	N	numeric(4,0)	range	1985.0000	2015.0000	number
NUMBER	Y	N	numeric(3,0)	range	0.0000	280.0000	number
SPECIES	N	N	char(4)	taxa			
LOCATION	N	N	char(1)	enum			
POSITION	N	Y	char(3)	freetext			
LENGTH	N	N	numeric(3,0)	range	150.0000	270.0000	cm
BARKCOVER	N	N	numeric(3,0)	range	0.0000	100.0000	%
X0	N	N	numeric(3,0)	range	0.0000	0.0000	cm
DM0	N	N	numeric(3,0)	range	109.0000	330.0000	mm
X1	N	Y	numeric(3,0)	range	10.0000	53.0000	cm

DM1	N	Y	numeric(3,0)	range	109.0000	312.0000	mm
X2	N	Y	numeric(3,0)	range	40.0000	94.0000	cm
DM2	N	Y	numeric(3,0)	range	87.0000	308.0000	mm
X3	N	Y	numeric(3,0)	range	65.0000	140.0000	cm
DM3	N	Y	numeric(3,0)	range	17.0000	306.0000	mm
X4	N	Y	numeric(3,0)	range	91.0000	221.0000	cm
DM4	N	Y	numeric(3,0)	range	25.0000	303.0000	mm
X5	N	Y	numeric(3,0)	range	120.0000	255.0000	cm
DM5	N	Y	numeric(3,0)	range	0.0000	303.0000	mm
X6	N	Y	numeric(3,0)	range	147.0000	262.0000	cm
DM6	N	Y	numeric(3,0)	range	0.0000	298.0000	mm
X7	N	N	numeric(3,0)	range	150.0000	270.0000	cm
DM7	N	N	numeric(3,0)	range	0.0000	318.0000	mm
SAMPLEDATE	N	N	datetime	range	6/19/1985 12:00:00 AM	11/10/2015 12:00:00 AM	YYYY-MM-DD

2. Radial Thickness Of Tissue Types

Attribute List:

DBCODE	N	N	char(5)	freetext			
ENTITY	N	N	numeric(1,0)	range	2.0000	2.0000	number
STUDYID	N	N	char(3)	place			
YEAR	Y	N	numeric(4,0)	range	1985.0000	1985.0000	number
NUMBER	Y	N	numeric(3,0)	range	1.0000	280.0000	number
END_REM	Y	N	char(1)	enum			
HWT	N	N	numeric(4,1)	range	0.0000	131.0000	cm
SWT	N	N	numeric(4,1)	range	4.0000	153.0000	cm
IBT	N	N	numeric(4,1)	range	1.0000	7.0000	cm
OBT	N	N	numeric(4,1)	range	1.0000	18.0000	cm
SAMPLEDATE	N	N	datetime	range	6/11/1985 12:00:00 AM	6/20/1985 12:00:00 AM	YYYY-MM-DD

3. Sample Dimensions, Weights, Density, and Moisture Contents

Attribute List:

DBCODE	N	N	char(5)	freetext			
ENTITY	N	N	numeric(1,0)	range	3.0000	3.0000	number
STUDYID	N	N	char(3)	place			
YEAR	Y	N	numeric(4,0)	range	1985.0000	2015.0000	number

NUMBER	Y	N	numeric(3,0)	range	0.0000	280.0000	number
POS	Y	N	char(1)	enum			
SUBSTR	Y	N	char(2)	enum			
VOLFORM	N	N	char(1)	enum			
D1	N	N	numeric(5,1)	range	1.0000	810.0000	mm
D2	N	N	numeric(5,1)	range	1.0000	435.0000	mm
D3	N	Y	numeric(5,1)	range	0.4000	417.0000	mm
D4	N	Y	numeric(3,0)	range	43.0000	161.0000	mm
WETWTD	N	Y	numeric(6,0)	range	37.0000	226450.0000	g
DRYWTD	N	Y	numeric(6,0)	range	4.0000	121229.0000	g
WETWTM	N	Y	numeric(5,0)	range	504.0000	26300.0000	g
DRYWTM	N	Y	numeric(5,0)	range	288.0000	9890.0000	g
WVOL	N	Y	numeric(3,0)	range	20.0000	600.0000	ml
CVOL	N	Y	numeric(6,0)	range	480.0000	925037.0000	number
DEN	N	Y	numeric(5,0)	range	1.0000	1462.0000	ml
MC	N	Y	numeric(3,0)	range	11.0000	825.0000	%
SAMPLEDATE	N	N	datetime	range	6/19/1985 12:00:00 AM	6/16/2015 12:00:00 AM	YYYY-MM-DD

4. Log Volumes, Tissue Volumes, Total Mass, Proportional Mass

Attribute List:

DBCODE	N	N	char(5)	freetext			
ENTITY	N	N	numeric(1,0)	range	4.0000	4.0000	number
STUDYID	N	N	char(3)	place			
YEAR	Y	N	numeric(4,0)	range	1985.0000	2015.0000	number
NUMBER	Y	N	numeric(3,0)	range	1.0000	280.0000	number
MAXVOL	N	N	numeric(5,0)	range	884.0000	21192.0000	m3
TVOL	N	N	numeric(5,0)	range	3833.0000	19013.0000	m3
FVH	N	Y	numeric(3,0)	range	0.0000	87.0000	%
FVI	N	Y	numeric(3,0)	range	0.0000	11.0000	%
FVO	N	Y	numeric(3,0)	range	0.0000	21.0000	%
FVS	N	N	numeric(3,0)	range	8.0000	100.0000	%
TMASS	N	N	numeric(6,0)	range	474.0000	99041.0000	g
FMH	N	Y	numeric(3,0)	range	0.0000	92.0000	%
FMI	N	Y	numeric(3,0)	range	0.0000	12.0000	%
FMO	N	Y	numeric(3,0)	range	0.0000	100.0000	%

FMS	N	N	numeric(3,0)	range	0.0000	100.0000	%
DENH	N	Y	numeric(5,3)	range	0.0000	0.6350	g/ml
DENI	N	Y	numeric(5,3)	range	0.0000	0.7000	g/ml
DENO	N	Y	numeric(5,3)	range	0.0000	0.9060	g/ml
DENS	N	N	numeric(5,3)	range	0.0000	0.6120	g/ml
MCH	N	Y	numeric(3,0)	range	0.0000	332.0000	%
MCI	N	Y	numeric(3,0)	range	0.0000	495.0000	%
MCO	N	Y	numeric(3,0)	range	0.0000	467.0000	%
MCS	N	N	numeric(3,0)	range	0.0000	525.0000	%
SAMPLEDATE	N	N	datetime	range	6/19/1985 12:00:00 AM	11/10/2015 12:00:00 AM	YYYY-MM-DD

Attributes Definitions:

BARKCOVER

Portion of log covered by bark, includes inner and outer bark

CVOL

Volume calculated from measurement

D1

Length in dimension 1

D2

Length in dimension 2

D3

Length in dimension 3

D4

Length in dimension 4, used only when volform = 4

DBCODE

FSDB Database code

DEN

Density of sample

DENH

Mean density (n=2) of heartwood for log.

DENI

Mean density (n=2) of inner bark (not calculated for alru)

DENO

Mean density (n=2) of outer bark. for alru inner and outer bark combined.

DENS

Mean density (n=2) of sapwood.

DM0

Diameter measurement of the large end of the log

DM1

Diameter measurement of the first cross-section

DM2

Diamter measurement of the second cross-section

DM3

Diameter measurement of the third cross-section

DM4

Diameter measurement of the fourth cross-section

DM5

Diameter measurement of the fifth cross-section

DM6

Diameter measurement of the sixth cross-section

DM7

Diameter at the small end of the log

DRYWTD

Oven-dry weight of total sample

DRYWTM

Dry weight of moisture content sample (subsample of total sample)

END_REM

The end of log cross-section was removed, 1=large end, 2=small end

ENTITY

Entity number

FMH

Fractional mass of heartwood. fmh = (fvh*tvol*denh)/tmass.

FMI

Fractional mass of inner bark. not calculated for alru. see fmh for formula.

FMO

Fractional mass of outer bark. see fmh for formula. for al ru this includes inner bark.

FMS

Fractional mass of sapwood. see fmh for formula.

FVH

Fractional volume of heartwood (not calculated for alru). shape is frustrum of cone for this and next 3 variables

FVI

Fractional volume of inner bark (not calc for alru)

FVO

Fractioanl volume of outer bark (for alru this includes in ner bark)

FVS

Fractioanl volume of sapwood

HWT

Radial thickness of heartwood

IBT

Radial thickness of inner bark

LENGTH

Length of log

LOCATION

Location of log, stream = a, land = t

MAXVOL

Maximum volume of log based on exterior measurements on cardtype 1. assume shape is frustrum of cone.

MC

Moisture content of sample

MCH

Mean moisture content of sapwood (n=2). not calculated for alru.

MCI

Mean moisture content of inner bark (n=2). not calculated for alru.

MCO

Mean moisture content of outer bark (n=2). for alru inner and outer bark combined.

MCS

Mean moisture content fo sapwood (n=2).

NUMBER

Log number

OBT

Radial thickness of outer bark

POS

Position of sample (consecutive alpha codes for sample sections) 2=small end

POSITION

Indicates where log was found or placed. for stream the numbers indicate the 10-m section log occurred, 1=1-10,2-10-20, etc

SAMPLEDATE

Date of observation

SPECIES

Species of log

STUDYID

Study area id

SUBSTR

Code for type of substrate sampled

SWT

Radial thickness of softwood

TMASS

Total dry mass of log.

TVOL

Total vol based on length on cardtype 1 and radial measure mentson cardtype 2. incl bark loss. shape is frustrum of cone.

VOLFORM

Code for equation to be used in calculating the volume from variables d1, d2 d3

WETWTD

Fresh weight of total sample

WETWTM

Wet weight of moisture content sample (subsample of total sample)

WVOL

Volume from water displacement

X0

The point where diameter measurement was taken for the large end of the log

X1

The point where first cross-section was removed

X2

Point where second cross-section was removed

X3

The point where third cross-section was removed

X4

The point where fourth cross-section was removed

X5

The point where fifth cross-section was removed

X6

The point where the sixth cross-section was removed

X7

Position of the small end of the log, should equal the total length

YEAR

Year of observation

Enumerated Domains:

Enumerated Domain for Attribute: LOCATION

T	Terrestrial or upland site
A	Aquatic or stream site

Enumerated Domain for Attribute: END_REM

2	Small end
1	Large end

Enumerated Domain for Attribute: POS

D	Fourth sample from decayed log
E	Fifth sample from decayed log
F	Sixth sample from decayed log , nearest the small end
C	Third sample from decayed log
1	Initial sample from large end of log
A	First sample from decayed nearest large end of log
B	Second sample from decayed nearest large end of log
2	Initial sample from small end of log

Enumerated Domain for Attribute: SUBSTR

OB	Outer bark
IB	Inner bark
HW	Heartwood
SW	Sapwood
W	Undifferentiated wood; unable to distinguish SW from HW

Enumerated Domain for Attribute: VOLFORM

5	Sector of circle: v=d1*d1*(d2/360)*d3.
3	Frustrum of cone: d1=large end diam, d2=small end diam, d3=length, v=pi/3*d3*(d1*d1/4 + d1*d2/2 + d2*d2/4).
1	Cylinder: d1=diameter, d2=length, v=pi/4*d1*d1*d2.
2	Rectangular paralleloid: d1,d2,d3 are lentghs of sides, v=d1*d2*d3.
4	Triangular piece: d1=log side of triangle,d2 = base of triangle, d3=thichness of piece, v=a*d3
6	Donut shape; circle with hollow