Title: Dynamics of large wood in streams: Tagged log inventory, Mack Creek, Andrews Experimental Forest, 1985 to 2008

Abstract:

Although many studies have identified the characteristics of wood stored in streams, few have attempted to measure the long-term dynamics of large wood. From 1982-1985, we developed a long-term study of input, storage, decomposition, and redistribution of large wood in Mack Creek. Each year from 1985 to the present, we have surveyed a 1.1 km section of this stream. This annual survey has allowed us to quantify the standing stocks and characteristics of large wood within the stream and floodplain of an old-growth forest and an older (ca. 1963) clear-cut. In addition, these data allow us to measure rates of input, fragmentation and movement.

Keywords: Aquatic decomposition; Biomass; Debris dams; Disturbance; Ecology; Ecosystem processes; Floods; Geomorphology; Stream ecology; Streams; Wind; Wood movement; Woody debris; Disturbance; geomorphology; ecology; stream ecology; debris flows; floods; biomass; wind; decomposition; biological processes; disturbance; wood; woody debris; ecosystems; aquatic ecosystems; streams; ecosystem processes;

Date data commenced: 1985-10-20

Date data terminated: 2008-11-10

Principal Investigator: Stanley V. Gregory

List of Entities:

1. Tagged log inventory at Mack Creek, HJA

**Attribute List:**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Type</th>
<th>Description</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBCODE</td>
<td>N N</td>
<td>char(5)</td>
<td>enum</td>
</tr>
<tr>
<td>ENTITY</td>
<td>N N</td>
<td>numeric(2,0)</td>
<td>range</td>
</tr>
<tr>
<td>SITECODE</td>
<td>N N</td>
<td>char(2)</td>
<td>place</td>
</tr>
<tr>
<td>YEAR</td>
<td>Y N</td>
<td>numeric(4,0)</td>
<td>range</td>
</tr>
<tr>
<td>GRID</td>
<td>Y N</td>
<td>numeric(4,0)</td>
<td>range</td>
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<tr>
<td>LOGID</td>
<td>Y N</td>
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<td>freetext</td>
</tr>
<tr>
<td>STATUS</td>
<td>N N</td>
<td>char(5)</td>
<td>enum</td>
</tr>
<tr>
<td>FRAGCODE</td>
<td>N Y</td>
<td>char(1)</td>
<td>enum</td>
</tr>
<tr>
<td>LOCATION</td>
<td>N Y</td>
<td>char(2)</td>
<td>enum</td>
</tr>
<tr>
<td>POSITION</td>
<td>N Y</td>
<td>char(1)</td>
<td>enum</td>
</tr>
<tr>
<td>SIGHTTAG</td>
<td>N Y</td>
<td>char(4)</td>
<td>enum</td>
</tr>
<tr>
<td>BEARING</td>
<td>N Y</td>
<td>numeric(3,0)</td>
<td>range</td>
</tr>
<tr>
<td>ORIENT</td>
<td>N Y</td>
<td>char(1)</td>
<td>enum</td>
</tr>
<tr>
<td>ROOTWAD</td>
<td>N Y</td>
<td>char(1)</td>
<td>enum</td>
</tr>
<tr>
<td>UPSTREAM</td>
<td>N Y</td>
<td>char(4)</td>
<td>enum</td>
</tr>
<tr>
<td>INBOARD</td>
<td>N Y</td>
<td>char(4)</td>
<td>enum</td>
</tr>
<tr>
<td>ORIGIN</td>
<td>N Y</td>
<td>char(1)</td>
<td>enum</td>
</tr>
<tr>
<td>ACCUM</td>
<td>N Y</td>
<td>char(1)</td>
<td>enum</td>
</tr>
<tr>
<td>DECAY</td>
<td>N Y</td>
<td>char(3)</td>
<td>enum</td>
</tr>
</tbody>
</table>
STABILITY1   N   Y   char(1)   enum
STABILITY2   N   Y   char(1)   enum
STABILITY3   N   Y   char(1)   enum
STABILITY4   N   Y   char(1)   enum
MOSS         N   Y   char(1)   enum
DIAMETER     N   Y   numeric(4,2)  range 0.0000 2.2000 m
LENGTH       N   Y   numeric(5,2)  range 0.0000 51.0000 m
LENGPLUS     N   Y   char(1)   enum
PCTZONE1     N   Y   numeric(3,0)  range 0.0000 100.0000 %
PCTZONE2     N   Y   numeric(3,0)  range 0.0000 100.0000 %
PCTZONE3     N   Y   numeric(3,0)  range 0.0000 100.0000 %
PCTZONE4     N   Y   numeric(3,0)  range 0.0000 100.0000 %
COMMENTS     N   Y   varchar(254)  freetext

Attributes Definitions:

ACCUM
    Log in accumulation (5 or more logs, must be touching) or not

BEARING
    Compass bearing along one side of log

COMMENTS
    Notes

DBCODE
    FSDB Database code

DECAY
    Decay class (based on Maser & Sedell)

DIAMETER
    Diameter in middle of log

ENTITY
    Entity number

FRAGCODE
    Fragmentation code

GRID
    Reach and section within grid

INBOARD
    Inboard-most tag

LENGPLUS
    Length plus (one or both ends buried)
LENGTH
Length
LOCATION
Geomorphologic location code
LOGID
Log identification (tag color, number, letter (letter indicates log is broken & at least one tag is missing))
MOSS
Moss percent cover code
ORIENT
Orientation
ORIGIN
Origin of log if known
PCTZONE1
Percent of log in zone 1 (wetted channel) (Beschta)
PCTZONE2
Percent of log in zone 2 (active channel) (Beschta)
PCTZONE3
Percent of log in zone 3 (suspended above active channel) (Beschta)
PCTZONE4
Percent of log in zone 4 (floodplain) (Beschta)
POSITION
Geomorphologic position code
ROOTWAD
Rootwad (present or absent)
SIGHTTAG
Sight tag from which bearing is shot
SITECODE
Location of study site
STABILITY1
Stability code 1 -- unstable
STABILITY2
Stability code 2 -- stabilized by rock
STABILITY3
Stability code 3 -- stabilized by another log
STABILITY4
Stability code 4 -- stabilized by tree
STATUS
Condition of log during year surveyed

UPSTREAM

Upstream-most tag

YEAR

Year surveyed

Enumerated Domains:

Enumerated Domain for Attribute: ACCUM
A  In an accumulation (5 or more logs touching)
X  Not in an accumulation

Enumerated Domain for Attribute: DECAY
1  Bark firmly attached
1.5 Intermediate between classes 1 and 2
2  Bark loosely attached
2.5 Intermediate between classes 2 and 3
3  No bark
3.5 Intermediate between classes 3 and 4
4  Punky
4.5 Intermediate between classes 4 and 5
5  No bark, extensive decay, log fragmenting and no longer a cylinder, soon to become soil

Enumerated Domain for Attribute: FRAGCODE
C  Child piece of fragmented log (portion moved from original position, or smaller of movers)
N  Not fragmented
P  Parent piece of fragmented log (in original position or, if mover, larger than child piece)

Enumerated Domain for Attribute: INBOARD
MA  A tag would be inboard-most, but tag is missing
MB  B tag would be inboard-most, but tag is missing
MC  C tag would be inboard-most, but tag is missing
MD  D tag would be inboard-most, but tag is missing
A  A tag is inboard most tag
B  B tag is inboard most tag
C  C tag is inboard most tag
D  D tag is inboard most tag
X  Inboard determination not possible due to orientation of log or missing tags

Enumerated Domain for Attribute: LENGPLUS
Y  One or both ends of log buried
Neither end of log buried

**Enumerated Domain for Attribute: LOCATION**
1. Completely on bank in island reach
2. Anchored on or in bank
3. Spanning active channel
4. Completely in active channel
5. Completely on island
6. Anchored on inboard bank of island
7. Completely in side channel
8. Anchored on outboard bank of island
9. Side channel spanner
10. Completely on bank in island reach

**Enumerated Domain for Attribute: MOSS**
1. Less than 5 percent of log covered by moss
2. Between 5 and 25 percent of log covered by moss
3. Between 25 and 75 percent of log covered by moss
4. More than 75 percent of log covered with moss

**Enumerated Domain for Attribute: ORIENT**
N. Normal to channel
P. Parallel to channel
X. No particular orientation

**Enumerated Domain for Attribute: ORIGIN**
O. Original position (fell in or missing in earlier years)
F. Floated
S. Slash
X. Unknown

**Enumerated Domain for Attribute: POSITION**
L. Left side of channel (facing upstream)
R. Right side of channel (facing upstream)
C. Center of channel
H. Head of island
X. None applicable

**Enumerated Domain for Attribute: ROOTWAD**
Y. Rootwad present
X. Rootwad absent
Enumerated Domain for Attribute: SIGHTTAG
MA  Bearing taken from end of log where A tag should be located if the entire log were present
MB  Bearing taken from end of log where B tag should be located if the entire log were present
MC  Bearing taken from end of log where C tag should be located if the entire log were present
MD  Bearing taken from end of log where D tag should be located if the entire log were present
A   Bearing taken from A tag
AC  Bearing taken from AC end of log
B   Bearing taken from B tag
BD  Bearing taken from BD end of log
C   Bearing taken from C tag
D   Bearing taken from D tag
AXIS Bearing taken along primary log axis
BANK Bearing taken from nearest stream bank
VERT Log vertical, no bearing possible
X   Bearing not possible due to orientation of log and/or missing sighttags
M   Bearing taken, but sighttag not recorded

Enumerated Domain for Attribute: STABILITY1
Y   No stabilizing factor
X   Some other stabilizing factor

Enumerated Domain for Attribute: STABILITY2
Y   Log stabilized by boulder
X   Log not stabilized by boulder

Enumerated Domain for Attribute: STABILITY3
Y   Log stabilized by other logs
X   Log not stabilized by other logs

Enumerated Domain for Attribute: STABILITY4
Y   Log stabilized by tree (bole or roots)
X   Log not stabilized by tree

Enumerated Domain for Attribute: STATUS
F   Found
L   Likely still in previous location; no search due to large size & floodplain location
    OR deep snow (2003)
M   Moved
MR  Moved and retired
NR  New and retired
O   Original
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR</td>
<td>Original and retired</td>
</tr>
<tr>
<td>P</td>
<td>Probable</td>
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<tr>
<td>R</td>
<td>Retired</td>
</tr>
<tr>
<td>V</td>
<td>Overlooked</td>
</tr>
<tr>
<td>VR</td>
<td>Overlooked and retired</td>
</tr>
<tr>
<td>X</td>
<td>Not found</td>
</tr>
<tr>
<td>XMR</td>
<td>Not found, moved, then retired</td>
</tr>
<tr>
<td>XR</td>
<td>Not found and retired</td>
</tr>
<tr>
<td>N</td>
<td>New input</td>
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</table>

Enumerated Domain for Attribute: **UPSTREAM**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA</td>
<td>A tag would be upstream-most, but tag is missing</td>
</tr>
<tr>
<td>MB</td>
<td>B tag would be upstream-most, but tag is missing</td>
</tr>
<tr>
<td>MC</td>
<td>C tag would be upstream-most, but tag is missing</td>
</tr>
<tr>
<td>MD</td>
<td>D tag would be upstream-most, but tag is missing</td>
</tr>
<tr>
<td>A</td>
<td>A tag is upstream most tag</td>
</tr>
<tr>
<td>B</td>
<td>B tag is upstream most tag</td>
</tr>
<tr>
<td>C</td>
<td>C tag is upstream most tag</td>
</tr>
<tr>
<td>D</td>
<td>D tag is upstream most tag</td>
</tr>
<tr>
<td>X</td>
<td>Upstream determination not possible due to orientation of log or missing tags</td>
</tr>
</tbody>
</table>

Enumerated Domain for Attribute: **DBCODE**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>GS006</td>
<td>FSDB Data set code GS006</td>
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