Title: Long-term growth, mortality and regeneration of trees in permanent vegetation plots in the Pacific Northwest, 1910 to present

Abstract:

A network of more than 130 permanent vegetation plots provides long-term information on patterns and rates of forest succession in most of the major forest zones of the Pacific Northwest. The plot network extends from the coast to the Cascades in western Oregon and Washington and east to ponderosa pine forests in the Oregon Cascades. Most of the permanent plots were established during two intervals: from 1910 to 1948, and from 1970 to 1989. The earlier plots were established by U.S. Forest Service researchers to quantify timber growth in young stands of important commercial species and to help answer other applied forestry questions. The more recent period of plot establishment began under the Coniferous Forest Biome program of the International Biological Program during the 1970s, and continued under the Long-term Ecological Research program. A broader set of objectives motivated plot establishment since 1970, especially quantification of composition, structure, and population and ecosystem dynamics of natural forests. Plots have one of three spatial arrangements: (1) contiguous rectangles subjectively placed within an area of homogeneous forest; (2) circular plots subjectively placed within an area of homogeneous forest; and (3) circular plots systematically located on long transects to sample an entire watershed, ridge, or reserve. Rectangular study areas are mostly 1.0 ha or 0.4 ha (1.0 ac) in size (slope-corrected). Circular plots are 0.1 ha (0.247 ac), not corrected for slope. The tree stratum is the focus of work in closed-forest study areas. All trees larger than a minimum diameter (5 cm for most areas) are permanently tagged. Plots are censused every 5 or 6 years. Attributes measured or assessed at each census include tree diameter, tree vigor, and the condition of the crown and stem. The same attributes are recorded for trees (ingrowth) that have exceeded the minimum diameter since the previous census. In many plots tree locations are surveyed to provide a plot-specific x-y location. A mortality assessment is done for trees that have died since the previous census. The assessment characterizes rooting, stem, and crown condition, obvious signs of distress or disturbance, and the apparent predisposing and proximate causes of tree death.

Keywords: Biomass; Biomass (trees); Biomass (woody debris); Disturbance; Ecosystem dynamics; Forest composition; Forest structure; Growth and yield; Long-Term Ecological Research (LTER); Long-term productivity; Mortality; Natural forests; Old-growth forests; Pathogens; Permanent plots; Primary production; Regeneration; Succession; Tree measurements; Windthrow; Spatial data; Organic matter; Stand structure; Long-Term Ecological Research (LTER); Forest dynamics; Measurements; Productivity; Biomass; Plant properties; Wind; Community composition; Plant species composition; Spatial properties; Long term; Permanent plots; Succession; Primary production; Plant growth; Mortality; Regeneration; Disease; Disturbance; Woody debris; Organic matter; Ecosystems; Forests; Old growth forests; Trees; Windthrow;

Date data commenced: 1910-02-01

Date data terminated: 2018-07-27

Principal Investigator: David Carl Shaw

List of Entities:

1. Initial tree conditions with spatial coordinates
2. Individual tree remeasurement
3. Individual tree mortality
4. Tree heights
5. Plot description and establishment year
6. Stand characteristics and sampling status
7. Stand GPS spatial data
8. Stem tallies in three stands of the Cascade Head EF
9. Summaries for density, basal area, volume, biomass, bole NPP, and mortality

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**Attribute List:**

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### 3: Individual tree mortality

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4. Tree heights

Height data of selected trees.

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5. Plot description and establishment year

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7. Stand GPS spatial data

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8. Stem tallies in three stands of the Cascade Head EF

**Attribute List:**
Summaries for density, basal area, volume, biomass, bole npp, and mortality

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Attributes Definitions:

ADD_LCOORD
Additional legal coordinates

ADD_QRCODE
Additional quad reference code

ADD_QUAD
Additional quad maps

ADDHT
Additional height if base of tree not visible

AGE
Tree age at stand establishment

AGE_DOM
Age of dominant trees in stand at the time of plot establishment, estimated or based on tree-ring count.

ANBASE
Angle to base of tree

ANCRBASE
Angle to base of tree crown

ANN_MORT_BM
Annual mortality biomass (total only)

ANTENNAHT
Antenna height

ANTOP
Angle to top of tree

AREA
Area of plot

AREA_HA
Stand area in ha, slope-corrected

ASPECT
Overall aspect in degrees azimuth of stand

BASALAREA
Basal area

BEG_YEAR
Overall aspect of stand

BIOMASS
Bole Biomass (wood plus bark)

BOLE1
Bole conditions

BROKEN
Was top broken?
CANOPY_CLASS
    Canopy class code

CHECK_NOTES
    Pertinent comments about the condition of the tree or to explain oddities about the measurement for a given remeasurement check

CLASSTYPE
    Type of class (d = diameter class, h = height class)

CLIMATE
    Climate information

COMMENTS
    General comments about the measurement

CONDITION1
    Condition code 1 - general tree health indicator is one of potentially six noted conditions in arbitrary order

CONDITION2
    Condition code 2 - general tree health indicator is one of potentially six noted conditions in arbitrary order

CONDITION3
    Condition code 3 - general tree health indicator is one of potentially six noted conditions in arbitrary order

CONDITION4
    Condition code 4 - general tree health indicator is one of potentially six noted conditions in arbitrary order

CONDITION5
    Condition code 5 - general tree health indicator is one of potentially six noted conditions in arbitrary order

CONDITION6
    Condition code 6 - general tree health indicator is one of potentially six noted conditions in arbitrary order

CRBASEHT
    Height to base of crown

CREW4_DAYS
    Total number of days required for remeasurement with a crew of 4 people

CROWN_PCT
    Percent of a tree's live crown volume that is still intact along the stem (does not apply to uprooted trees); record for living trees begins in 2010 (Entity 2) - only recorded when mortality is noted before 2010 (Entity 3).

CROWN_RATIO
    Percent of a tree's height with live branches around one third or more of the bole's circumference

CROWN1
    Crown conditions

DATUM
    Datum

DBCODE
    FSDB Database code

DBH
Tree diameter at breast height (1.37 m)

DBH_CODE
Describes cases where dbh was estimated using methods defined in the codes

DBH_LAST
Last measured tree diameter at breast height (1.37m) - typically from last remeasurement as dbh is usually not measured for dead trees

DENSITY
Density

DETAILPLOT
Indicates whether plot is a detail plot

DIRECTIONS
Explicit directions for reaching stand

DISTURB1
Disturbance conditions

DOM_TREE
Dominant tree species (codes according to Garrison et al., 1972)

DOM_YR
The year of remeasurement for which rank of tree species dominance (relative basal area) was assessed

ELEV_M
Elevation

ELEV_MASK
Elevation mask

ELEVATION
Stand elevation

ELEVSTDDEV
Elevation standard deviation

ENTITY
Entity number

EST_REPORT
Existence of establishment report (paper) and comments

EST_YEAR
Establishment year of plot

ESTAB
Establishment year

EXPANSION
Year(s) of stand expansion

FSDBCODE
Primary FSDB database code associated with study metadata and tree growth data for this STANDID
GEOIDSEP
    Geoid differential
GROUND_PCT
    Percent of the down portion of the tree bole that is in direct contact with the ground (does not include branch contact). Only applies to MAIN_STEM code= 1,2 or POSITION code=2,4
HEIGHT
    Tree height
HERB_DOM
    Dominant herbs, year of evaluation, and comments
HISTORY
    Stand history
HITS
    Number of position fixes
IN_TV010
    Indicates whether stand is part on TV010 database
INIT_BM
    Bole biomass at the beginning of a remeasurement period
INIT_DENSITY
    Density at the beginning of a remeasurement period (stems < 15cm in stands with detailplots are ignored)
INTERVAL
    Remeasurement time interval (years)
LASTMORT
    Most recent year of mortality check
LASTREM
    Most recent year of remeasurement
LAT_DEC
    Latitude decimal
LAT_DEG
    Latitude degrees
LAT_MIN
    Latitude minutes
LAT_SEC
    Latitude seconds
LAT_UTM
    Latitude utm
LATCENTER
    Mean latitude value
LATITUDE
Stand latitude

LATSTDDEV
Latitude standard deviation

LCOORD
Legal coordinates

LEAN_ANGLE
Angle of tree lean in degrees from vertical, where vertical is 0 degrees (not recorded for uprooted trees); record for living trees begins in 2010 (Entity 2) - only recorded when mortality is noted before 2010 (Entity 3).

LOC_NAME
Location name

LOG_MAP
Presence of log map (y/n)

LON_DEC
Longitude decimal

LON_DEG
Longitude degrees

LON_MIN
Longitude minutes

LON_SEC
Longitude seconds

LON_UTM
Longitude utm

LONCENTER
Mean longitude value

LONGITUDE
Sand longitude

LONSTDDEV
Longitude standard deviation

MAIN_STEM
Main stem condition code (use of this code begins in 2010)

MAP_TREES
A stem map (paper) exists for the stand (y/n)

MIDPOINT
Midpoint of class in inches

MIN_DBH
Minimum dbh measured in non-detail plots

MNG_AGNC
Managing agency
MONTH
    Month
MORT_CAUSE1
    Proximate mortality cause: the immediate cause that precipitates tree death (defined as primary mortality cause before 2010)
MORT_CAUSE2
    Predisposing mortality cause: any condition that produces a susceptibility or disposition to tree death without actually causing it (defined as secondary or contributing mortality cause before 2010)
MORT_NOTES
    Mortality check comments added to clarify observations and decisions (for example, note the name of the pathogen if known)
MOSS_DOM
    Dominant mosses, year of evaluation, and comments
NEXTMORT
    Next mortality check
NEXTREM
    Next remeasurement year
NPP
    Net primary bole production
PCTMORTPERYR
    Percent annual mortality
PDOP
    Position, dilution and precision
PLOT_NR
    Plot number
PLOTNUMBER
    Plot number within STANDID
POSITION
    Tree position (used prior to 2010); describes the physical position of the tree; POSITION is replaced with two separate measurements of MAIN_STEM and ROOTING beginning 2010
PSP_STUDYID
    Permanent Study Plots (PSP) study identification code - a mutually exclusive grouping of study forest stands
QREF_CODE
    Quad reference code
QUAD_MAP
    Name of quad map
QUARTER
    Quarter subplot number for circular plots - zero is assigned when quarter is not used or not applicable
REF_Point
    Reference point
REL_BA
Relative basal area

REL_BIOMASS
Relative biomass

REL_DENSITY
Relative density

REL_VOLUME
Relative bole wood volume

RNGR_DIST
Ranger district

ROOT
Rooting medium

ROOTING
Tree rooting condition code (use of this code begins in 2010)

SAMPLEDATE
Date of remeasurement (day of month was not always tracked; in these cases the 1st of each month is assigned)

SEASON
Season of remeasurement

SEC16TH
Direction of 1/16th section

SEC4TH
Direction of quarter section

SEC64TH
Direction of 1/64th section

SERAL
Seral stage

SHRUB_DOM
Dominant shrubs, year of evaluation, and comments

SIGSTR
Satellite signal level

SLOPE
Slope of plot

SLOPEDIST
Horizontal distance from measuring point to tree

SOILS
Soil information

SPECIES
Tree species code (Taxonomic reference: Garrison and Skovlin 1976)

ST_SLOPE
  Overall slope of stand in percent

STANDID
  Study forest stand or watershed identification code

START_DATE
  Starting date

STATE
  State

STEM_MAP
  Presence of stem map (y/n)

STEMCOUNT
  Count of stems in class

STND_SHAPE
  Plot shapes

SUPPORT_PCT
  Percent of the down portion of the tree bole that is supported above the ground (by its own branches, other trees or downed logs, or other objects such as rocks). Only applies to MAIN_STEM code= 1,2 or POSITION code=2,4

TAG
  Current tree tag number

TOPO
  Stand topography information

TRANSECT
  Transect number

TREE_PCT
  Percent of the entire main stem length that is intact (does not apply to uprooted trees); record for living trees begins in 2010 (Entity 2) - only recorded when mortality is noted before 2010 (Entity 3).

TREE_STATUS
  Tree status code

TREE_VIGOR
  Overall vigor code

TREEID
  Tree identification code represented as STANDID+PLOTID+00000, where 00000 represents a unique tree number for that stand and plot

UNDERSTORY
  Presence of understory data (y/n)

UTM_DATUM
  UTM datum

VEG_TYPE
Dominant vegetation

VOLUME
Bole wood volume

XCOORD
X coordinate

YCOORD
Y coordinate

YEAR
Year of establishment, remeasurement, or mortality

Enumerated Domains:

Enumerated Domain for Attribute: BOLE1
U No bole condition is recorded
1 Good straight bole
2 Pistol butt
3 Butt swell -- listed if abnormal for species
4 Forked or multiple butt
5 Leaning
6 Grouse ladder
7 Sweeping
8 Crooks in bole
9 Conks present

Enumerated Domain for Attribute: BOLE2
U No bole condition is recorded
1 Good straight bole
2 Pistol butt
3 Butt swell -- listed if abnormal for species
4 Forked or multiple butt
5 Leaning
6 Grouse ladder
7 Sweeping
8 Crooks in bole
9 Conks present

Enumerated Domain for Attribute: BOLE3
U No bole condition is recorded
1 Good straight bole
2 Pistol butt
3 Butt swell -- listed if abnormal for species
4 Forked or multiple butt
5 Leaning
6 Grouse ladder
7 Sweeping
8 Crooks in bole
9 Conks present

Enumerated Domain for Attribute: CROWN1
U No crown condition is recorded
1 Crown in good condition
2 Broken top
3 Multiple tops or leaders
4 Dead top
5 Top condition is unknown
6 Half-crowned
7 Crook in crown
8 Mistletoe
9 Flat top

Enumerated Domain for Attribute: CROWN2
U No crown condition is recorded
1 Crown in good condition
2 Broken top
3 Multiple tops or leaders
4 Dead top
5 Top condition is unknown
6 Half-crowned
7 Crook in crown
8 Mistletoe
9 Flat top

Enumerated Domain for Attribute: CROWN3
U No crown condition is recorded
1 Crown in good condition
2 Broken top
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Multiple tops or leaders</td>
</tr>
<tr>
<td>4</td>
<td>Dead top</td>
</tr>
<tr>
<td>5</td>
<td>Top condition is unknown</td>
</tr>
<tr>
<td>6</td>
<td>Half-crowned</td>
</tr>
<tr>
<td>7</td>
<td>Crook in crown</td>
</tr>
<tr>
<td>8</td>
<td>Mistletoe</td>
</tr>
<tr>
<td>9</td>
<td>Flat top</td>
</tr>
</tbody>
</table>

**Enumerated Domain for Attribute: DBCODE**
- **TV010** FSDB Data set code TV010

**Enumerated Domain for Attribute: DISTURB1**
- **U** No disturbance condition noted
  - 1 No scars or other disturbances observed
  - 2 Fire scar
  - 3 Log fall scar
  - 4 Unknown scar
  - 5 Animal scar
  - 6 Frost crack
  - 7 Lightning

**Enumerated Domain for Attribute: DISTURB2**
- **U** No disturbance condition noted
  - 1 No scars or other disturbances observed
  - 2 Fire scar
  - 3 Log fall scar
  - 4 Unknown scar
  - 5 Animal scar
  - 6 Frost crack
  - 7 Lightning

**Enumerated Domain for Attribute: QUARTER**
- 0 No quarter subplot number assigned
  - 1 Quarter subplot number 1
  - 2 Quarter subplot number 2
  - 3 Quarter subplot number 3
  - 4 Quarter subplot number 4

**Enumerated Domain for Attribute: ROOT**
1  Rooting medium not recorded
2  Trees rooted in mineral medium
3  Trees rooted in an organic medium
4  Rooting medium examined but unknown

Enumerated Domain for Attribute: CANOPY_CLASS
C  Co-dominant: Crown extends to the top of the general canopy layer and receives light from the top but not much from the sides
D  Dominant: Crown emerges from the general canopy layer and receives light from the top and the sides
E  Emergent: only used in Stand RS39 in 1992
I  Intermediate: Crown extends into the lower portion of the general canopy layer and receives mostly filtered light from the top and the sides
S  Suppressed: Crown completely beneath the general canopy layer
U  Unknown or not measured

Enumerated Domain for Attribute: DBCODE
TV010  FSB Data set code TV010

Enumerated Domain for Attribute: DBH_CODE
1  DBH estimated by linear interpolation or extrapolation
2  DBH estimated from growth rates of nearby trees of similar size
3  DBH estimated assuming ‘no growth’ (usually missing, non-vigorous, or damaged trees)
4  DBH estimated for individual boles using basal area of joint dbh of grown together (fused) trees
8  DBH is measured using a non-standard field procedure or estimated in the field
9  DBH estimated, method unknown or unspecified
G  Good: normally measured DBH
M  Missing: no measurement taken for missing or dead (mortality) trees
U  Unknown: DBH is missing for a tree not listed as missing or dead
V  Verified: diameter is double checked in the field
A  DBH needs adjustment based on comments
5  DBH estimated for individual boles using USFS Forest Inventory and Analysis (FIA) method for Independent trees that grow together

Enumerated Domain for Attribute: QUARTER
0  No quarter subplot number assigned
1  Quarter subplot number 1
2  Quarter subplot number 2
3  Quarter subplot number 3
4  Quarter subplot number 4

Enumerated Domain for Attribute: TREE_STATUS
1  Living tree
Ingrowth - typically young and previously unmeasured trees that now satisfy minimum diameter requirements. Ingrowth codes are not used in the year of plot establishment.

Living stem is fused with one or more tree stems at measurement height and measured together as one.

Dead tree - typically is not noted in the year of plot establishment.

Tree is missing or not found; no measurements are possible.

Enumerated Domain for Attribute: TREE_VIGOR

1. Good vigor: no apparent signs of distress
2. Fair vigor: some signs of distress apparent (e.g., discolored foliage, paucity of leaves or needles, broken stem with few live branches)
3. Poor vigor: extreme distress apparent (i.e., death imminent)
M. Vigor is not recorded for dead or missing trees
U. Unknown vigor of a living tree - vigor is not recorded

Enumerated Domain for Attribute: MAIN_STEM

1. Main stem intact (not broken)
2. Main stem broken at or above the root collar
3. Main stem broken below root collar
9. Not recorded / missing

Enumerated Domain for Attribute: ROOTING

1. Fully rooted; root-soil interface intact, stem is freestanding
2. Partially uprooted (roots exposed), but stem is still freestanding and self-supporting
3. Uprooted and down, stem is not freestanding
9. Condition not recorded / missing

Enumerated Domain for Attribute: MORT_CAUSE1

01. Suppression
10. Disease
11. Mistletoe
12. Bark insect
13. Defoliating insect
14. Unknown pathogen
20. Windthrow
21. Co-opted windthrow
22. Windsnap
23. Broken top
24. Crushed by fallen GREEN tree or limb
30. Crushed by fallen DEAD tree, limb, rock, etc.
31. Lightning
32 Animal kill
33 Snow or ice breakage or crushing
34 Mudflow
40 Fire
50 Other disturbance
60 Unable to determine primal or primary cause during field inspection
70 Tree removed from plot via landslides or other disturbance. This does not apply to trees not found or missing.
99 Unknown: no attempt to note proximal or primary cause of mortality
02 Previously noted injury/damage

Enumerated Domain for Attribute: MORT_CAUSE2
99 Unknown: no attempt to note proximal or primary cause of mortality
01 Suppression
10 Disease
11 Mistletoe
12 Bark insect
13 Defoliating insect
14 Unknown pathogen
20 Windthrow
21 Co-opted windthrow
22 Windsnap
23 Broken top
24 Crushed by fallen GREEN tree or limb
30 Crushed by fallen DEAD tree, limb, rock, etc.
31 Lightning
32 Animal kill
33 Snow or ice breakage or crushing
34 Mudflow
40 Fire
50 Other disturbance
60 Unable to determine primal or primary cause during field inspection
70 Tree removed from plot via landslides or other disturbance. This does not apply to trees not found or missing.
02 Previously noted injury/damage

Enumerated Domain for Attribute: CONDITION1
01 Green needles or leaves present
02 Dead needles or leaves present
03 Bark sloughing
04 Tree has been dead for several years
11 Crown flat-topped
12 Evidence for earlier loss of part of crown
13 Spike top / Top dieback
14 Crown stripped by falling tree or snag
21 Rot at break
41 Pitch tubes on bole
42 Beetle galleries
51 Conks
52 Rot
53 Tree hollow
54 Pitch sheets
55 Oozing wounds
56 Mistletoe plants observed
60 Witch's broom
71 Scarring of bole
72 Girdling
73 Woodpecker / Sapsucker activity
74 No bark remaining on tree
99 Condition code not noted
22 Top not found
43 Insect frass
44 Insect holes

Enumerated Domain for Attribute: CONDITION2
01 Green needles or leaves present
02 Dead needles or leaves present
03 Bark sloughing
04 Tree has been dead for several years
11 Crown flat-topped
12 Evidence for earlier loss of part of crown
13 Spike top / Top dieback
14 Crown stripped by falling tree or snag
21  Rot at break  
41  Pitch tubes on bole  
42  Beetle galleries  
51  Conks  
52  Rot  
53  Tree hollow  
54  Pitch sheets  
55  Oozing wounds  
56  Mistletoe plants observed  
60  Witch's broom  
71  Scarring of bole  
72  Girdling  
73  Woodpecker / Sapsucker activity  
74  No bark remaining on tree  
99  Condition code not noted  
22  Top not found  
43  Insect frass  
44  Insect holes  

Enumerated Domain for Attribute: CONDITION3  
01  Green needles or leaves present  
02  Dead needles or leaves present  
03  Bark sloughing  
04  Tree has been dead for several years  
11  Crown flat-topped  
12  Evidence for earlier loss of part of crown  
13  Spike top / Top dieback  
14  Crown stripped by falling tree or snag  
21  Rot at break  
41  Pitch tubes on bole  
42  Beetle galleries  
51  Conks  
52  Rot  
53  Tree hollow  
54  Pitch sheets
55 Oozing wounds
56 Mistletoe plants observed
60 Witch's broom
71 Scarring of bole
72 Girdling
73 Woodpecker / Sapsucker activity
74 No bark remaining on tree
99 Condition code not noted
22 Top not found
43 Insect frass
44 Insect holes

Enumerated Domain for Attribute: CONDITION4
01 Green needles or leaves present
02 Dead needles or leaves present
03 Bark sloughing
04 Tree has been dead for several years
11 Crown flat-topped
12 Evidence for earlier loss of part of crown
13 Spike top / Top dieback
14 Crown stripped by falling tree or snag
21 Rot at break
41 Pitch tubes on bole
42 Beetle galleries
51 Conks
52 Rot
53 Tree hollow
54 Pitch sheets
55 Oozing wounds
56 Mistletoe plants observed
60 Witch's broom
71 Scarring of bole
72 Girdling
73 Woodpecker / Sapsucker activity
74 No bark remaining on tree
99 Condition code not noted
22 Top not found
43 Insect frass
44 Insect holes

Enumerated Domain for Attribute: CONDITION5
01 Green needles or leaves present
02 Dead needles or leaves present
03 Bark sloughing
04 Tree has been dead for several years
11 Crown flat-topped
12 Evidence for earlier loss of part of crown
13 Spike top / Top dieback
14 Crown stripped by falling tree or snag
21 Rot at break
41 Pitch tubes on bole
42 Beetle galleries
51 Conks
52 Rot
53 Tree hollow
54 Pitch sheets
55 Oozing wounds
56 Mistletoe plants observed
60 Witch's broom
71 Scarring of bole
72 Girdling
73 Woodpecker / Sapsucker activity
74 No bark remaining on tree
99 Condition code not noted
22 Top not found
43 Insect frass
44 Insect holes

Enumerated Domain for Attribute: CONDITION6
01 Green needles or leaves present
02 Dead needles or leaves present
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>03</td>
<td>Bark sloughing</td>
</tr>
<tr>
<td>04</td>
<td>Tree has been dead for several years</td>
</tr>
<tr>
<td>11</td>
<td>Crown flat-topped</td>
</tr>
<tr>
<td>12</td>
<td>Evidence for earlier loss of part of crown</td>
</tr>
<tr>
<td>13</td>
<td>Spike top / Top dieback</td>
</tr>
<tr>
<td>14</td>
<td>Crown stripped by falling tree or snag</td>
</tr>
<tr>
<td>21</td>
<td>Rot at break</td>
</tr>
<tr>
<td>41</td>
<td>Pitch tubes on bole</td>
</tr>
<tr>
<td>42</td>
<td>Beetle galleries</td>
</tr>
<tr>
<td>51</td>
<td>Conks</td>
</tr>
<tr>
<td>52</td>
<td>Rot</td>
</tr>
<tr>
<td>53</td>
<td>Tree hollow</td>
</tr>
<tr>
<td>54</td>
<td>Pitch sheets</td>
</tr>
<tr>
<td>55</td>
<td>Oozing wounds</td>
</tr>
<tr>
<td>56</td>
<td>Mistletoe plants observed</td>
</tr>
<tr>
<td>60</td>
<td>Witch's broom</td>
</tr>
<tr>
<td>71</td>
<td>Scarring of bole</td>
</tr>
<tr>
<td>72</td>
<td>Girdling</td>
</tr>
<tr>
<td>73</td>
<td>Woodpecker / Sapsucker activity</td>
</tr>
<tr>
<td>74</td>
<td>No bark remaining on tree</td>
</tr>
<tr>
<td>99</td>
<td>Condition code not noted</td>
</tr>
<tr>
<td>22</td>
<td>Top not found</td>
</tr>
<tr>
<td>43</td>
<td>Insect frass</td>
</tr>
<tr>
<td>44</td>
<td>Insect holes</td>
</tr>
</tbody>
</table>

**Enumerated Domain for Attribute: DBCODE**
TV010  FSDB Data set code TV010

**Enumerated Domain for Attribute: POSITION**

1  Standing with crown (may be leaning) 
2  Main stem broken 
3  Crushed/knocked over/fallen over AND still rooted 
4  Uprooted 
9  Unknown: position not recorded or otherwise unknown 

**Enumerated Domain for Attribute: MAIN_STEM**
1  Main stem intact (not broken)
<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Main stem broken at or above the root collar</td>
</tr>
<tr>
<td>3</td>
<td>Main stem broken below root collar</td>
</tr>
<tr>
<td>9</td>
<td>Not recorded / missing</td>
</tr>
</tbody>
</table>

Enumerated Domain for Attribute: **ROOTING**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fully rooted; root-soil interface intact, stem is freestanding</td>
</tr>
<tr>
<td>2</td>
<td>Partially uprooted (roots exposed), but stem is still freestanding and self-supporting</td>
</tr>
<tr>
<td>3</td>
<td>Uprooted and down, stem is not freestanding</td>
</tr>
<tr>
<td>9</td>
<td>Condition not recorded / missing</td>
</tr>
</tbody>
</table>

Enumerated Domain for Attribute: **BROKEN**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>TREE NORMAL (BLANK)</td>
</tr>
<tr>
<td>B</td>
<td>TREE WITH BROKEN TOP</td>
</tr>
</tbody>
</table>

Enumerated Domain for Attribute: **DBCODE**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV010</td>
<td>FSDB Data set code TV010</td>
</tr>
</tbody>
</table>

Enumerated Domain for Attribute: **DETAILPLOT**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>Plot is a detailplot</td>
</tr>
<tr>
<td>F</td>
<td>Plot is not a detailplot</td>
</tr>
</tbody>
</table>

Enumerated Domain for Attribute: **IN_TV010**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>Stand is in TV010 database</td>
</tr>
<tr>
<td>F</td>
<td>Stand is not in TV010 database</td>
</tr>
</tbody>
</table>

Enumerated Domain for Attribute: **LOG_MAP**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Stem map exists</td>
</tr>
<tr>
<td>N</td>
<td>Stem map does not exist</td>
</tr>
</tbody>
</table>

Enumerated Domain for Attribute: **MAP_TREES**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Stem map exists</td>
</tr>
<tr>
<td>N</td>
<td>Stem map does not exist</td>
</tr>
</tbody>
</table>

Enumerated Domain for Attribute: **SERAL**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old-growth</td>
<td>Old-growth stage</td>
</tr>
<tr>
<td>Mature</td>
<td>Mature stage</td>
</tr>
<tr>
<td>Young</td>
<td>Young stage</td>
</tr>
</tbody>
</table>

Enumerated Domain for Attribute: **STEM_MAP**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Stem map exists</td>
</tr>
</tbody>
</table>
N Stem map does not exist

Enumerated Domain for Attribute: UNDERSTORY
Y Stem map exists
N Stem map does not exist

Enumerated Domain for Attribute: SEASON
Spring Spring remeasurement; before leaf out
Summer Summer remeasurement

Enumerated Domain for Attribute: FSDBCODE
TV010 Tree growth and mortality measurements in long-term permanent vegetation plots in the Pacific Northwest (LTER Reference Stands) study code
TP073 Plant succession and biomass dynamics following logging and burning in the Andrews Experimental Forest Watersheds 1 and 3, 1962-Present study code
TP041 Post-logging community structure and biomass accumulation in Andrews Experimental Forest Watershed 10 study code
TP059 WATERSHED 10, H.J. ANDREWS EF; RIPARIAN study code
TP098 MACK WATERSHED, H.J. ANDREWS EF; RIPARIAN study code
TP114 Plant biomass dynamics following logging, burning, and thinning in watersheds 6 and 7 at the Andrews Experimental Forest study code
TP115 Plant biomass dynamics in old-growth watersheds 8 and 9 at the Andrews Experimental Forest study code

Enumerated Domain for Attribute: DBCODE
TV010 FSDB Data set code TV010

Enumerated Domain for Attribute: CLASSTYPE
D Diameter class
H Height class

Enumerated Domain for Attribute: DBCODE
TV010 FSDB Data set code TV010

Enumerated Domain for Attribute: DBCODE
TV010 FSDB Data set code TV010