# USFS Region 6 Forest Insect and Disease Aerial Detection Survey Data Dictionary Date: 11/2015

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## Region Six Insect and Disease Layers Available:

| | | | |
|---|---|---|---|
| r6id1947.shp | r6id1967.shp | r6id1987.shp | r6id2007.shp |
| r6id1948.shp | r6id1968.shp | r6id1988.shp | r6id2008.shp |
| r6id1949.shp | r6id1969.shp | r6id1989.shp | r6id2009.shp |
| r6id1950.shp | r6id1970.shp | r6id1990.shp | r6id2010.shp |
| r6id1951.shp | r6id1971.shp | r6id1991.shp | r6id2011.shp |
| r6id1952.shp | r6id1972.shp | r6id1992.shp | r6id2012.shp |
| r6id1953.shp | r6id1973.shp | r6id1993.shp | r6id2013.shp |
| r6id1954.shp | r6id1974.shp | r6id1994.shp | r6id2014.shp |
| r6id1955.shp | r6id1975.shp | r6id1995.shp | r6id2015.shp |
| r6id1956.shp | r6id1976.shp | r6id1996.shp | |
| r6id1957.shp | r6id1977.shp | r6id1997.shp | |
| r6id1958.shp | r6id1978.shp | r6id1998.shp | |
| r6id1959.shp | r6id1979.shp | r6id1999.shp | |
| r6id1960.shp | r6id1980.shp | r6id2000.shp | |
| r6id1961.shp | r6id1981.shp | r6id2001.shp | |
| r6id1962.shp | r6id1982.shp | r6id2002.shp | |
| r6id1963.shp | r6id1983.shp | r6id2003.shp | |
| r6id1964.shp | r6id1984.shp | r6id2004.shp | |
| r6id1965.shp | r6id1985.shp | r6id2005.shp | |
| r6id1966.shp | r6id1986.shp | r6id2006.shp | |

## Data Description:

Theme keywords: insect, disease, tree mortality, tree defoliation, tree damage, disturbance.
Place keywords: Oregon and Washington
Temporal keywords: 1980-2015
Feature Class: polygon
Data source and date: various (see narrative below)
Data extent: all forested lands in Oregon and Washington (all ownerships)
Data Confidence: fair (see narrative)
Locational Confidence: fair (see narrative)

Scale: 1:100,000
Date data transferred to base: various/none (see narrative)
Projection: Albers
Horizontal Datum: NAD 83
Units: Meters
Spheroid: GRS 1980
1st standard parallel: 43 0 0.000
2nd standard parallel: 48 0 0.000
Central Meridian: -120 0 0.00
Latitude of projection's origin: 34 0 0.00
False Easting (meters): 600000.00000
False Northing (meters): 0.00000
Primary contact: Zachary Heath – zheath@fs.fed.us 503-668-1459
Secondary contact: Charlie Schrader-Patton– cschrader@fs.fed.us 541-312-4291
Originator/publisher: USFS/R6/RO/State and Private Forestry/Forest Health Protection
Availability for download: http://www.fs.fed.us/r6/nr/fid/data.shtml
Download format: arc/Info .e00 files; shapefiles

| Column | Item | Definition | Description |
|---|---|---|---|
| 1-24 | | | Standard coverage items |
| 25-54 | ALYYYY | 30,30,C | Summary of the damaging agent(s) and the total number of current dead trees and/or severity level of the defoliation affecting that polygon; there are 1-3 damaging agents/polygon. |
| 55-58 | AGENT1 | 4,4,C | First damaging agent code |
| 59-64 | DAM1C | 6,6,C | Number of dead trees/acre or severity level associated with the first damaging agent; character field |
| 65-68 | AGENT2 | 4,4,C | Second damaging agent code |
| 69-74 | DAM2C | 6,6,C | Number of dead trees/acre or severity level associated with the second damaging agent; character field |
| 75-78 | AGENT3 | 4,4,C | Third damaging agent code |
| 79-84 | DAM3C | 6,6,C | Number of dead trees/acre or severity level associated with the third damaging agent; character field |
| 85-94 | DAM1 | 10,10,N,4 | Number of dead trees/acre (if present in dam1c); numeric field |
| 95-104 | DAM2 | 10,10,N,4 | Number of dead trees/acre (if present in dam2c); numeric field |
| 105-114 | DAM3 | 10,10,N,4 | Number of dead trees/acre (if present in dam3c); numeric field |

## Attribute Examples:

Example 1.) If AL2000 = '4-10!BS-L!1-.25A' and the polygon is 20 acres, then:

AGENT1: 4
DAM1C: .5 (10 dead trees / 20 acre polygon = .5 dead trees/acre)
AGENT2: BS
DAM2C: L
AGENT3: 1
DAM3C: .25 ('A' indicates dead trees/acre; no conversion needed)
DAM1: .5
DAM2: .0
DAM3: .25

Example 2.) If AL1984 = 'RD' and the polygon is 10 acres, then:

AGENT1: RD
DAM1C: (no severity modifier is **required**, so this item may remain blank)
AGENT2: (there is no second damaging agent, so this item remains blank)
DAM2C: (there is no second agent severity, so this item remains blank)
AGENT3: (there is no third damaging agent, so this item remains blank)
DAM3C: (there is no third agent severity, so this item remains blank)
DAM1: .0
DAM2: .0
DAM3: .0

## Process Record/Narrative:

Each year, all forested federal, state and private land in Oregon and Washington are aerially surveyed for insect and disease activity. This survey is flown cooperatively by Region 6 USDA Forest Service, Forest Health Protection (FHP); Oregon Department of Forestry (ODF), Insect and Disease Section; and Washington Department of Natural Resources (WDNR). These data are collected to determine regional insect and disease trends and to serve as an indicator to land owners/managers on insect and disease activity in their area.

Data are collected during annual surveys that are generally flown from early July through September. Historically, the surveys were flown in fixed-wing aircraft on various grid patterns. The accuracy of polygon placement and polygon attributes may be limited by several factors, including: surveyor experience, weather, time of day, time of year and visibility. Areas of activity were sketched on 1:126,720 or 1:100,000 USGS quad, paper maps by two flight observers, each one sketching approximately a two mile swath out their side of the plane. After the flight, the two observer's maps were combined and overlapping polygons were resolved on a final map. The data was then manuscripted on a stable base and scanned; it was edited and attributed using Arc/Info software. All data was forced into a UTM Zone 10 projection.

In 2000, Region 6 aerial surveyors began beta-testing a digitally assisted sketchmapping system (DASM). GeoLink software allows the surveyor to digitize and attribute the damage polygons in real time using gps and a geo-referenced, digital base map on a laptop. After the flight, the data is converted to ArcGIS shape files and processed. Since 2000, portions of the regional surveys have been flown using this software. Since 2003, 100% of the surveys have been flown using GeoLink. Further details about DASM is at:
http://www.fs.fed.us/foresthealth/technology/pdfs/dasm_detailed_overview.pdf

Feature datasets showing when areas were flown, which data capture method was used, and who flew the areas are available on request.

Since 2003, the insect and disease data has also been posted as 100k quad .pdf maps on the web. They are best used when plotted at 36"x36", but users can also zoom in, on screen, and print a small area of interest. The 95 quad maps cover the forested areas in Oregon and Washington that are surveyed each year. The base map data is the TOPO! 100K quad series from National Geographic. Finalized survey maps and spatial survey data are generally posted on the website by November of the survey year. Links to these maps can be found at: http://www.fs.usda.gov/detail/r6/forest-grasslandhealth/insects-diseases/?cid=stelprdb5294941

Draft maps of the survey data are posted anywhere from one day to one week after the flight (between July and September) for use during the current year's field season. No draft spatial data is made available during this timeframe. Feedback from field personnel is used to help clean up the current-year data for final posting. The draft data can be viewed at:
http://www.fs.fed.us/wwetac/threat_map/R6_ADS_Review.html

Cumulative mortality (back to 1985) and cumulative defoliation (back to 2010) derived from the aerial survey data can be viewed at:
http://fs.bioe.orst.edu/web_maps/R6_Cumulative_Mortality_Defoliation.html

## Disclaimer:

The insect and disease data should be used only as an indicator of insect and disease activity, and should be ground-verified for actual causal agent and location. Polygons indicate areas of tree mortality and/or defoliation; intensity of damage is variable and not all trees indicated by polygons are dead or defoliated. The joint cooperators reserve the right to correct, modify, update or replace the data as necessary. Using this data for purposes other than those for which it was intended may yield inaccurate or misleading results.

The agencies which cooperatively conduct this survey (FHP, WDNR and ODF) strive to maintain an accurate Aerial Detection Survey (ADS) dataset, but due to the conditions under which the data are collected, FHP, WDNR and ODF shall not be held responsible for missing or inaccurate data. ADS are not intended to replace more site-specific information.

An accuracy assessment has not been done for this dataset; however ground checks are completed in accordance with local and national guidelines: http://www.fs.fed.us/foresthealth/aviation/qualityassurance.shtml. Maps and data may be updated without notice.

Please cite USDA Forest Service, Forest Health Protection; Washington Department of Natural Resources, Resource Protection Division, Forest Health; and Oregon Department of Forestry, Forest Health Management" as the source of this data in maps and publications.

## Attribute Code Lists:

### BEETLES

| Code | Description | Severity |
|---|---|---|
| 1- | Douglas-fir Beetle | # of dead trees |
| 2- | Douglas-fir Engraver | # of dead trees |
| 3- | Engelmann Spruce Beetle | # of dead tress |
| 4- | Fir Engraver | # of dead trees |
| 5- | Western Balsam Bark Beetle, Sub-Alpine Fir | # of dead trees |
| F- | Flathead fir borer | # of dead trees |
| F1- | Flatheaded borer; Douglas-fir; saplings (code used in the 70's) | # of dead trees |
| F2- | Flatheaded borer; Douglas-fir; mixed (used in the 70's) | # of dead trees |
| F3- | Flatheaded borer; Douglas-fir; saw timber (used in the 70's) | # of dead trees |
| P- | Flatheaded borer; Ponderosa pine | # of dead trees |
| P1- | Flatheaded borer; Ponderosa pine; saplings (used in the 70's) | # of dead trees |
| P2- | Flatheaded borer; Ponderosa pine; mixed (used in the 70's) | # of dead trees |
| P3- | Flatheaded borer; Ponderosa pine; saw (used in the 70's) | # of dead trees |
| 6B- | Mountain Pine Beetle, Whitebark Pine | # of dead trees |
| 6J- | Jeffrey Pine Beetle, Jeffrey Pine | # of dead trees |
| 6K- | Mountain Pine Beetle, Knobcone Pine | # of dead trees |
| 6L- | Mountain Pine Beetle, Lodgepole Pine | # of dead trees |
| 6P- | Mountain Pine Beetle, Ponderosa Pine | # of dead trees |
| 6S- | Mountain Pine Beetle, Sugar Pine | # of dead trees |
| 6W- | Mountain Pine Beetle, Western White Pine | # of dead trees |
| 7- | Pine Engraver (Historically, L/M/H was used as a modifier) ips | # of dead trees |
| 8- | Western Pine Beetle | # of dead trees |
| 88- | Western Pine Beetle, Pole-size Ponderosa Pine | # of dead trees |
| 9- | Silver Fir Beetle | # of dead trees |

# OTHER INSECTS

| Code | Description | Severity |
|---|---|---|
| AB- | Balsam woolly adelgid | # of dead trees - AND/OR - L/M/H* |
| AC- | Cooley spruce gall aphid | L/M/H |
| AM | Maple discoloration | L/M/H |
| AS- | Spruce aphid | L/M/H |
| BB- | Western blackheaded budworm | L/M/H |
| BM- | Modoc budworm | L/M/H/V |
| BM- | Modoc budworm | 1/2/3/4** |
| BP- | Sugar pine tortrix | L/M/H |
| BS- | Western spruce budworm | L/M/H/V |
| BS- | Western spruce budworm | 1/2/3/4** |
| CH- | Larch casebearer/Hypodermella | L/M/H |
| FB- | Alder flea beetle | L/M/H |
| FM- | Fir mealybug | L/M/H |
| GP- | Gouty pitch midge | L/M/H |
| HL- | Western hemlock looper | L/M/H |
| LG- | Green striped forest looper | L/M/H |
| LL- | Larch looper | L/M/H |
| LS- | Black Pine needle scale | L/M/H |
| MD- | Douglas-fir budmoth | L/M/H |
| MF- | Pacific silver fir budmoth | L/M/H |
| ML- | Larch budmoth | L/M/H |
| MN- | Douglas-fir needle midge | L/M/H |
| MS- | Spruce budmoth | L/M/H |
| NM- | Needle miner | L/M/H |
| ND- | Needle miner, Douglas-fir | L/M/H |
| NJ- | Needle miner, Jeffrey Pine | L/M/H |
| NK- | Needle miner, Knobcone Pine | L/M/H |
| NL- | Needle miner, Lodgepole Pine | L/M/H |
| NP- | Needle miner, Ponderosa Pine | L/M/H |
| NS- | Needle miner, Sugar Pine | L/M/H |
| NT- | Needle miner, True Fir | L/M/H |
| NW- | Needle miner, Western White Pine | L/M/H |
| OL- | Western oak looper | L/M/H |
| OL- | Western oak looper (in Douglas-fir) | # of dead trees |
| PB- | Pine butterfly | L/M/H |
| PH- | Phantom hemlock looper | L/M/H |
| PM- | Pandora moth | L/M/H |
| PN- | Pine needlesheath miner | L/M/H |
| PS- | Pine needle scale | L/M/H |
| S- | Spider mite | L/M/H |

| | | |
|---|---|---|
| SA- | Sawfly | L/M/H |
| SD- | Sawfly, Douglas-fir | L/M/H |
| SF- | Sawfly, True fir | L/M/H |
| SH- | Sawfly, Hemlock | L/M/H |
| SK- | Sawfly, Knobcone pine | L/M/H |
| SL- | Sawfly, Lodgepole pine | L/M/H |
| SM- | Satin moth | L/M/H |
| SP- | Sawfly, Ponderosa pine | L/M/H |
| SW- | Sawfly, Western Larch | L/M/H |
| TA- | Tent caterpillar, Alder | L/M/H |
| TC- | Tent caterpillar, Other | L/M/H |
| TM- | Douglas-fir tussock moth | L/M/H |
| TS- | Tent caterpillar, Aspen | L/M/H |
| XS- | Noctuid moth | L/M/H |

*AB = Number of dead trees or L/M/H. Balsam woolly adelgid can have both mortality and severity reported because of differences in infestation.

1) Branch infestation causes flagging and is reported as L/M/H.
2) Bole infestation can cause tree mortality, which is reported by the estimated number of current dead stems observed during the survey.

One polygon may have both types of damage recorded (example: AB-L!AB-15).

**The numbering system used in parts of Oregon (1985-1998) and parts of Washington (1991-1998) to reflect current budworm defoliation severities, while indicating relative cumulative damage.

1 = Current year's defoliation is visible from the air.
2 = Current year's defoliation with some bare tops visible (very little gray and still a lot of green foliage).
3 = Current year's defoliation visible with a lot of bare tops (both some gray foliage and some green foliage visible in host trees).
4 = Current year's defoliation with bare crowns (very gray in color, no visible green foliage in tree).

## OTHER DAMAGING AGENTS

| Code | Description | Severity |
|---|---|---|
| BEAR- | Bear damage | # of dead trees (1993->present; Prior to 1993, L/M/H were used.) |
| BR- | Blister rust | # of dead trees - OR – L/M/H |
| BY- | Bynum's blight/Lophodermella mordida, host Ponderosa pine | L/M/H |
| CC- | Cytospora canker | L/M/H |

| | | |
|---|---|---|
| DH- | Dying hemlock | # of dead trees<br>- OR -<br>L/M/H |
| FIRE- | Fire damage | # of dead trees<br>-OR-<br>No modifier |
| HAIL- | Hail damage | L/M/H |
| HD- | Hardwood decline | # of dead trees<br>- OR -<br>L/M/H |
| HDA- | Hardwood decline in quaking aspen (code introduced in 2011) | # of dead trees<br>-OR-<br>L/M/H |
| HDM- | Hardwood decline in maple (code introduced 2015) | L/M/H |
| HDO- | Hardwood decline in oak (code introduced in 2011) | # of dead trees<br>-OR-<br>L/M/H |
| LC- | Needle cast, lodgepole pine | L/M/H |
| LW | Black Stain Root Disease (If another agent is present, no modifier is used with the LW code.) | # of dead trees<br>-OR- no modifier |
| NFH | Areas not flown – have host species. | |
| NFN | Areas not flown – have no host species. | |
| OUT | No damage detected (in the middle of a polygon with activity) | |
| PC- | Needle cast in Ponderosa pine | L/M/H |
| PL- | Port-Orford-cedar root disease, Phytophthora lateralis | # of dead trees<br>- OR -<br>L/M/H |
| PMD- | Pacific madrone decline | L/M/H |
| PR- | Needle rust in poplars | L/M/H |
| RB- | Red belt | L/M/H |
| RC- | Needle cast, larch | L/M/H |
| RD- | Root disease (If another agent is present, no modifier is used with the RD code.) | # of dead trees<br>- OR –<br>No modifier |
| SNC | Swiss needle cast | L/M/H/S |
| SLID- | Slide | # of dead trees<br>-OR-<br>No modifier |
| UNKD- | Unknown defoliation | L/M/H |
| UNKM- | Unknown mortality | # of dead trees |
| WATR- | Water damage | # of dead trees<br>- OR –<br>No modifier |
| WIND | Wind-throw | # of dead trees<br>-OR-<br>No modifier |
| WNTR | Winter damage | L/M/H<br>- OR-<br>no modifier |