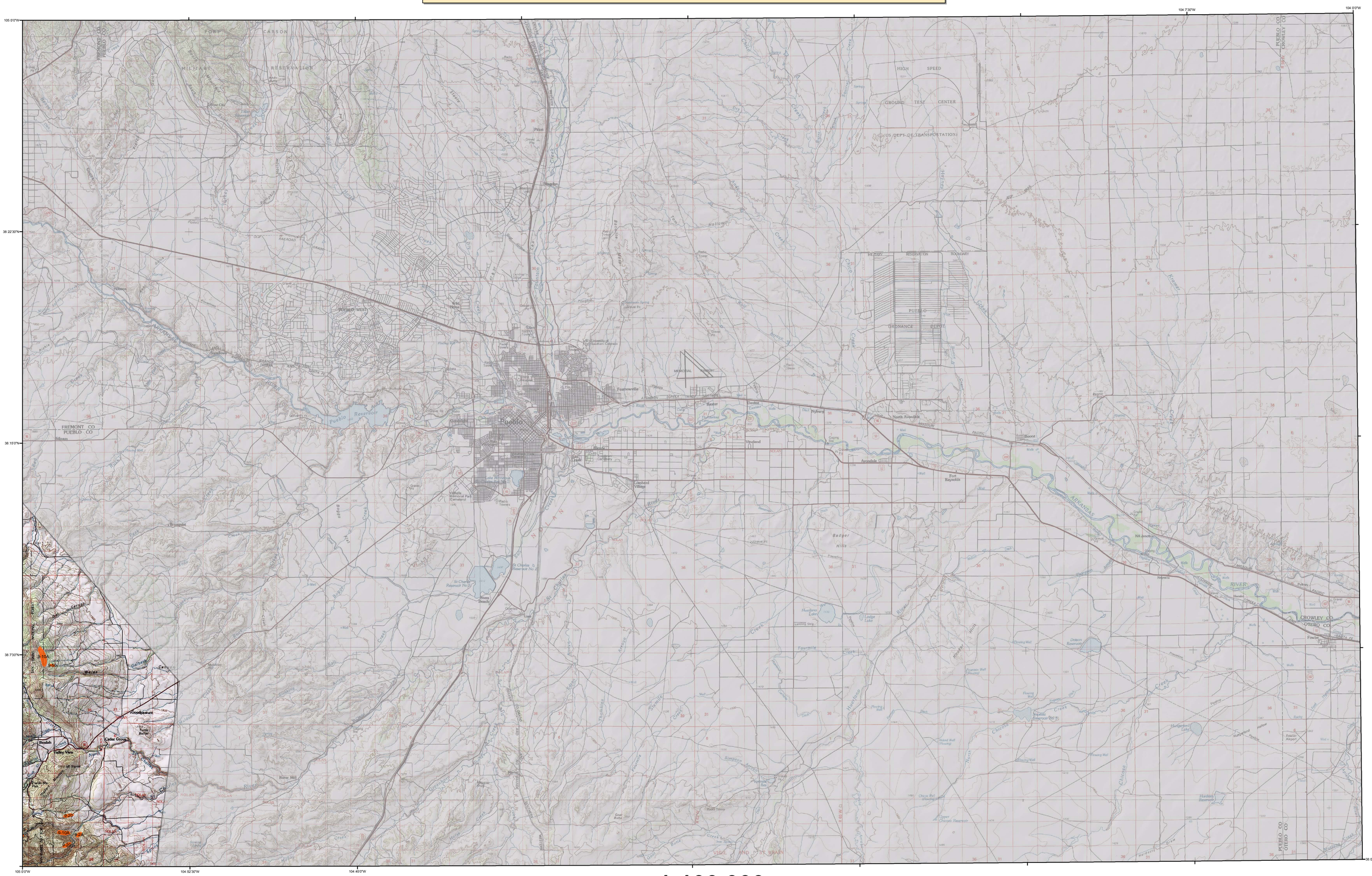
# 2007 Aerial Insect and Disease Survey
# Pueblo, Colorado
# USGS 100K DRG: 38104-A1




## 1:100,000

## Legend

Causal Agent(s) | Not Flown

Use of the Number System

Example: 5-25 = The first number before the dash is the causal agent code. The number after the dash is the number of dead "fader" trees in the polygon or point. When recent dead trees are not counted, an intensity code of L-light, M-moderate, and H-high may be used after the causal agent code. Periodically, trees per acreage estimates are used after the causal agent code instead of number of dead "fader" trees (or an intensity code). For example: 5-1/2A = The first number before the dash is the causal agent code. The number after the dash is an estimation of the number of dead "fader" trees in the polygon per acre. In this case it would be an estimation that, on the average, one tree per every two acres would be a dead "fader" tree. In another example: 5-3A = that on the average, an estimated three trees per acre are dead "fader" trees. A / is used as a separator when a point/ polygon has more than one causal agent code.

| Code | Causal Agent | Primary Host | Code | Causal Agent | Primary Host | Code | Causal Agent | Primary Host |
|---|---|---|---|---|---|---|---|---|
| 1 | Douglas-fir beetle | Douglas-fir | 49 | Atropellis | Lodgepole Pine | 106 | fox squirrel flagging | Cottonwood,Poplar |
| 2 | Engelmann Spruce Beetle | Englemann Spruce | 50 | White pine blister rust | 5-Needle Pine | 107 | fall webworm | Cottonwood,Poplar |
| 5 | Mountain pine beetle | Ponderosa Pine | 51 | Dwarf mistletoe | Softwoods | 108 | road salt | Softwoods |
| 6 | Mountain pine beetle | Lodgepole Pine | 52 | Elytroderma | Ponderosa Pine | 109 | pinewood nematode | Scotch Pine |
| 7 | Mountain pine beetle | 5-Needle Pine | 53 | Includes #55, 56 & 68 | All Tree Species | 110 | oak wilt | Oak |
| 8 | Western pine beetle | Ponderosa Pine | 54 | Air pollutants | All Tree Species | 111 | foliage disease | All Tree Species |
| 9 | Fir Engraver | White Fir | 55 | Chemical damage | All Tree Species | 112 | spruce ips | White Spruce |
| 10 | Douglas-fir engraver beetle | Douglas-fir | 56 | Lophodermium pinastri | Softwoods | 113 | twolined chestnut borer | Oak |
| 11 | Western balsam bark beetle | Subalpine Fir | 57 | Rhabdocline pseudotsugae | Douglas-fir | 114 | anthracnose like foliar disease | Bur Oak |
| 12 | Unidentified bark beetle | Softwoods | 58 | Lophodermella arcuata | Softwoods | 115 | Dieback | All Tree Species |
| 13 | Pine engraver | Lodgepole Pine | 59 | Lecanosticta acicocola | Softwoods | 116 | Mortality | All Tree Species |
| 14 | Pine engraver | Ponderosa Pine | 60 | Lophodermella concolor | Softwoods | 117 | Discoloration | All Tree Species |
| 15 | Ponderosa pine needle miner | Lodgepole Pine | 61 | Dothistroma pini | Softwoods | 118 | Herbicide | All Tree Species |
| 16 | Lodgepole pine needle miner | Ponderosa Pine | 62 | Needle cast (Hypodermataceae) | Softwoods | 119 | Flagging | All Tree Species |
| 17 | Jack pine budworm | Jack Pine | 63 | Root Rot | All Tree Species | 120 | aspen tortrix | Quaking Aspen |
| 18 | Spruce budworm, light defol. | Douglas-fir | 64 | Unidentified disease | Softwoods | 121 | Marssonina Blight | Quaking Aspen |
| 19 | Spruce budworm, medium defol. | Douglas-fir | 65 | Winter damage light | All Tree Species | 200 | Dieback (ash) | Ash |
| 20 | Spruce budworm, heavy defol. | Douglas-fir | 66 | Winter damage medium | All Tree Species | 201 | Dieback (cottonwood) | Cottonwood,Poplar |
| 22 | Douglas-fir tussock moth | Douglas-fir | 67 | Winter damage heavy | All Tree Species | 202 | Dieback (hardwood) | Hardwoods |
| 23 | Pine Butterfly | Ponderosa Pine | 68 | Diplodia | Softwoods | 204 | Dieback (oak) | Oak |
| 26 | Pine looper | Ponderosa Pine | 69 | Pinyon black stain | Common Pinyon | 210 | Mortality (old cottonwood) | Cottonwood,Poplar |
| 27 | Pine tortrix | Ponderosa Pine | 70 | Fire | All Tree Species | 211 | Mortality (eastern cedar) | Eastern Red Cedar |
| 28 | Tent caterpillars | Hardwoods | 71 | Porcupine | Softwoods | 212 | Mortality (hardwood) | Hardwoods |
| 29 | Leaf beetles | Hardwoods | 72 | Windthrow | All Tree Species | 213 | Mortality (oak) | Oak |
| 33 | Oak leaf roller | Hardwoods | 73 | High water damage | All Tree Species | 214 | Mortality (spruce) | Spruce |
| 34 | Pine needle-sheath miner | Ponderosa Pine | 74 | Avalanche | All Tree Species | 220 | Discoloration (ash) | Ash |
| 35 | Pine sawflies | Ponderosa Pine | 75 | Aspen decline-multiple agent(s) | Quaking Aspen | 221 | Discoloration (conifer) | Softwoods |
| 36 | Pine tussock moth | Ponderosa Pine | 76 | Pinyon pine mortality | Common Pinyon | 222 | Discoloration (cottonwood) | Cottonwood,Poplar |
| 37 | Cankerworms | Hardwoods | 77 | Juniper mortality–unknown agent(s) | Juniper | 223 | Discoloration (eastern cedar) | Eastern Red Cedar |
| 38 | Variable oak leaf caterpillar | Hardwoods | 78 | Gamble oak decline-unknown agent(s) | Gambel Oak | 224 | Discoloration (hardwood) | Hardwoods |
| 39 | Unidentified defoliator | All Tree Species | 79 | Limber pine decline–multiple agent(s) | Limber Pine | 225 | Discoloration (oak) | Oak |
| 41 | Heterobasidion annosum (Fomes annosus) | Softwoods | 80 | Hail damage | All Tree Species | 226 | Discoloration (spruce) | Spruce |
| 42 | Armillaria ostoyae (Armillaria mellea) | Softwoods | 99 | Unknown polygon | Unknown | 230 | Herbicide (cottonwood) | Cottonwood,Poplar |
| 43 | Polyporus schweinitzii | Softwoods | 100 | old pinion mortality | Common Pinyon | 231 | Herbicide (eastern cedar) | Eastern Red Cedar |
| 44 | Phomopsis | Softwoods | 101 | road salt Ips | Lodgepole Pine | 240 | Flagging (hardwood) | Hardwoods |
| 45 | Cytospora | All Tree Species | 102 | dutch elm disease | Elm | 250 | Unidentified defoliator (cottonwood) | Cottonwood,Poplar |
| 46 | Western gall rust | Unknown | 103 | diplodia blight | Ponderosa Pine | 251 | Unidentified defoliator (elm) | Elm |
| 47 | Comandra rust | Unknown | 104 | Ips hunterii | Spruce, White Spruce | 252 | Unidentified defoliator (hardwood) | Hardwoods |
| 48 | Stalactiforme rust | Lodgepole Pine | 105 | drought killed narrow leaf cottonwood | Narrowleaf Cottonwood | 300 | Mortality (pine) | Pine |

## USGS 100K Quad - Location Map

Legend
- Flown Area
- State Boundaries
- Counties

## How Aerial Surveys Are Conducted

Data represented on this map are based on aerial observations manually recorded onto a map. This procedure is considered both an art form and a form of scientific data collection, and is highly subjective. An observer only has a few seconds to recognize the color difference between healthy and damaged trees of different species; diagnose causal agents correctly; estimate intensity; delineate the extent of damage; and precisely record this information on a georeferenced map. Air turbulence, cloud shadows, distance from aircraft, haze, smoke, and observer experience can all affect the quality of the survey. These data summaries provide an estimate of conditions on the ground and may differ from estimates derived by other methods.

Aerial surveys provide information on the current status for many causal agents, and are important when examining insect activity trends by comparing historical and current survey data over large areas.

Overview surveys are a "snap shot" in time and therefore may not be timed to accurately capture the true extent or severity of a particular disturbance activity. Aerial surveys can be thought of as the first stage in a multi-stage sampling design. Other remote sensing approaches, including aerial photography, electro-optical sensors, and specially designed aerial surveys with modified flight patterns, can be used to more accurately delineate the extent and severity of a particular disturbance agent. The preceding methods are often more costly than overview surveys, and are generally reserved to address situations of sufficient environmental, economic, or political importance.


**Area surveyed by William Ciesla**
**Map Created: 01/29/2008**
**Projection: UTM NAD83 Zone 13**
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*****DISCLAIMER*****

Due to the nature of aerial surveys, the data on this map will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Many of the most destructive diseases are not represented on this map because these agents are not detectable from aerial surveys. The data presented on this map should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and casual agent. Shaded areas show locations where tree mortality or defoliation were apparent from the air. Intensity of damage is variable and not all trees in shaded areas are dead or defoliated.

The insect and disease data represented on this map are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using this map for purposes other than those for which it was intended may yield inaccurate or misleading results.


**A data dictionary and digital copies of this map and the insect and disease data are available at: http://www.fs.fed.us/r2/resources/fhm/aerialsurvey/**