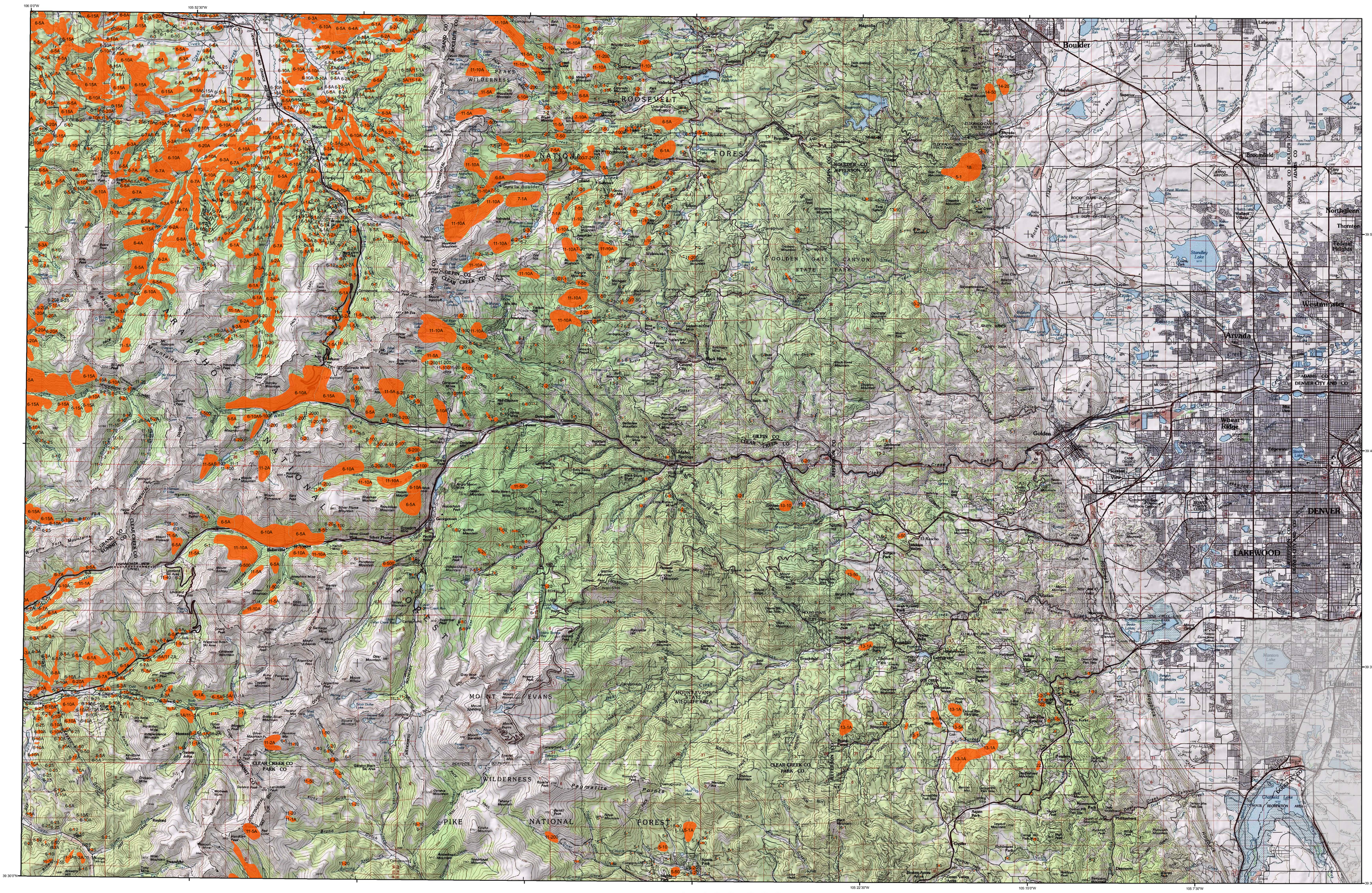
2006 Aerial Insect and Disease Survey
Denver West, Colorado
USGS 100K DRG: 39105-E1



1:100,000

Legend

Causal Agent(s) | Not Flown in 2006

Use of the Number System

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

USGS 100K Quad - Location Map

Legend
- Flown Area in 2006
- 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 Erik Johnson, Pat Ahern 8/17 - 8/25 2006
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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/

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