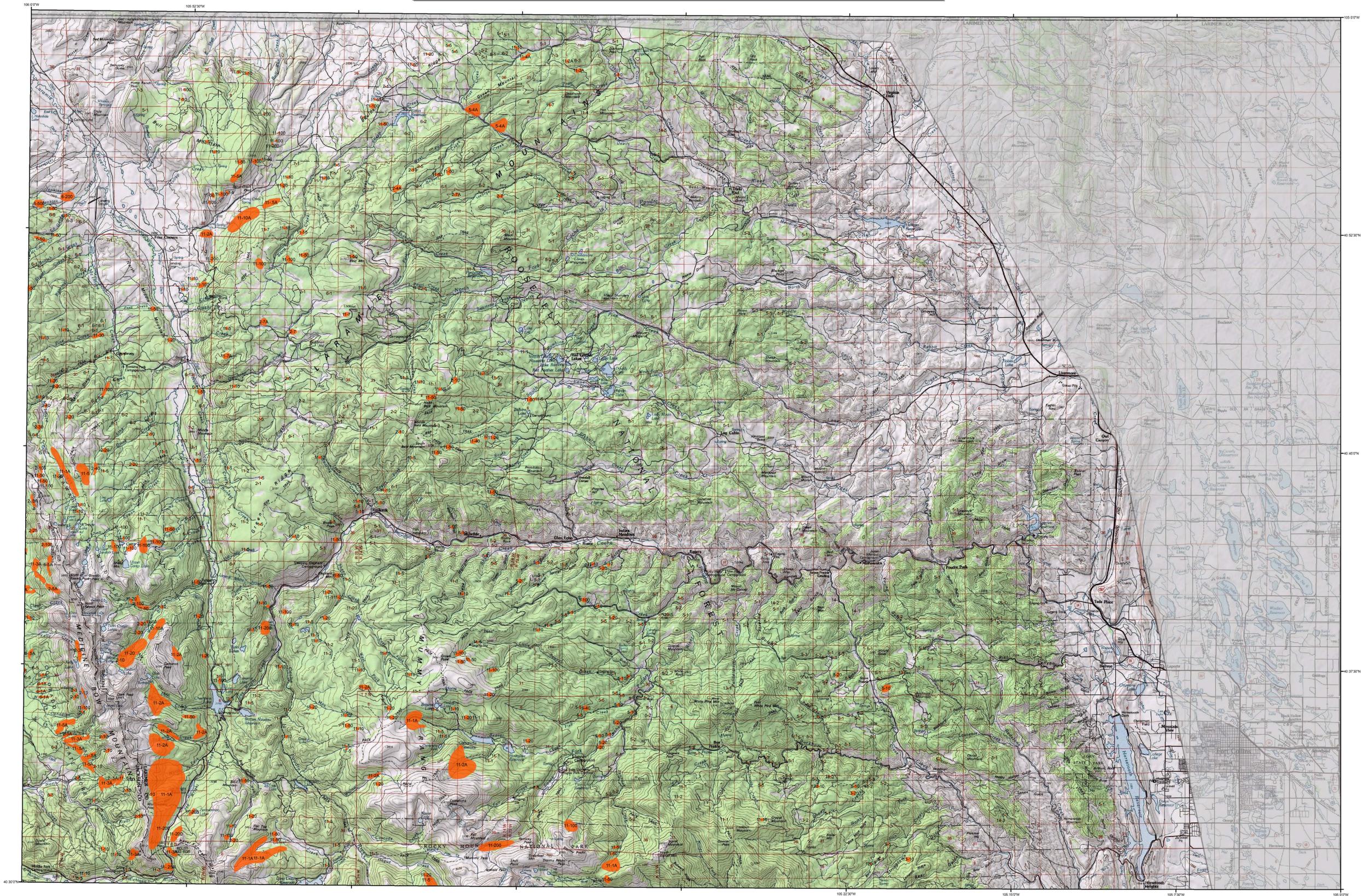


2005 Aerial Insect and Disease Survey Fort Collins, Colorado USGS 100K TOPO!: 40105-E1



1:100,000

Code	Causal Agent	Primary Host	Code	Causal Agent	Primary Host
1	Douglas-fir beetle	Douglas-fir	49	Anisoplia	Lodgepole Pine
2	Engelmann Spruce Beetle	Engelmann Spruce	50	White pine blister rust	5-needle Pine
3	Mountain pine beetle	Ponderosa Pine	51	Deaf millipede	Softwoods
4	Mountain pine beetle	Ponderosa Pine	52	Elytrodema	Ponderosa Pine
5	Mountain pine beetle	White Fir	53	Includes #50, 51 & 52	All Tree Species
6	Western pine beetle	Ponderosa Pine	54	Acy polystani	All Tree Species
7	Fire Enginer	White Fir	55	Chemical damage	All Tree Species
8	Western pine beetle	Douglas-fir	56	Lophodermium pinastri	Softwoods
9	Fire Enginer	Subalpine Fir	57	Rhabdocline pseudotsugae	Douglas-fir
10	Douglas-fir engraver beetle	Softwoods	58	Lophodermium araucariae	Softwoods
11	Western balsam bark beetle	Lodgepole Pine	59	Lecanosticis alococia	Softwoods
12	Unidentified bark beetle	Ponderosa Pine	60	Lophodermella concolor	Softwoods
13	Pine engraver	Lodgepole Pine	61	Dobsonia sp.	Softwoods
14	Pine engraver	Ponderosa Pine	62	Needle cast (Hypodermataceae)	Softwoods
15	Ponderosa pine needle miner	Lodgepole Pine	63	Rust	All Tree Species
16	Lodgepole pine needle miner	Ponderosa Pine	64	Unidentified disease	Softwoods
17	Jack pine budworm	Jack Pine	65	Winter damage light	All Tree Species
18	Spruce budworm, light defol.	Douglas-fir	66	Winter damage medium	All Tree Species
19	Spruce budworm, heavy defol.	Douglas-fir	67	Winter damage heavy	All Tree Species
20	Douglas-fir tussock moth	Ponderosa Pine	68	Diptera	Softwoods
21	Pine butterfly	Ponderosa Pine	69	Pinonj black stain	Common Pinonj
22	Pine looper	Ponderosa Pine	70	Pinonj	All Tree Species
23	Pine looper	Ponderosa Pine	71	Porcupine	Softwoods
24	Tent caterpillars	Hardwoods	72	Windthrow	All Tree Species
25	Leaf beetles	Hardwoods	73	High water damage	All Tree Species
26	Oak leaf roller	Hardwoods	74	Avallanthe	All Tree Species
27	Pine needle-needle miner	Ponderosa Pine	75	Asian decline-multiple agent(s)	All Tree Species
28	Pine sawflies	Ponderosa Pine	76	Pinonj pine mortality	Common Pinonj
29	Pine tussock moth	Ponderosa Pine	77	Juniper mortality-unknown agent(s)	Juniper
30	Cankerworms	Hardwoods	78	Quercus oak decline-unknown agent(s)	Damned Oak
31	Variable oak leaf caterpillar	Hardwoods	79	Limber pine decline-multiple agent(s)	Limber Pine
32	Unidentified defoliator	All Tree Species	80	Hail damage	All Tree Species
33	Heliothisian arionum (Fomes annosus)	Softwoods	81	Unknown polygon	Unknown
34	Amillaria ostroyae (Amillaria mellea)	Softwoods	82	Unknown polygon	Unknown
35	Polyporus schweinitzii	Softwoods	83	Unknown polygon	Unknown
36	Phomopsis	Softwoods	84	Unknown polygon	Unknown
37	Cytospora	All Tree Species	85	Unknown polygon	Unknown
38	Western gall rust	Unknown	86	Unknown polygon	Unknown
39	Comandra rust	Unknown	87	Unknown polygon	Unknown
40	Stemflow rust	Lodgepole Pine	88	Unknown polygon	Unknown



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 & Crystal Tischler
7/18 - 8/8 2005
Map Created: 02-06
Projection: UTM NAD83 Zone 13
Author: J. Ross, USDA Forest Service**

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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 causal 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.

*****DISCLAIMER*****

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/>