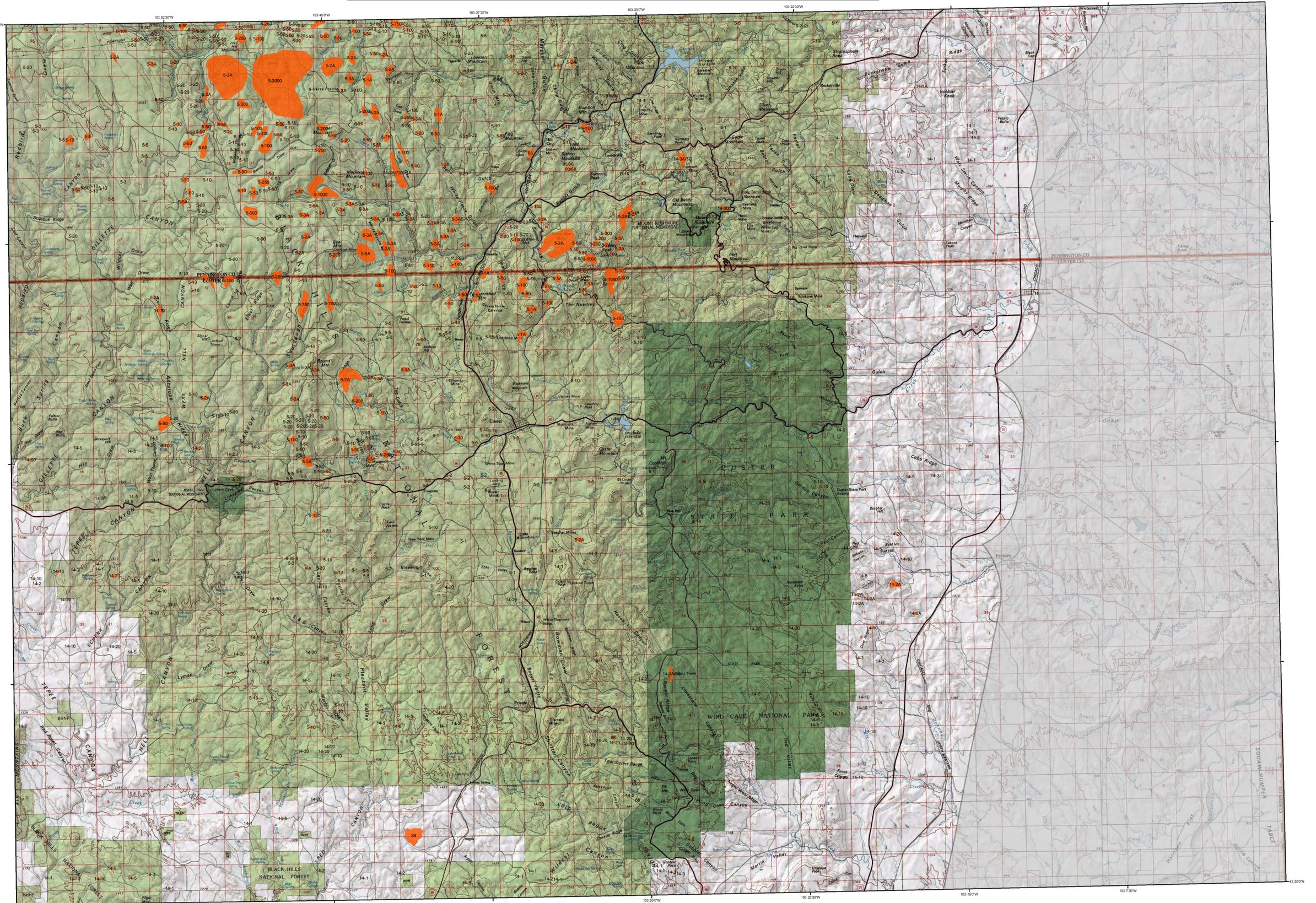


2007 Aerial Insect and Disease Survey Mount Rushmore, South Dakota USGS 100K DRG: 43103-E1



1:100,000

Legend		Causal Agent(s)	Not Flown		
<p>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: 5-120A = 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 specific polygon has more than one causal agent code.</p>					
Code	Causal Agent	Primary Host	Code	Causal Agent	Primary Host
1	Douglas-fir beetle	Douglas-fir	59	Atropis	Lodgepole Pine
2	Engelmann Spruce Beetle	Engelmann Spruce	60	White pine blister rust	5-Needle Pine
3	Mountain pine beetle	Ponderosa Pine	61	Cherry leaf miner	Softwoods
4	Mountain pine beetle	Lodgepole Pine	62	Elytrodema	Ponderosa Pine
5	Mountain pine beetle	5-Needle Pine	63	Inclusio #05, 06 & 08	All Tree Species
6	Western pine beetle	Ponderosa Pine	64	Air pollution	All Tree Species
7	Mountain pine beetle	White Fir	65	Chemical damage	All Tree Species
8	Western pine beetle	Douglas-fir	66	Lophodendrom constrict	Softwoods
9	Fire Enginer	Subalpine Fir	67	Rhabdocline pseudotsugae	Douglas-fir
10	Douglas-fir engraver beetle	Subalpine Fir	68	Lophodendromella arcuata	Softwoods
11	Western bark bark beetle	Unidentified bark beetle	69	Lecanostoma acicola	Softwoods
12	Unidentified bark beetle	Ponderosa Pine	70	Lophodendromella concolor	Softwoods
13	Pine engraver	Lodgepole Pine	71	Orthotoma pice	Softwoods
14	Pine engraver	Ponderosa Pine	72	Needle cast (Hypodermaceae)	All Tree Species
15	Ponderosa pine needle miner	Lodgepole Pine	73	Root Rot	All Tree Species
16	Ponderosa pine needle miner	Ponderosa Pine	74	Unidentified disease	All Tree Species
17	Jack pine budworm	Jack Pine	75	Winter damage light	All Tree Species
18	Jack pine budworm	Douglas-fir	76	Winter damage medium	All Tree Species
19	Spruce budworm, heavy defol.	Douglas-fir	77	Winter damage heavy	All Tree Species
20	Spruce budworm, light defol.	Douglas-fir	78	Dieback (softwood)	Softwoods
21	Spruce budworm, heavy defol.	Douglas-fir	79	Dieback (hardwood)	Hardwoods
22	Douglas-fir tussock moth	Douglas-fir	80	Dieback (oak)	Oak
23	Pine butterfly	Ponderosa Pine	81	Mortality (old cottonwood)	Cottonwood/Poplar
24	Pine looper	Ponderosa Pine	82	Mortality (eastern cedar)	Eastern Red Cedar
25	Pine tortrix	Ponderosa Pine	83	Mortality (hardwood)	Hardwoods
26	Test caterpillar	Hardwoods	84	Mortality (spruce)	Spruce
27	Leaf beetles	Hardwoods	85	Discoloration (ash)	Ash
28	Oak leaf roller	Hardwoods	86	Discoloration (cottonwood)	Cottonwood/Poplar
29	Pine needle-shaft miner	Ponderosa Pine	87	Discoloration (eastern cedar)	Eastern Red Cedar
30	Pine sawfly	Ponderosa Pine	88	Discoloration (oak)	Oak
31	Pine tussock moth	Ponderosa Pine	89	Discoloration (spruce)	Spruce
32	Variable oak leaf caterpillar	Hardwoods	90	Discoloration (cottonwood)	Cottonwood/Poplar
33	Unidentified defoliator	All Tree Species	91	Discoloration (eastern cedar)	Eastern Red Cedar
34	Helicobasidium aransum (Fomes annosus)	Softwoods	92	Discoloration (hardwood)	Hardwoods
35	Armillaria ostoyae (Armillaria mellea)	Softwoods	93	Discoloration (oak)	Oak
36	Plygonus schweinitzi	Softwoods	94	Discoloration (spruce)	Spruce
37	Phytophthora	All Tree Species	95	Herbicide (cottonwood)	Cottonwood/Poplar
38	Western gall rust	Unknown	96	Herbicide (eastern cedar)	Eastern Red Cedar
39	Comandra rust	Unknown	97	Flagging (hardwood)	Hardwoods
40	Stachybotrya rust	Lodgepole Pine	98	Unidentified defoliator (cottonwood)	Cottonwood/Poplar
41			99	Unidentified defoliator (spruce)	Spruce
42			100	Unidentified defoliator (hardwood)	Hardwoods
43			101	Mortality (pine)	Pine

USGS 100K Quad - Location Map



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 Bill Schupp & Al Dymerski
Map Created: 12/12/2007
Projection: UTM NAD83 Zone 13
Author: J. Ross, USDA Forest Service

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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 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.

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/>