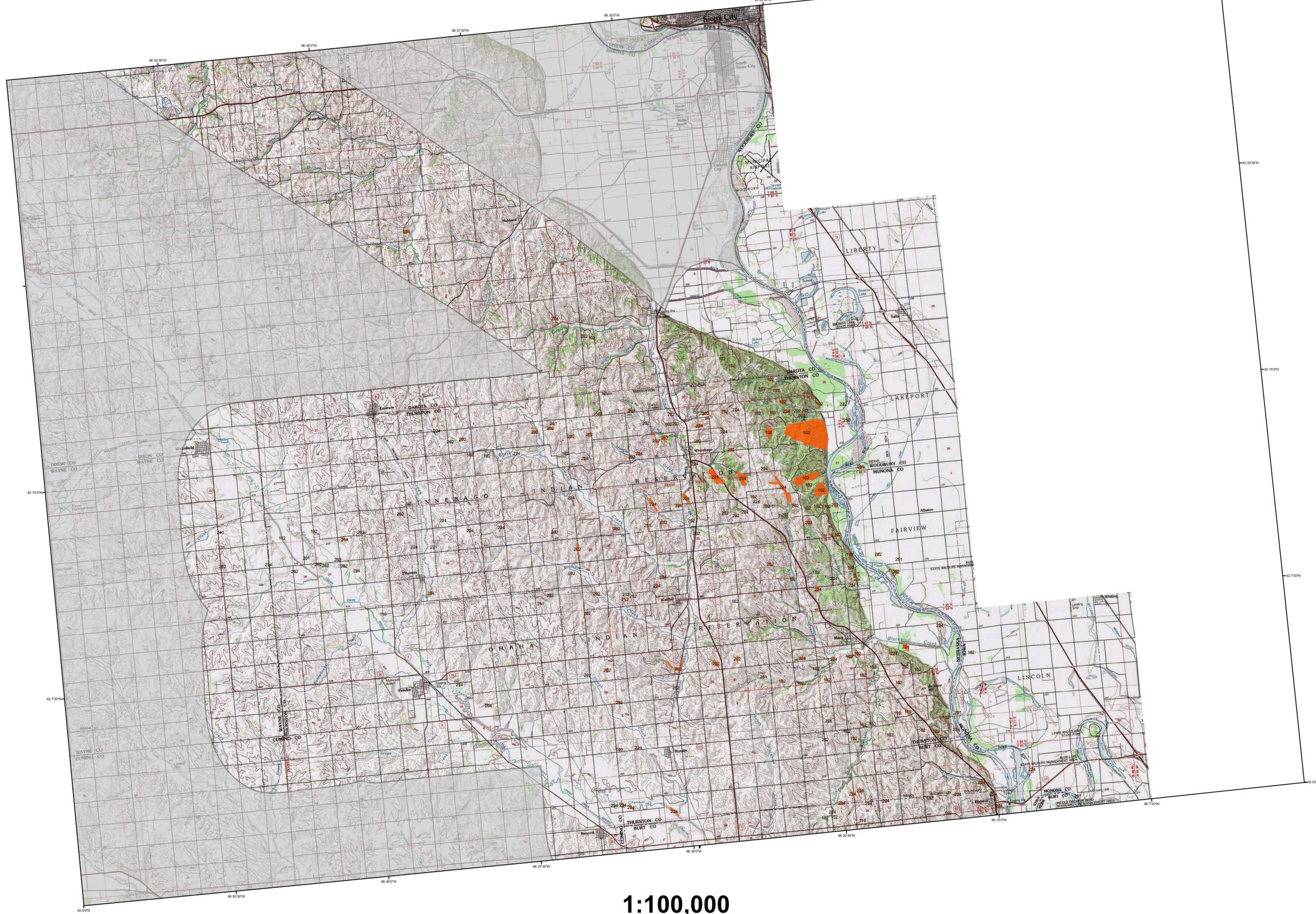


# 2005 Aerial Insect and Disease Survey Sioux City South, Iowa, Nebraska & South Dakota USGS 100K DRG: 42096-A1



**Legend**

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: 5-12(A) = 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 good 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	68	Armadillo	Lodgepole Pine	102	fox squirrel flagging	Cottonwood/Poplar
2	Engelmann spruce beetle	Engelmann Spruce	69	White pine blister rust	5-Needle Pine	107	fall webworm	Cottonwood/Poplar
3	Mountain pine beetle	Ponderosa Pine	70	Deer fly	Softwoods	108	road kill	Softwoods
4	Mountain pine beetle	Lodgepole Pine	71	Elyrodium	Ponderosa Pine	109	pinewood nematode	Softwoods
5	Mountain pine beetle	5-Needle Pine	72	Inclusio #05, 05 & 09	All Tree Species	110	oak wilt	Oak
6	Western pine beetle	Ponderosa Pine	73	Air pollutants	All Tree Species	111	foliage disease	All Tree Species
7	Fire Engulfer	White Fir	74	Chemical damage	All Tree Species	112	spruce Ips	White Spruce
8	Douglas-fir engraver beetle	Douglas-fir	75	Lophodermium pinasti	Softwoods	113	hemlock chestnut borer	Oak
9	Western balsam bark beetle	Subalpine Fir	76	Rhabdocline pseudotsugae	Douglas-fir	114	anthracnose like foliar disease	Bur Oak
10	Unidentified bark beetle	Softwoods	77	Lophodermium arcauta	Softwoods	115	Dieback	All Tree Species
11	Pine engraver	Lodgepole Pine	78	Lachnospiza acicola	Softwoods	116	Mortality	All Tree Species
12	Pine engraver	Ponderosa Pine	79	Lophodermium concolor	Softwoods	117	Discoloration	All Tree Species
13	Pine engraver	Lodgepole Pine	80	Cochlostoma jun	Softwoods	118	Hemlock	All Tree Species
14	Pine engraver	Ponderosa Pine	81	Needle cast (Phyodermataceae)	Softwoods	119	Flagging	All Tree Species
15	Lodgepole pine needle miner	Lodgepole Pine	82	Needle cast (Phyodermataceae)	Softwoods	120	Aspen tortrix	Quaking Aspen
16	Lodgepole pine needle miner	Jack Pine	83	Floor Rot	All Tree Species	121	Mansuetina blight	Aspen
17	Jack pine budworm	Douglas-fir	84	Unidentified disease	All Tree Species	200	Dieback (ash)	Cottonwood/Poplar
18	Spruce budworm, light defol.	Douglas-fir	85	Winter damage light	All Tree Species	201	Dieback (cottonwood)	Hardwoods
19	Spruce budworm, medium defol.	Douglas-fir	86	Winter damage medium	All Tree Species	202	Dieback (hardwood)	Oak
20	Spruce budworm, heavy defol.	Douglas-fir	87	Winter damage heavy	All Tree Species	204	Dieback (oak)	Oak
21	Douglas-fir tussock moth	Ponderosa Pine	88	Diopsida	Softwoods	210	Mortality (old cottonwood)	Cottonwood/Poplar
22	Pine looper	Ponderosa Pine	89	Prion black stain	Common Prion	211	Mortality (eastern cedar)	Eastern Red Cedar
23	Pine looper	Jack Pine	90	Fire	All Tree Species	212	Mortality (hemlock)	Oak
24	Pine tortrix	Softwoods	91	Prionopsis	Softwoods	213	Mortality (spruce)	Spruce
25	Tart caterpillars	Hardwoods	92	Winter damage	All Tree Species	220	Discoloration (ash)	Ash
26	Leaf beetles	Hardwoods	93	Aspen decline-multiple agent(s)	Quaking Aspen	221	Discoloration (cotter)	Softwoods
27	Oak leaf roller	Hardwoods	94	Prion pine mortality	Common Prion	222	Discoloration (eastern cedar)	Eastern Red Cedar
28	Pine sawflies	Ponderosa Pine	95	Juniper mortality-unknown agent(s)	Juniper	223	Discoloration (oak)	Oak
29	Pine sawflies	Ponderosa Pine	96	Gambel oak decline-unknown agent(s)	Gambel Oak	224	Discoloration (spruce)	Spruce
30	Pine tussock moth	Ponderosa Pine	97	Limber pine decline-multiple agent(s)	Limber Pine	225	Discoloration (oak)	Oak
31	Cankerworms	Hardwoods	98	High water damage	All Tree Species	226	Discoloration (hardwood)	Hardwoods
32	Variable oak leaf caterpillar	All Tree Species	99	Unknown polygon	Unknown	227	Harbicide (cottonwood)	Softwoods
33	Unidentified defoliator	All Tree Species	100	old prison mortality	Common Prion	230	Harbicide (eastern cedar)	Eastern Red Cedar
34	Armillaria ostoyae (Armillaria mellea)	Softwoods	101	road kill top	Lodgepole Pine	240	Flagging (hardwood)	Hardwoods
35	Polyporus schweinitzi	Softwoods	102	oak wilt disease	Elm	250	Unidentified defoliator (cottonwood)	Cottonwood/Poplar
36	Phomopsis	All Tree Species	103	dieback blight	Ponderosa Pine	251	Unidentified defoliator (elm)	Hardwoods
37	Cytospora	Unknown	104	husk nut	Spruce, White Spruce	300	Mortality (pine)	Pine
38	Western gall rust	Unknown	105	straght killed narrow leaf cottonwood	Narrowleaf Cottonwood			
39	Comandra rust	Lodgepole Pine						
40	Stachytarax rust	Lodgepole Pine						



**1:100,000**

**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 Schaupp & Al Dymerski 7/11 - 7/15 2005**  
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**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 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/>