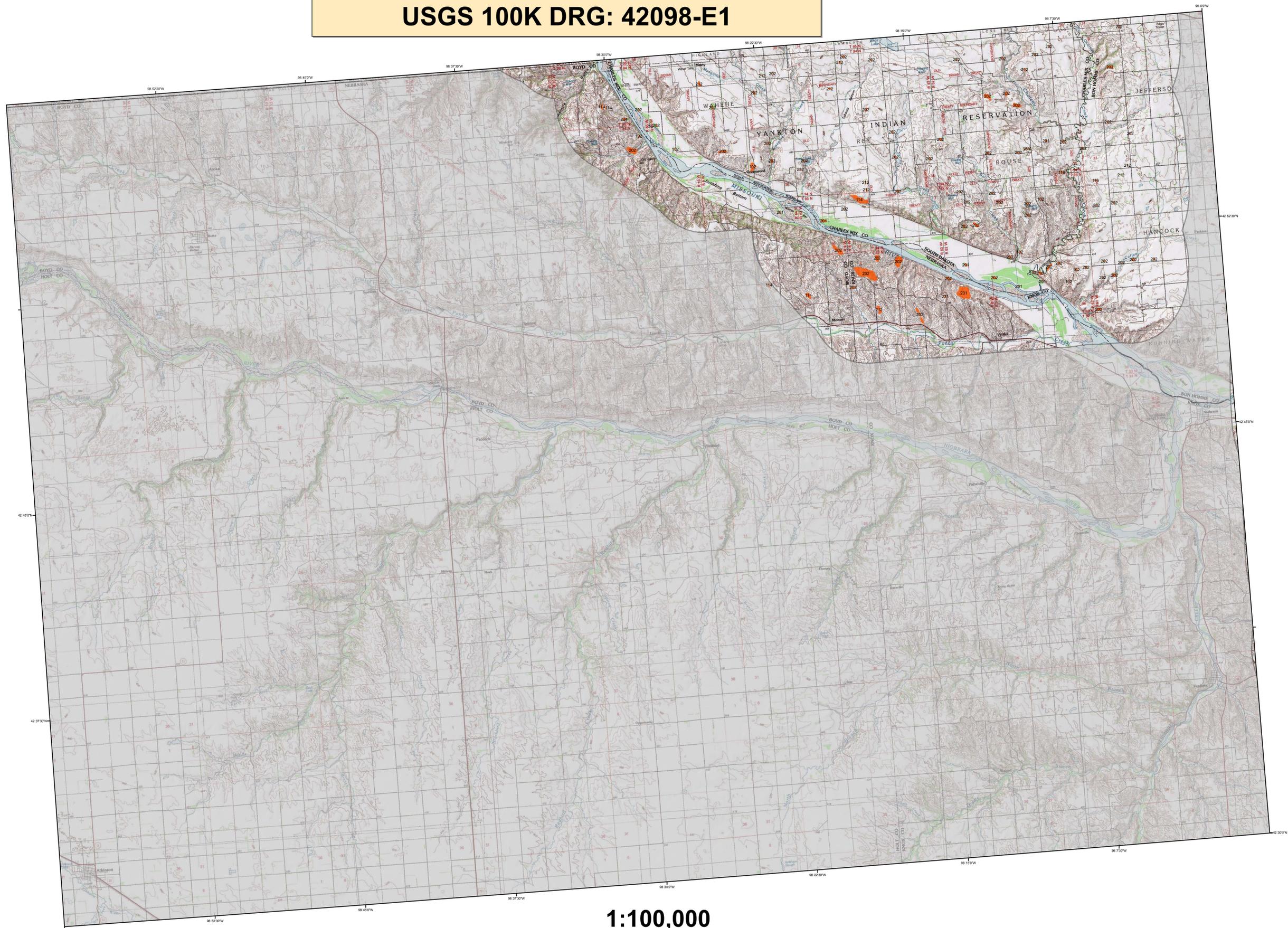


# 2005 Aerial Insect and Disease Survey Atkinson, Nebraska & South Dakota USGS 100K DRG: 42098-E1



1:100,000

**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 "ladder" trees in the polygon or point. When recent dead trees are not counted, an intensity code of L, 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 "ladder" trees (or an intensity code). For example: 5-12L = The first number before the dash is the causal agent code. The number after the dash is an estimation of the number of dead "ladder" 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 "ladder" tree. In another example: 5-3A = that on the average, an estimated three trees per acre are dead "ladder" 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
1	Douglas-fir beetle	Douglas-fir	46	Arthropod	Lodgepole Pine
2	Engelmann spruce beetle	Engelmann Spruce	47	White pine blister rust	Sitka Spruce
3	Mountain pine beetle	Ponderosa Pine	51	Dwarf mistletoe	Softwoods
4	Mountain pine beetle	Lodgepole Pine	52	Euproctera	Ponderosa Pine
5	Mountain pine beetle	5-Needle Pine	53	Includes #02, 05 & 05	All Tree Species
6	Mountain pine beetle	Ponderosa Pine	54	Air pollution	All Tree Species
7	Western pine beetle	Ponderosa Pine	55	Chemical damage	All Tree Species
8	White Fir	White Fir	56	Lophodermium pinasti	Softwoods
9	Fir engraver	Douglas-fir	57	Rhabdocline pseudotsugae	Douglas-fir
10	Douglas-fir engraver beetle	Sitka Spruce	58	Lophodermium anacuta	Softwoods
11	Western balsam bark beetle	Softwoods	59	Lecanosticca acicosa	Softwoods
12	Unidentified bark beetle	Lodgepole Pine	60	Lophodermium concolor	Softwoods
13	Pine engraver	Lodgepole Pine	61	Dothiora pin	Softwoods
14	Pine engraver	Lodgepole Pine	62	Nedea cast (Hydrodromataceae)	Softwoods
15	Ponderosa pine needle miner	Lodgepole Pine	63	Root Rot	All Tree Species
16	Lodgepole pine needle miner	Lodgepole 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, medium defol.	Douglas-fir	67	Winter damage heavy	All Tree Species
20	Spruce budworm, heavy defol.	Douglas-fir	68	Diplotis	Softwoods
21	Douglas-fir tussock moth	Douglas-fir	69	Pinyon bark stain	Common Pinyon
22	Pine butterfly	Ponderosa Pine	70	Fire	All Tree Species
23	Pine looper	Ponderosa Pine	71	Fire	All Tree Species
24	Pine tortrix	Ponderosa Pine	72	Windthrow	All Tree Species
25	Tent caterpillars	Hardwoods	73	High water damage	All Tree Species
26	Pine needle-ash miner	Hardwoods	74	Aspen decline-multiple agents)	Quaking Aspen
27	Pine sawflies	Ponderosa Pine	75	Pinyon pine mortality	Common Pinyon
28	Pine tussock moth	Ponderosa Pine	76	Juniper mortality-unknown agents)	Juniper
29	Cankerworms	Hardwoods	77	Gambel oak decline-unknown agents)	Gambel Oak
30	Variable oak leaf caterpillar	Hardwoods	78	Limber pine decline-multiple agents)	Limber Pine
31	Unidentified defoliator	All Tree Species	79	Hail damage	All Tree Species
32	Heterobasidion annosum (Fomes annosus)	Softwoods	80	Unknown polygon	Unknown
33	Armillaria ostroyae (Armillaria mellea)	Softwoods	81	old prison mortality	Common Pinyon
34	Polyborus schweinitzi	Softwoods	82	Unidentified defoliator (cottonwood)	Lodgepole Pine
35	Phomopsis	Softwoods	83	Unidentified defoliator (elm)	Elm
36	Cytospora	All Tree Species	84	Unidentified defoliator (hardwood)	Hardwoods
37	Western gall rust	Unknown	85	Unidentified defoliator (hardwood)	Hardwoods
38	Conioidium rust	Unknown	86	drought killed narrow leaf cottonwood	Narrowleaf Cottonwood
39	Strobiliform rust	Lodgepole Pine	87		
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**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  
 Map Created: 01-06  
 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/>