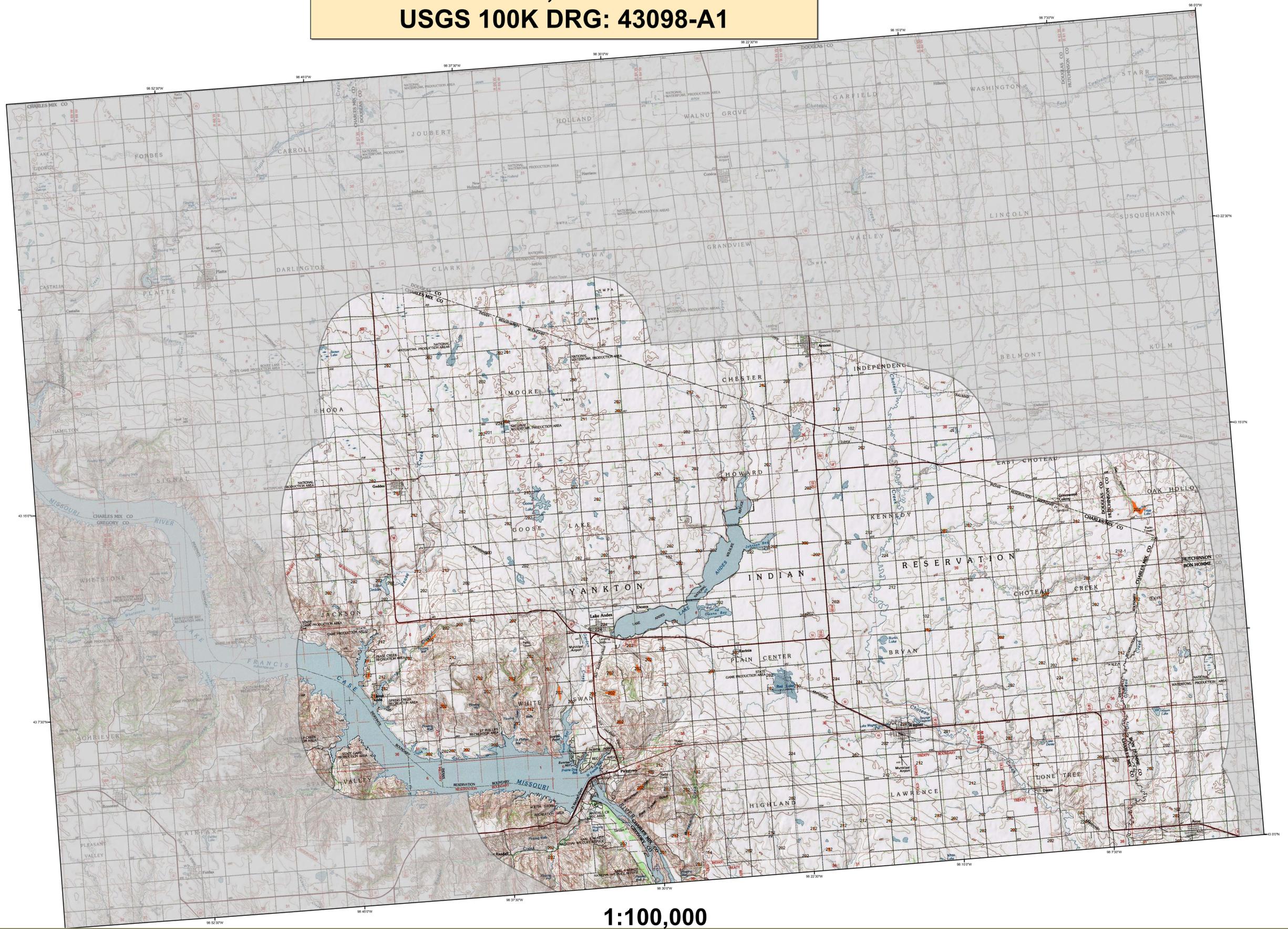


2005 Aerial Insect and Disease Survey Lake Andes, South Dakota USGS 100K DRG: 43098-A1



1:100,000

Legend

Use of the Number System
 Example: 5-25 = The first number before the dash is the number of dead "faded" 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 acre estimates are used after the causal agent code instead of number of dead "faded" 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 "faded" 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 "faded" tree. In another example: 5-3A = that on the average, an estimated three trees per acre are dead "faded" 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	106	fox squirrel flagging	Cottonwood/Poplar
2	Engelmann spruce beetle	Engelmann Spruce	107	fox squirrel	Cottonwood/Poplar
3	Mountain pine beetle	Ponderosa Pine	108	road salt	Softwoods
4	Mountain pine beetle	Lodgepole Pine	109	greenwood nematode	Softwoods
5	Needle Pine	5-Needle Pine	110	oak wilt	Oak
6	Western pine beetle	Ponderosa Pine	111	oil-spill disease	All Tree Species
7	White Fir	White Fir	112	spruce ips	White Spruce
8	Douglas-fir engraver beetle	Douglas-fir	113	woolwood chestnut borer	Oak
9	Western balsam bark beetle	Subalpine Fir	114	ambrosia leaf miner disease	Rail Oak
10	Unidentified bark beetle	Softwoods	115	Diabrotica	All Tree Species
11	Pine engraver	Lodgepole Pine	116	Mortality	All Tree Species
12	Pine engraver	Ponderosa Pine	117	Discoloration	All Tree Species
13	Ponderosa pine needle miner	Lodgepole Pine	118	Herbicide	All Tree Species
14	Ponderosa pine needle miner	Ponderosa Pine	119	Stagging	All Tree Species
15	Jack pine budworm	Jack Pine	120	aspen tortrix	Quaking Aspen
16	Spruce budworm, light defol.	Douglas-fir	121	Mankonia Blight	Quaking Aspen
17	Spruce budworm, medium defol.	Douglas-fir	200	Diabrotica (ash)	Ash
18	Spruce budworm, heavy defol.	Douglas-fir	201	Diabrotica (cottonwood)	Cottonwood/Poplar
19	Douglas-fir tussock moth	Douglas-fir	202	Diabrotica (hardwood)	Hardwoods
20	Pine Buttery	Ponderosa Pine	203	Diabrotica (oak)	Oak
21	Pine looper	Ponderosa Pine	204	Diabrotica (cedar)	Cedar
22	Pine tortrix	Ponderosa Pine	205	Mortality (eastern cedar)	Eastern Red Cedar
23	Tart caterpillars	Hardwoods	206	Mortality (hardwood)	Hardwoods
24	Leaf beetles	Hardwoods	207	Mortality (spruce)	Spruce
25	Oak leaf roller	Hardwoods	208	Mortality (spruce)	Spruce
26	Pine needle-sheath miner	Ponderosa Pine	209	Discoloration (ash)	Ash
27	Pine sawflies	Ponderosa Pine	210	Discoloration (cedar)	Cedar
28	Pine tussock moth	Ponderosa Pine	211	Discoloration (cottonwood)	Cottonwood/Poplar
29	Cankerworms	Hardwoods	212	Discoloration (eastern cedar)	Eastern Red Cedar
30	Variable oak leaf caterpillar	Hardwoods	213	Discoloration (hardwood)	Hardwoods
31	Unidentified defoliator	All Tree Species	214	Discoloration (oak)	Oak
32	Heterobasidion annosum (Fomes annosus)	Softwoods	215	Discoloration (spruce)	Spruce
33	Armillaria ostroyae (Armillaria mellea)	Softwoods	216	Herbicide (cottonwood)	Cottonwood/Poplar
34	Polytopus swainsonii	Softwoods	217	Herbicide (eastern cedar)	Eastern Red Cedar
35	Chrysomya	All Tree Species	218	Mortality (cedar)	Eastern Red Cedar
36	Western gall rust	Unknown	219	Unidentified defoliator (cottonwood)	Cottonwood/Poplar
37	Chrysomya	All Tree Species	220	Unidentified defoliator (cedar)	Cedar
38	Chrysomya	All Tree Species	221	Unidentified defoliator (hardwood)	Hardwoods
39	Chrysomya	All Tree Species	222	Mortality (pine)	Pine
40	Chrysomya	All Tree Species			

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

Map Created: 01-06

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/>