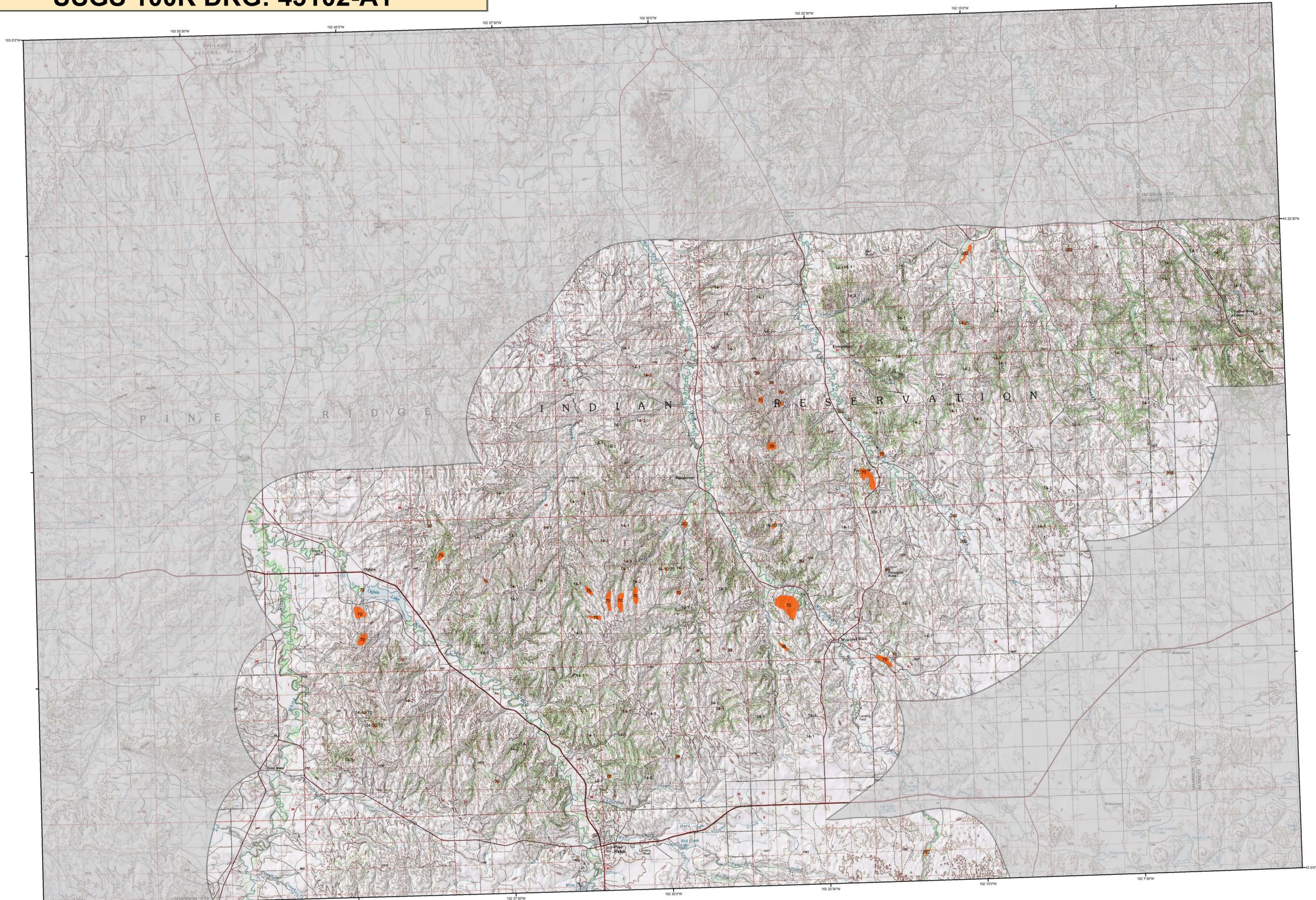


# 2006 Aerial Insect and Disease Survey Pine Ridge, South Dakota USGS 100K DRG: 43102-A1



1:100,000

## Legend

Code	Causal Agent	Primary Host	Code	Causal Agent	Primary Host	Code	Causal Agent	Primary Host
1	Douglas-fir beetle	Douglas-fir	46	Hemlock	Lodgepole Pine	106	fox squirrel flagging	Cottonwood/Poplar
2	Engelmann spruce beetle	Engelmann Spruce	50	White pine blister rust	5-Needle Pine	107	fall webworm	Cottonwood/Poplar
3	Mountain pine beetle	Ponderosa Pine	51	Oak mistletoe	Softwoods	108	road oak	Softwoods
4	Mountain pine beetle	Lodgepole Pine	52	Elyrodia	Ponderosa Pine	109	pinewood nematode	Softwoods
5	Mountain pine beetle	5-Needle Pine	53	Incluses #05, 06 & 08	All Tree Species	110	oak wilt	Oak
6	Western pine beetle	Ponderosa Pine	54	Air pollutants	All Tree Species	111	foliage disease	All Tree Species
7	Fire Engrafer	White Fir	55	Chemical damage	All Tree Species	112	spruce ips	White Spruce
8	Douglas-fir engraver beetle	Douglas-fir	56	Lophodermium praeusti	Softwoods	113	beetle/ chestnut borer	Oak
9	Western balsam bark beetle	Subalpine Fir	57	Rhizoctonia pseudotsugae	Douglas-fir	114	androsace like foliar disease	Bur Oak
10	Unidentified bark beetle	Softwoods	58	Lophodermium arcuta	Softwoods	115	Daback	All Tree Species
11	Pine engraver	Lodgepole Pine	59	Lachnospiza acicola	Softwoods	116	Mortality	All Tree Species
12	Pine engraver	Ponderosa Pine	60	Lophodermium concolor	Softwoods	117	Discoloration	All Tree Species
13	Pine engraver	Lodgepole Pine	61	Dothistroma pin	Softwoods	118	Herbicide	All Tree Species
14	Pine engraver	Ponderosa Pine	62	Needle cast (Hypodermataceae)	Softwoods	119	Flagging	All Tree Species
15	Lodgepole pine needle miner	Lodgepole Pine	63	Rust Rot	All Tree Species	120	aspens tortix	Quaking Aspen
16	Lodgepole pine needle miner	Ponderosa Pine	64	Unidentified disease	Softwoods	121	Mesoxena blight	Quaking Aspen
17	Jack pine budworm, light defol.	Douglas-fir	65	Winter damage light	All Tree Species	200	Daback (ash)	Ash
18	Jack pine budworm, medium defol.	Douglas-fir	66	Winter damage medium	All Tree Species	201	Daback (cottonwood)	Cottonwood/Poplar
19	Jack pine budworm, heavy defol.	Douglas-fir	67	Winter damage heavy	All Tree Species	202	Daback (hardwood)	Hardwoods
20	Jack pine budworm, heavy defol.	Douglas-fir	68	Opioida	Softwoods	204	Daback (oak)	Oak
21	Pine butterfly	Ponderosa Pine	69	Prion black stain	Common Prinyon	210	Mortality (old cottonwood)	Cottonwood/Poplar
22	Pine looper	Ponderosa Pine	70	Fire	All Tree Species	211	Mortality (eastern cedar)	Eastern Red Cedar
23	Pine looper	Ponderosa Pine	71	Pansynops	Softwoods	212	Mortality (hardwood)	Hardwoods
24	Pine tortix	Softwoods	72	Windthrow	All Tree Species	213	Mortality (oak)	Oak
25	Leaf beetles	Hardwoods	73	High water damage	All Tree Species	214	Mortality (spruce)	Spruce
26	Oak leaf roller	Hardwoods	74	Avalanche	All Tree Species	220	Discoloration (ash)	Ash
27	Pine needle-shash miner	Ponderosa Pine	75	Aspen decline-multiple agents)	Quaking Aspen	221	Discoloration (conifer)	Softwoods
28	Pine needle-shash miner	Ponderosa Pine	76	Prion pine mortality	Common Prinyon	222	Discoloration (cottonwood)	Cottonwood/Poplar
29	Leaf beetles	Hardwoods	77	Juniper mortality-unknown agents)	Juniper	223	Discoloration (eastern cedar)	Eastern Red Cedar
30	Leaf beetles	Hardwoods	78	Quercus oak decline-unknown agents)	Quercus Oak	224	Discoloration (hardwood)	Hardwoods
31	Leaf beetles	Hardwoods	79	Limbic pine decline-multiple agents)	Limbic Pine	225	Discoloration (oak)	Oak
32	Leaf beetles	Hardwoods	80	Hail damage	All Tree Species	226	Discoloration (spruce)	Spruce
33	Oak leaf roller	Hardwoods	81	Unknown polygon	Unknown	230	Herbicide (cottonwood)	Cottonwood/Poplar
34	Pine needle-shash miner	Ponderosa Pine	82	old prion mortality	Common Prinyon	231	Herbicide (eastern cedar)	Eastern Red Cedar
35	Pine sawfly	Softwoods	100	old prion mortality	Lodgepole Pine	240	Flagging (hardwood)	Hardwoods
36	Variable oak leaf caterpillar	All Tree Species	101	road kill top	Unknown	250	Unidentified defoliator (cottonwood)	Cottonwood/Poplar
37	Cankerworms	Softwoods	102	cutch elm disease	Elm	251	Unidentified defoliator (elm)	Elm
38	Variable oak leaf caterpillar	All Tree Species	103	didkida blight	Ponderosa Pine	252	Unidentified defoliator (hardwood)	Hardwoods
39	Unidentified defoliator	Softwoods	104	lps hanters	Spruce, White Spruce	300	Mortality (pine)	Pine
40	Armillaria cotycae (Armillaria mellea)	Softwoods	105	drought killed narrow leaf cottonwood	Narrowleaf Cottonwood			
41	Pogonopus schweinitzi	Softwoods						
42	Phomopsis	Softwoods						
43	Cytospora	All Tree Species						
44	Western gall rust	Unknown						
45	Comandra rust	Lodgepole Pine						
46	Shiitake rust	Lodgepole Pine						

## USGS 100K Quad - Location Map



Legend  
 Flown Area in 2006  
 State Boundaries  
 Counties

## 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 Schaupt & Al Dymerski 08/30/2006

Map Created: 01/17/2007

Projection: UTM NAD83 Zone 13  
 Author: J. Ross, USDA Forest Service

## DIRECT ALL INQUIRIES TO:



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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/>