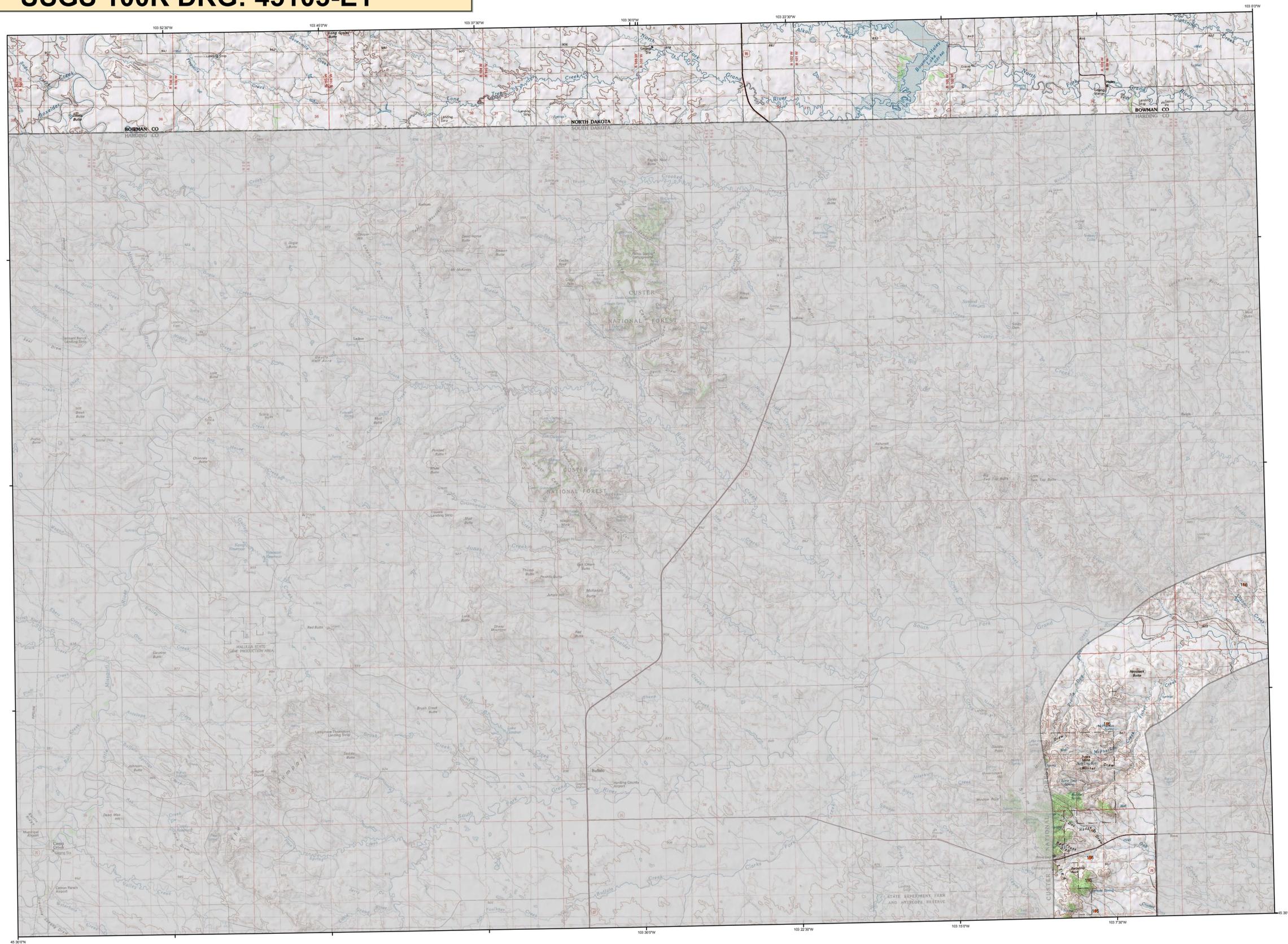


# 2006 Aerial Insect and Disease Survey Camp Crook, South Dakota USGS 100K DRG: 45103-E1



1:100,000

Code	Causal Agent	Primary Host	Code	Causal Agent	Primary Host	Code	Causal Agent	Primary Host
1	Douglas-fir beetle	Douglas-fir	100	Anisoplia	Lodgepole Pine	108	Iron laurel borer	Cottonwood/Poplar
2	Engelmann spruce beetle	Engelmann Spruce	101	White pine blister rust	5-needle Pine	107	fall webworm	Cottonwood/Poplar
3	Mountain pine beetle	Ponderosa Pine	102	Dwarf mistletoe	Softwoods	108	road salt	Softwoods
4	Mountain pine beetle	Lodgepole Pine	103	Elysiodes	Ponderosa Pine	109	pinewood nematode	Spruce Pine
5	Mountain pine beetle	5-needle Pine	104	Incluses #65, 66 & 69	All Tree Species	110	oak wilt	Oak
6	Western pine beetle	Ponderosa Pine	105	Air pollutants	All Tree Species	111	foliage disease	All Tree Species
7	White fir	White Fir	106	Chemical damage	All Tree Species	112	spine tip	White Spruce
8	White fir	Douglas-fir	107	Lophodermium praeurti	Softwoods	113	western chestnut borer	Oak
9	Western balsam bark beetle	Subalpine Fir	108	Lophodermium arcauata	Softwoods	114	anthracnose like foliar disease	Bur Oak
10	Western balsam bark beetle	Lodgepole Pine	109	Lecanocitta acicola	Softwoods	115	Diaback	All Tree Species
11	Unidentified bark beetle	Ponderosa Pine	110	Lophodermium concolor	Softwoods	116	Mortality	All Tree Species
12	Pine engraver	Lodgepole Pine	111	Duthiersia spp	Softwoods	117	Flagging	All Tree Species
13	Pine engraver	Ponderosa Pine	112	Needle cast (Hypodemateaceae)	Softwoods	118	Discoloration	All Tree Species
14	Pine engraver	Lodgepole Pine	113	Rust Rot	All Tree Species	119	Diaback (oak)	Oak
15	Ponderosa pine needle miner	Ponderosa Pine	114	Unidentified disease	All Tree Species	120	Diaback (hardwood)	Hardwoods
16	Ponderosa pine needle miner	Lodgepole Pine	115	Winter damage light	All Tree Species	121	Marsippos Bight	Quaking Aspen
17	Jack pine budworm	Jack Pine	116	Winter damage medium	All Tree Species	122	Diaback (ash)	Ash
18	Spruce budworm, light defol.	Douglas-fir	117	Winter damage heavy	All Tree Species	123	Diaback (cottonwood)	Cottonwood/Poplar
19	Spruce budworm, medium defol.	Douglas-fir	118	White pine mortality	Common Pinon	200	Diaback (hardwood)	Hardwoods
20	Spruce budworm, heavy defol.	Douglas-fir	119	Pinon black stain	Common Pinon	204	Diaback (oak)	Oak
21	Douglas-fir tussock moth	Douglas-fir	120	Fire	All Tree Species	210	Mortality (old cottonwood)	Cottonwood/Poplar
22	Pine butterfly	Ponderosa Pine	121	Fire	All Tree Species	211	Mortality (eastern cedar)	Eastern Red Cedar
23	Pine looper	Ponderosa Pine	122	Fire	All Tree Species	212	Mortality (oak)	Oak
24	Leaf miner	Hardwoods	123	Fire	All Tree Species	213	Mortality (spruce)	Spruce
25	Leaf beetles	Hardwoods	124	Fire	All Tree Species	220	Discoloration (ash)	Ash
26	Oak leaf roller	Hardwoods	125	Fire	All Tree Species	221	Discoloration (conifer)	Softwoods
27	Pine needle-shaft miner	Ponderosa Pine	126	Fire	All Tree Species	222	Discoloration (cottonwood)	Cottonwood/Poplar
28	Pine sawflies	Ponderosa Pine	127	Fire	All Tree Species	223	Discoloration (eastern cedar)	Eastern Red Cedar
29	Variable oak leaf caterpillar	Hardwoods	128	Fire	All Tree Species	224	Discoloration (hardwood)	Hardwoods
30	Unidentified defoliator	All Tree Species	129	Fire	All Tree Species	225	Discoloration (oak)	Oak
31	Heterobasidion annosum (Fomes annosus)	Softwoods	130	Fire	All Tree Species	226	Discoloration (spruce)	Spruce
32	Amelara caryocarpae (Amelara melale)	Softwoods	131	Fire	All Tree Species	227	Herbicide (cottonwood)	Cottonwood/Poplar
33	Polygonus schweinfeltii	Softwoods	132	Fire	All Tree Species	228	Herbicide (eastern cedar)	Eastern Red Cedar
34	Phonopora	Softwoods	133	Fire	All Tree Species	229	Herbicide (hardwood)	Hardwoods
35	Cytospora	All Tree Species	134	Fire	All Tree Species	230	Herbicide (oak)	Oak
36	Western gall rust	Unknown	135	Fire	All Tree Species	231	Herbicide (eastern cedar)	Eastern Red Cedar
37	Coniostoma rust	Unknown	136	Fire	All Tree Species	232	Herbicide (spruce)	Spruce
38	Shabalinia rust	Lodgepole Pine	137	Fire	All Tree Species	233	Unidentified defoliator (cottonwood)	Cottonwood/Poplar
39	Unidentified defoliator	All Tree Species	138	Fire	All Tree Species	234	Unidentified defoliator (elm)	Elm
40	Unidentified defoliator	All Tree Species	139	Fire	All Tree Species	235	Unidentified defoliator (hardwood)	Hardwoods
41	Unidentified defoliator	All Tree Species	140	Fire	All Tree Species	300	Mortality (pine)	Pine



**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 Al Dymerski 07/10/2006**  
**Map Created: 01/19/2007**  
**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/>