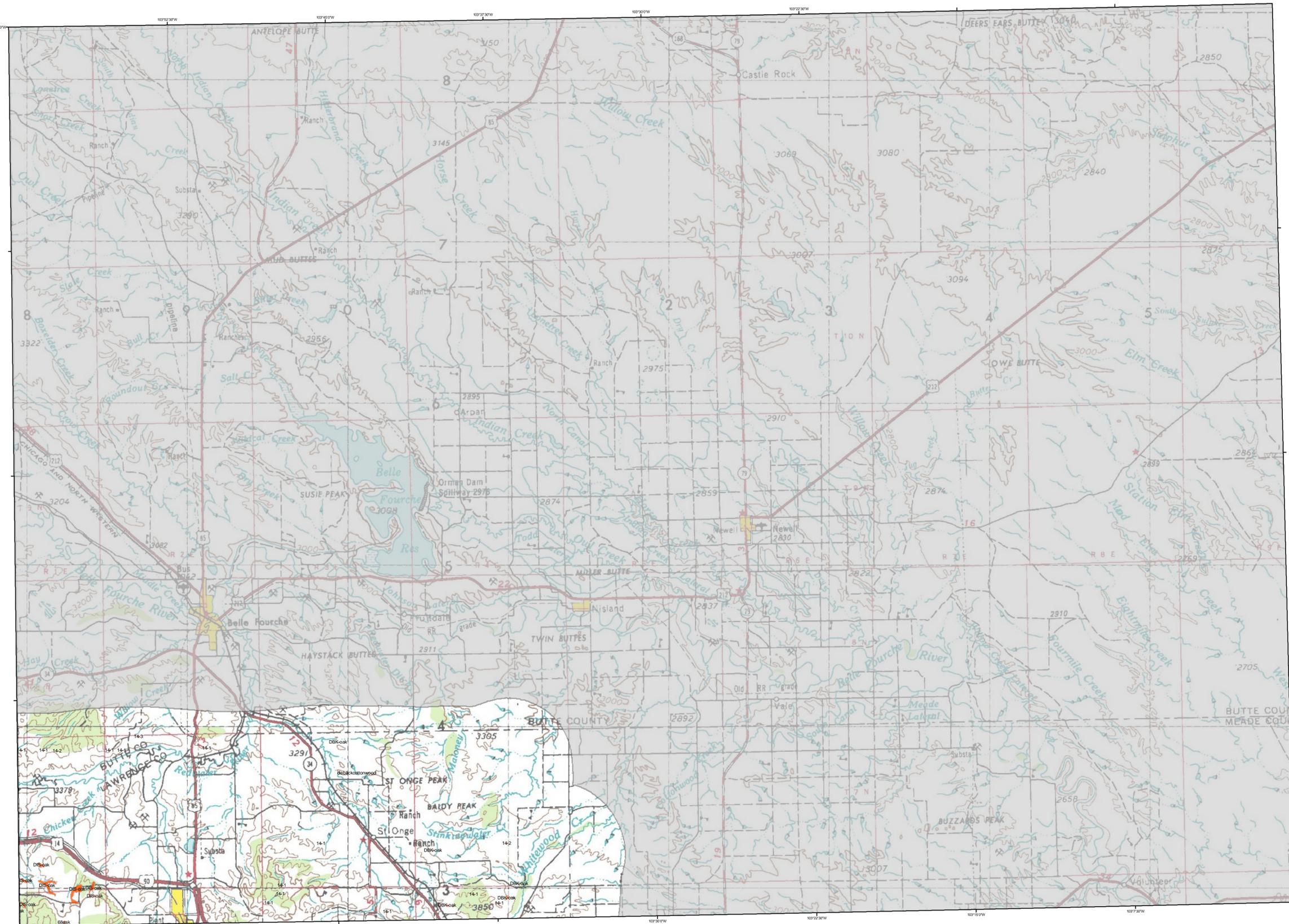


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2008 Aerial Insect and Disease Survey Belle Fourche, South Dakota USGS 100K DRG: 44103-E1

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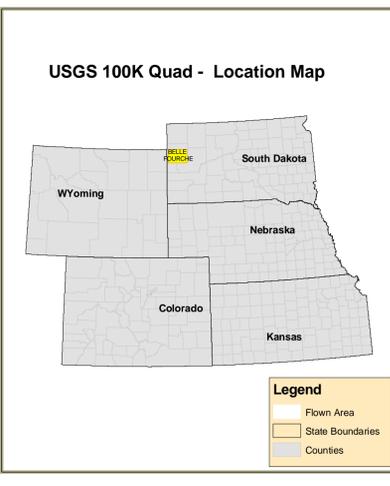


1:100,000

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 "fader" trees in the polygon or point. When recent dead trees are not counted, an intensity code of L (Light, Moderate, and 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 "fader" trees (or an intensity code). For example, 5-1/2/24 = 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 "1" 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	105	For squirrel trapping	Cottonwood/Poplar
2	Engelmann spruce beetle	Engelmann spruce	107	fall webworm	Cottonwood/Poplar
3	Mountain pine beetle	Ponderosa pine	109	road salt	Softwoods
4	Mountain pine beetle	Lodgepole pine	110	pine wood nematode	Scottish Pine
5	Western pine beetle	5-Needle Pine	111	oak wilt	Oak
6	Western pine beetle	Ponderosa pine	112	ring disease	All Tree Species
7	Fire Engriener	White fir	113	spuce ips	White Spruce
8	Douglas-fir engraver beetle	Oak	114	infectious chestnut bore	Oak
9	Western balsam bark beetle	Subspline fir	115	anthracnose like foliar disease	Bur Oak
10	Unidentified bark beetle	Softwoods	116	Dieback	All Tree Species
11	Pine engraver	Douglas-fir	117	Mortality	All Tree Species
12	Pine engraver	Ponderosa pine	118	Discoloration	All Tree Species
13	Pine engraver	Lodgepole pine	119	Herbicide	All Tree Species
14	Ponderosa pine needle miner	Ponderosa pine	120	aspen tortrix	Quaking Aspen
15	Lodgepole pine needle miner	Lodgepole pine	121	Mesquona Blight	Quaking Aspen
16	Jack pine budworm	Jack pine	200	Dieback (ash)	Ash
17	Spine budworm, light defol.	Douglas-fir	201	Dieback (cottonwood)	Cottonwood/Poplar
18	Spine budworm, medium defol.	Douglas-fir	202	Dieback (hardwood)	Hardwoods
19	Spine budworm, heavy defol.	Douglas-fir	204	Dieback (oak)	Oak
20	Douglas-fir tussock moth	Douglas-fir	210	Mortality (oak cottonwood)	Cottonwood/Poplar
21	Pine butterfly	Ponderosa pine	211	Mortality (eastern cedar)	Eastern Red Cedar
22	Pine looper	Ponderosa pine	212	Mortality (hardwood)	Hardwoods
23	Pine tortrix	Ponderosa pine	213	Mortality (oak)	Oak
24	Text caterpillars	Hardwoods	214	Mortality (spruce)	Spruce
25	Leaf beetles	Hardwoods	220	Discoloration (ash)	Ash
26	Oak leaf roller	Hardwoods	221	Discoloration (conifer)	Softwoods
27	Pine needle-sheath miner	Ponderosa pine	222	Discoloration (cottonwood)	Cottonwood/Poplar
28	Pine sawflies	Ponderosa pine	223	Discoloration (eastern cedar)	Eastern Red Cedar
29	Pine tussock moth	Ponderosa pine	224	Discoloration (hardwood)	Hardwoods
30	Variable oak leaf caterpillar	Hardwoods	225	Discoloration (oak)	Oak
31	Unidentified defoliator	Softwoods	226	Discoloration (spruce)	Spruce
32	Herobasidion arizonae (Pinosus arizonae)	Lodgepole pine	227	Herbicide (eastern cedar)	Eastern Red Cedar
33	Armillaria ostroya (Armillaria mellea)	Softwoods	230	Unidentified defoliator (cottonwood)	Cottonwood/Poplar
34	Polytopora schweinitzi	Softwoods	231	Unidentified defoliator (oak)	Oak
35	Phytophthora	All Tree Species	232	Unidentified defoliator (spruce)	Spruce
36	Cytospora	Hardwoods	233	Unidentified defoliator (hardwood)	Hardwoods
37	Western gall rust	Unknown	300	Mortality (pine)	Pine
38	Comandra rust	Lodgepole pine			
39	Staphylinid rust	Lodgepole 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 Bill Schaupp & Al Dymerski
Map Created:
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/>