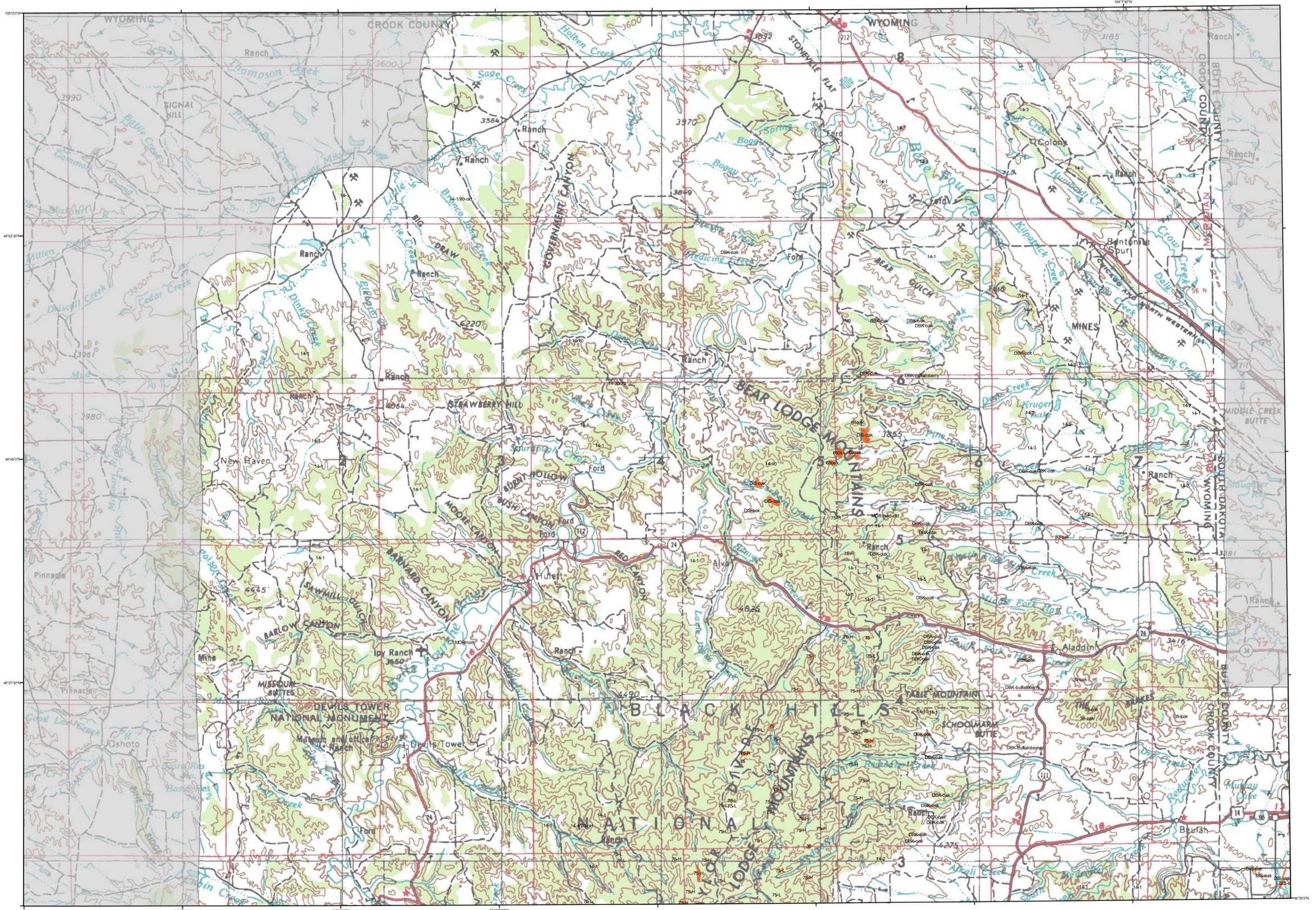


# 2008 Aerial Insect and Disease Survey Devils Tower, Wyoming USGS 100K TOPO! 44104-E1

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1:100,000

Code	Causal Agent	Primary Host	Code	Causal Agent	Primary Host
1	Douglas-fir beetle	Douglas-fir	49	Atropisella	Lodgepole Pine
2	Engelmann spruce beetle	Engelmann spruce	50	White pine blister rust	Lodgepole Pine
5	Mountain pine beetle	Ponderosa Pine	51	Dwarf mistletoe	Softwoods
7	Mountain pine beetle	Lodgepole Pine	52	Erythronium	Ponderosa Pine
8	Western pine beetle	Sitka Spruce	53	Inedulis 60, 65 & 65	All Tree Species
9	Fire Engraver	Ponderosa Pine	54	Air pollutants	All Tree Species
10	Douglas-fir engraver beetle	Douglas-fir	55	Chemical damage	Softwoods
11	Western balsam bark beetle	Subalpine Fir	56	Lophodermium praeurti	Softwoods
12	Unidentified bark beetle	Softwoods	57	Rhinodiplosis pseudotsugae	Douglas-fir
13	Pine engraver	Lodgepole Pine	58	Lophodermium arcuta	Softwoods
14	Pine engraver	Ponderosa Pine	59	Lacanostota acicola	Softwoods
15	Ponderosa pine needle miner	Lodgepole Pine	60	Lophodermium concolor	Softwoods
16	Lodgepole pine needle miner	Ponderosa Pine	61	Dothiora pin	Softwoods
17	Jack pine budworm	Jack Pine	62	Needle cast (tracheomyces)	Softwoods
18	Spruce budworm, light defol.	Douglas-fir	63	Root Rot	All Tree Species
19	Spruce budworm, medium defol.	Douglas-fir	64	Unidentified disease	Softwoods
20	Spruce budworm, heavy defol.	Douglas-fir	65	Winter damage light	All Tree Species
21	Douglas-fir tussock moth	Douglas-fir	66	Winter damage medium	All Tree Species
22	Pine butterfly	Ponderosa Pine	67	Winter damage heavy	All Tree Species
23	Pine looper	Ponderosa Pine	68	Diplota	Softwoods
24	Tent caterpillars	Hardwoods	69	Prionus bark stain	All Tree Species
25	Leaf beetles	Hardwoods	70	Fire	All Tree Species
33	Oak leaf roller	Hardwoods	71	Porcupine	Softwoods
34	Pine needle-shaft miner	Ponderosa Pine	72	Windthrow	All Tree Species
35	Pine sawflies	Ponderosa Pine	73	High water damage	All Tree Species
36	Pine bark scale	Ponderosa Pine	74	Avalanche	All Tree Species
37	Carabid beetle	Ponderosa Pine	75	Aspen decline-multiple agents)	Quaking Aspen
38	Variable oak leaf caterpillar	Hardwoods	76	Prionus pine mortality	Common Pinyon
39	Unidentified defoliator	Hardwoods	77	Prionus pine mortality (unknown agents)	Common Pinyon
41	Heterobasidion annosum (Fomes annosus)	Softwoods	78	Gambel oak decline-unknown agents)	Limb Pine
42	Amelara satyria (Amelara melale)	Softwoods	79	Limb pine decline-multiple agents)	Limb Pine
43	Polyphagous sawfly	Softwoods	80	Hail damage	All Tree Species
44	Phomopsis	Softwoods	81	Unknown polygon	Common Pinyon
45	Cutworm	All Tree Species	82	Unknown polygon	Common Pinyon
46	Western gall rust	Unknown	83	Unknown polygon	Common Pinyon
47	Comandra rust	Unknown	84	Unknown polygon	Common Pinyon
48	Sheldahl rust	Lodgepole Pine	85	Unknown polygon	Common Pinyon
100	fox squirrel flagging	Cottonwood/Poplar	101	road salt tip	Lodgepole Pine
107	fall webworm	Cottonwood/Poplar	102	sach em disease	Elm
108	road salt	Softwoods	103	spkoda blight	Ponderosa Pine
109	pinewood nematode	Scotch Pine	104	fox summit	Spruce White Spruce
110	oak	All Tree Species	105	straght killed narrow leaf cottonwood	Narrowleaf Cottonwood
111	foliage disease	All Tree Species			
112	spoke tip	White Spruce			
113	twinkled chestnut bore	Bur Oak			
114	ambrosia like foliar disease	Elm			
115	Diaback	All Tree Species			
116	Mortality	All Tree Species			
117	Discoloration	All Tree Species			
118	Herbicide	All Tree Species			
119	Flagging	All Tree Species			
120	Aspen tortrix	Quaking Aspen			
121	Mansonia blight	Quaking Aspen			
200	Deback (oak)	Hardwoods			
201	Deback (cottonwood)	Cottonwood/Poplar			
202	Deback (hardwood)	Hardwoods			
204	Deback (oak)	Oak			
211	Mortality (eastern cedar)	Eastern Red Cedar			
212	Mortality (hardwood)	Hardwoods			
213	Mortality (oak)	Oak			
214	Mortality (spruce)	Spruce			
215	Discoloration (oak)	Oak			
221	Discoloration (conifer)	Softwoods			
222	Discoloration (cottonwood)	Cottonwood/Poplar			
223	Discoloration (eastern cedar)	Eastern Red Cedar			
224	Discoloration (hardwood)	Hardwoods			
225	Discoloration (oak)	Oak			
226	Discoloration (spruce)	Spruce			
230	Unidentified defoliator (cottonwood)	Cottonwood/Poplar			
231	Unidentified defoliator (elm)	Elm			
232	Unidentified defoliator (hardwood)	Hardwoods			
240	Flagging (hardwood)	Cottonwood/Poplar			
241	Unidentified defoliator (cottonwood)	Cottonwood/Poplar			
242	Unidentified defoliator (elm)	Elm			
243	Unidentified defoliator (hardwood)	Hardwoods			
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 Bill Schaupp & Al Dymerski**  
**Map Created:**  
**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 operators 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/>