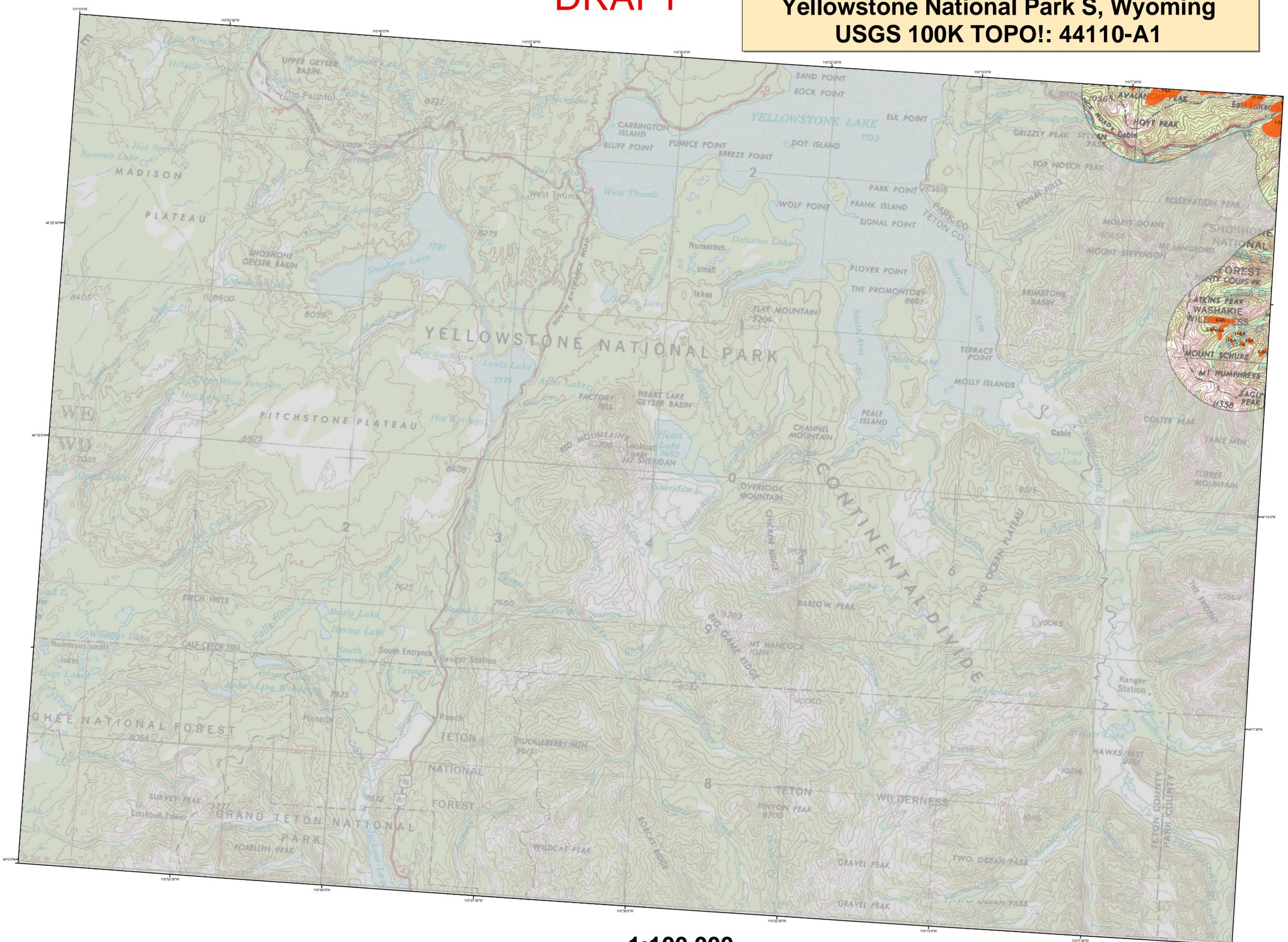


**\*\*DRAFT\*\***

**2008 Aerial Insect and Disease Survey  
Yellowstone National Park S, Wyoming  
USGS 100K TOPO!: 44110-A1**

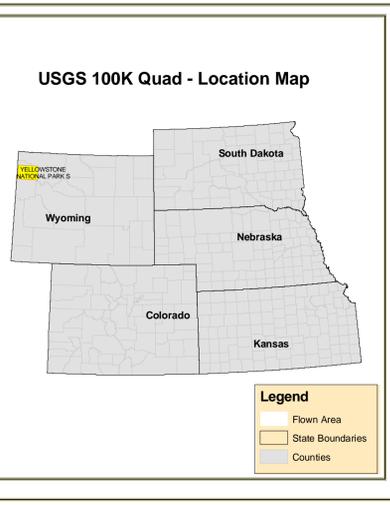


**1:100,000**

**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 "ladder" 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 acreage estimates are used after the causal agent code instead of number of dead "ladder" trees (or an intensity code). For example: 5-122a = The first number before the dash is the causal agent code. The number after the dash is an estimation of the number of dead "ladder" 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 "ladder" tree. In another example: 5-3A = that on the average, an estimated three trees per acre are dead "ladder" 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	Code	Causal Agent	Primary Host
1	Douglas-fir beetle	Douglas-fir	49	Wingless	Lodgepole Pine	106	Box scumming fungus	Cottonwood/Poplar
2	Engelmann Spruce Beetle	Engelmann Spruce	50	White pine blister rust	5-needle Pine	107	fat webworm	Cottonwood/Poplar
5	Mountain pine beetle	Ponderosa Pine	61	Dwarf mistletoe	Softwoods	108	road salt	Softwoods
6	Mountain pine beetle	Lodgepole Pine	62	Erythronium	Ponderosa Pine	109	onewood nematode	Softwoods
7	Mountain pine beetle	Ponderosa Pine	63	Inducible 50 & 68	All Tree Species	110	oak wilt	Oak
8	Western pine beetle	Ponderosa Pine	64	Air pollutants	All Tree Species	111	foliage disease	All Tree Species
9	Fir Engiever	White Fir	65	Chemical damage	All Tree Species	112	spine itch	White Spruce
10	Douglas-fir engraver beetle	Douglas-fir	66	Loophodermum pinastri	Softwoods	113	twined chestnut borer	Oak
11	Western balsam bark beetle	Sitka Spruce	67	Rhabdocline pseudotsugae	Douglas-fir	114	anthracnose like leaf disease	Bur Oak
12	Unidentified bark beetle	Softwoods	68	Loophodermum arcuata	Softwoods	115	Dieback	All Tree Species
13	Pine engraver	Lodgepole Pine	69	Lophodermium	Softwoods	116	Mortality	All Tree Species
14	Pine engraver	Ponderosa Pine	70	Loophodermium concolor	Softwoods	117	Discoloration	All Tree Species
15	Pondopine pine needle miner	Lodgepole Pine	71	Corticium pin	Softwoods	118	Herbicide	All Tree Species
16	Lodgepole pine needle miner	Ponderosa Pine	72	Needle cast (Hymenoptera)	Softwoods	119	Flagging	All Tree Species
17	Jack pine budworm	Jack Pine	73	Root Rot	All Tree Species	120	aspen tortrix	Quaking Aspen
18	Spine budworm, light defol.	Douglas-fir	74	Unidentified disease	Softwoods	121	Mansonia blight	Quaking Aspen
19	Spine budworm, medium defol.	Douglas-fir	75	Winter damage light	All Tree Species	200	Dieback (ash)	Ash
20	Spine budworm, heavy defol.	Douglas-fir	76	Winter damage medium	All Tree Species	201	Dieback (cottonwood)	Cottonwood/Poplar
21	Douglas-fir tussock moth	Douglas-fir	77	Winter damage heavy	All Tree Species	202	Dieback (hardwood)	Hardwoods
22	Pine Butterfly	Ponderosa Pine	78	Diptera	Softwoods	204	Dieback (oak)	Oak
23	Pine looper	Ponderosa Pine	69	Prion black stain	Common Pinyon	210	Mortality (oak cottonwood)	Cottonwood/Poplar
27	Pine tortrix	Ponderosa Pine	70	Fire	All Tree Species	211	Mortality (eastern cedar)	Eastern Red Cedar
28	Teal caterpillars	Softwoods	71	Flanigine	Softwoods	212	Mortality (hardwood)	Hardwoods
29	Leaf beetles	Hardwoods	72	Windthrow	All Tree Species	213	Mortality (oak)	Oak
33	Oak leaf roller	Hardwoods	73	High water damage	All Tree Species	214	Mortality (spruce)	Spruce
34	Pine needle-shaft miner	Ponderosa Pine	74	Armadillo	All Tree Species	221	Discoloration (ash)	Ash
35	Pine sawflies	Ponderosa Pine	75	Aspen decline-multiple agents)	Quaking Aspen	222	Discoloration (cottonwood)	Cottonwood/Poplar
36	Pine tussock moth	Ponderosa Pine	76	Prion pine mortality	Common Pinyon	223	Discoloration (eastern cedar)	Eastern Red Cedar
37	Cankworms	Hardwoods	77	Juniper mortality-unknown agents)	Juniper	224	Discoloration (hardwood)	Hardwoods
38	Variable oak leaf caterpillar	Hardwoods	78	Gambel oak decline-unknown agents)	Gambel Oak	225	Discoloration (oak)	Oak
41	Herobasidion anisum (Fomes annosa)	Softwoods	79	Limber pine decline-multiple agents)	Limber Pine	226	Discoloration (spruce)	Spruce
42	Armillaria ostroyae (Armillaria mellea)	Softwoods	80	Hail damage	All Tree Species	228	Herbicide (cottonwood)	Cottonwood/Poplar
43	Polytopus schweinfurthii	Softwoods	89	Unknown pathogen	Common Pinyon	231	Herbicide (eastern cedar)	Eastern Red Cedar
44	Phomopsis	Softwoods	100	old prison mortality	Lodgepole Pine	240	Flagging (hardwood)	Hardwoods
45	Cytospora	All Tree Species	101	leaf fall top	Elm	250	Unidentified defolator (cottonwood)	Cottonwood/Poplar
46	Western gall rust	Unknown	102	albuta blight	Ponderosa Pine	251	Unidentified defolator (elm)	Elm
47	Comandra rust	Unknown	104	ice burn	Spruce, White Spruce	300	Mortality (pine)	Pine
48	Stalkform rust	Lodgepole Pine	105	drought killed narrow leaf cottonwood	Narrowleaf Cottonwood			



**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 AI 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 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/>