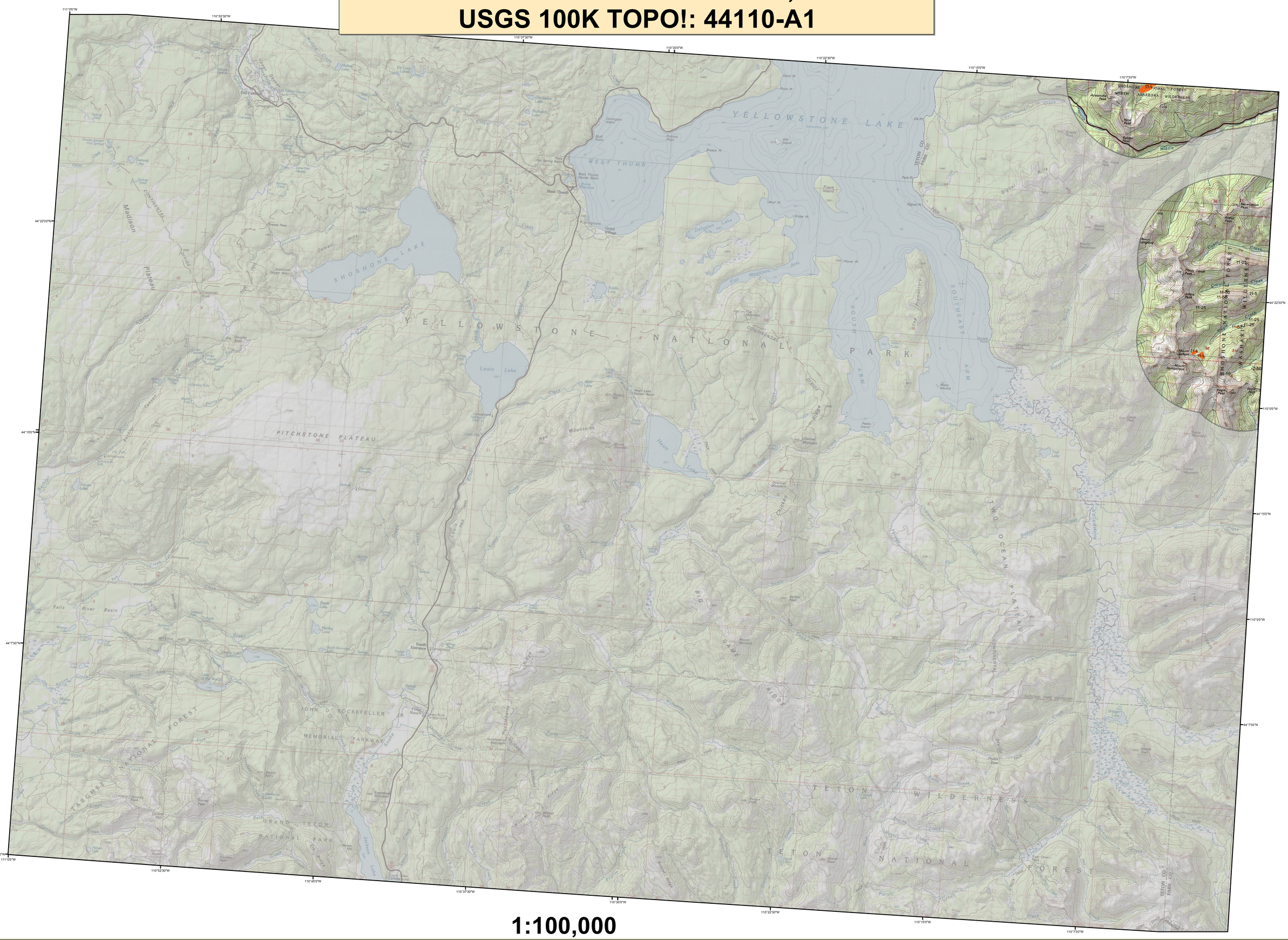
# 2013 Aerial Insect and Disease Survey
# YELLOWSTONE NATIONAL PARK S, WYOMING
# USGS 100K TOPO!: 44110-A1




1:100,000

## Legend

Causal Agent(s) | Not Flown

Use of the Number System
Example: 5-L = The first number before the dash is the causal agent code. The letter after the dash is the estimate of dead "fader" trees in the polygon or point as a percentage of the total trees within the delineated area. An intensity code of L-light, M-moderate, S-severe, and VS - very severe may be used after the causal agent code.
L-light: 1-10%; M-moderate: 11-29%; S-severe: 30-50%; VS - very severe: >50% Value ranges represent the percent of current "faders" in relation to the total forested area within the polygon. Periodically, whole numbers of trees can used as an intensity code for small groups of trees. For example: 5-10 = 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.

| Code | Causal Agent | Primary Host | Code | Causal Agent | Primary Host | Code | Causal Agent | Primary Host |
|---|---|---|---|---|---|---|---|---|
| 1 | Douglas-fir beetle | Douglas-fir | 49 | Atropellis | Lodgepole Pine | 106 | fox squirrel flagging | Cottonwood,Poplar |
| 2 | Engelmann Spruce Beetle | Englemann Spruce | 48 | Stalactiforme rust | Lodgepole Pine | 107 | fall webworm | Cottonwood,Poplar |
| 3 | Blue Spruce Ips | Blue Spruce | 50 | White pine blister rust | 5-Needle Pine | 108 | road salt | Softwoods |
| 5 | Mountain pine beetle | Ponderosa Pine | 51 | Dwarf mistletoe | Softwoods | 109 | pinewood nematode | Scotch Pine |
| 6 | Mountain pine beetle | Lodgepole Pine | 52 | Elytroderma | Ponderosa Pine | 110 | oak wilt | Oak |
| 7 | Mountain pine beetle | 5-Needle Pine | 53 | Includes #65, 66 & 68 | All Tree Species | 111 | foliage disease | All Tree Species |
| 8 | Western pine beetle | Ponderosa Pine | 54 | Air pollutants | All Tree Species | 112 | spruce ips | White Spruce |
| 9 | Fir Engraver | White Fir | 55 | Chemical damage | All Tree Species | 113 | twolined chestnut borer | Oak |
| 10 | Douglas-fir engraver beetle | Douglas-fir | 56 | Lophodermium pinastri | Softwoods | 114 | anthracnose like foliar disease | Bur Oak |
| 11 | Western balsam bark beetle | Subalpine Fir | 57 | Rhabdocline pseudotsugae | Douglas-fir | 115 | Dieback | All Tree Species |
| 12 | Unidentified bark beetle | Softwoods | 58 | Lophodermella arcuata | Softwoods | 116 | Mortality | All Tree Species |
| 13 | Pine engraver | Lodgepole Pine | 59 | Lecanostica sciocola | Softwoods | 117 | Discoloration | All Tree Species |
| 14 | Pine engraver | Ponderosa Pine | 60 | Lophodermella concolor | Softwoods | 118 | Herbicide | All Tree Species |
| 15 | Ponderosa pine needle miner | Lodgepole Pine | 61 | Dothistroma pini | Softwoods | 119 | Flagging | All Tree Species |
| 16 | Lodgepole pine needle miner | Ponderosa Pine | 62 | Needle cast (Hypodermataceae) | Softwoods | 120 | aspen tortrix | Quaking Aspen |
| 17 | Jack pine budworm | Jack Pine | 63 | Root Rot | All Tree Species | 121 | Marssonina Blight | Quaking Aspen |
| 18 | Spruce budworm, light defol. | Douglas-fir | 64 | Unidentified disease | Softwoods | 200 | Dieback (ash) | Ash |
| 19 | Spruce budworm, medium defol. | Douglas-fir | 65 | Winter damage light | All Tree Species | 201 | Dieback (cottonwood) | Cottonwood,Poplar |
| 20 | Spruce budworm, heavy defol. | Douglas-fir | 66 | Winter damage medium | All Tree Species | 202 | Dieback (hardwood) | Hardwoods |
| 22 | Douglas-fir tussock moth | Douglas-fir | 67 | Winter damage heavy | All Tree Species | 204 | Dieback (oak) | Oak |
| 23 | Pine Butterfly | Ponderosa Pine | 68 | Diplodia | Softwoods | 210 | Mortality (old cottonwood) | Cottonwood,Poplar |
| 26 | Pine looper | Ponderosa Pine | 69 | Pinyon black stain | Common Pinyon | 211 | Mortality (eastern cedar) | Eastern Red Cedar |
| 27 | Pine tortrix | Ponderosa Pine | 70 | Fire | All Tree Species | 212 | Mortality (hardwood) | Hardwoods |
| 28 | Tent caterpillars | Hardwoods | 71 | Porcupine | Softwoods | 213 | Mortality (oak) | Oak |
| 29 | Leaf beetles | Hardwoods | 72 | Windthrow | All Tree Species | 214 | Mortality (spruce) | Spruce |
| 30 | Aspen defoliation | Quaking Aspen | 73 | High water damage | All Tree Species | 220 | Discoloration (ash) | Ash |
| 33 | Oak leaf roller | Hardwoods | 74 | Avalanche | All Tree Species | 221 | Discoloration (conifer) | Softwoods |
| 34 | Pine needle-sheath miner | Ponderosa Pine | 75 | Aspen decline-multiple agent(s) | Quaking Aspen | 222 | Discoloration (cottonwood) | Cottonwood,Poplar |
| 35 | Pine sawflies | Ponderosa Pine | 76 | Pinyon pine mortality | Common Pinyon | 223 | Discoloration (eastern cedar) | Eastern Red Cedar |
| 36 | Pine tussock moth | Ponderosa Pine | 77 | Juniper mortality-unknown agent(s) | Juniper | 224 | Discoloration (hardwood) | Hardwoods |
| 37 | Cankerworms | Hardwoods | 78 | Gamble oak decline-unknown agent(s) | Gambel Oak | 225 | Discoloration (oak) | Oak |
| 38 | Variable oak leaf caterpillar | Hardwoods | 79 | Limber pine decline-multiple agent(s) | Limber Pine | 226 | Discoloration (spruce) | Spruce |
| 39 | Unidentified defoliator | All Tree Species | 80 | Hail damage | All Tree Species | 230 | Herbicide (cottonwood) | Cottonwood,Poplar |
| 40 | Cottonwood Decline/Mortality | Cottonwood | 99 | Unknown polygon | Unknown | 231 | Herbicide (eastern cedar) | Eastern Red Cedar |
| 41 | Heterobasidion annosum (Fomes annosus) | Softwoods | 100 | old pinion mortality | Common Pinyon | 240 | Flagging (hardwood) | Hardwoods |
| 42 | Armillaria ostoyae (Armillaria mellea) | Softwoods | 101 | road salt Ipp | Lodgepole Pine | 250 | Unidentified defoliator (cottonwood) | Cottonwood,Poplar |
| 44 | Phomopsis | Softwoods | 102 | dutch elm disease | Elm | 251 | Unidentified defoliator (elm) | Elm |
| 45 | Cytospora | All Tree Species | 103 | diplodia blight | Ponderosa Pine | 252 | Unidentified defoliator (hardwood) | Hardwoods |
| 46 | Western gall rust | Unknown | 105 | drought killed narrow leaf cottonwood | Narrowleaf Cottonwood | 300 | Mortality (pine) | Pine |
| 47 | Comandra rust | Unknown | | | | | | |

## Region 2 - Location Map
## USGS 100K Quad
## *YELLOWSTONE NATIONAL PARK S, WYOMING*

### 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.

**Map Created: 1/2/2014**
**Projection: UTM NAD83 Zone 13**
**Author: J. Ross, USDA Forest Service**

**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/**

## DIRECT ALL INQUIRIES TO: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*****DISCLAIMER*****

Forest Health Protection (FHP) and its partners strive to maintain an accurate Aerial Detection Survey (ADS) Dataset, but due to the conditions under which the data are collected, FHP and its partners shall not be held responsible for missing or inaccurate data. ADS are not intended to replace more specific information. An accuracy assessment has not been done for this dataset; however, ground checks are completed in accordance with local and national guidelines http://www.fs.fed.us/foresthealth/aviation/qualityassurance.shtml. Maps and data may be updated without notice. Please cite "USDA Forest Service, Forest Health Protection and its partners" as the source of this data in maps and publications.

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.