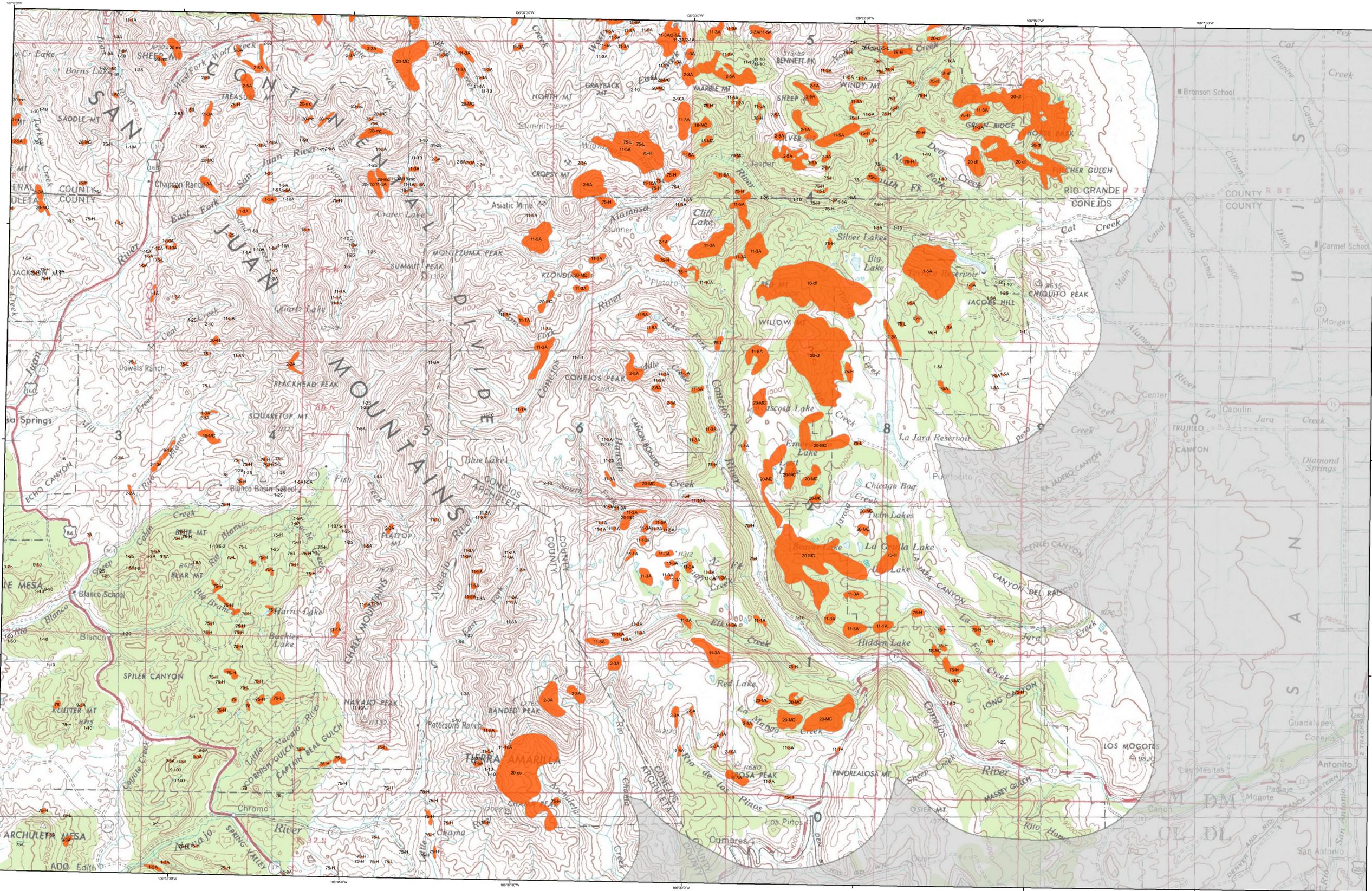


2008 Aerial Insect and Disease Survey Antonito, Colorado USGS 100K TOPO!: 37106-A1

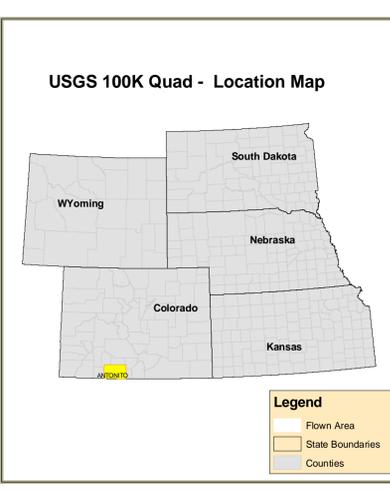
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1:100,000

| Code | Causal Agent | Primary Host | Code | Causal Agent | Primary Host |
|------|-------------------------------|------------------|------|---------------------------------|--------------------|
| 1 | Douglas-fir beetle | Douglas-fir | 106 | Aspen twig borer | Aspen |
| 2 | Engelmann spruce beetle | Engelmann spruce | 107 | fall webworm | Cottonwood, Poplar |
| 3 | Mountain pine beetle | Ponderosa Pine | 108 | road salt | Softwoods |
| 4 | Mountain pine beetle | Ponderosa Pine | 109 | pinewood nematode | Softwood |
| 5 | Mountain pine beetle | Ponderosa Pine | 110 | oak wilt | Oak |
| 6 | Mountain pine beetle | Ponderosa Pine | 111 | foliar disease | All Tree Species |
| 7 | Mountain pine beetle | Ponderosa Pine | 112 | spine itch | White Spruce |
| 8 | Mountain pine beetle | Ponderosa Pine | 113 | beetwood chestnut borer | Bur Oak |
| 9 | Fire Engulver | White Fir | 114 | anthracnose like foliar disease | Oak |
| 10 | Douglas-fir engraver beetle | Douglas-fir | 115 | Deback | All Tree Species |
| 11 | Western bark beetle | Softwoods | 116 | Mortality (hardwood) | All Tree Species |
| 12 | Unidentified bark beetle | Softwoods | 117 | Discoloration | All Tree Species |
| 13 | Pine engraver | Lodgepole Pine | 118 | Herbicide | All Tree Species |
| 14 | Pine engraver | Ponderosa Pine | 119 | Flagging | All Tree Species |
| 15 | Ponderosa pine needle miner | Lodgepole Pine | 120 | aspens tortrix | Quaking Aspen |
| 16 | Lodgepole pine needle miner | Ponderosa Pine | 121 | Mesquite Blight | Quaking Aspen |
| 17 | Jack pine budworm | Jack Pine | 200 | Deback (ash) | Ash |
| 18 | Spine budworm, light defol. | Douglas-fir | 201 | Deback (cottonwood) | Cottonwood, Poplar |
| 19 | Spine budworm, medium defol. | Douglas-fir | 202 | Deback (hardwood) | Hardwoods |
| 20 | Spine budworm, heavy defol. | Douglas-fir | 203 | Deback (oak) | Oak |
| 21 | Douglas-fir tussock moth | Douglas-fir | 210 | Mortality (eastern cedar) | Eastern Red Cedar |
| 22 | Pine butterfly | Ponderosa Pine | 211 | Mortality (hardwood) | Hardwoods |
| 23 | Pine looper | Ponderosa Pine | 212 | Mortality (oak) | Oak |
| 24 | Pine looper | Ponderosa Pine | 213 | Mortality (spruce) | Spruce |
| 25 | Pine looper | Ponderosa Pine | 214 | Discoloration (oak) | Oak |
| 26 | Leaf beetles | Hardwoods | 215 | Discoloration (conifer) | Softwoods |
| 27 | Oak leaf roller | Hardwoods | 216 | Herbicide (cottonwood) | Cottonwood, Poplar |
| 28 | Pine needle-shaft miner | Ponderosa Pine | 217 | Discoloration (eastern cedar) | Eastern Red Cedar |
| 29 | Pine sawfly | Ponderosa Pine | 218 | Discoloration (hardwood) | Hardwoods |
| 30 | Pine sawfly | Ponderosa Pine | 219 | Discoloration (oak) | Oak |
| 31 | Pine sawfly | Ponderosa Pine | 220 | Discoloration (spruce) | Spruce |
| 32 | Variable oak leaf caterpillar | Hardwoods | 221 | Herbicide (cottonwood) | Cottonwood, Poplar |
| 33 | Cantharid | Hardwoods | 222 | Discoloration (eastern cedar) | Eastern Red Cedar |
| 34 | Cantharid | Hardwoods | 223 | Discoloration (hardwood) | Hardwoods |
| 35 | Cantharid | Hardwoods | 224 | Discoloration (oak) | Oak |
| 36 | Cantharid | Hardwoods | 225 | Discoloration (spruce) | Spruce |
| 37 | Cantharid | Hardwoods | 226 | Herbicide (cottonwood) | Cottonwood, Poplar |
| 38 | Cantharid | Hardwoods | 227 | Herbicide (eastern cedar) | Eastern Red Cedar |
| 39 | Cantharid | Hardwoods | 228 | Discoloration (hardwood) | Hardwoods |
| 40 | Cantharid | Hardwoods | 229 | Discoloration (oak) | Oak |
| 41 | Cantharid | Hardwoods | 230 | Discoloration (spruce) | Spruce |
| 42 | Cantharid | Hardwoods | 231 | Herbicide (cottonwood) | Cottonwood, Poplar |
| 43 | Cantharid | Hardwoods | 232 | Herbicide (eastern cedar) | Eastern Red Cedar |
| 44 | Cantharid | Hardwoods | 233 | Discoloration (hardwood) | Hardwoods |
| 45 | Cantharid | Hardwoods | 234 | Discoloration (oak) | Oak |
| 46 | Cantharid | Hardwoods | 235 | Discoloration (spruce) | Spruce |
| 47 | Cantharid | Hardwoods | 236 | Herbicide (cottonwood) | Cottonwood, Poplar |
| 48 | Cantharid | Hardwoods | 237 | Herbicide (eastern cedar) | Eastern Red Cedar |
| 49 | Cantharid | Hardwoods | 238 | Discoloration (hardwood) | Hardwoods |
| 50 | Cantharid | Hardwoods | 239 | Discoloration (oak) | Oak |
| 51 | Cantharid | Hardwoods | 240 | Discoloration (spruce) | Spruce |
| 52 | Cantharid | Hardwoods | 241 | Herbicide (cottonwood) | Cottonwood, Poplar |
| 53 | Cantharid | Hardwoods | 242 | Herbicide (eastern cedar) | Eastern Red Cedar |
| 54 | Cantharid | Hardwoods | 243 | Discoloration (hardwood) | Hardwoods |
| 55 | Cantharid | Hardwoods | 244 | Discoloration (oak) | Oak |
| 56 | Cantharid | Hardwoods | 245 | Discoloration (spruce) | Spruce |
| 57 | Cantharid | Hardwoods | 246 | Herbicide (cottonwood) | Cottonwood, Poplar |
| 58 | Cantharid | Hardwoods | 247 | Herbicide (eastern cedar) | Eastern Red Cedar |
| 59 | Cantharid | Hardwoods | 248 | Discoloration (hardwood) | Hardwoods |
| 60 | Cantharid | Hardwoods | 249 | Discoloration (oak) | Oak |
| 61 | Cantharid | Hardwoods | 250 | Discoloration (spruce) | Spruce |
| 62 | Cantharid | Hardwoods | 251 | Herbicide (cottonwood) | Cottonwood, Poplar |
| 63 | Cantharid | Hardwoods | 252 | Herbicide (eastern cedar) | Eastern Red Cedar |
| 64 | Cantharid | Hardwoods | 253 | Discoloration (hardwood) | Hardwoods |
| 65 | Cantharid | Hardwoods | 254 | Discoloration (oak) | Oak |
| 66 | Cantharid | Hardwoods | 255 | Discoloration (spruce) | Spruce |
| 67 | Cantharid | Hardwoods | 256 | Herbicide (cottonwood) | Cottonwood, Poplar |
| 68 | Cantharid | Hardwoods | 257 | Herbicide (eastern cedar) | Eastern Red Cedar |
| 69 | Cantharid | Hardwoods | 258 | Discoloration (hardwood) | Hardwoods |
| 70 | Cantharid | Hardwoods | 259 | Discoloration (oak) | Oak |
| 71 | Cantharid | Hardwoods | 260 | Discoloration (spruce) | Spruce |
| 72 | Cantharid | Hardwoods | 261 | Herbicide (cottonwood) | Cottonwood, Poplar |
| 73 | Cantharid | Hardwoods | 262 | Herbicide (eastern cedar) | Eastern Red Cedar |
| 74 | Cantharid | Hardwoods | 263 | Discoloration (hardwood) | Hardwoods |
| 75 | Cantharid | Hardwoods | 264 | Discoloration (oak) | Oak |
| 76 | Cantharid | Hardwoods | 265 | Discoloration (spruce) | Spruce |
| 77 | Cantharid | Hardwoods | 266 | Herbicide (cottonwood) | Cottonwood, Poplar |
| 78 | Cantharid | Hardwoods | 267 | Herbicide (eastern cedar) | Eastern Red Cedar |
| 79 | Cantharid | Hardwoods | 268 | Discoloration (hardwood) | Hardwoods |
| 80 | Cantharid | Hardwoods | 269 | Discoloration (oak) | Oak |
| 81 | Cantharid | Hardwoods | 270 | Discoloration (spruce) | Spruce |
| 82 | Cantharid | Hardwoods | 271 | Herbicide (cottonwood) | Cottonwood, Poplar |
| 83 | Cantharid | Hardwoods | 272 | Herbicide (eastern cedar) | Eastern Red Cedar |
| 84 | Cantharid | Hardwoods | 273 | Discoloration (hardwood) | Hardwoods |
| 85 | Cantharid | Hardwoods | 274 | Discoloration (oak) | Oak |
| 86 | Cantharid | Hardwoods | 275 | Discoloration (spruce) | Spruce |
| 87 | Cantharid | Hardwoods | 276 | Herbicide (cottonwood) | Cottonwood, Poplar |
| 88 | Cantharid | Hardwoods | 277 | Herbicide (eastern cedar) | Eastern Red Cedar |
| 89 | Cantharid | Hardwoods | 278 | Discoloration (hardwood) | Hardwoods |
| 90 | Cantharid | Hardwoods | 279 | Discoloration (oak) | Oak |
| 91 | Cantharid | Hardwoods | 280 | Discoloration (spruce) | Spruce |
| 92 | Cantharid | Hardwoods | 281 | Herbicide (cottonwood) | Cottonwood, Poplar |
| 93 | Cantharid | Hardwoods | 282 | Herbicide (eastern cedar) | Eastern Red Cedar |
| 94 | Cantharid | Hardwoods | 283 | Discoloration (hardwood) | Hardwoods |
| 95 | Cantharid | Hardwoods | 284 | Discoloration (oak) | Oak |
| 96 | Cantharid | Hardwoods | 285 | Discoloration (spruce) | Spruce |
| 97 | Cantharid | Hardwoods | 286 | Herbicide (cottonwood) | Cottonwood, Poplar |
| 98 | Cantharid | Hardwoods | 287 | Herbicide (eastern cedar) | Eastern Red Cedar |
| 99 | Cantharid | Hardwoods | 288 | Discoloration (hardwood) | Hardwoods |
| 100 | Cantharid | Hardwoods | 289 | Discoloration (oak) | Oak |
| 101 | Cantharid | Hardwoods | 290 | Discoloration (spruce) | Spruce |
| 102 | Cantharid | Hardwoods | 291 | Herbicide (cottonwood) | Cottonwood, Poplar |
| 103 | Cantharid | Hardwoods | 292 | Herbicide (eastern cedar) | Eastern Red Cedar |
| 104 | Cantharid | Hardwoods | 293 | Discoloration (hardwood) | Hardwoods |
| 105 | Cantharid | Hardwoods | 294 | Discoloration (oak) | Oak |
| 106 | Cantharid | Hardwoods | 295 | Discoloration (spruce) | Spruce |
| 107 | Cantharid | Hardwoods | 296 | Herbicide (cottonwood) | Cottonwood, Poplar |
| 108 | Cantharid | Hardwoods | 297 | Herbicide (eastern cedar) | Eastern Red Cedar |
| 109 | Cantharid | Hardwoods | 298 | Discoloration (hardwood) | Hardwoods |
| 110 | Cantharid | Hardwoods | 299 | Discoloration (oak) | Oak |
| 111 | Cantharid | Hardwoods | 300 | Discoloration (spruce) | Spruce |



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 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 & Pat Ahern
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 2 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/>