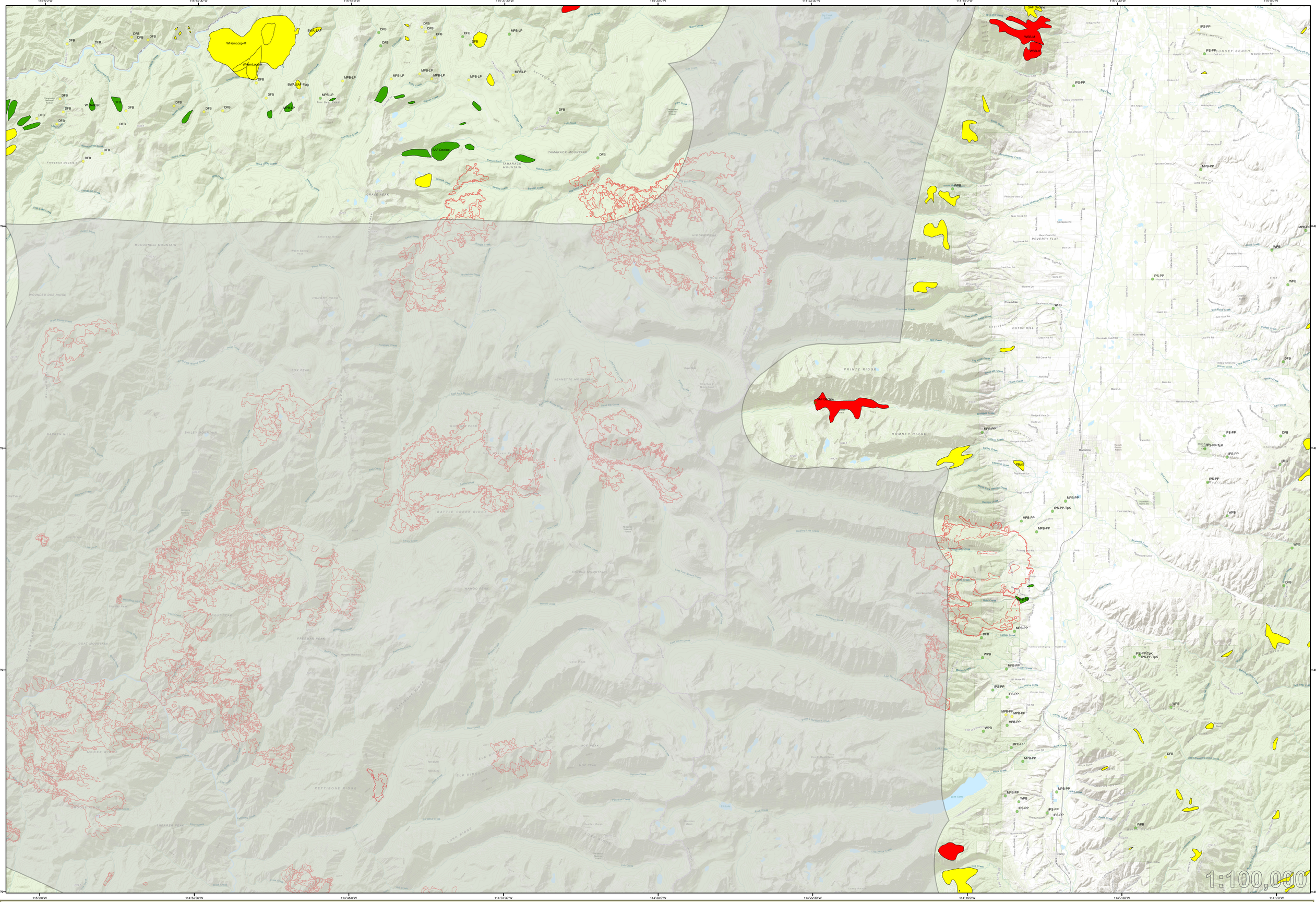
# 2019 Aerial Insect and Disease Survey
# Hamilton, Montana




## Legend

### Damage Points

**Number of Trees**

- 1 - 5
- 6 - 30
- > 30

### Damage Polygons

**Percent Affected**

- Light (1-10%)
- Moderate (11-50%)
- Severe (>50%)
- Not flown
- Fire Perimeters (2016 - 2018)

**CODING SYSTEM**

Codes have two parts: the first represents the causal agent and the second represents the host. If needed, the two-part code is followed by an 'M' or 'H' to indicate severity of the activity. Data is color coded to represent the intensity of activity as seen in the legend.

Examples:
**MPB-LPP** represents mountain pine beetle in Lodgepole pine.
**WSB-DF/SAF-H** represents western spruce budworm infestation in subalpine fir/Douglas-fir mix with >75% of leaves defoliated.

| Causal Agent Codes | |
|---|---|
| **Abiotic** | |
| **ASP Defol** | Aspen Defoliation |
| **ASP Diebck** | Aspen Dieback |
| **ASP Mort** | Aspen Mortality |
| **AvaInch** | Avalanche |
| **Flood** | Flooding-high water |
| **Frost** | Frost |
| **Wind** | Wind |

| Bark Beetles | |
|---|---|
| **DFB** | DFB |
| **ESB** | Engelmann Spruce beetle |
| **FEB** | Fir engraver beetle |
| **IPS** | Pine engraver beetle |
| **IPS Emarg** | IPS emarginatus |
| **MPB** | Mountain pine beetle |
| **WPB** | Mountain pine beetle |

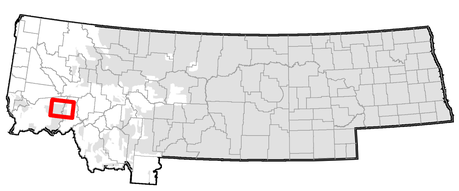
| Defoliators | |
|---|---|
| **BWA** | Balsam wooly adelgid |
| **DFTM** | Douglas-fir Tussock Moth |
| **PButt** | Pine Butterfly |
| **WHemLoop** | Western Hemlock Looper |
| **WSB** | Western Spruce Budworm |

| Causal Agent Codes | |
|---|---|
| **Disease** | |
| **SAF Decline** | Sub Alpine Fir Decline |
| **WL_Ndl Cst** | Western larch needle cast |
| **WPBR** | White pine blister rust |

| Host Codes | |
|---|---|
| **ASP** | Aspen |
| **DF** | Douglas-fir |
| **GF** | Grand fir |
| **LIM/WBP** | Limber pine / Whitebark pine |
| **LP** | Lodgepole pine |
| **PP** | Ponderosa pine |
| **SAF** | Subalpine fir |
| **WL** | Western larch |
| **WWP** | Western white pine |

| Miscellaneous | |
|---|---|
| **Defol** | Defoliation |
| **M** | Defoliation - Moderate ( 50-75% of leaves defoliated) |
| **H** | Defoliation - Heavy ( > 75% of leaves defoliated) |
| **Flag** | Flagging |
| **TpK** | Top kill |

## Region 1 - Location Map
## USGS 100K Quad
***USGS 100K TOPO!: 46114-A1***
***Hamilton, Montana***



**Legend**

- Counties
- Flown areas
- R1 Boundary

### HOW THE AERIAL SURVEYS ARE CONDUCTED

Data represented on this map are based on trees visibly affected by forest insects, diseases and abiotic factors that are detected and recorded by observers during aerial survey flights. These flights are conducted by a joint partnership between the USDA Forest Service and state cooperators.

Observers have just a few seconds to recognize characteristic signatures of healthy and damaged trees of different species, correctly diagnose damage causal agents, estimate the intensity or extent of damage, and precisely record information on a digital sketch mapping platform. Air turbulence, cloud shadow, haze, smoke, and observer experience can affect the quality of the survey. These sketchmaps and the resultant data summaries provide an estimate of conditions on the ground, and may differ from estimates derived by other methods.

Annual aerial surveys provide important information on the current status of detected causal agents and can be used to determine trends in damage levels over time by comparing previous and current survey data over large areas.

**Map Created: 2/4/2020**
**Projection: UTM NAD83 Zone 11T**
**Author: R1/R4 FHP GIS, USDA Forest Service**

## DIRECT ALL INQUIRIES TO:


**USDA FOREST SERVICE REGION 1**
State and Private Forestry
Forest Health Protection
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Missoula, MT 59804

**USDA FOREST SERVICE REGION 4**
State and Private Forestry
Forest Health Protection
1249 S. Vinnell Way, Suite 200
Boise, ID 83709


### DISCLAIMER

The digital map layer upon which the insect and disease data are presented vary in both source and scale, therefore, accuracy is not guaranteed.

The insect and disease data should be used only as an indicator of insect and disease activity, and should be ground – truthed for actual location and causal agent. Polygons indicate locations of tree mortality, defoliation, and/or other damage. Intensity of damage is variable, and not all trees and areas indicated are dead or damaged. The joint cooperators reserve the right to correct, modify, update, or replace the data as necessary. Using this data for purposes other than those for which it was intended may yield inaccurate or misleading results.