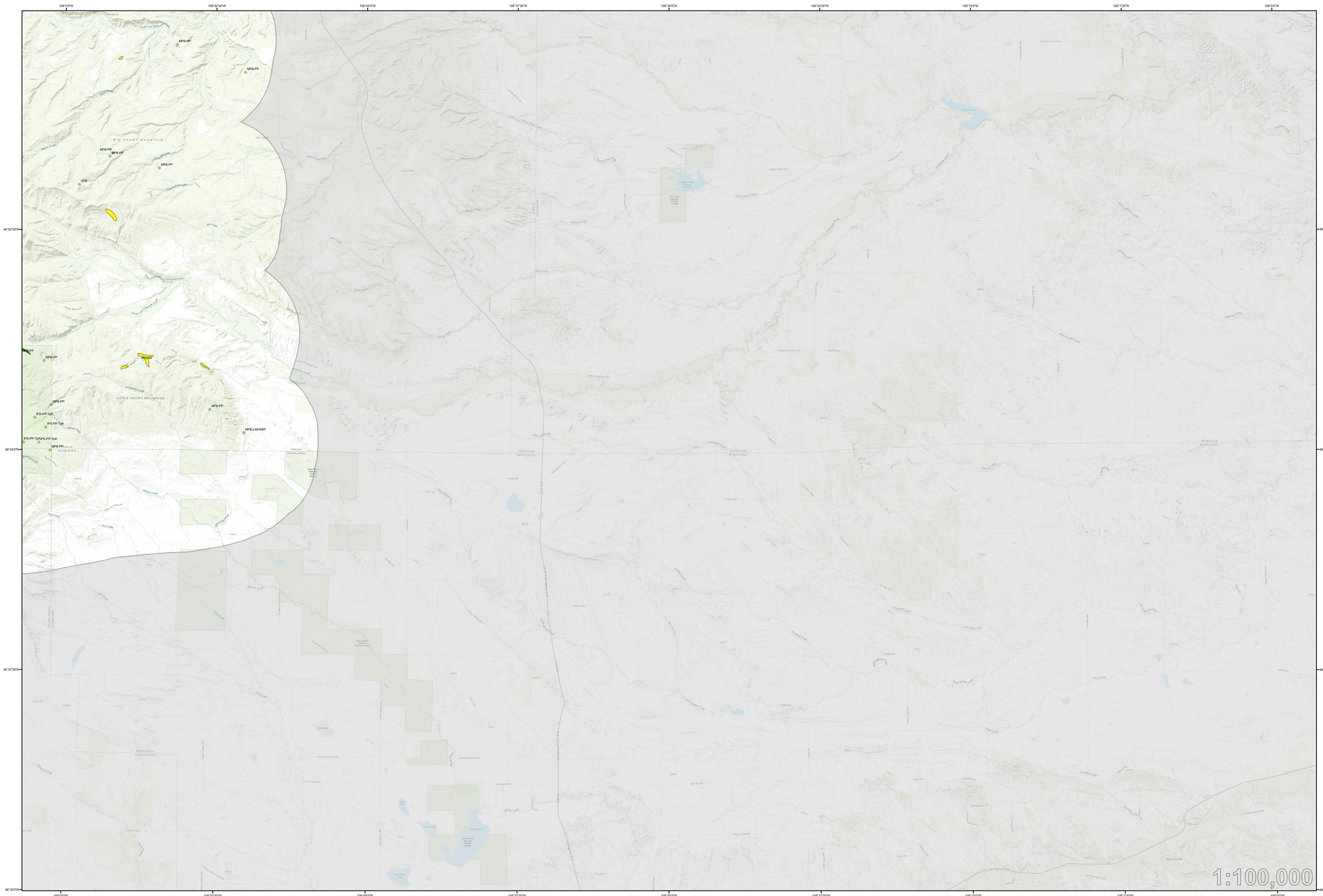
2019 Aerial Insect and Disease Survey
Musselshell, Montana



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
Avalnch	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

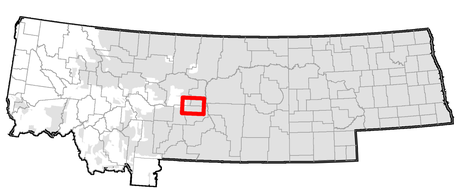
Defoliators	
BWA	Balsam wooly adelgid
DFTM	Douglas-fir Tussock Moth
PButt	Pine Butterfly
WHemLoop	Western Hemlock Looper
WSB	Western Spruce Budworm

Causal Agent Codes	
Disease	
SAF Decline	Sub Alpine Fir Decline
WL_Ndl Cst	Western larnch 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!: 46108-E1
Musselshell, 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 12T
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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.