Mopti, Mali
(Digital Globe)

Mobile Geospatial Technology's Role in Tracking Pest and Disease Infestations In our Nation's Forests

Everett Hinkley
USDA Forest Service – National Remote Sensing Program Manager

Civil GPS Service Interface Committee (CGSIC)

Fall 2020 Meeting

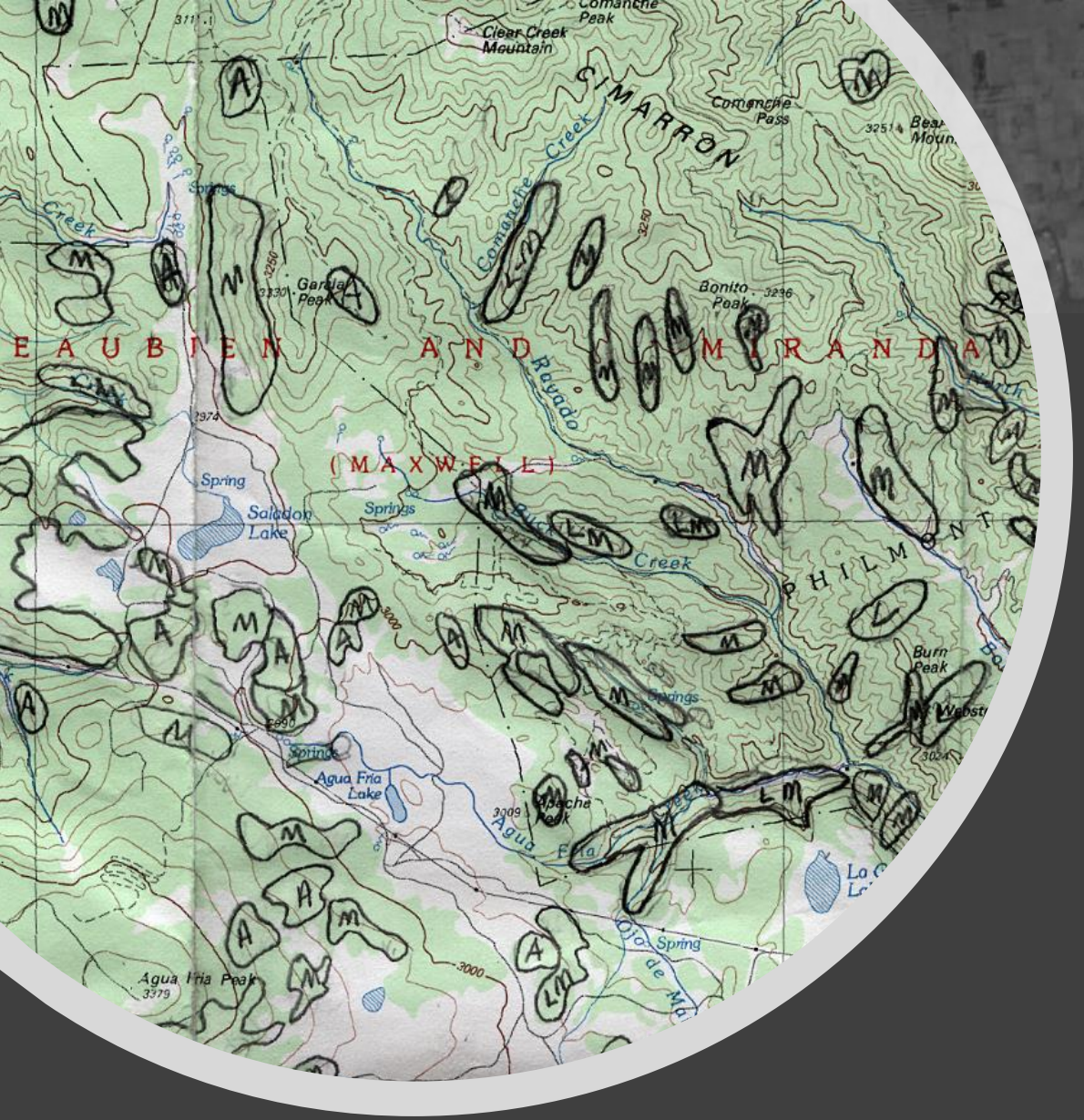
September 22, 2020

Mobile Geospatial in Forest Health

Geospatially enabled data gathering tools are crucial to mapping pest and disease outbreaks in our nation's forests.

The Forest Service developed and employs the Digital Mobile Sketch Mapping (DMSM) system, which comprises tablet hardware, software, and back end data support processes (ArcGIS Desktop Tools) which allows trained aerial surveyors, in light aircraft, and ground observers to record forest disturbances together with their causal agents.

This system greatly enhances the quality and quantity of forest health data while improving safety by leveraging satellite remote sensing capabilities to monitor forest disturbances.



What is Aerial Sketchmapping?

Aerial Sketchmapping is simply having a “map in the lap” for recording observations of interest on the ground below.

Aerial Surveys are done on an annual basis with trained observers flying in light aircraft over our nation’s forests.

With our digital sketchmapping tools, GPS is a critical part of accurately geolocating those observations.

Digital Aerial Sketchmapping

- The Digital Aerial Sketchmapping System offers several advantages over conventional paper maps.

- Relieves the surveyor of having to track aircraft position, allowing more time to observe and map damage.
- Wide array of base map options that may lead to more accurate mapping of features.
- Data available for immediate use in a GIS environment
- Data easily downloaded to GPS units for field checking or management action.

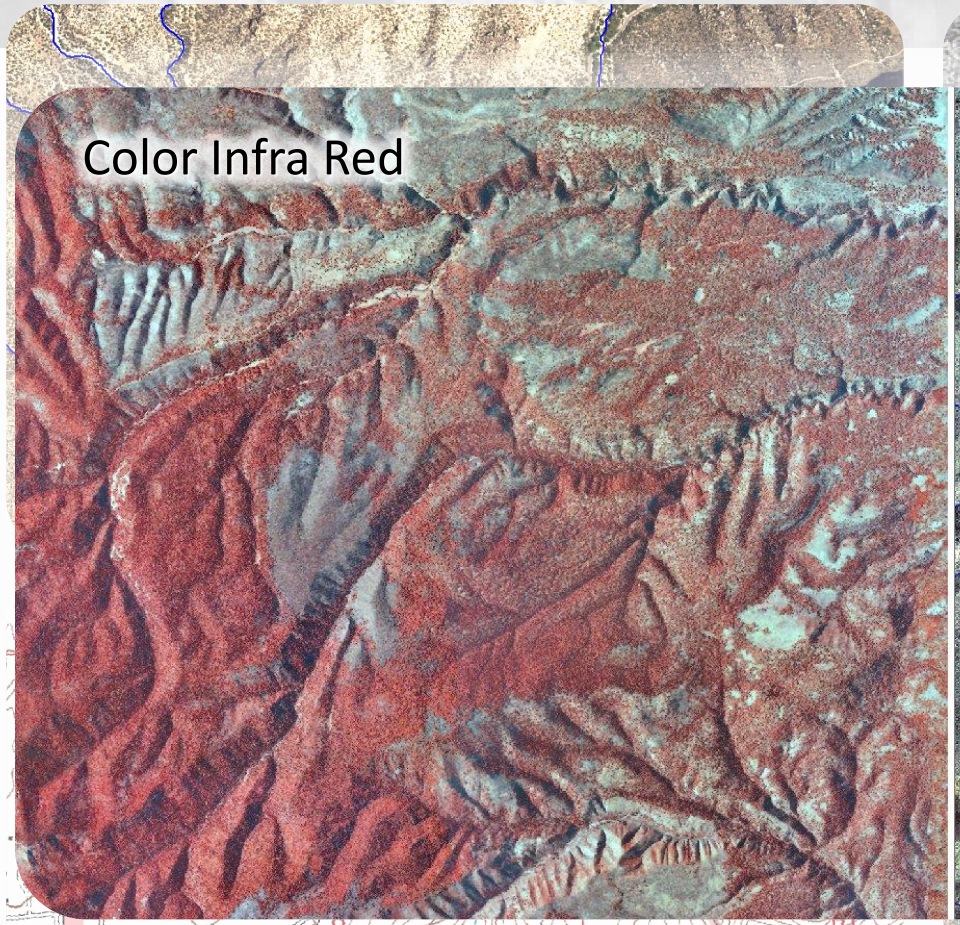
Early Digital Aerial Sketch Mapping Tools

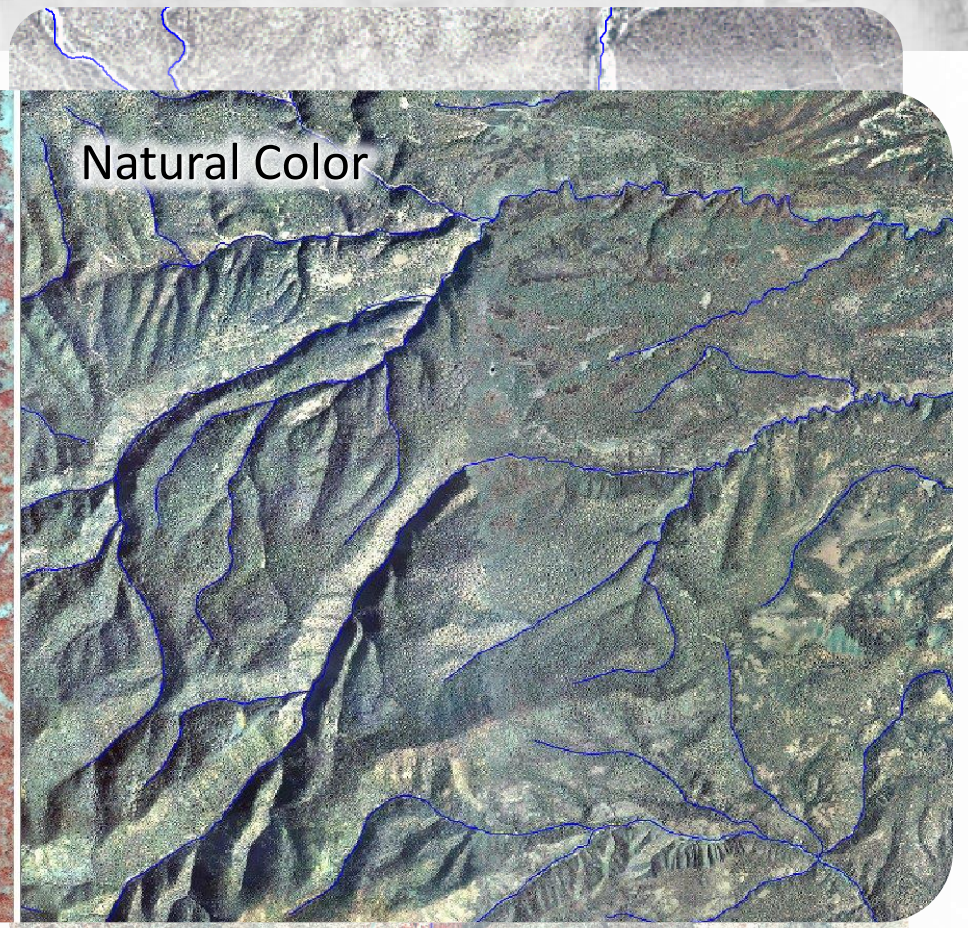
Digital Mobile Sketch Mapping (DMSM)

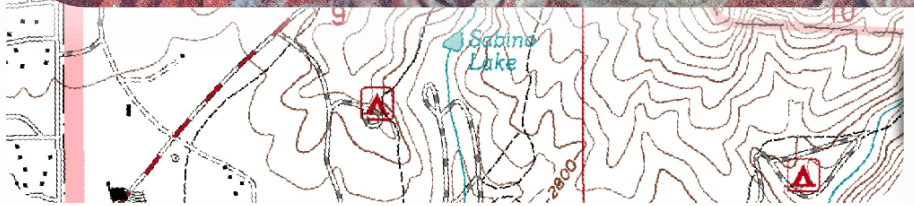
Current System

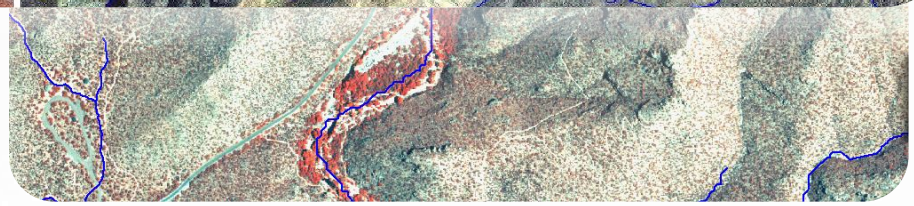
- OS
- Hardware
- “Cloud” data concept
- Standards & compliance

Raster Map Backgrounds



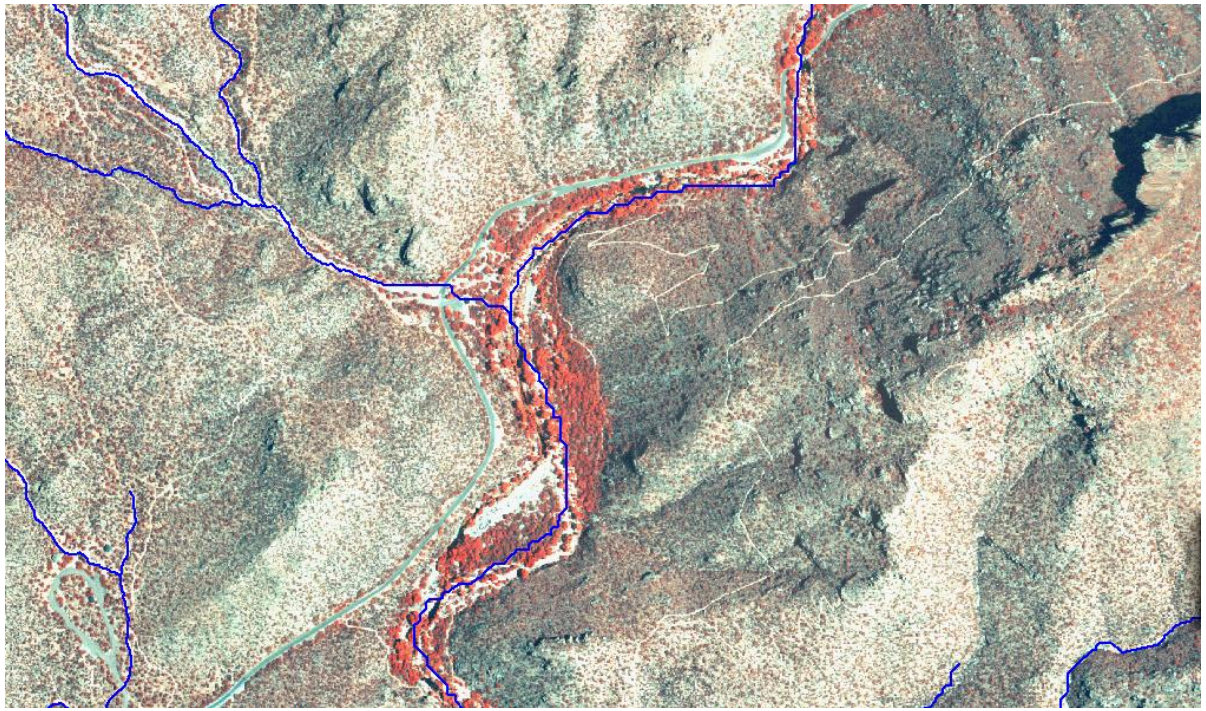






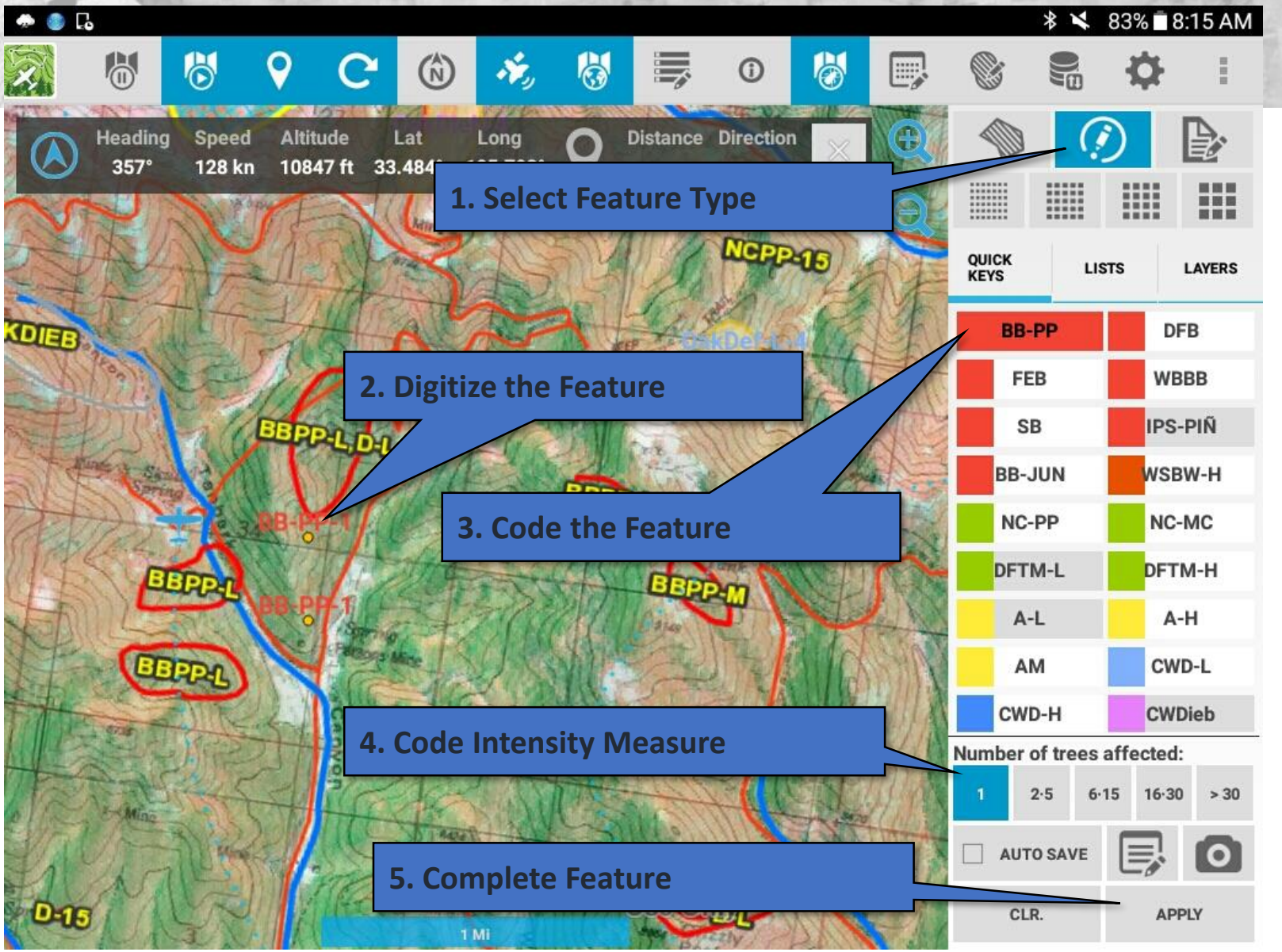
Vector Overlays

- Hydrography
- Roads
- Contours
- Survey boundaries
- Past year data
- Fires

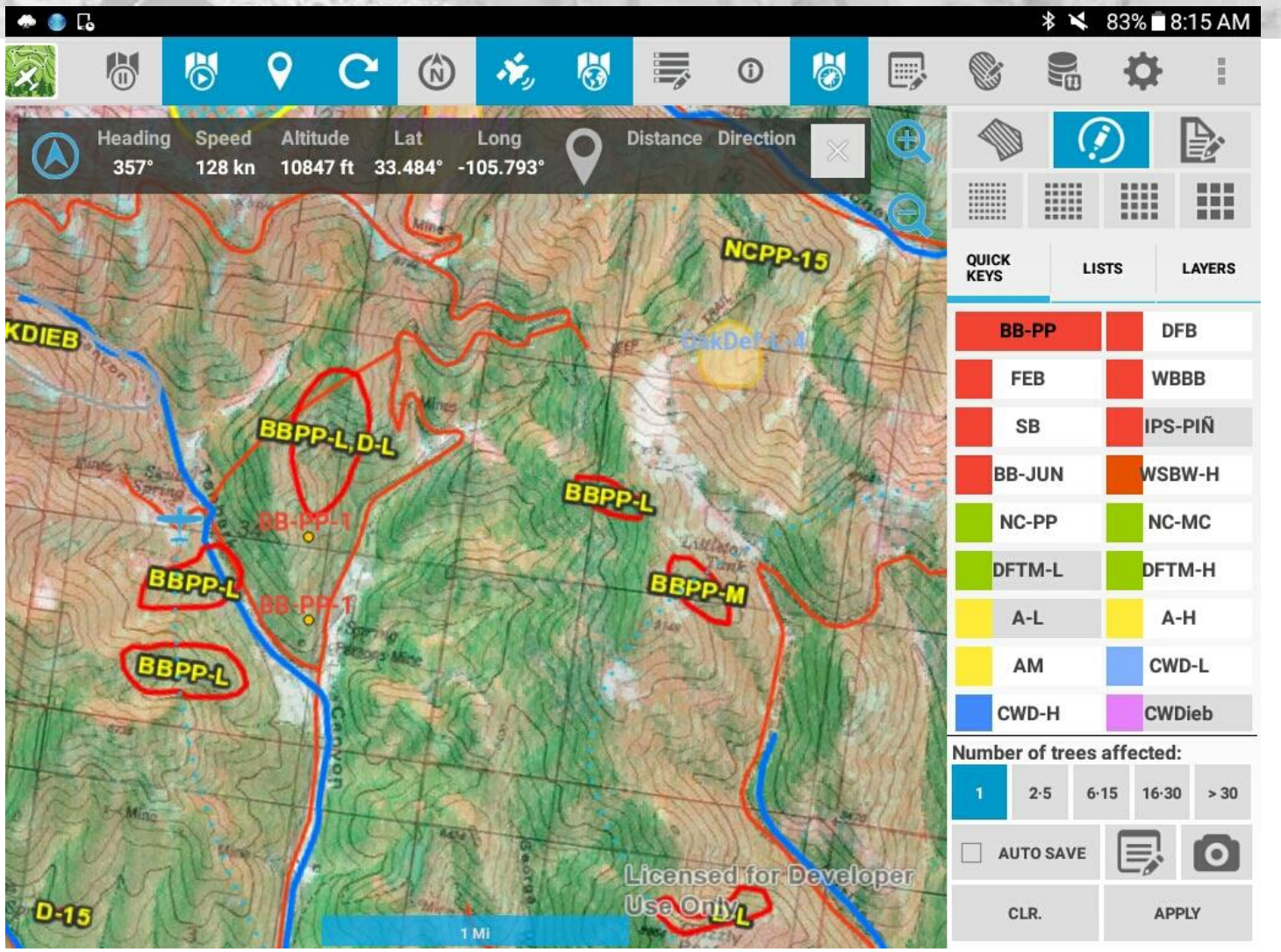


In the Aircraft

In the Aircraft

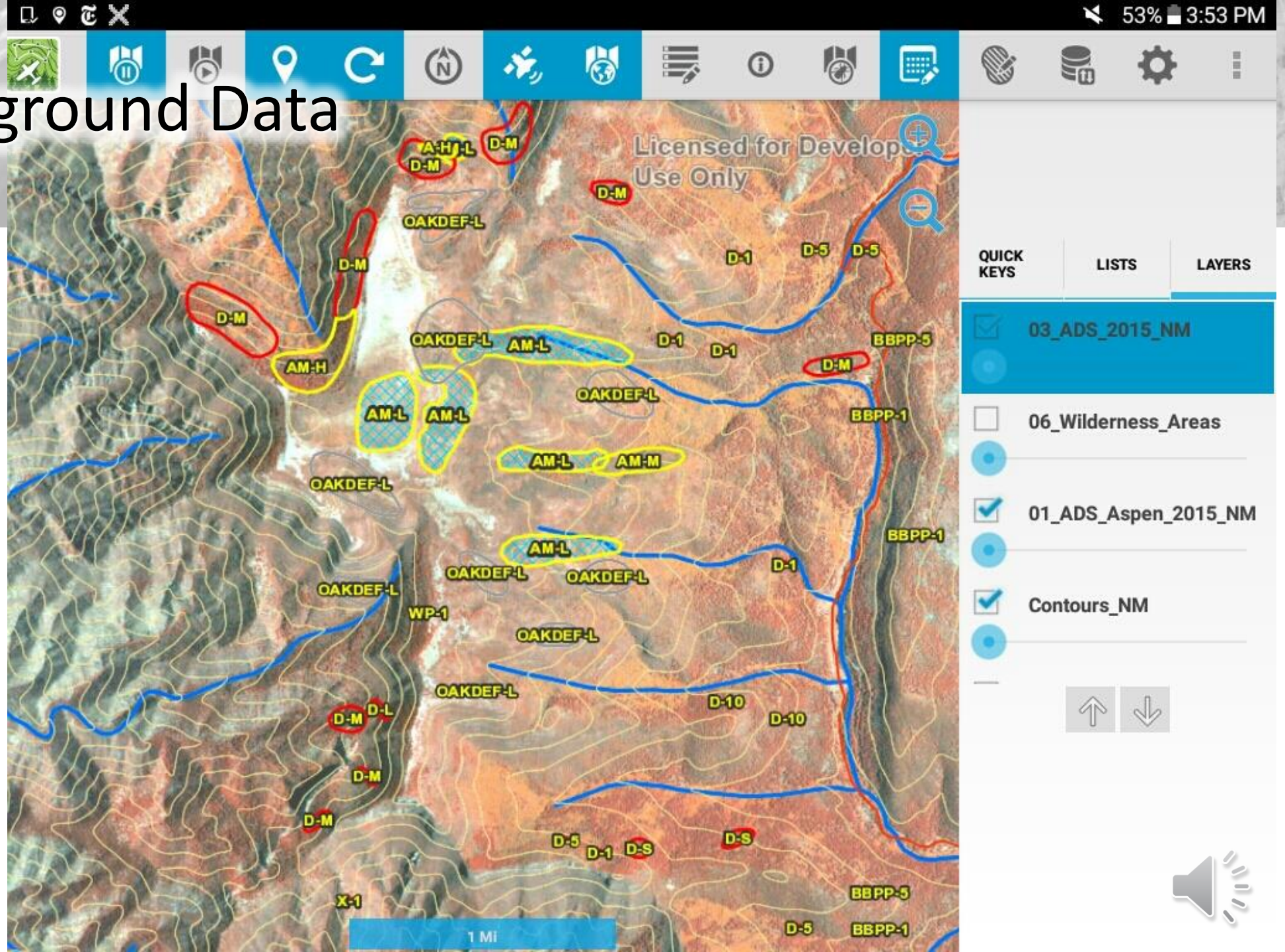


Digital Mobile Sketch Mapping (DMSM)

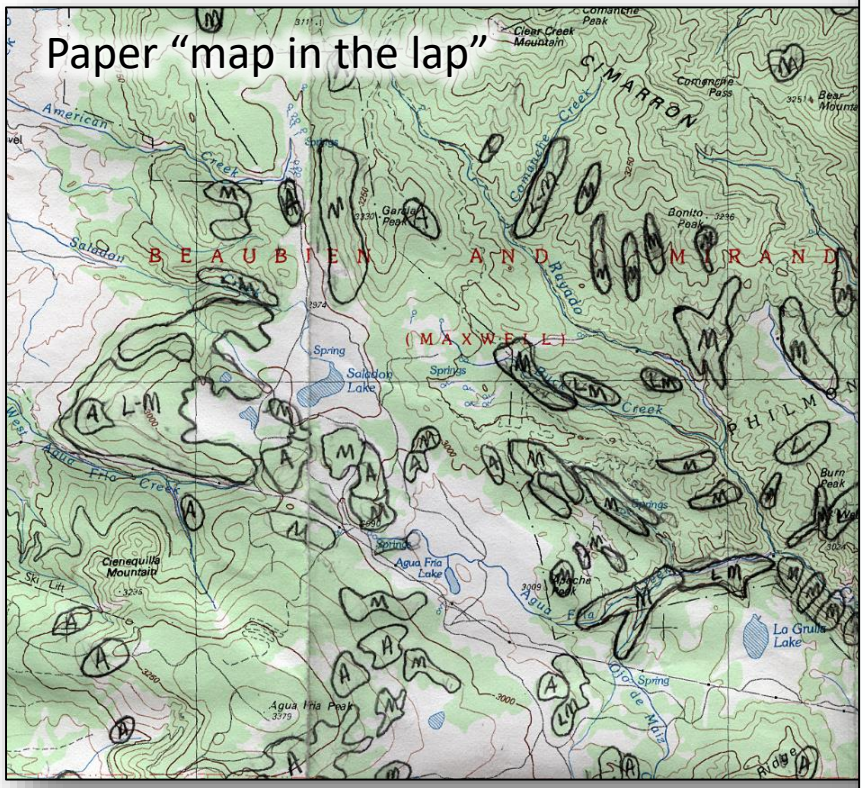


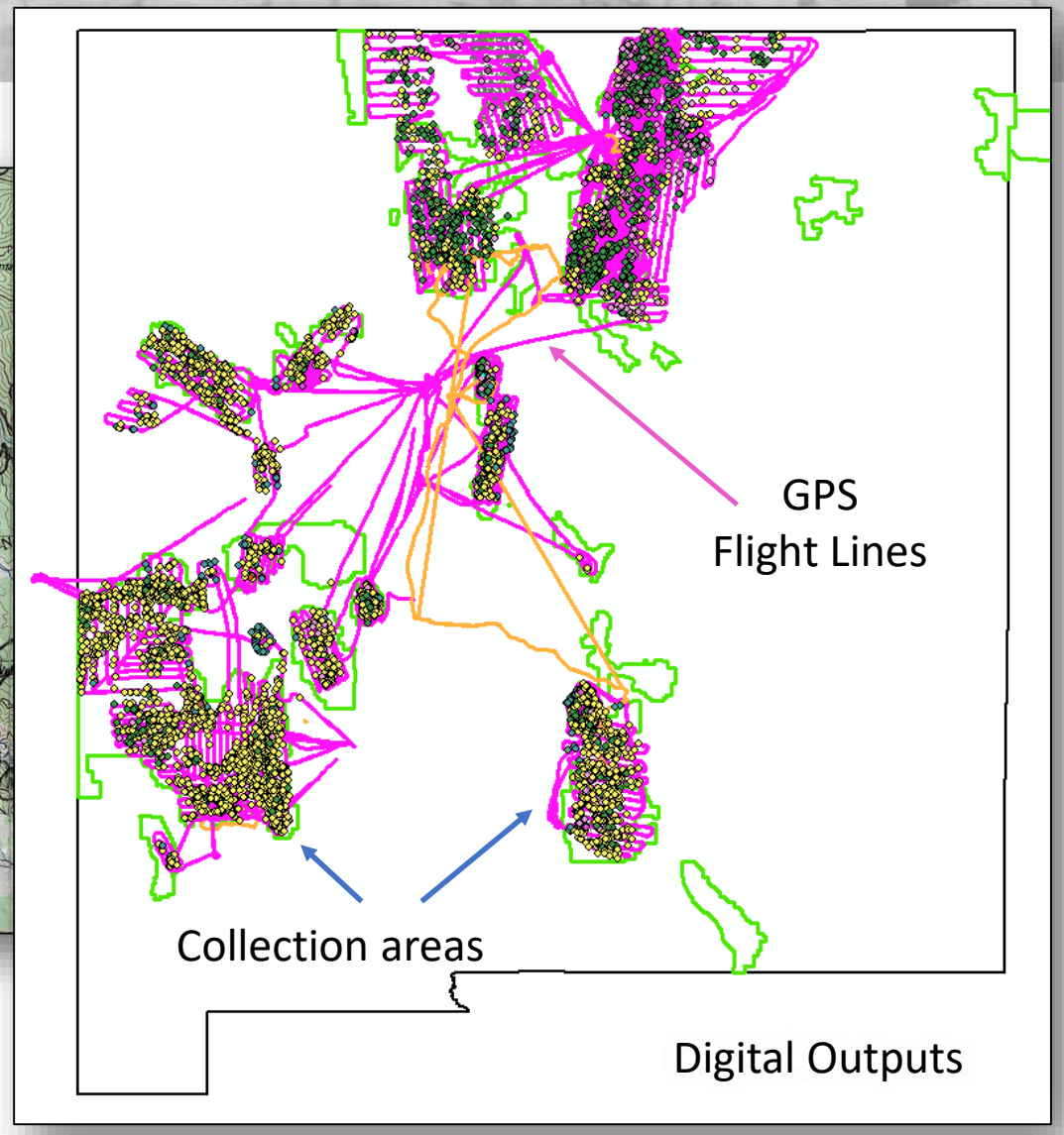
Screen view

Background Data



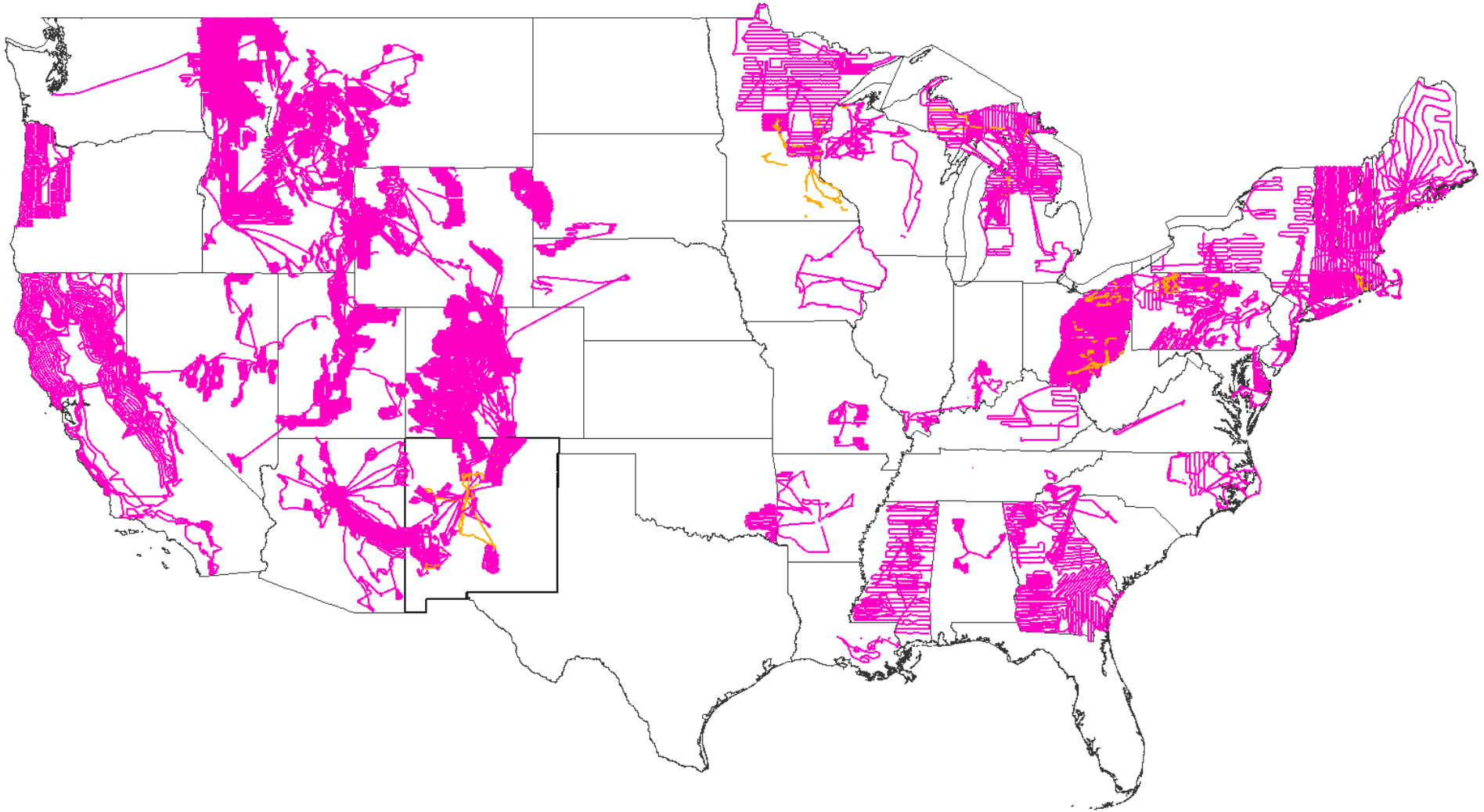
Post-Processing





ArcGIS Online

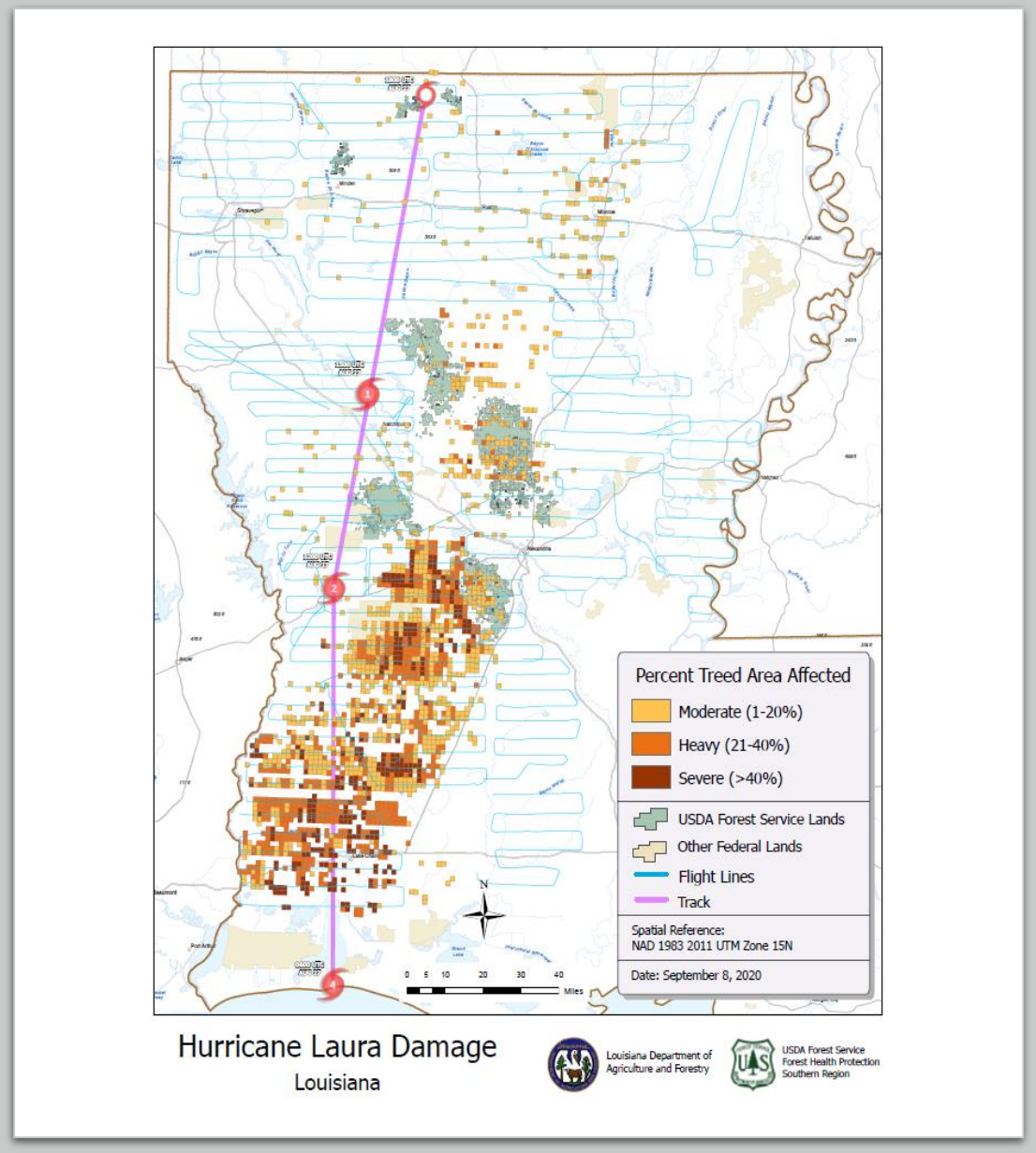
National Database



Other Applications

- Can also be tailored to serve in other mapping applications:
  - Invasive plant species
  - Wildfires
  - Hurricanes
  - Tornados
  - Floods

Map shows surveyed tree damage levels in areas affected by Hurricane Laura



Equipment Recommendations

Recommended Equipment

Tablets

Samsung Galaxy Tab S4 10.5” SM-T830NZKAXAR

SCREEN SIZE	RAM (GB)	CPU (GHz)	OS	POWER (HOURS)
10.5	4	2.35	Android 8.0 Oreo	~18

INTERNAL STORAGE (GB)	EXTERNAL STORAGE (GB)	PRICE	OTTERBOX	NOTES
64 or 256	400	$600-$700	$90	S-pen

Note: Samsung no longer makes the S4 tablet and it’s no longer available on contract. Our tech specialists will be testing Samsung ActivePro tablets soon and are looking forward to Samsung’s new S7 tablets.

Equipment Recommendations

Additional Recommendations

Memory Card

128GB

- Sandisk Extreme 128GB microSDXC UHS-I Card
- Samsung 128GB 95MB/s PRO Select Micro SDXC Memory Card
- SanDisk Extreme Plus 128GB Micro SDXC UHS-1 Card
- Samsung 128GB 100MB/s (U3) MicroSDXC EVO Select Memory Card

64GB

- SanDisk Extreme 64GB microSDXC UHS-I Card
- Samsung PRO Select 64GB 95MB/s MicroSDXC Memory Card
- SanDisk Extreme PLUS 64GB microSDXC UHS-I/U3 Card
- Samsung 64GB 100MB/s (U3) MicroSDXC EVO Select Memory Card

32GB

- SanDisk Extreme PLUS 32GB microSDXC UHS-I/U3 Card
- Samsung 32GB 95MB/s PRO Select Micro SDHC Memory Card
- SanDisk Extreme 32GB microSDHC UHS-I Card

Equipment Recommendations

Bluetooth GPS

Bad Elf GPS Pro

FHAAST recommends this unit because it features a large, backlit LCD screen that lets you see your location, speed, heading, altitude, and GPS lock status at a glance, which can be very helpful.

FHAAST has also successfully tested the DMSM application with some older GPS receivers from Emtac, Garmin, G-Sat, Holux and Qstarz.

There is an additional requirement of the application "Bluetooth GPS" from GG MobLab being installed on the tablet which can be found for free in the Google Play Store.

***FHAAST** = Forest Health Assessment & Applied Sciences Team*

Questions

Everett Hinkley

National Remote Sensing Program Manager

Everett.Hinkley@usda.gov