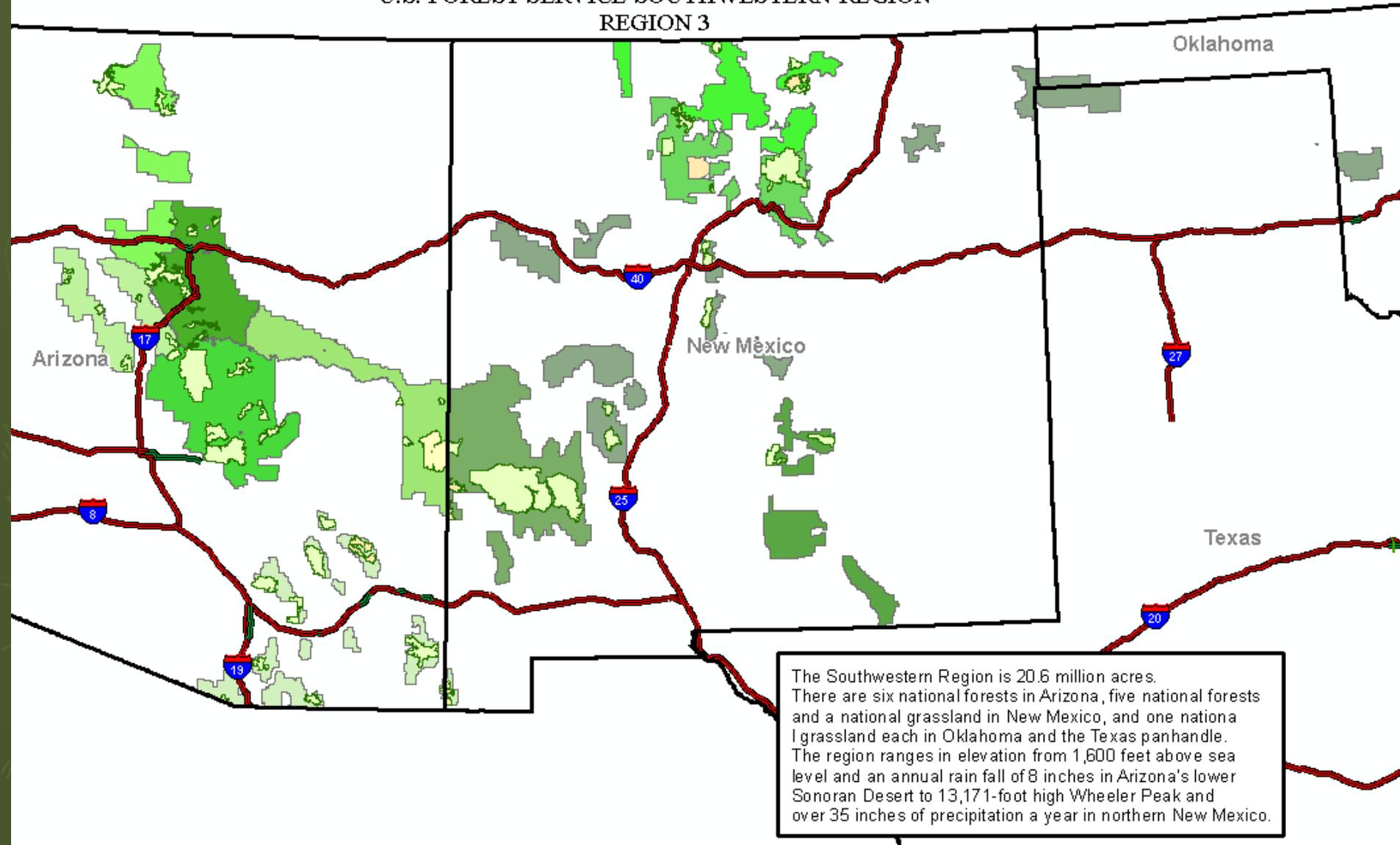
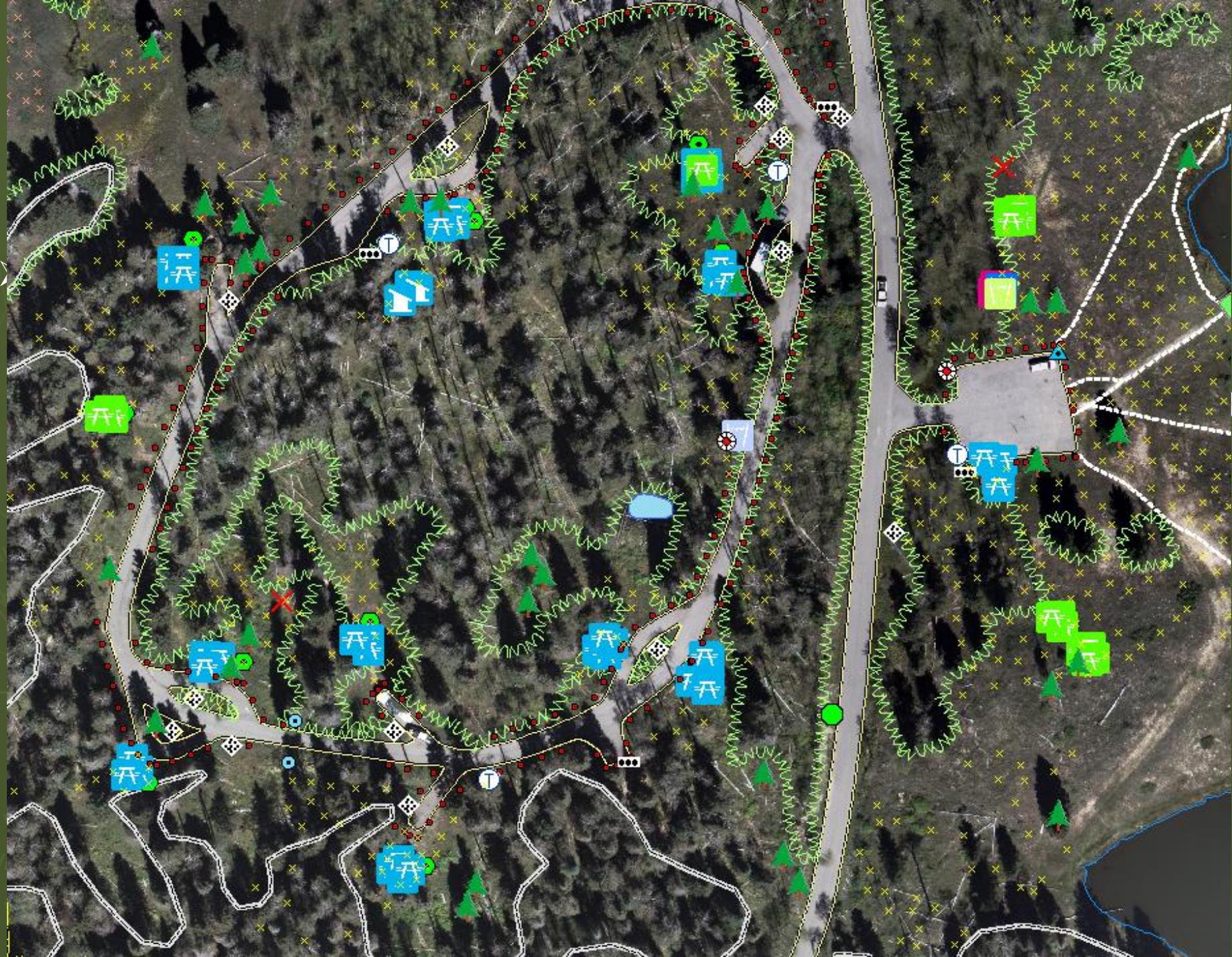
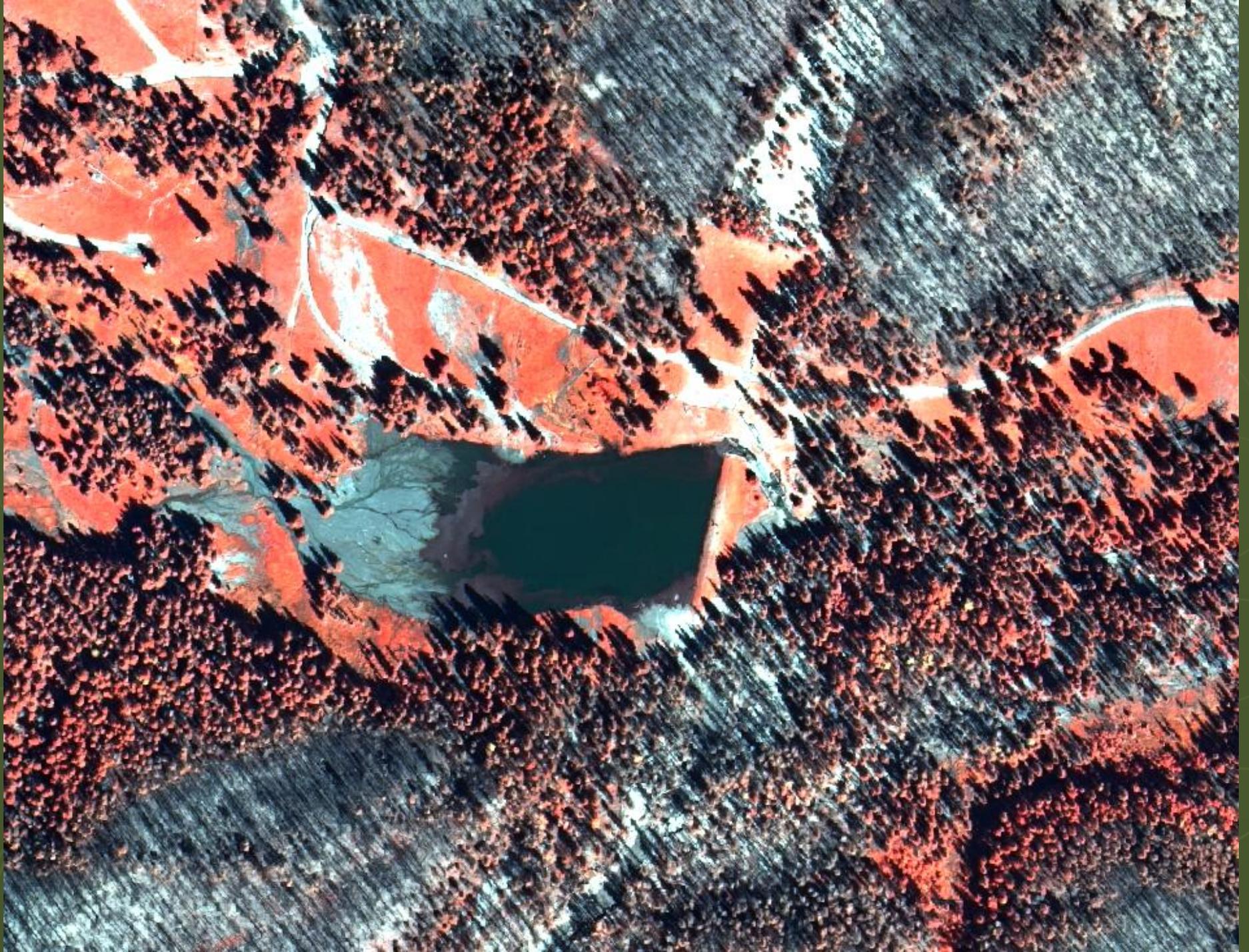


U.S. FOREST SERVICE SOUTHWESTERN REGION  
REGION 3



The Southwestern Region is 20.6 million acres. There are six national forests in Arizona, five national forests and a national grassland in New Mexico, and one national grassland each in Oklahoma and the Texas panhandle. The region ranges in elevation from 1,600 feet above sea level and an annual rain fall of 8 inches in Arizona's lower Sonoran Desert to 13,171-foot high Wheeler Peak and over 35 inches of precipitation a year in northern New Mexico.





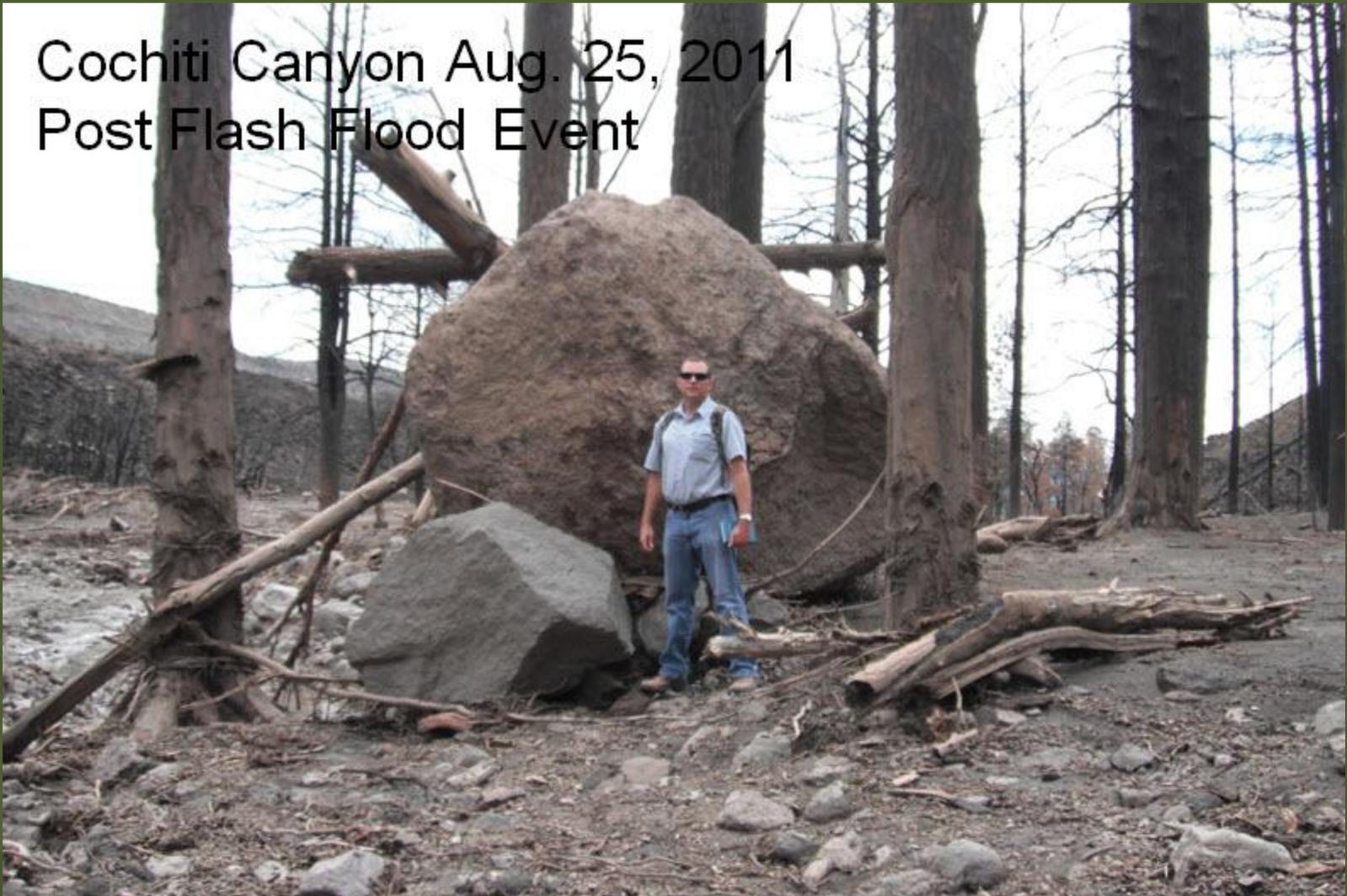
# Fire Events Summer 2011

- ▶ Extreme season – emergency events and multiple fires – Las Conchas, Wallow, Horseshoe.
- ▶ GIS services and needs in both states – New Mexico and Arizona
- ▶ AGIC committee and NMGIC partners collaborated

# Imagery Partnership

- ▶ Need for photography, orthophotography, surface and watershed delineations
- ▶ Partners with COE, Valles Caldera, SF NF, BIA and USGS to contribute funding for imagery. Shared costs
- ▶ Purchased digital color and orthos for an extent that encompassed multiple land management groups.

Cochiti Canyon Aug. 25, 2011  
Post Flash Flood Event





# Flood Movie





THANK YOU

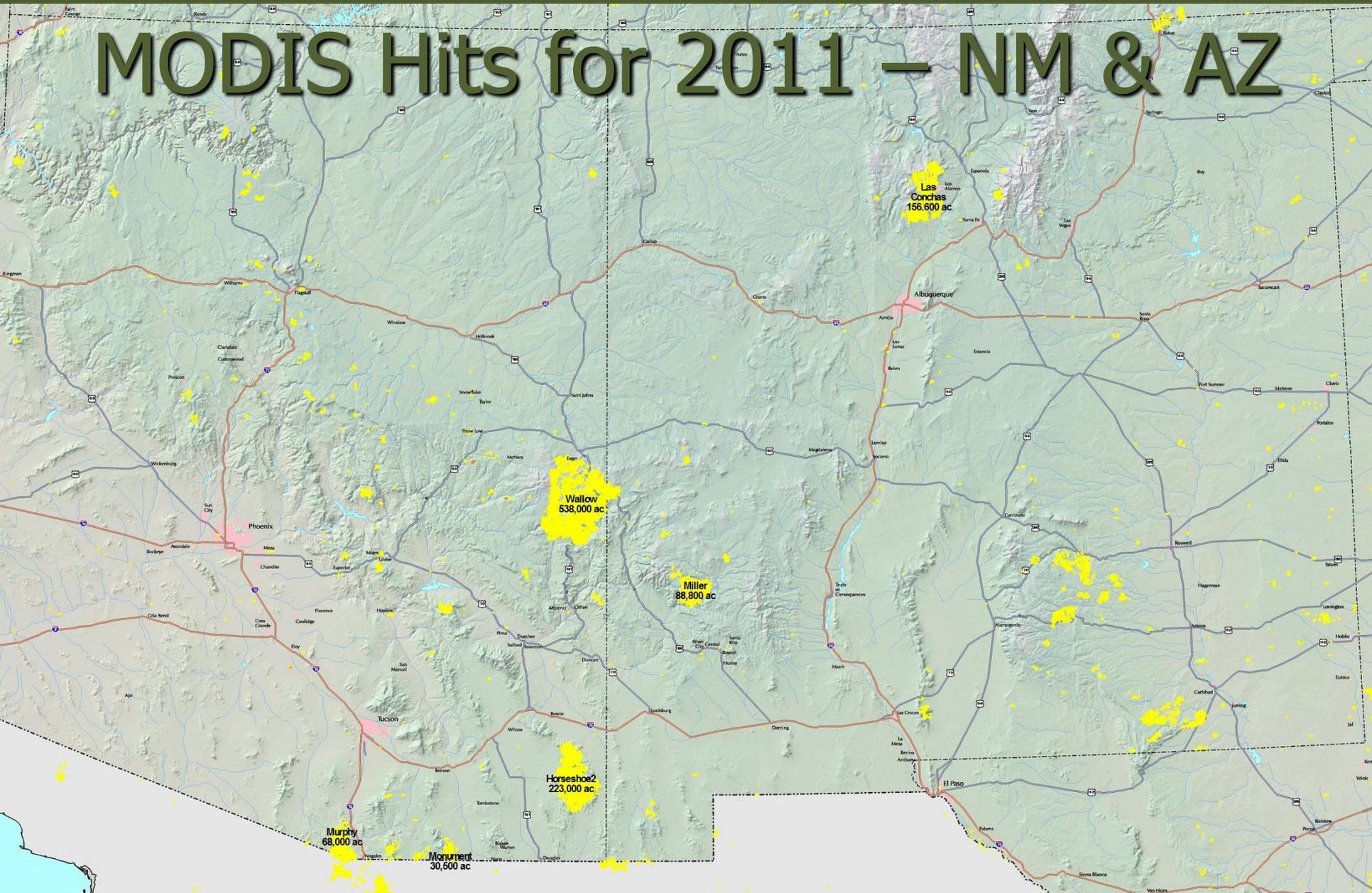
# Forest Service Southwestern Region

Remote Sensing

# 2011 – A Historic Fire Year

- ▶ Over 2 million acres burned in the SW
- ▶ Both AZ and NM had largest recorded fires
- ▶ Lots of requests for imagery and updates to derived products
  - Incident Management Teams
  - Multi-Agency Coordinating Groups
  - Area Command
  - Fire and Aviation Management and other RO staffs
  - Forests

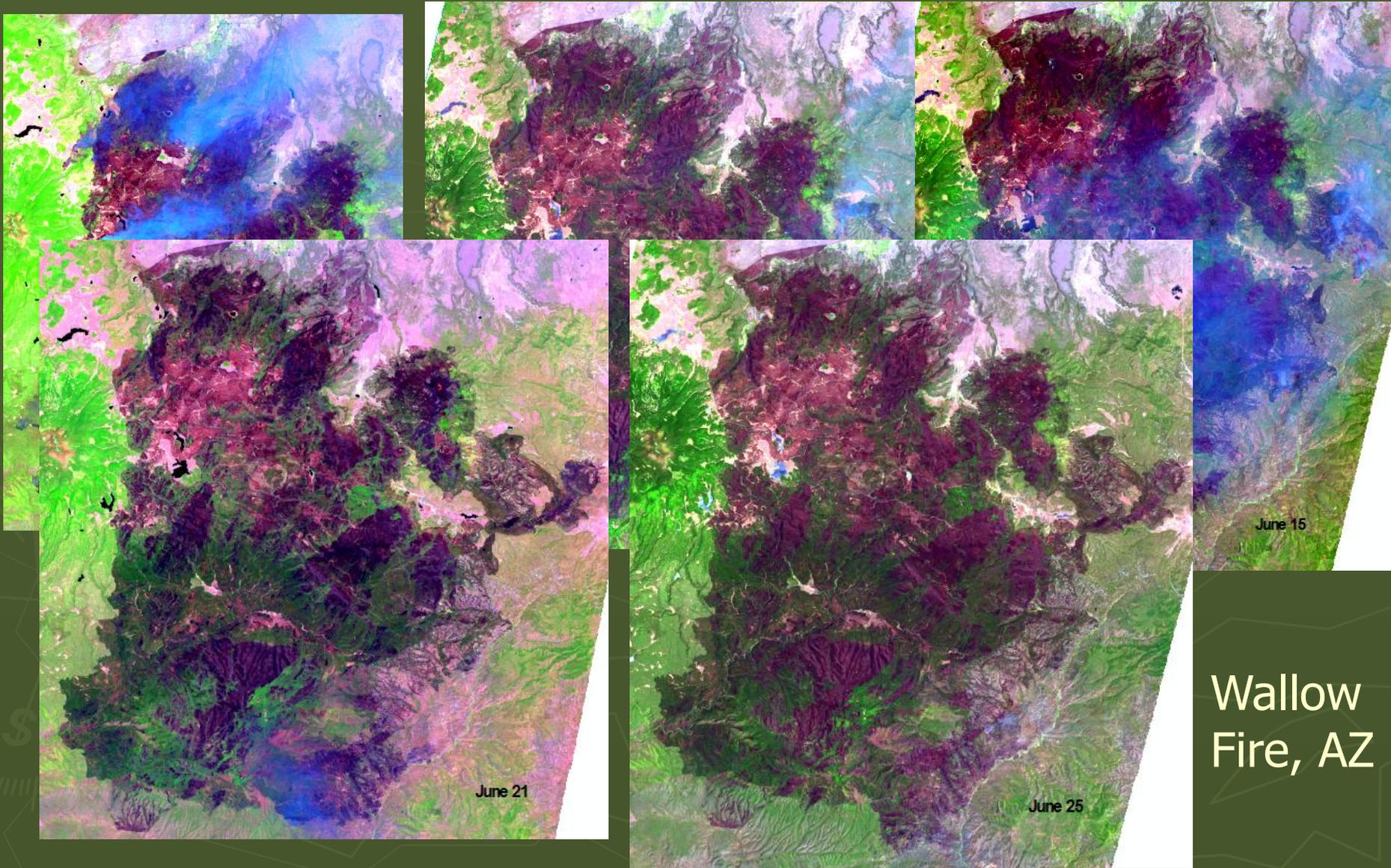
# MODIS Hits for 2011 – NM & AZ



# Satellite Imagery for Operational Awareness

- ▶ Utilized HDDS portal extensively
  - Thanks to Brenda Jones, Rynn Lamb, Bob Bewley - USGS
- ▶ Licensing issues
  - “all restricted data is to be used internally for the response with no redistribution”
  - Not as much of an issue once in Earth Explorer
- ▶ Having imagery ortho-rectified greatly increases utility
- ▶ SPOT imagery most useful – captured fire extent
- ▶ Working with RSAC to establish SOPs for FS requests

# SPOT Tasking Ability Was Key



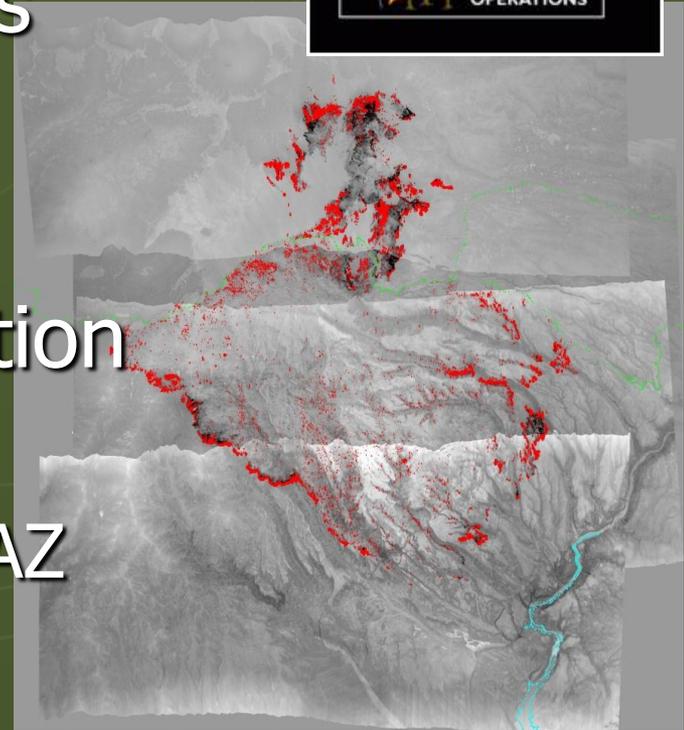
Wallow  
Fire, AZ

# Tactical Fire Mapping

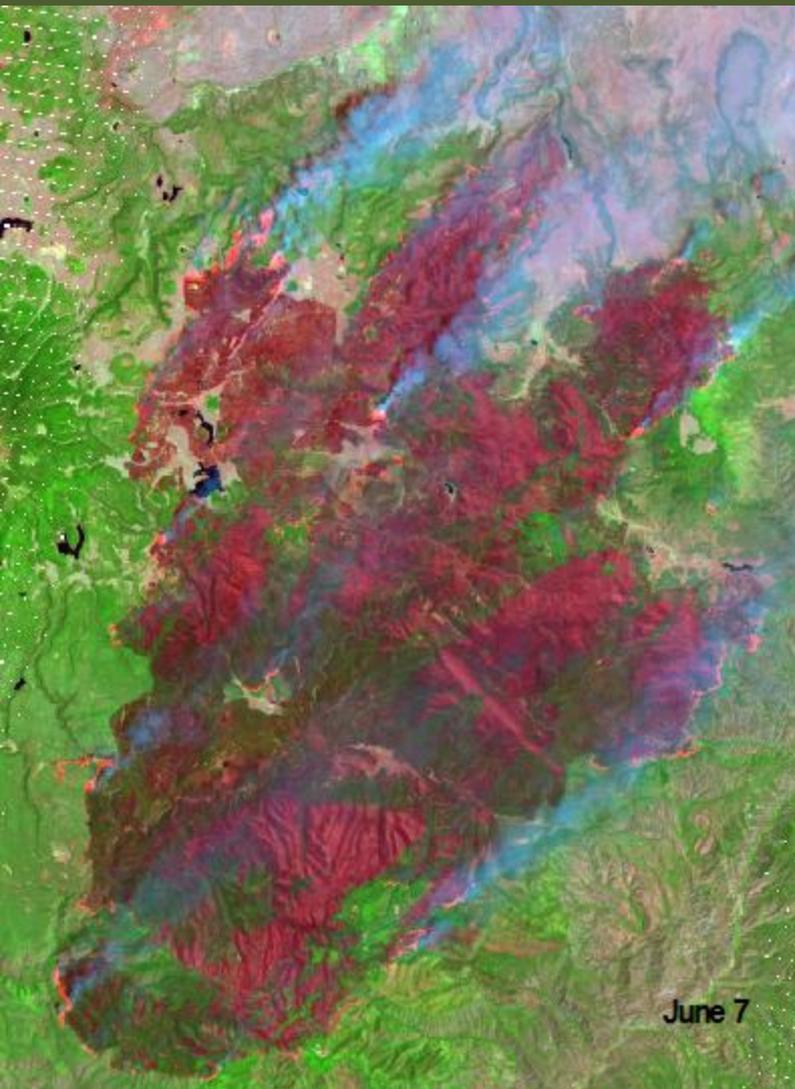
- ▶ National Infrared Operations
  - Flew 198 flights over 14 fires in NM and AZ

- ▶ Customs and Border Protection Predator

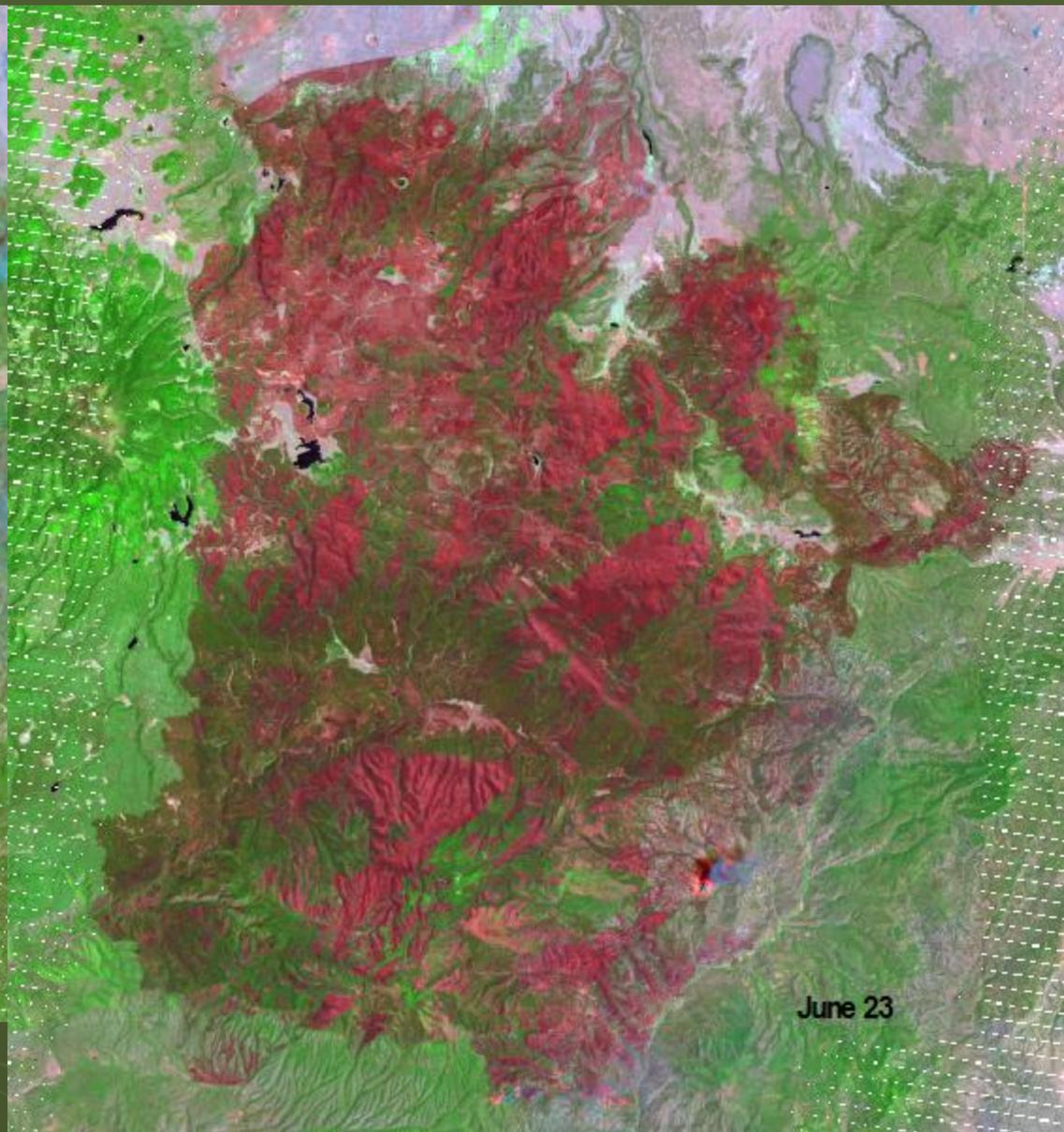
- Monument Fire, Sierra Vista AZ



# Landsat Still Critical



June 7



June 23

Wallow  
Fire, AZ

# Landsat-Derived Products

- ▶ Post-fire data produced by RSAC
  - BARC (Burned Area Reflectance Classification)
  - RAVG (Rapid Assessment of Vegetation)
  - MTBS (Monitoring Trends in Burn Severity)
- ▶ RAVG data utilized for rapid Changed Condition Assessments on Forests that are in plan revision – apply to existing vegetation map
- ▶ MTBS data to be used for updates to mid-scale existing vegetation maps

# Possible FS Acquisition of AMS



## Configurations

+ MISSION LIST

+ ORDER DATA

- CONFIGURATIONS

+ IMAGE GALLERY

+ CONTACT INFO



## SENSOR CONFIGURATION



### Wild Fire / Land Surface Scanner

IFOV: 1.25 or 2.5 mrad

FOV: 42.5 or 85.9 degrees

Resolution: 3 - 50 meters

[+ Back to Configurations](#)

Band	Wavelength (nm)	Simulated Band
1	420 - 450	
2	450 - 520	TM 1
3	520 - 600	TM 2
4	600 - 620	
5	630 - 690	TM 3
6	690 - 750	
7	760 - 900	TM 4
8	910 - 1050	
9	1550 - 1750	TM 5
10	2080 - 2350	TM 7
11	3600 - 3790	NPOES VIIRS M12
12	10.26 - 11.26 $\mu$ m	NPOES VIIRS M15

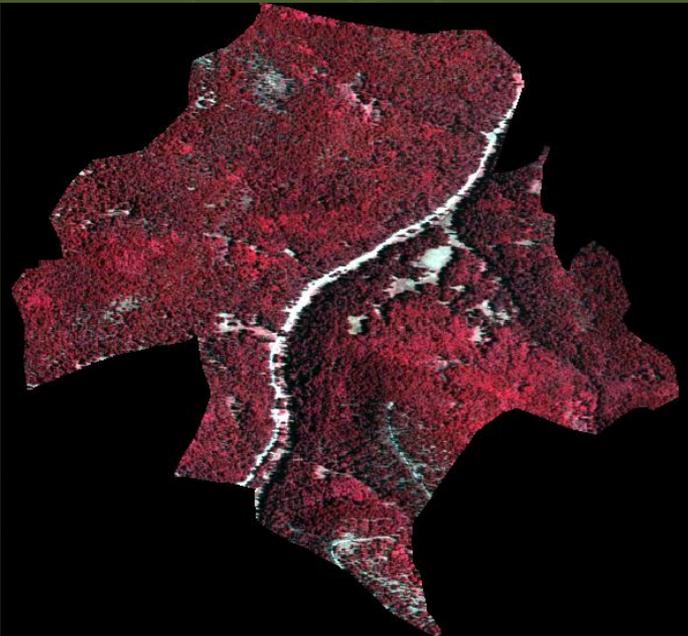
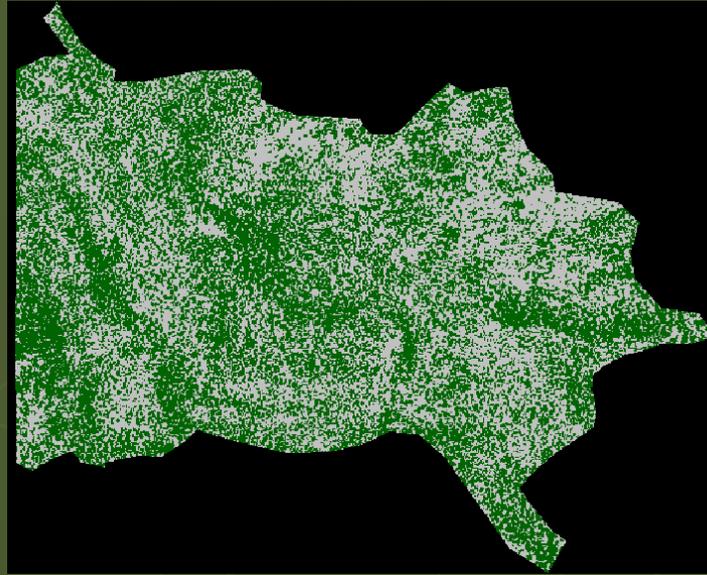
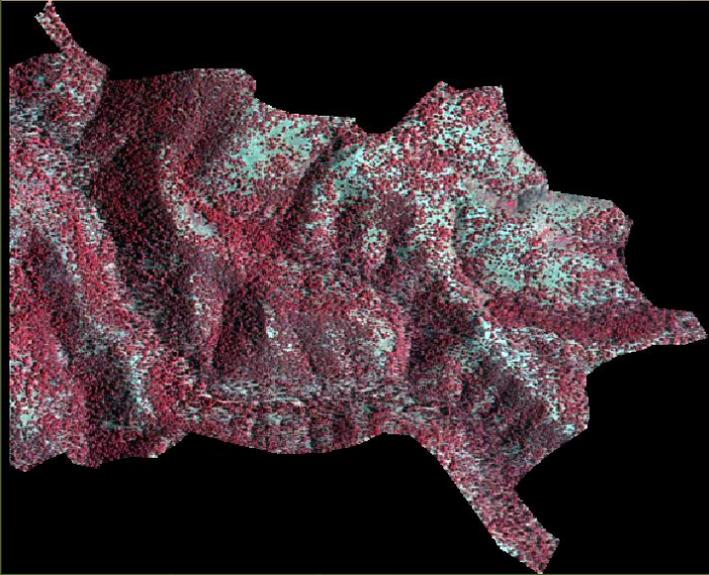
# Forest Restoration Projects

- ▶ Four Forest Restoration Initiative (4FRI)
- ▶ Southwest Jemez Mountains Restoration
- ▶ Work to restore ponderosa pine ecosystems to fire-adapted conditions
- ▶ How to monitor implementation and effectiveness with remote sensing
  - RSSC project with 4FRI
- ▶ Key metric is changes in canopy cover amount and distribution
- ▶ NAIP and resource photography are key resources

# NAIP Imagery is Important Tool

- ▶ Repeated coverage, “free”
- ▶ Near IR important for creating NDVI but...
- ▶ All NAIP is not equal
  - Time of year/day (shadows, phenology)
  - Sensor
  - Quality of color balance esp. CIR product

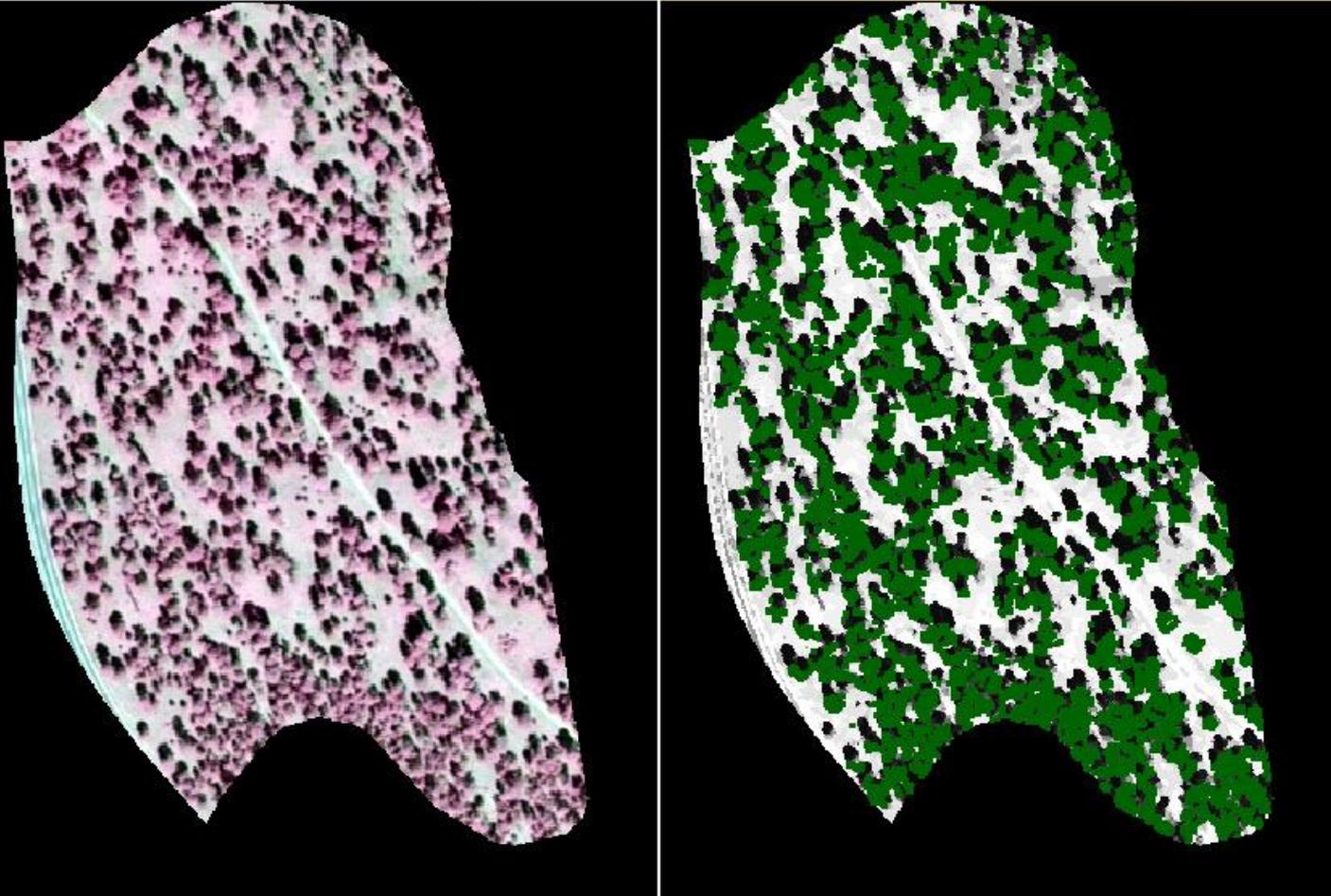
# NM 2011 NAIP



Binary (canopy,  
non-canopy)  
image derived  
using NDVI  
threshold

# AZ 2010 NAIP

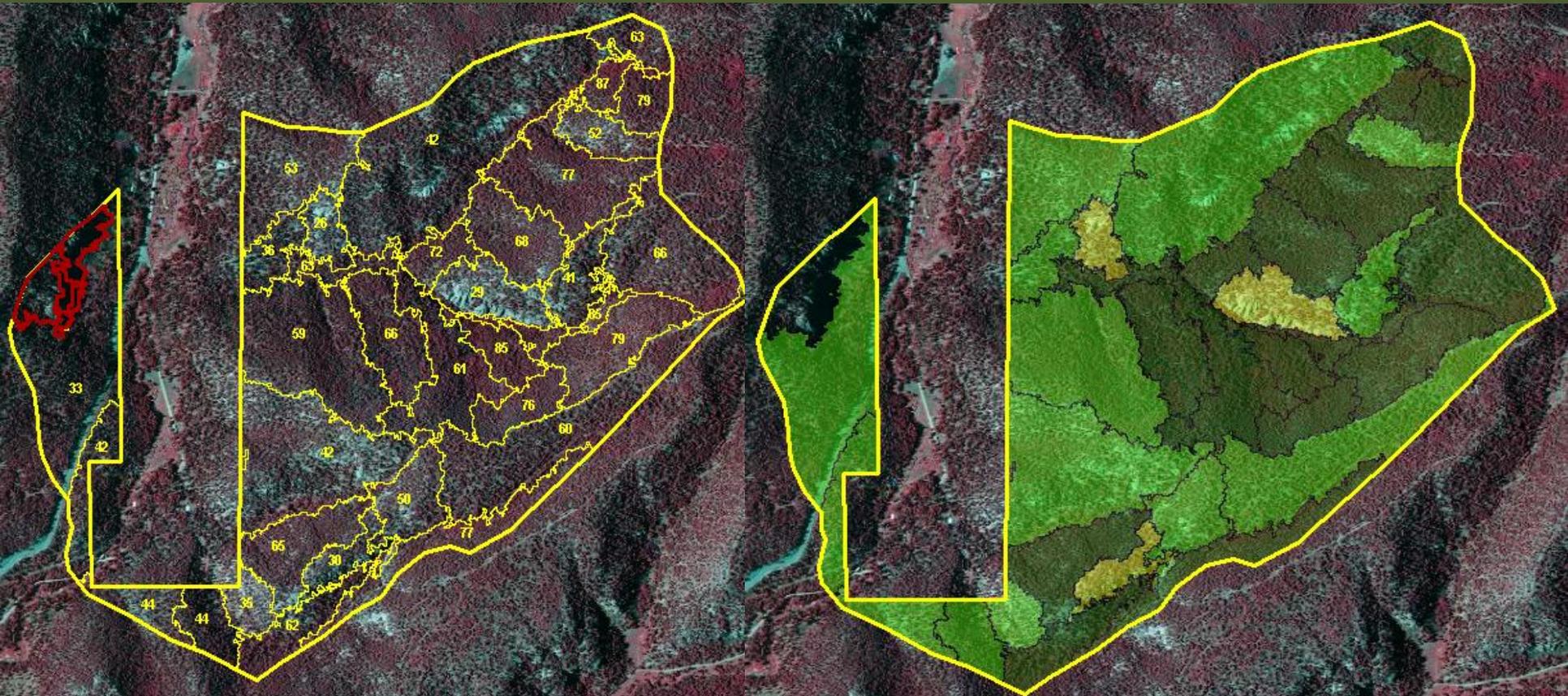
- ▶ Shadows and “muted” NIR makes it more complicated



Binary (canopy,  
non-canopy)  
image derived  
using  
unsupervised  
classification

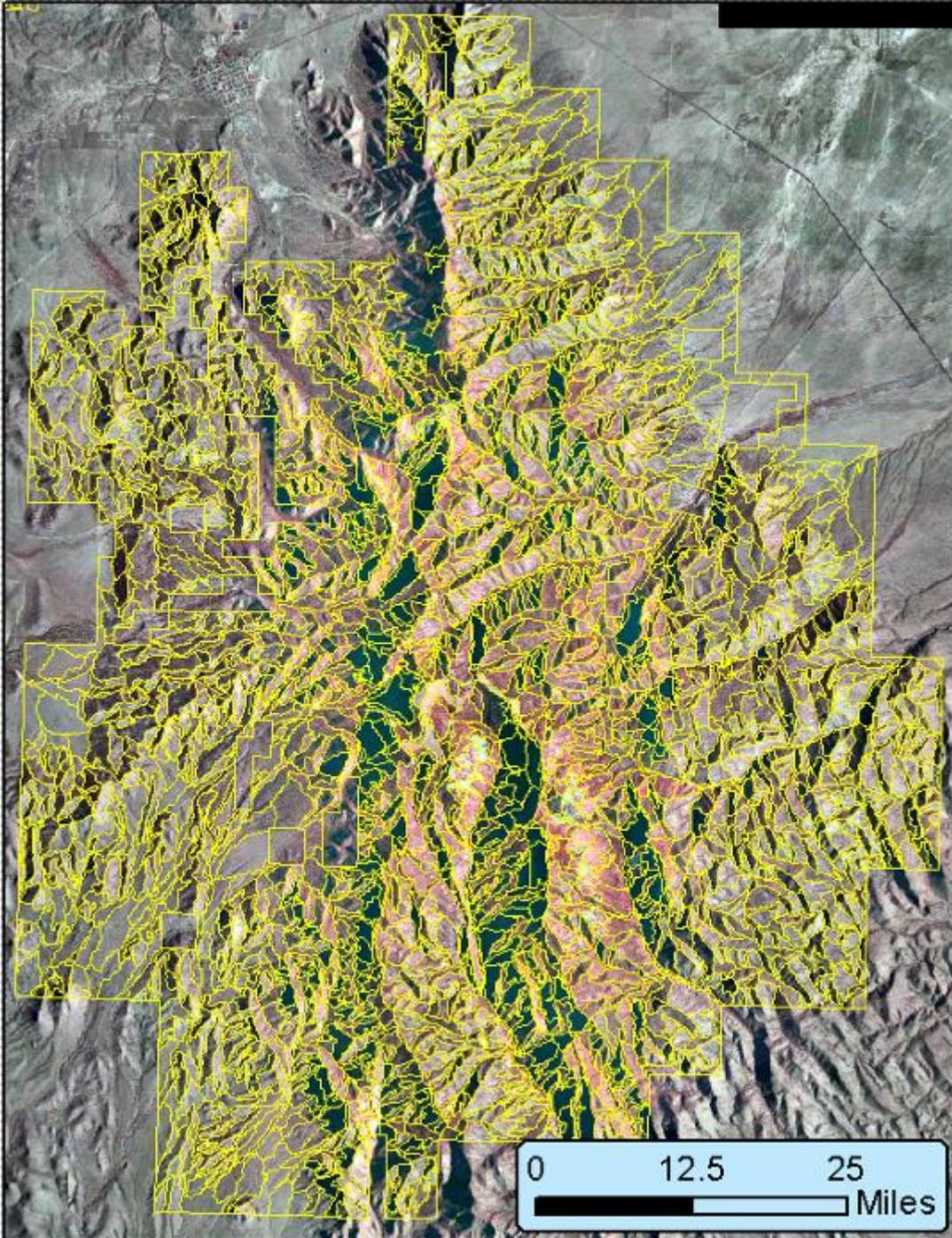
# Canopy Cover Amount & Distribution

- ▶ NDVI thresholding with image segmentation for Mexican Spotted Owl PACs (Protected Activity Centers)

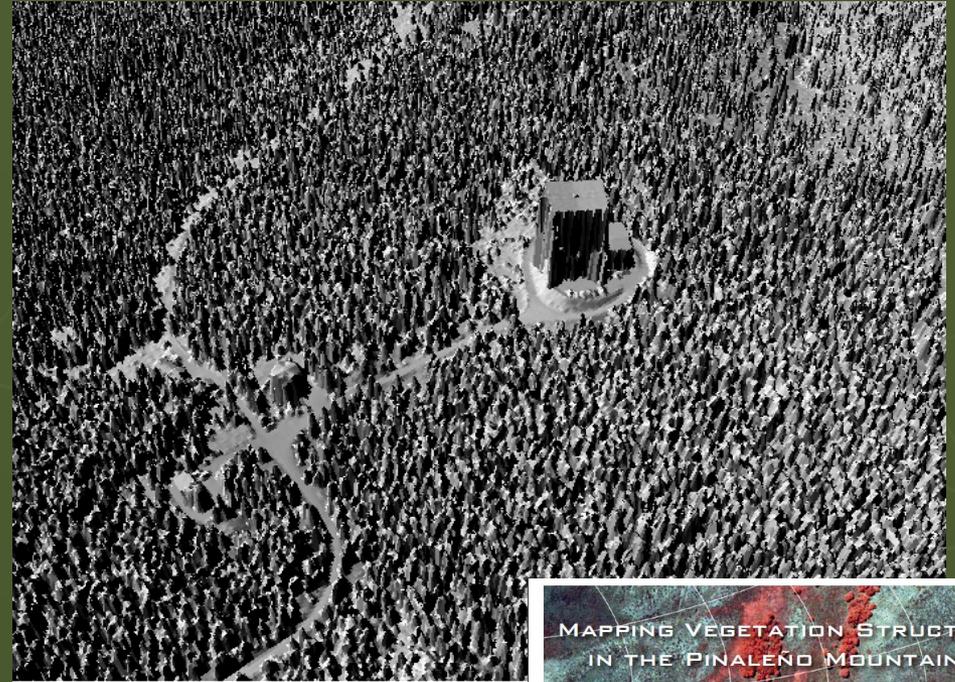


# Automated Stand Delineation

- ▶ Forest-wide stand delineations
  - Consistent
  - Economical (1–3¢/acre)
  - Fast (2-8 weeks for a forest of around 1.5 million acres)
- ▶ Good quality CIR mosaic is critical



# Pinaleño Mtns Lidar Project

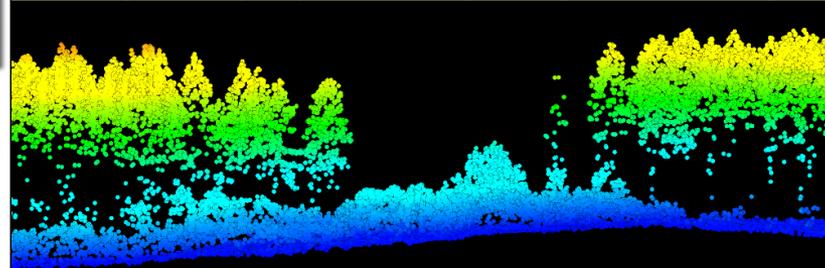


**PRACTICAL LIDAR ACQUISITION CONSIDERATIONS FOR FORESTRY APPLICATIONS**

October 2008 RSAC-0111-Brief1

A collage of images related to lidar acquisition for forestry. It includes a white sheet, a 3D point cloud, an airplane, ground-based lidar sensors, and a forest landscape.

USDA United States Department of Agriculture Forest Service **RSAC** Remote Sensing Applications Center



**MAPPING VEGETATION STRUCTURE IN THE PINALEÑO MOUNTAINS USING LIDAR**

June 2009 RSAC 0118-RPT1

A collage of images related to mapping vegetation structure using lidar. It includes a 3D point cloud, a close-up of a tree branch, and a forest landscape.

USDA United States Department of Agriculture Forest Service **RSAC** Remote Sensing Applications Center



Questions?