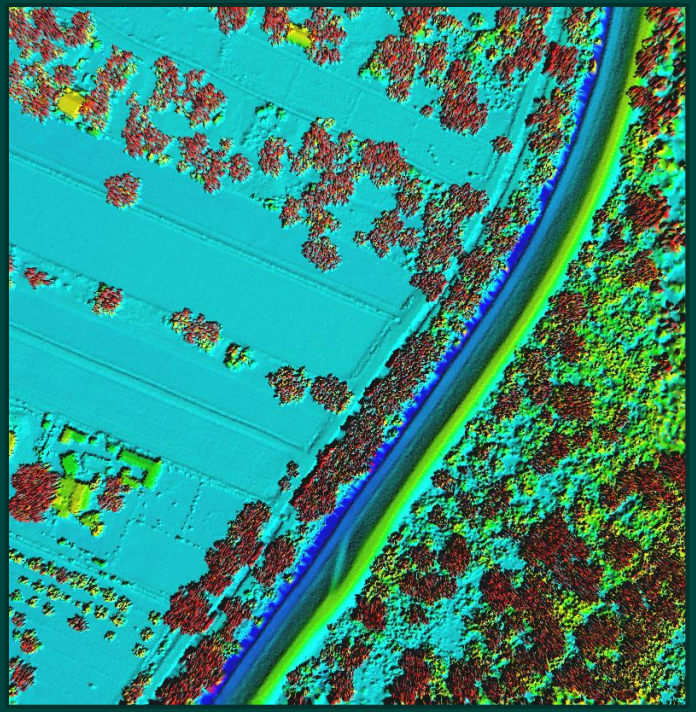
New Mexico Statewide Lidar Acquisition Plan

NM Elevation Data Planning and Acquisition Subcommittee
NM Geospatial Advisory Committee
December 2014

Subcommittee Members

Subcommittee Chair: Mike Inglis, UNM EDAC
NM GAC Chair: Gar Clarke, NM DoIT
John Peterson, USACE
Matt Dorsey, US BOR
Candace Bogart, USFS
Kerri Mich, US NRCS
Mike Timmons, NM Bureau of Geology
Caeri Thomas, Mid-Region Council of Governments
Erle Wright, Santa Fe County
Paul Neville, UNM EDAC
Chandra Bales, UNM EDAC



Corrales (MRCOG 2010, QL2) Classified by Elevation

NM Geospatial Advisory Committee (GAC) and Elevation Data Planning and Acquisition Subcommittee

NM GAC: Mission

1) **Coordinate geospatial technology in state government**
2) Develop policy recommendations and guidelines in state/local government
3) Share geospatial technology among all government agencies and the public

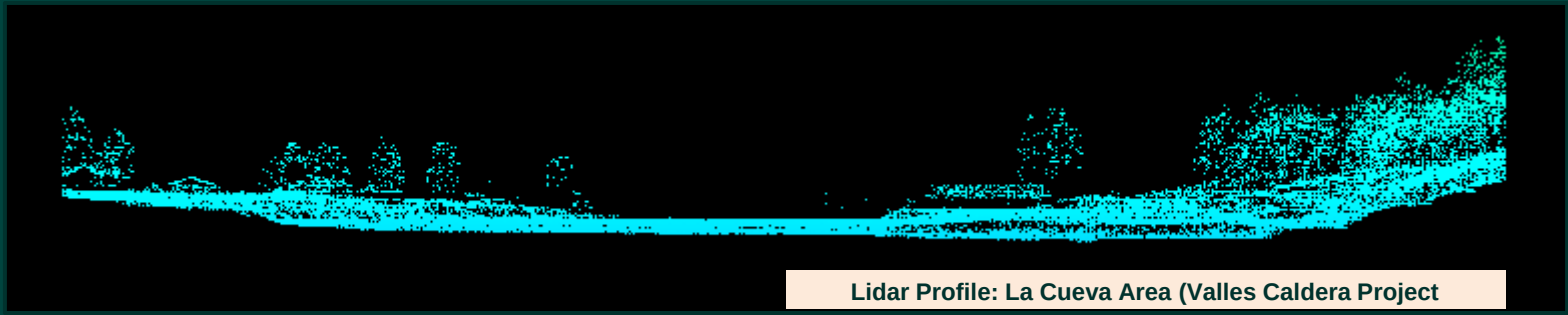
NM GAC, NM RGIS, and NMGIC: State's 3 core geospatial components

Subcommittee: Reasons and Roles

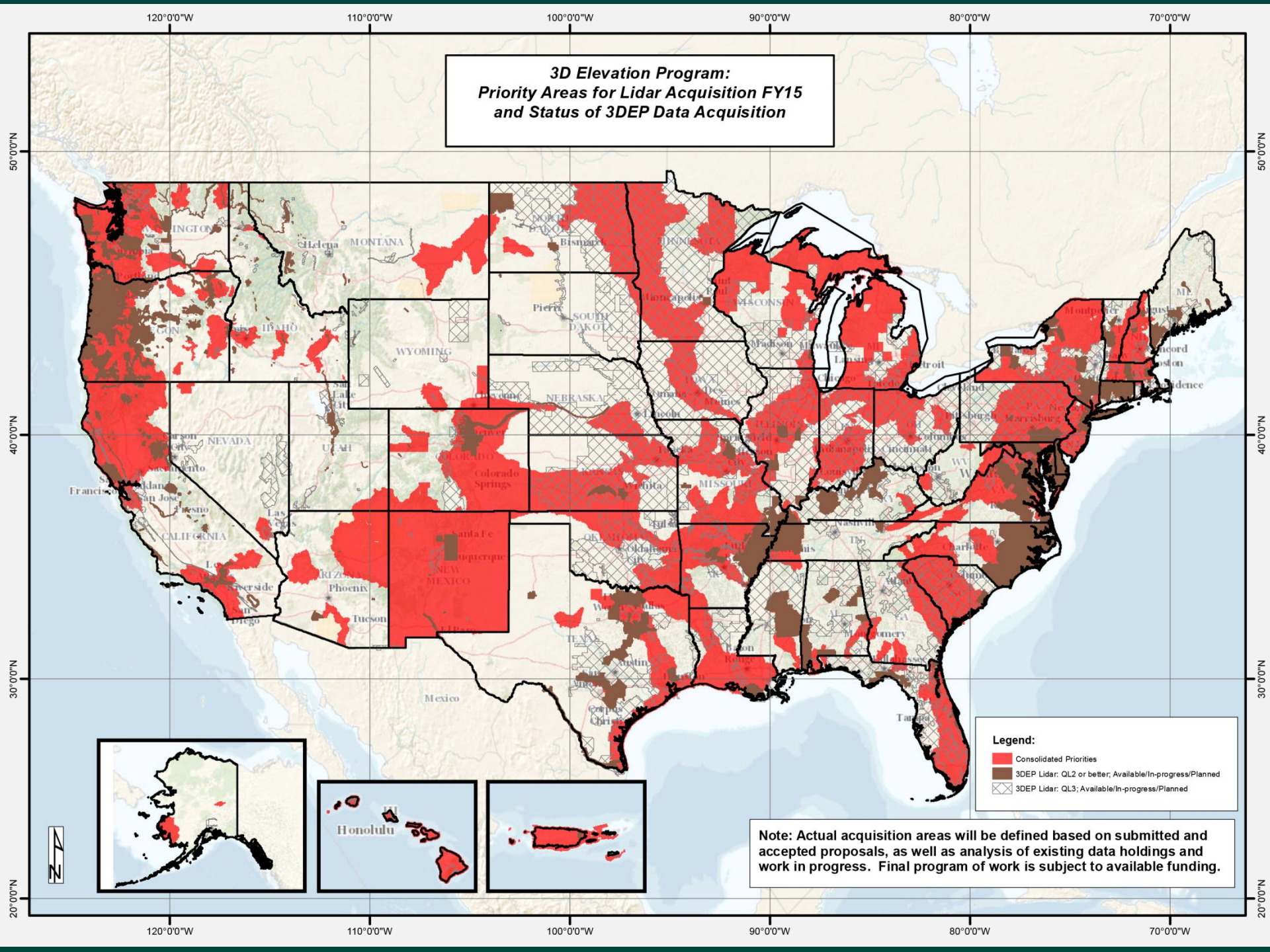
- Formed January 2014
- **Respond to New Mexico's needs for enhanced elevation data**
- NM Lidar inventory : Identify existing elevation-data infrastructure
- Develop partner and stakeholder relationships
- Identify lidar-data needs and priorities
- Develop the geospatial/map-based NM Statewide Lidar Acquisition Plan

NM Statewide Lidar Acquisition Plan: Process

- Identify lidar uses and users
- Meet with federal, state, and local partners and stakeholders
- Perform surveys to compile areas of interest, projects, and required data
- Water—New Mexico's basic issue: Develop map units by watershed
- Inventory current and in-progress lidar acquisition projects
- Assess needs in a geospatial context
- Prioritize needs by watershed
- **Draft NM Statewide Lidar Acquisition Plan**
- **Meet with NDEP/3DEP committees: funding and acquisition schedules, mechanisms to coordinate state and federal activities, Santa Fe Co contribution**

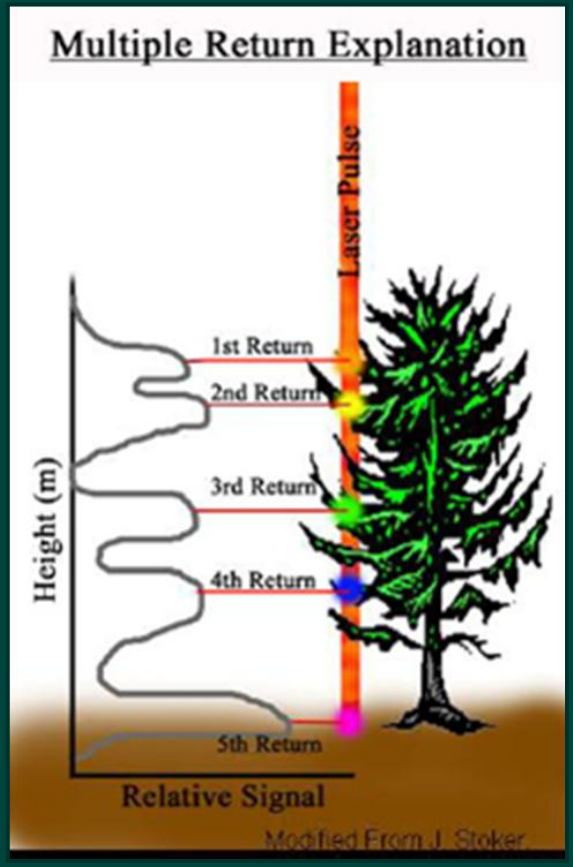


Lidar Profile: La Cueva Area (Valles Caldera Project


3D Elevation Program:
Priority Areas for Lidar Acquisition FY15
and Status of 3DEP Data Acquisition
120°0'0"W
110°0'0"W
100°0'0"W
90°0'0"W
80°0'0"W
70°0'0"W
50°0'0"N
40°0'0"N
30°0'0"N
20°0'0"N
Legend:
Consolidated Priorities
3DEP Lidar: QL2 or better; Available/In-progress/Planned
3DEP Lidar: QL3; Available/In-progress/Planned
Note: Actual acquisition areas will be defined based on submitted and accepted proposals, as well as analysis of existing data holdings and work in progress. Final program of work is subject to available funding.
Honolulu
N

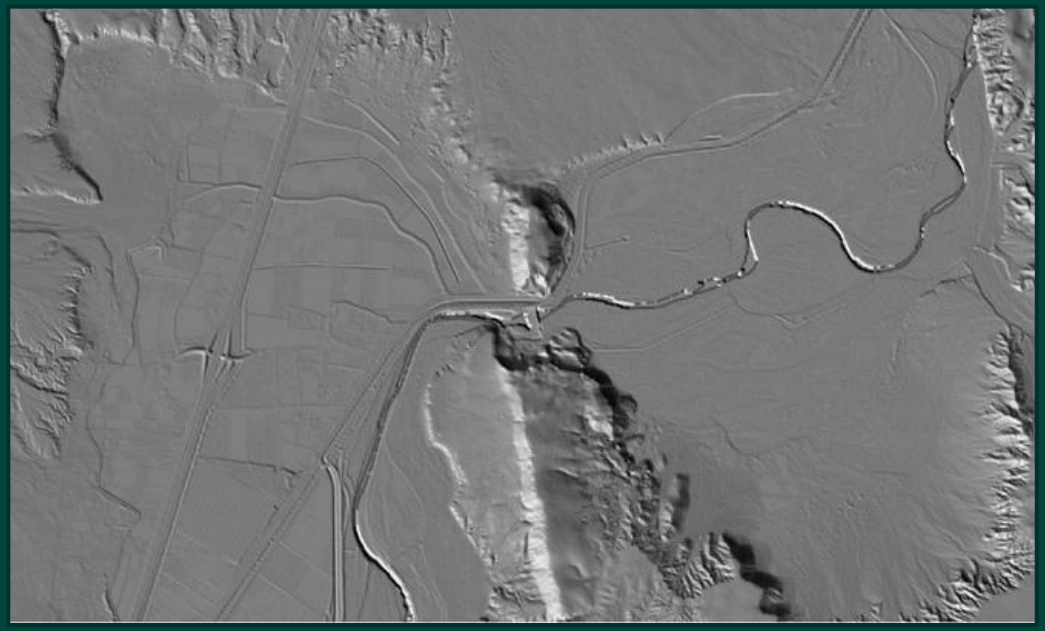
What is lidar?

- lidar: light detection and ranging
  - sometimes called 3D laser scanning
  - or laser elevation profiling
- Lidar measures distances to the Earth using laser pulses
- Processed pulses give precise 3D info about surface shape and features
- Result: A dense, detail-rich cloud of elevation points
- Point clouds yield many geospatial products: Bare Earth DEMs, Digital Surface Models (forest canopy, building footprints, floodplain maps, etc.), Contours, Elevation Profiles …

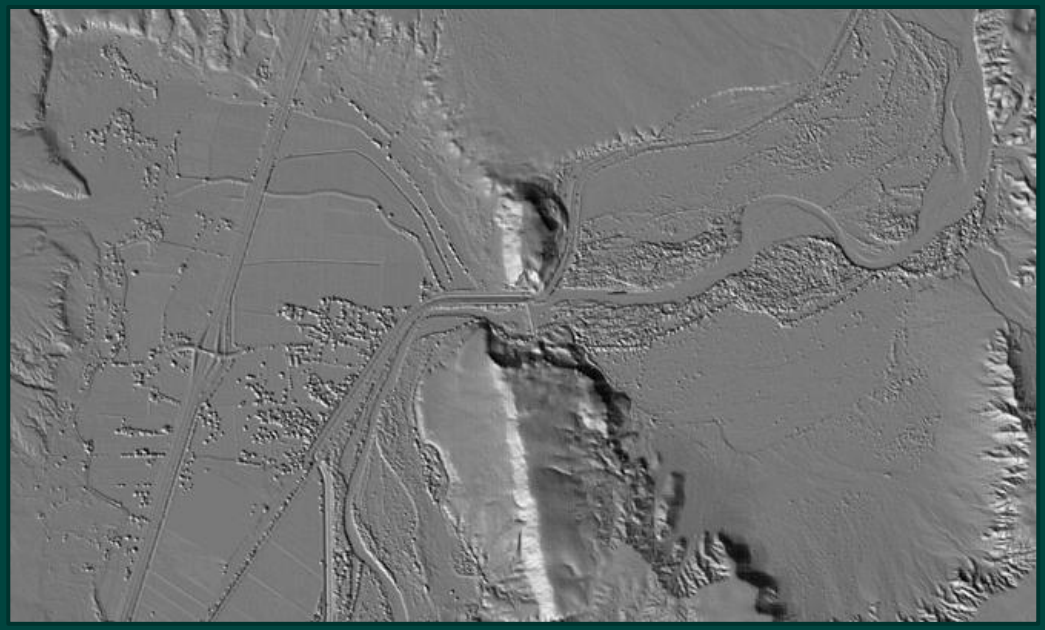


Lidar Products

San Acacia (NAIP 2011); 3.5 mi X 2.5 mi

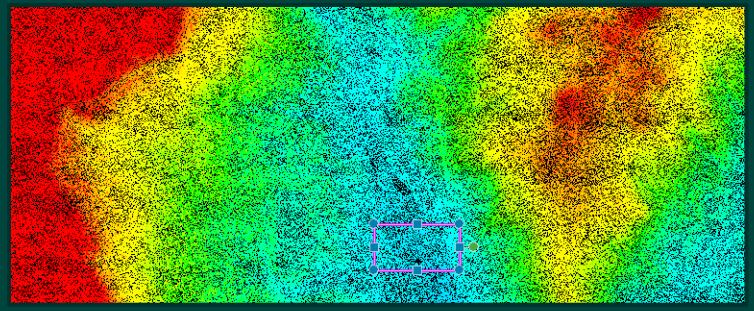


Bare Earth Model (shaded relief)
Generated from last return / minimum value
(USACE 2010 Floodplain Lidar Acquisition)



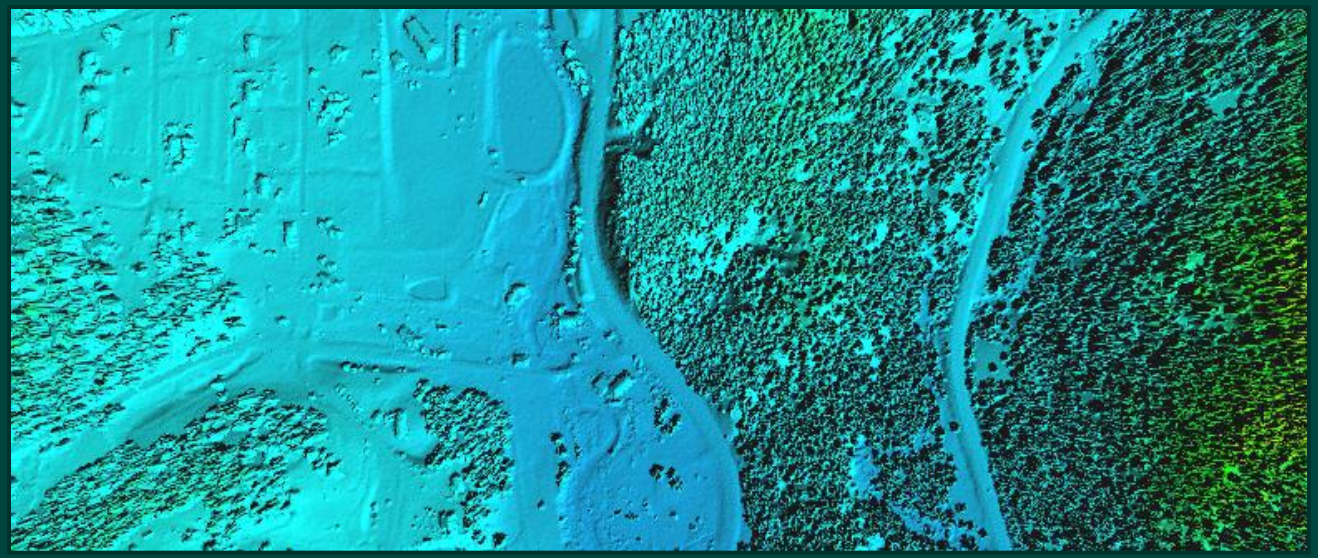
Digital Surface Model (shaded relief)
Generated from first return / maximum value
(USACE 2010 Floodplain Lidar Acquisition)

Lidar Products

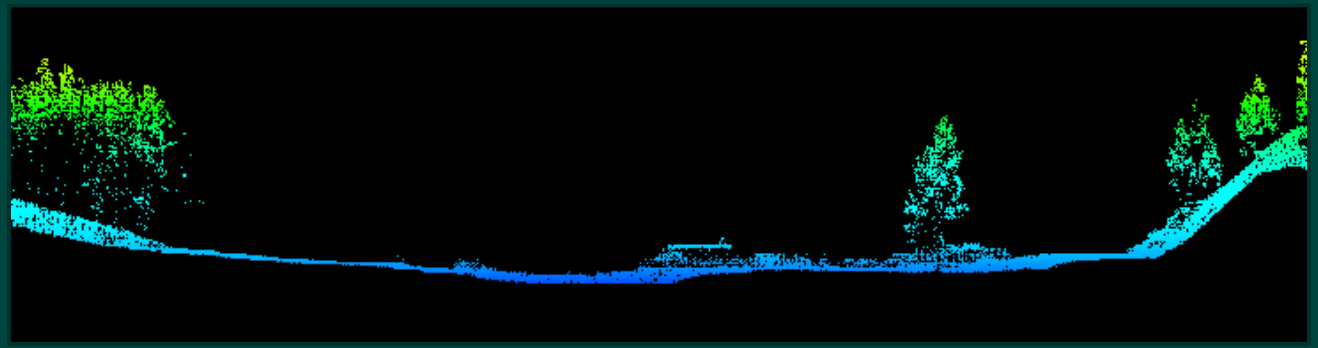


Lidar Point Cloud, Colored by Elevation

La Cueva Area (Valles Caldera Project, 2010)



Surface Model



Side-View Profile

Value to New Mexico from Enhanced Elevation Data (QL2 Lidar Data)

New Mexico's Greatest Concern: WATER
- watershed, drainage, runoff, drinking water, irrigation, flooding, evaporation …
- water resource protection and delivery, including water compacts

Wildfire and Urban Impacts
- fuel load, flood hazard/risk, emergency response/mitigation, access, recovery …

Transportation and Utility Corridors

Urban Growth and Planning

Forest Management
- restoration, thinning to increase water yield, post-fire mass wasting …

Energy Development
- oil and gas, solar, wind

Homeland Security and Defense
- military installations, national laboratories, WIPP, 200-mi border with Mexico

Tribal Lands

Agricultural Demands
- irrigation, grazing, dryland farming …

New Mexico Lidar Inventory

Lidar Data:

Not consistently formatted

Not acquired in same time period

Not all are publicly available

Not all are free even if available

Santa Fe County

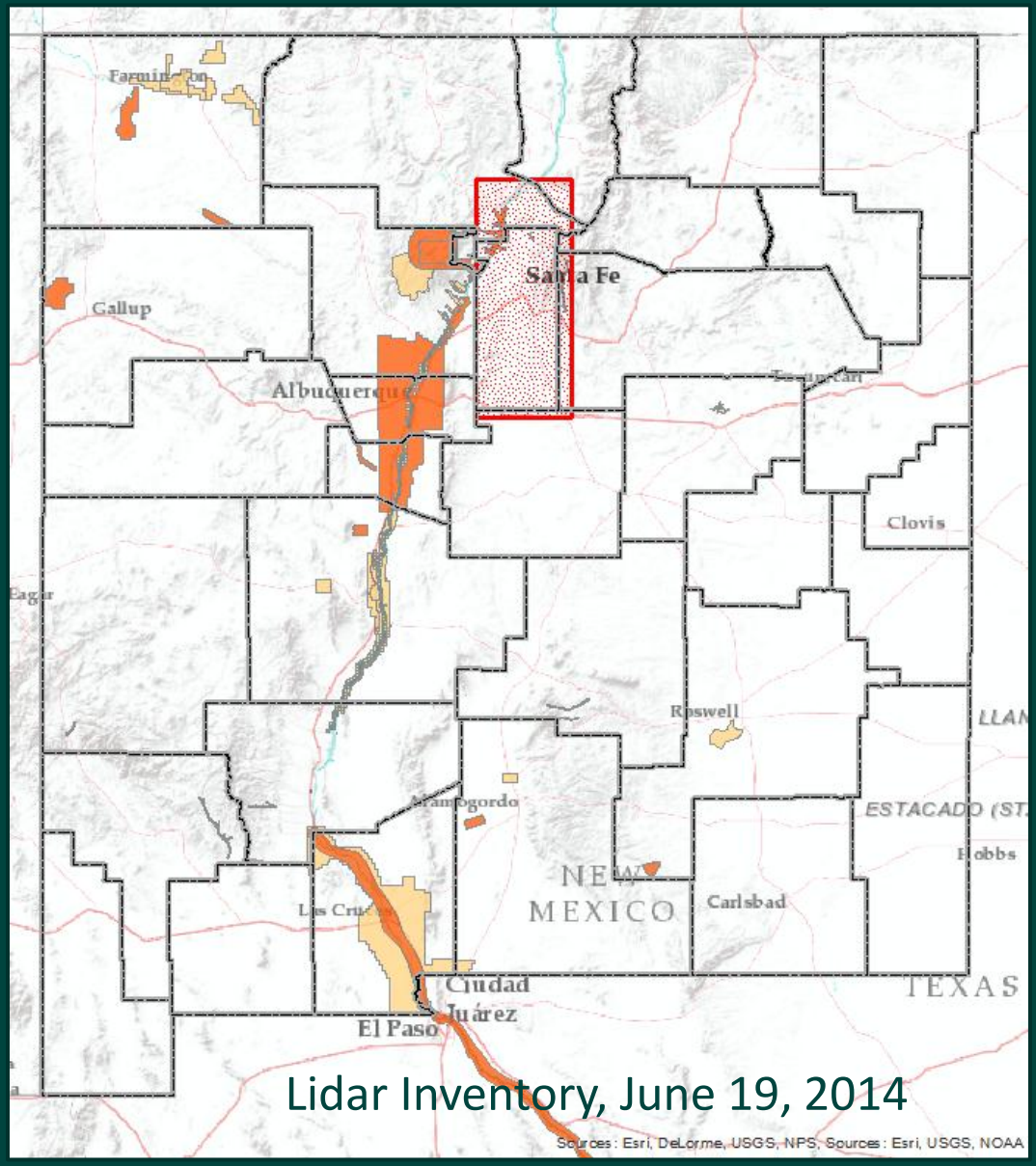
Approx 3,033 sq mi

At $235/sq mi, approx $713k

State of New Mexico

Approx 122,000 sq mi

At $235/sq mi, approx $28.7M



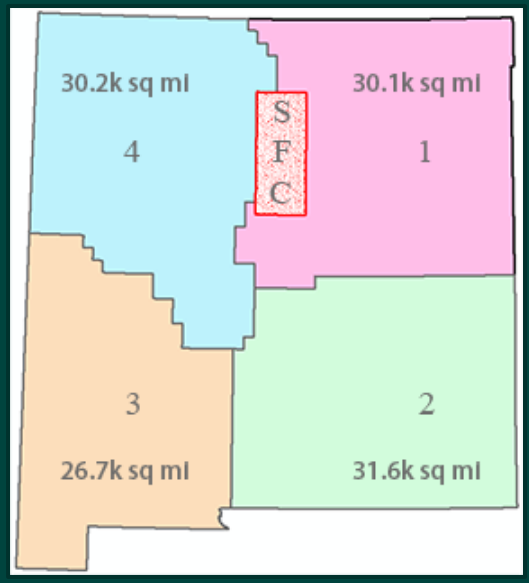
USGS 3D Elevation Program and Our NM Proposal

New Mexico Pre-Proposal (Stage I): Submitted 29 August 2014
NM pre-proposal accepted; NM invited to submit full proposal for lidar acquisition
NM Proposal (Stage II): In development for submission by 12 December 2014

New Mexico proposes statewide lidar acquisition/collection in FY15, with processing and delivery over the following 4 years

Statewide QL2 Lidar Acquisition

- **Single-year, baseline high-quality elevation data**
- Leverages economies of scale—efficient, cost effective
- Positions decision makers and analysts to identify, evaluate, mitigate, and respond to natural and human-caused changes in New Mexico
- Users: state, local government, federal, tribal, nonprofit, industry, business, private



New Mexico Land Status/Management

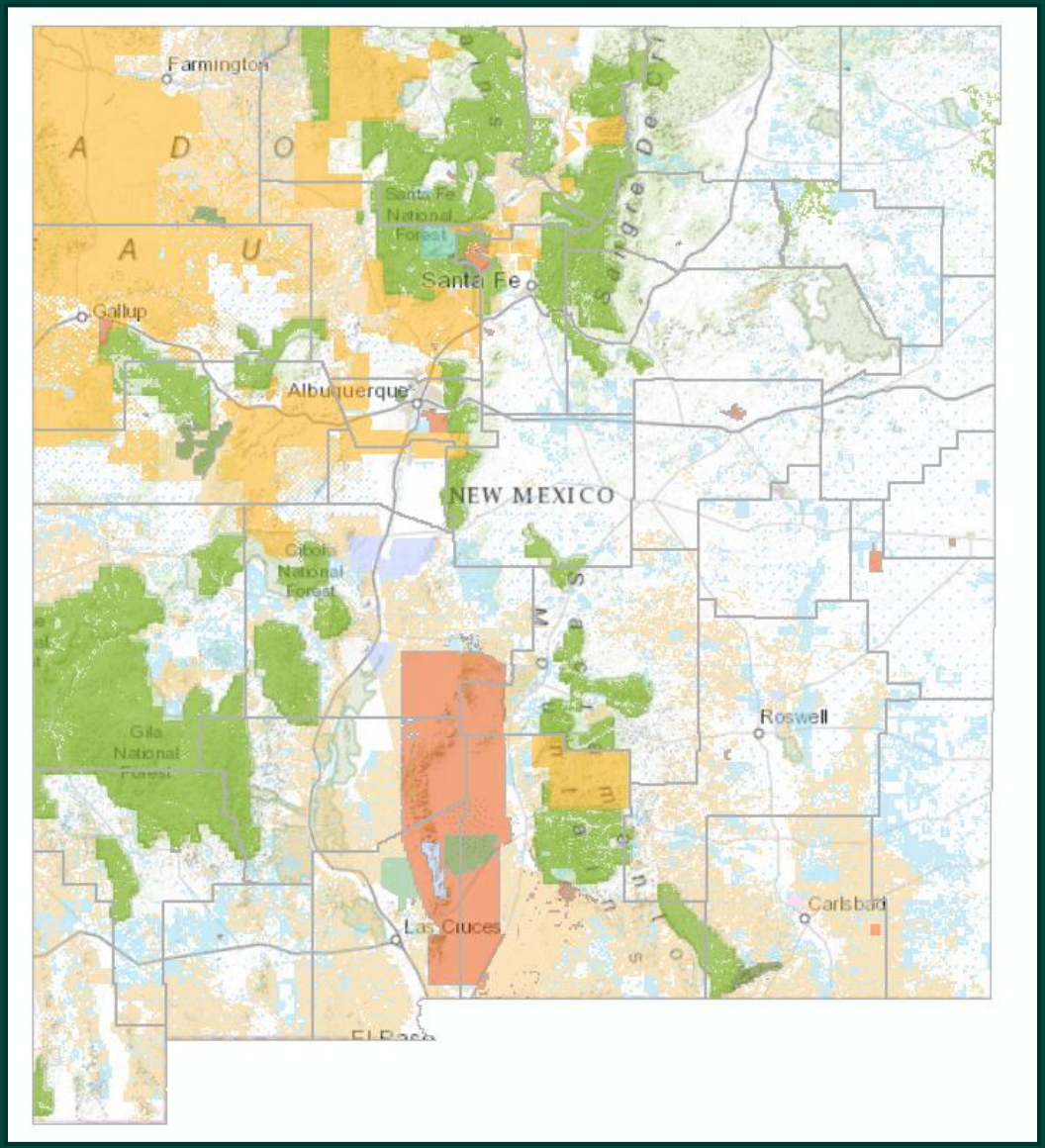
New Mexico by the Numbers

Federal	33.8%
Tribal	10.6%
State	12.1%
Private	43.6%

Rounding results in a total > 100%

Managing Agency (% Managed)

- BLM (17%)
- DOD (3%)
- USFS (12%)
- Other Federal (1%)
  BOR, USDA, DOE, FWS, NPS, Valles Caldera Nat'l Preserve
- BIA/Tribe (11%)
- NM/State (12%)
- Private (44%)



BLM New Mexico Statewide Land Status/Management

New Mexico Land Area and Lidar Costs (Acquisition to Data Delivery)

Land Status (%)

Federal	33.8	44.4
Tribal	10.6	
State	12.1	55.7
Private	43.6	

(Rounding results in a total > 100%)

	Land Area	Lidar Cost @ $235/sq mi
NM Statewide	121,736 sq mi	$28,607,960
NM minus SFC Project	118,576 sq mi	$27,865,360

Cost Shares (based on 118,576 sq mi * $235/sq mi)

Federal + Tribal ≈ 44.4%	$12,372,220	
State + Private ≈ 55.7%	$15,521,006	
USGS offers 50% share with NM	USGS	$7,760,503
	NM	$7,760,503
	→ $1,552,101/yr over 5 years	

(Rounding results in areas and costs > 100%)

New Mexico leverages funds 3:1

Questions?

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Thank You