Beaver Habitat Assessment Model on Federal Lands in New Mexico

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Acknowledgements

- New Mexico Environment Department, Wetlands Program

- Thank you to Wetlands Program staff **Maryann McGraw** and **Karen Menetrey**

- Professional Services Contract No. 13-667-5000-0007

Fall Workshop

- Met in September 2012
- Attendees became a technical steering committee
- Helped vet data inputs and methodology

Goal

- Development of a GIS layer representing **potential** dam building beaver habitat

- Development of a GIS layer representing qualitative **suitable** dam building beaver habitat

- Identify currently **occupied** streams

- These data should help to assess wetlands/beaver habitat reestablishment potential.

Potential Habitat

- Based on physical habitat characteristics that aren't likely to change with land management
  - Stream Slope
  - Stream Order

Suitable Habitat

- Begin with the suite of stream segments identified as potential habitat:
  - Incorporate existing vegetation type, canopy cover, road density & grazing.
  - Measure current suitability

Main Habitat Factors for Beaver

- Stable aquatic systems with adequate, permanent water
- Stream orders less than 5
- Stream gradients less than 15%
- *Adequate supplies of quality food
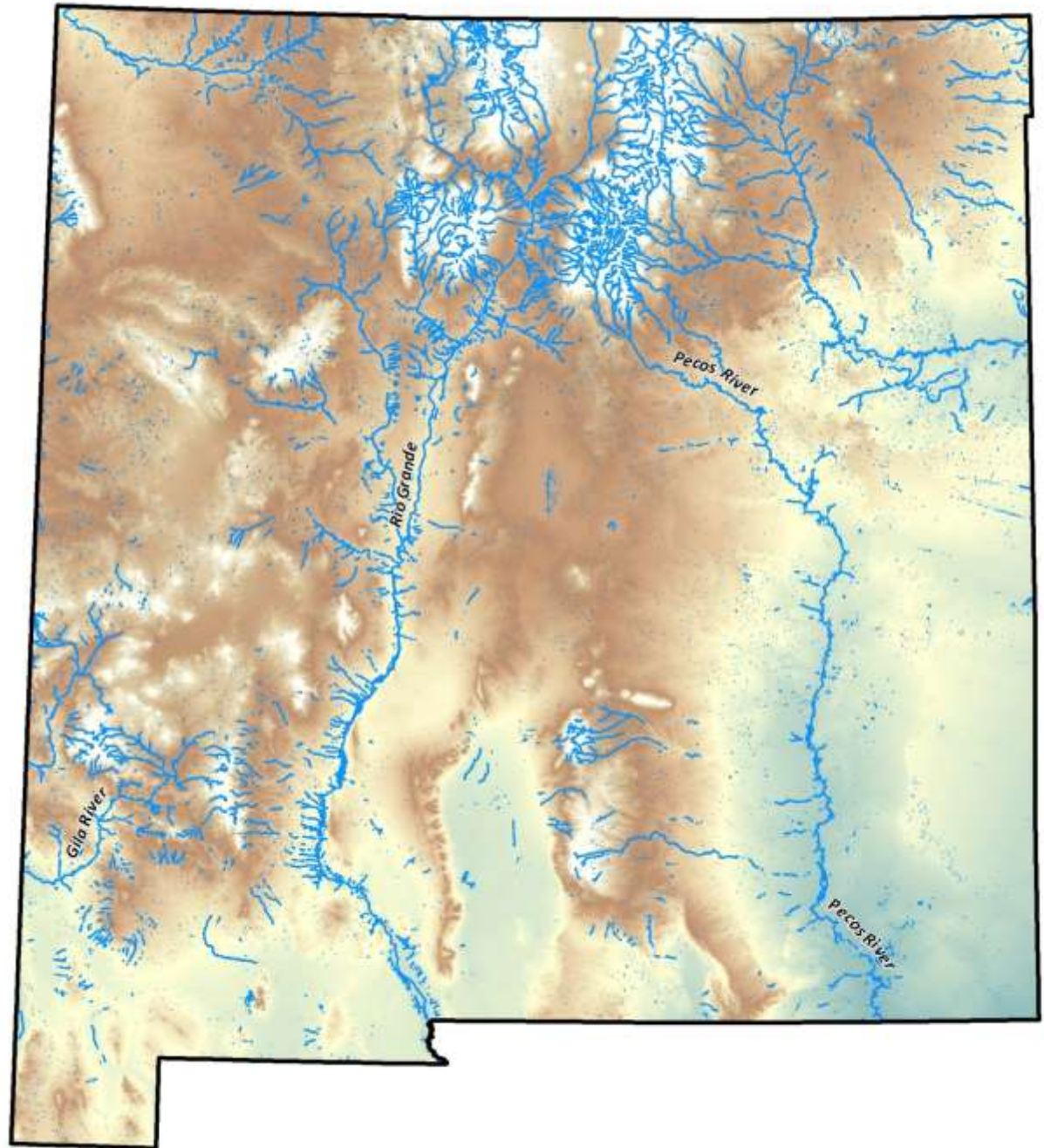
Identifying Potential Habitat

Decision Tree Approach

➢ ID perennial streams

   ➢On federal lands

      ➢With Strahler stream order 1-5

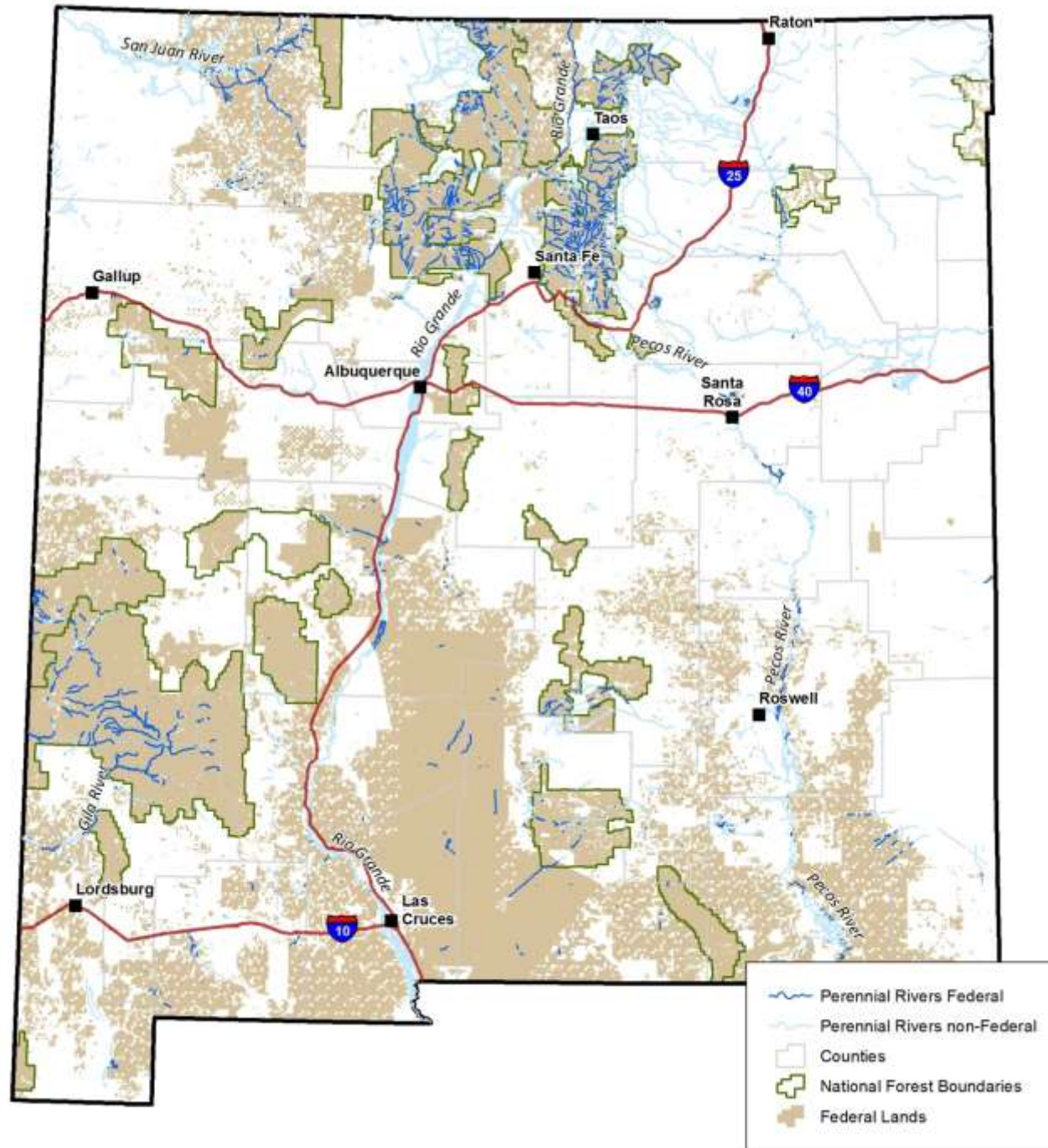   ➢And a stream slope gradient < 15%

Perennial Water

➤NHD Plus

➤http://www.horizon-systems.com/nhdplus/

➤ US EPA and USGS

Perennial Water on Federal Lands
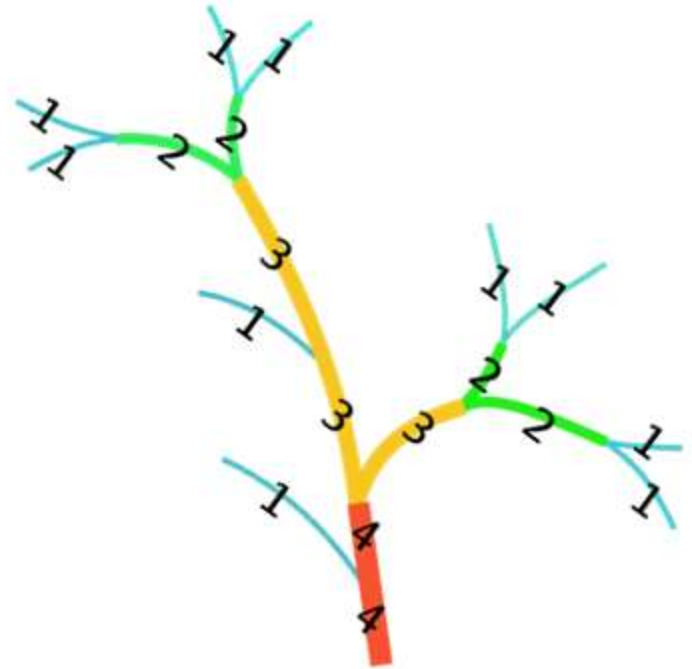
➢NHD Plus

http://www.horizon-systems.com/nhdplus/

➢ US EPA and USGS
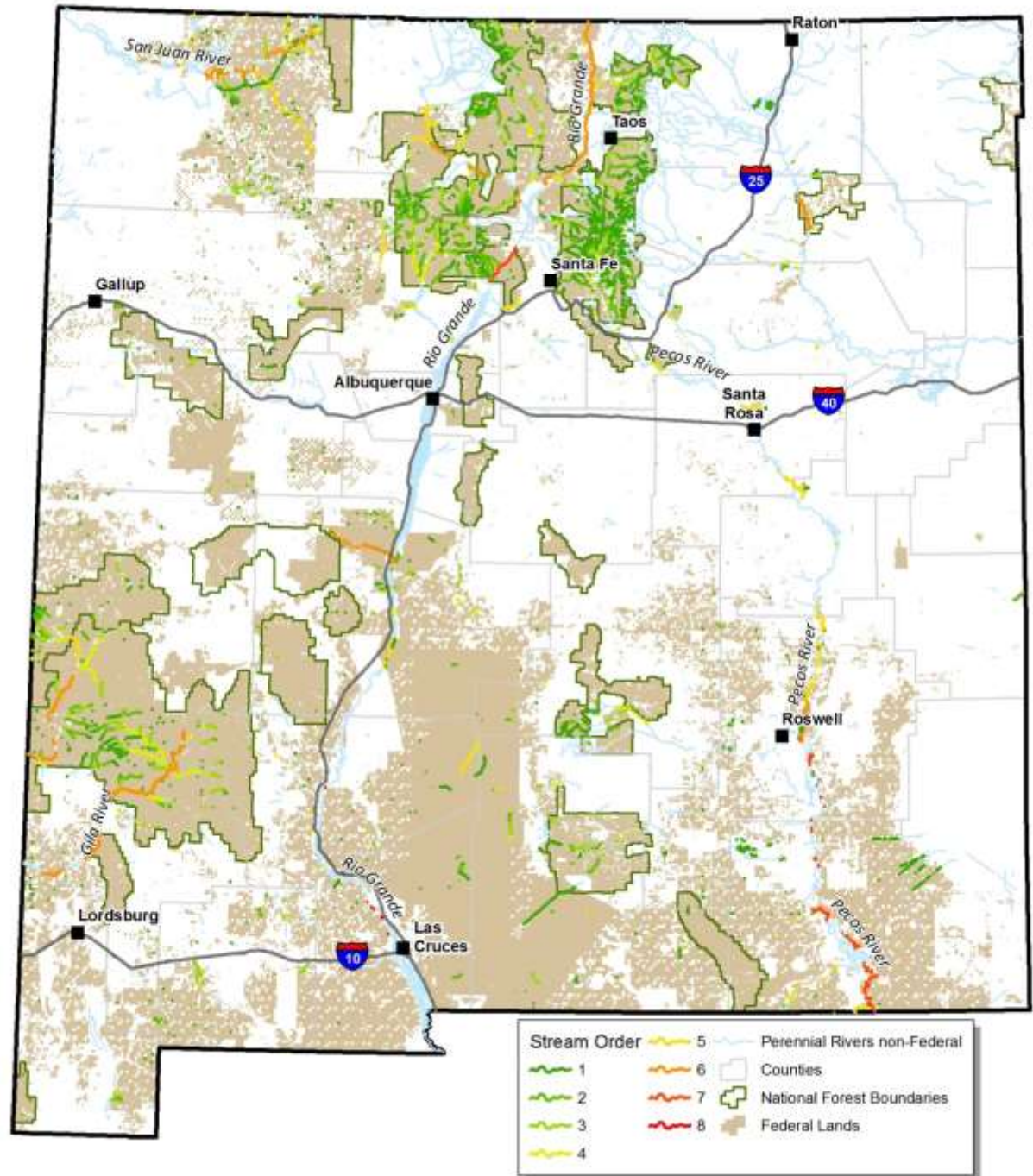
Strahler Stream Order

➢Strahler order follows dendritic networks from headwaters to the river outflow.

➢At headwaters, stream/rivers are assigned a Strahler order of one (1st order).

➢When two 1st order streams flow together, the downstream feature is assigned Strahler
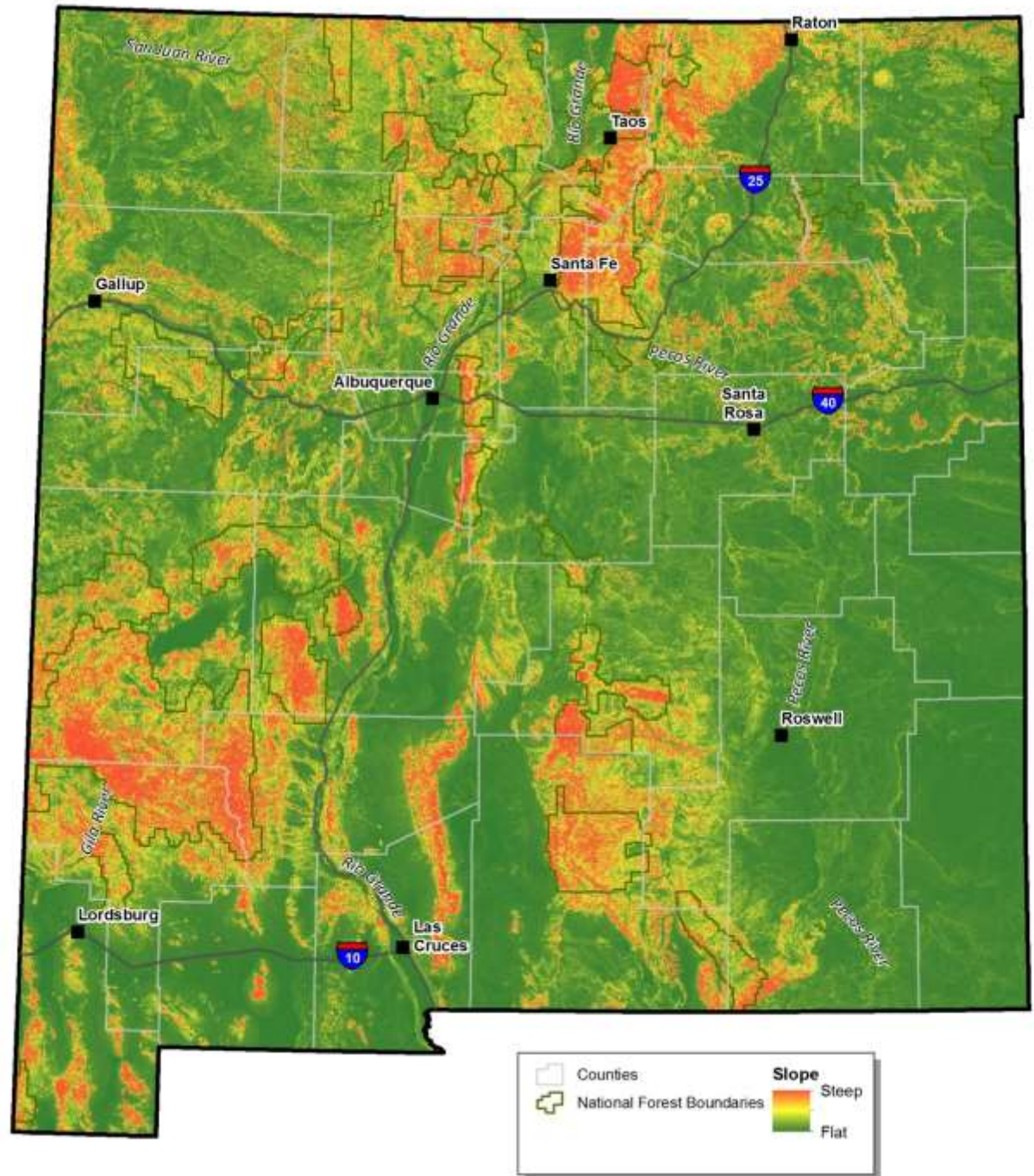
order of two (2nd order).

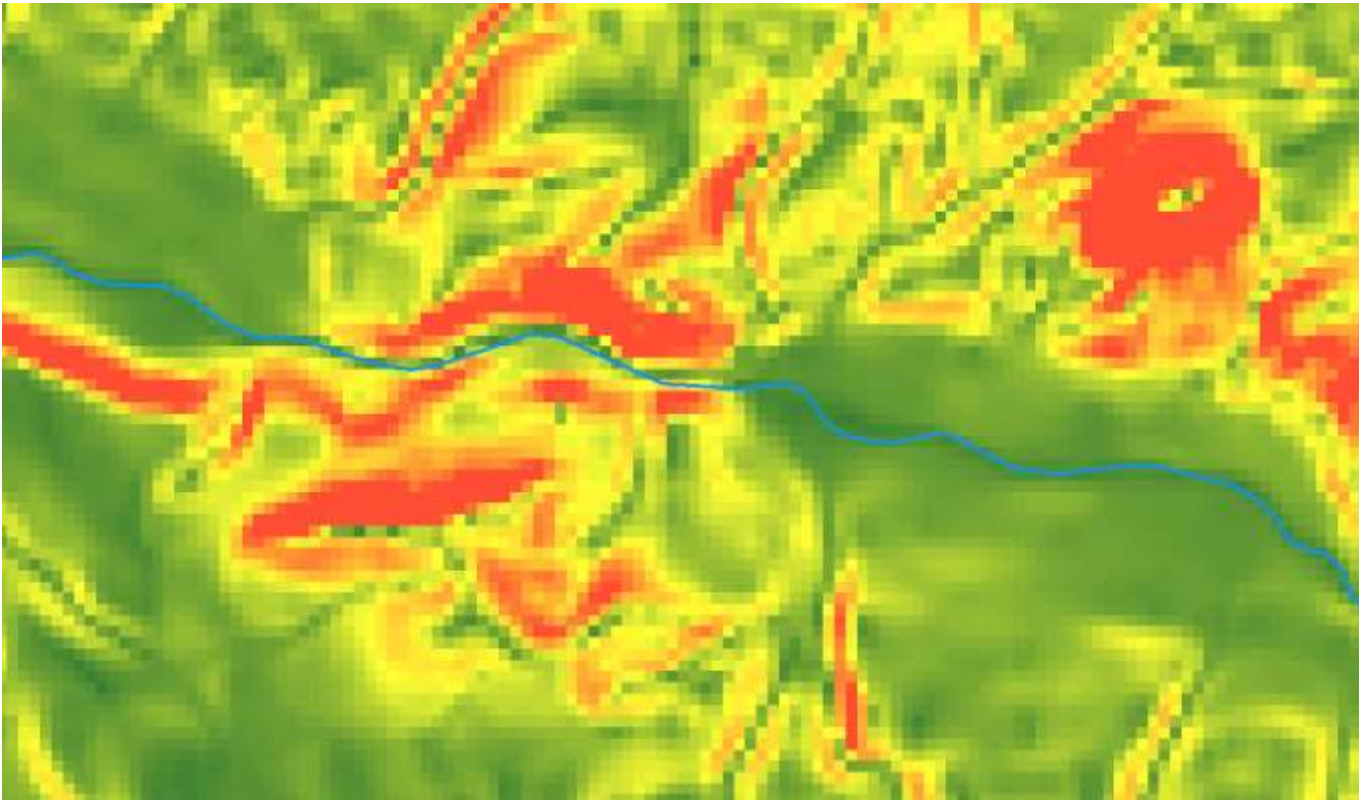# Strahler Stream Order

➢Dam building beaver prefer orders 1-5

Slope Derived from Elevation

➢RGIS
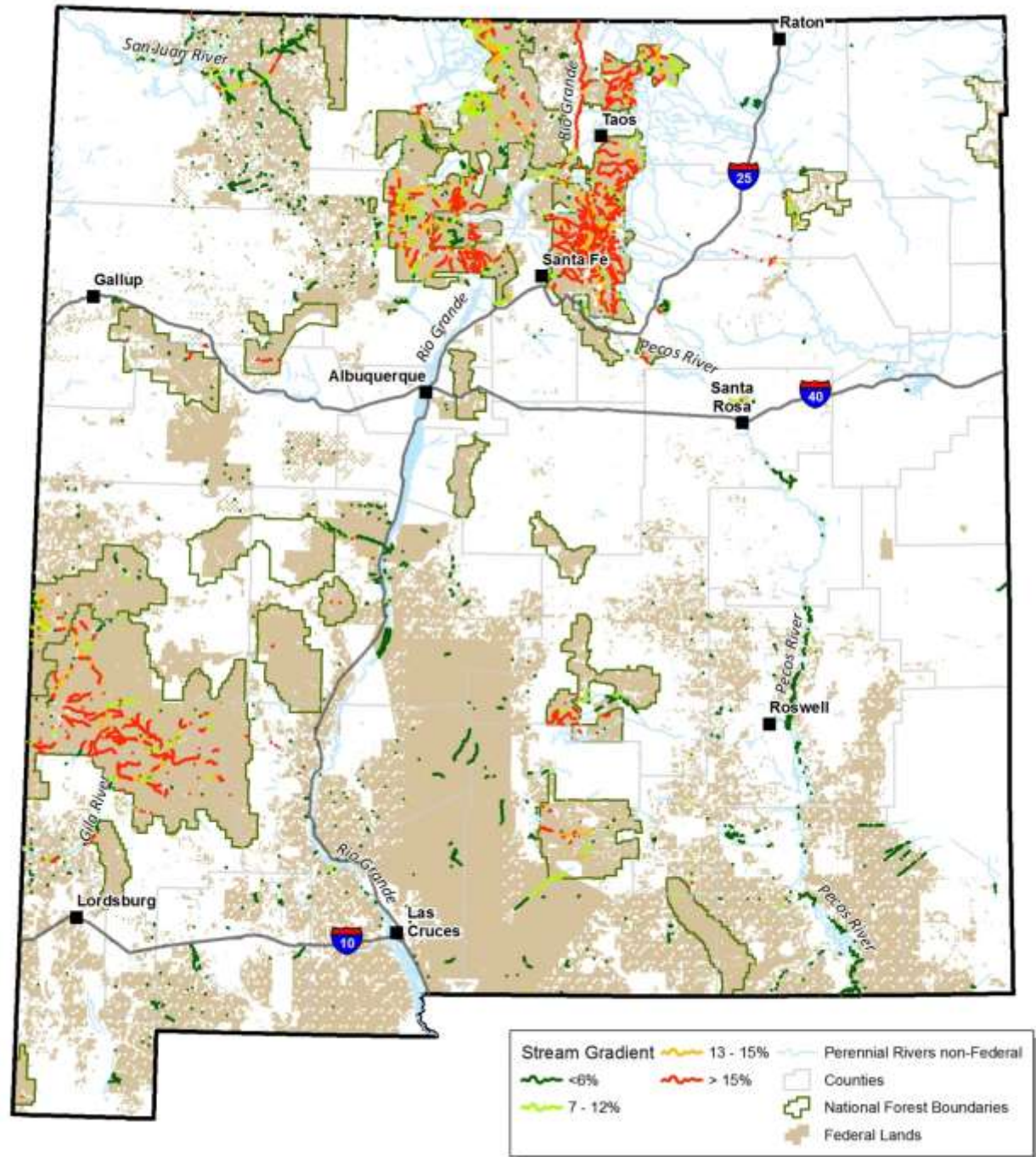
➢Enhanced 10 meter data

Calculating Stream Gradient

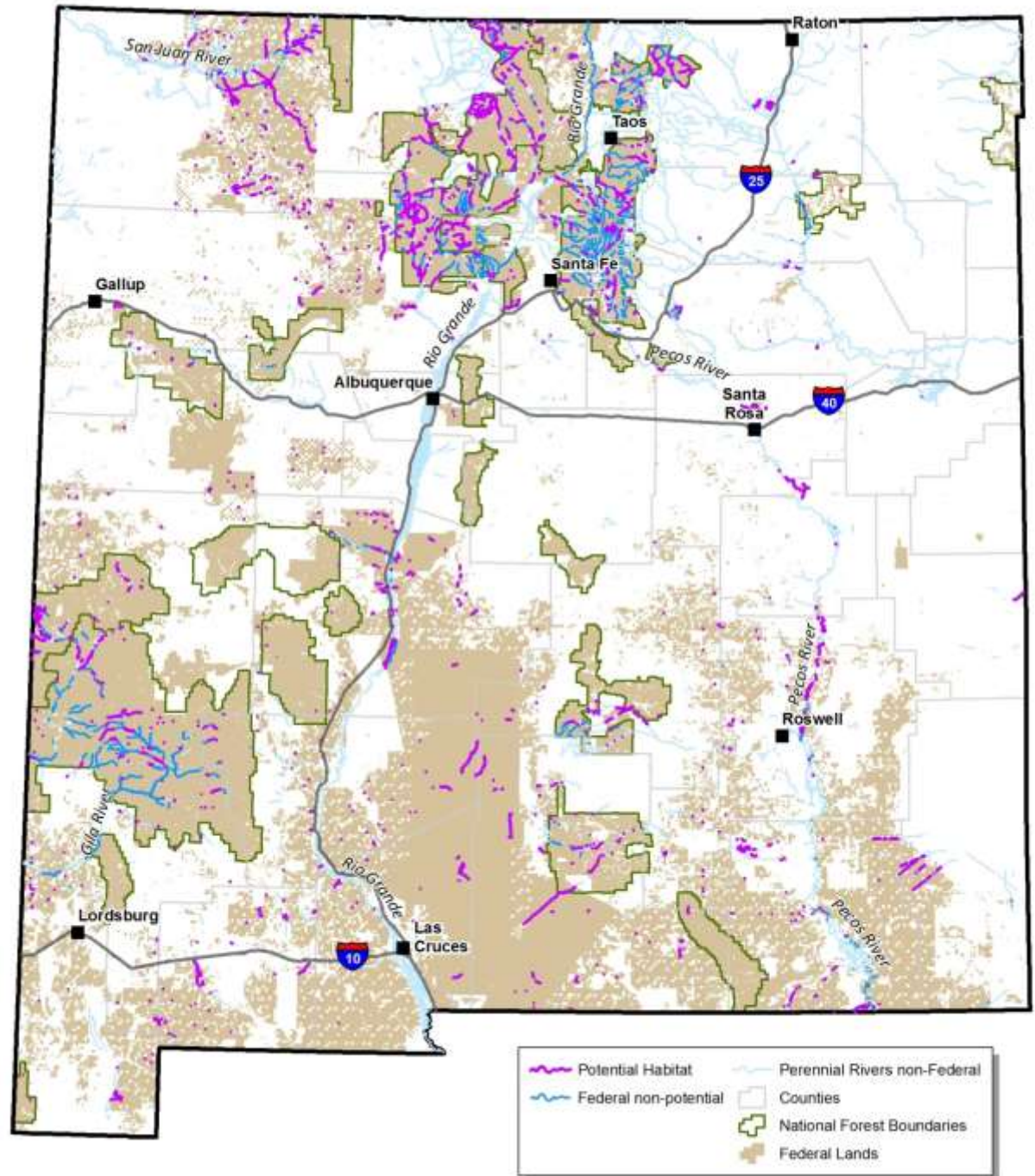➢Calculated as the average slope values for cells that correspond to a single stream segment

Stream Gradient

➤Dam building beaver prefer gradients <15%

Stream Gradient   ~~~ 13 - 15%   ~~~ Perennial Rivers non-Federal
  ~~~ <6%   Counties
  ~~~ 7 - 12%   ~~~ >15%   National Forest Boundaries
   Federal Lands

Potential Dam Building Habitat

Stream order

1-5

&

Stream gradient

<15%

Identifying Suitable Habitat

Looking at Additional Factors

➢ Existing Vegetation Type

➢ Canopy Cover

➢ Road Density by Watershed

➢ Grazing

Existing Vegetation Types

➢ **Issue 1:** riparian vegetation communities selected by beaver are not well represented even at a 30 meter resolution

➢ **Assumption:** a stream running through hardwood or conifer forest will likely include small riparian locales important to beaver.

Existing Vegetation Types

➢**Issue 2:** Recent wildfires were not represented in the vegetation dataset.

➢**Solution:** Acquire burn severity data from the USFS and incorporate it into the vegetation dataset
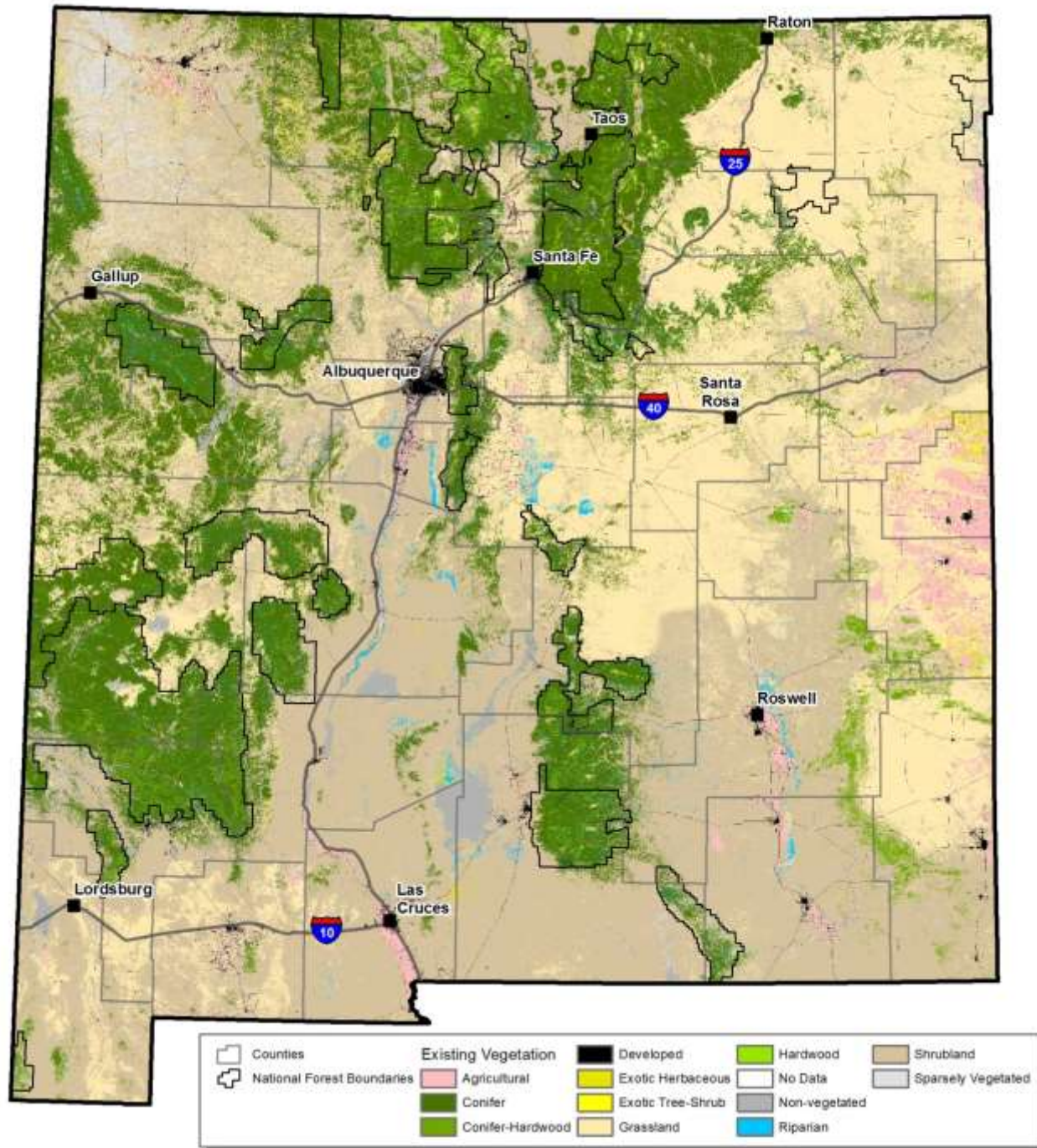
Existing Vegetation Types

➢Acquired wildfire burn severity data for 2008 – 2012

➢Monitoring Trends in Burn Severity (MTBS) 2008- 10

➢Burned Area Reflectance Classification (BARC) 2011 & 12

➢Incorporated the moderate and severe burn severity pixels into the vegetation dataset.

Existing Vegetation Types

➤Used structural data vegetation types
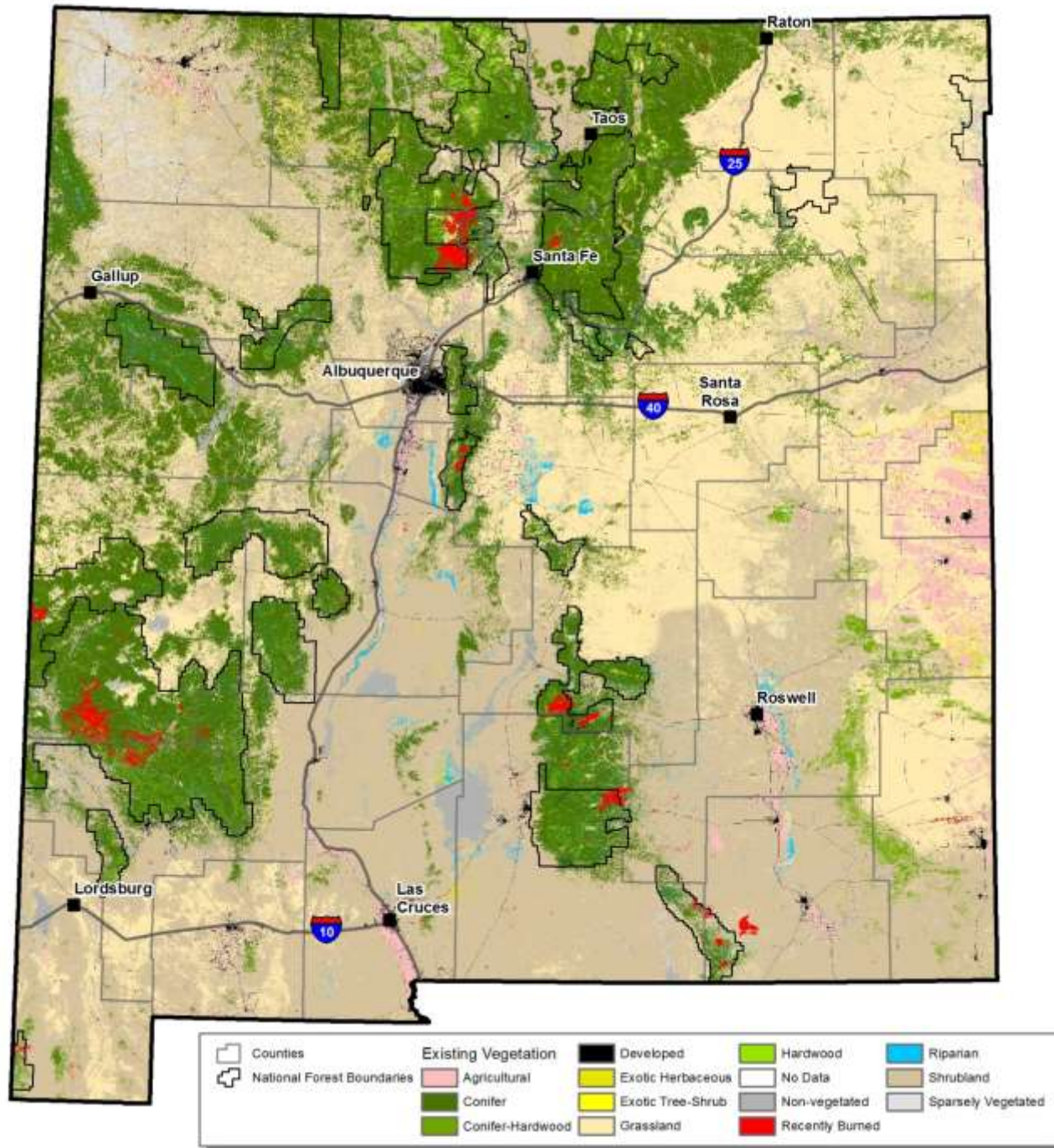
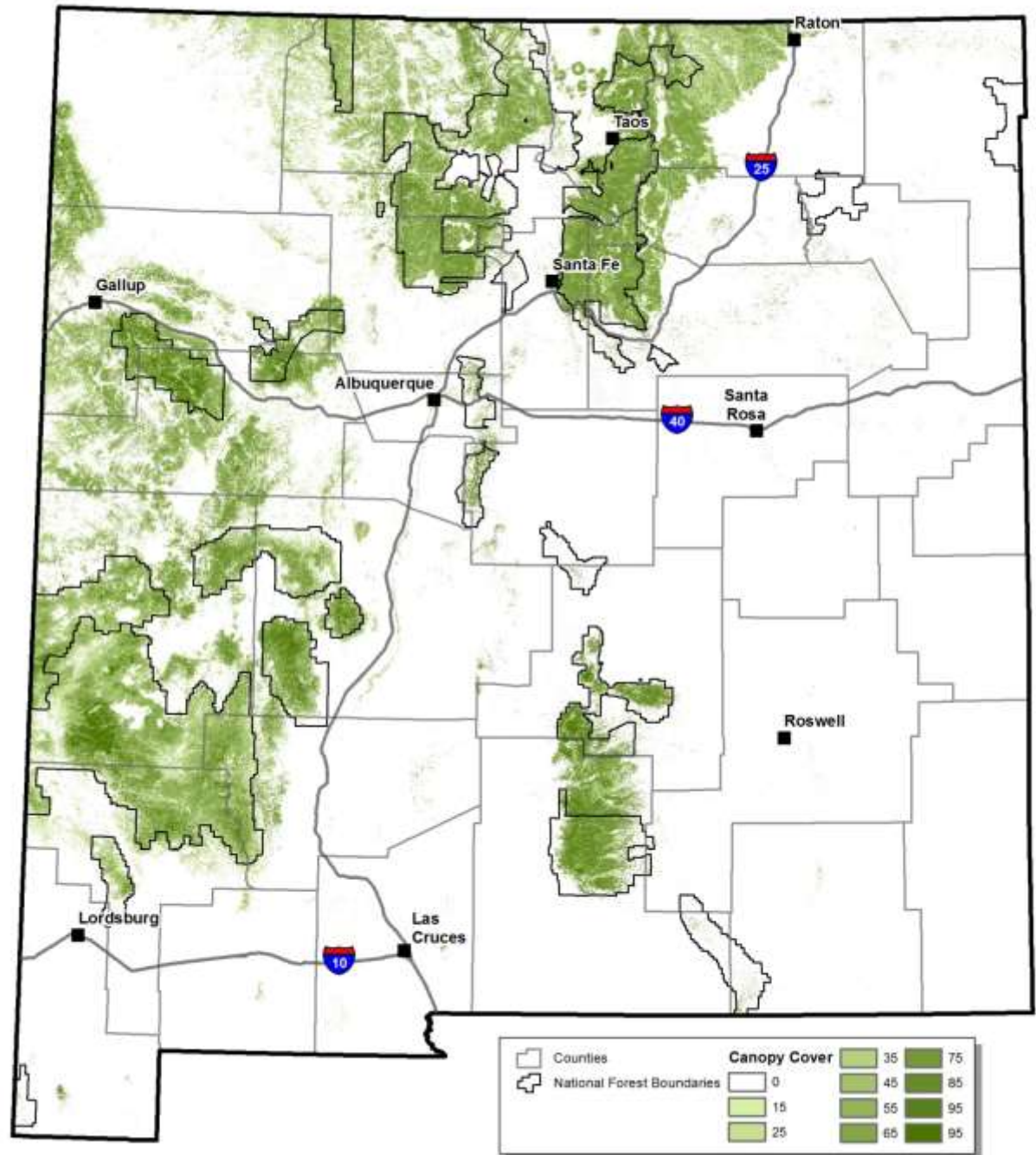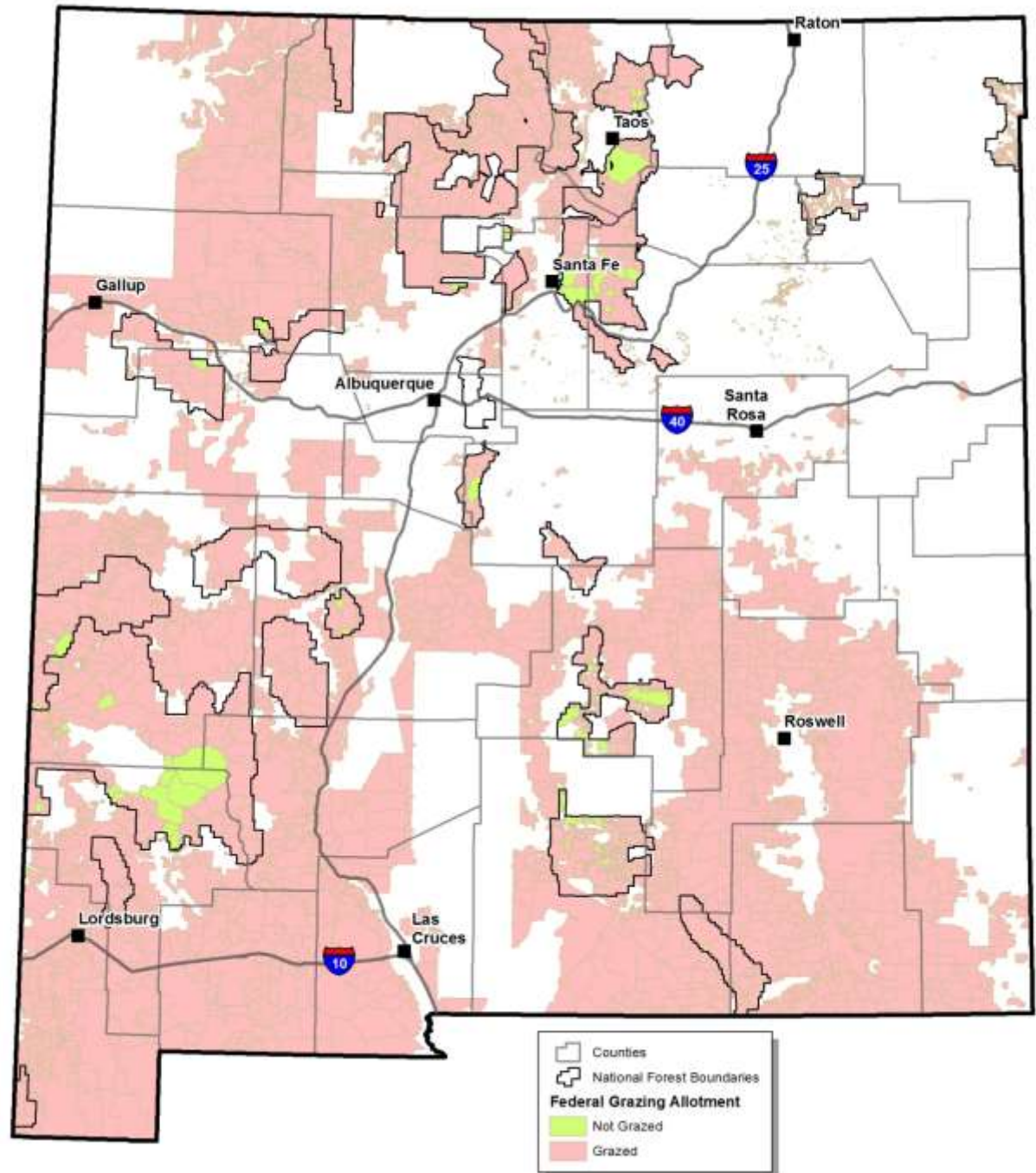# Existing Vegetation Types

LANDFIRE

➢ With wildfire data

% Canopy Cover
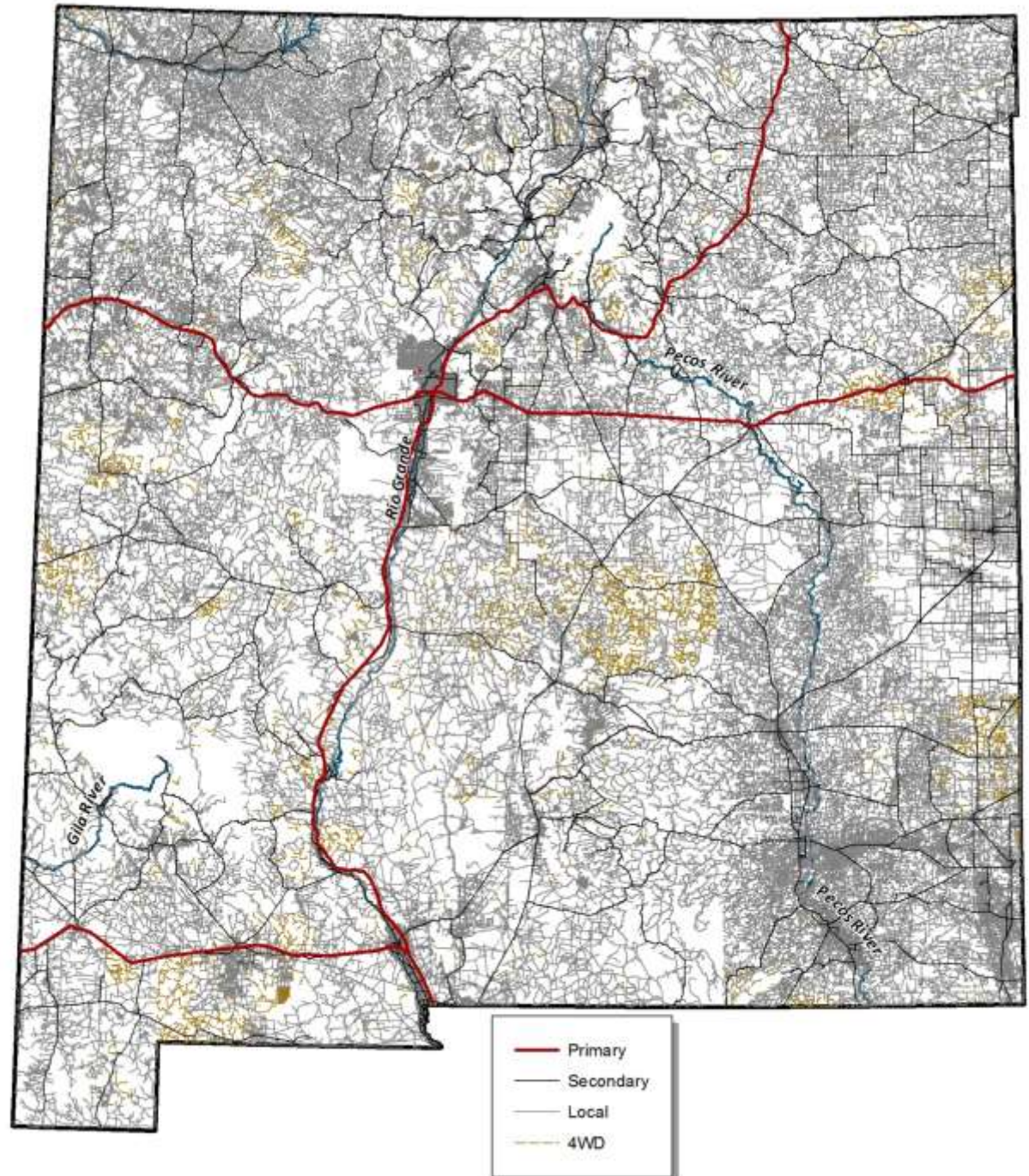

➤30 meter resolution

Cattle Grazing

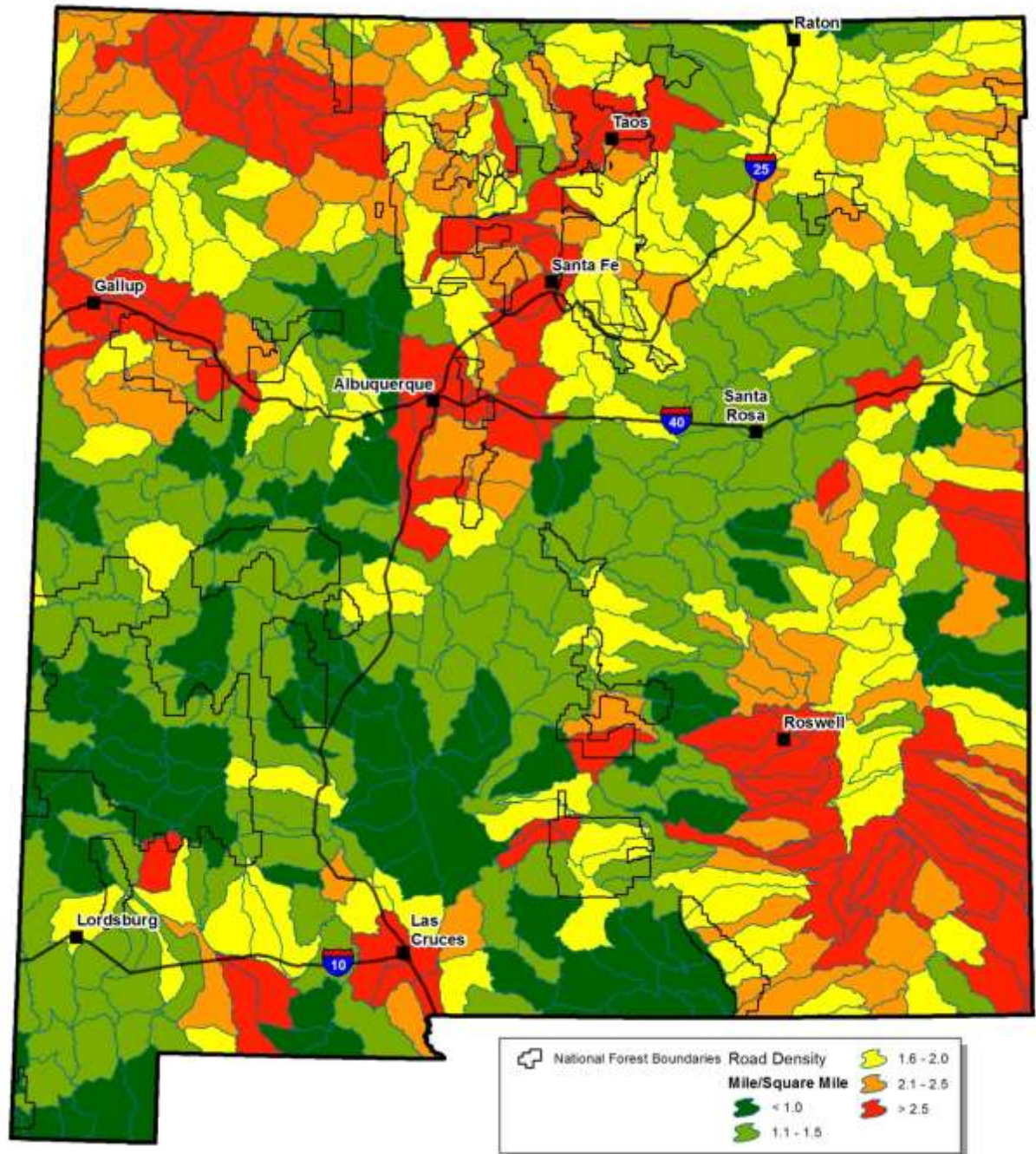# Road Density by Watershed

> 2012 TIGER roads

Road Density by Watershed

Suitable Habitat Ranking

GIS Habitat Factor	% Ranking
Stream Gradient	30
Stream Order	30
Existing Vegetation Type	10
Canopy Cover	10
Road Density	10
Grazing	10
Total	100

Quality of Potential Dam Building Habitat

Stream Gradient	Score
0 - 6%	10
7 - 12%	7
13 - 15 %	3
> 15%	1

Stream Order	Score
1	8
2	10
3	9
4	7
5	5
6	3
7	2
8	1

Existing Vegetation Type	Score
Riparian	10
Conifer	8
Conifer-Hardwood	8
Exotic Tree-Shrub	8
Hardwood	8
Agricultural	5
Shrubland	5
Recently burned	5
Exotic Herbaceous	3
Grassland	3
Developed	1
No Data	1
Non-vegetated	1
Sparsely Vegetated	1

Road Density	Score
<= 1 mile / sq mile	10
> 1 mile and <=1.5 sq mile	7
> 1.5 mile and <=2 sq mile	5
> 2 mile and <=2.5 sq mile	3
> 2.5 / sq mile	1

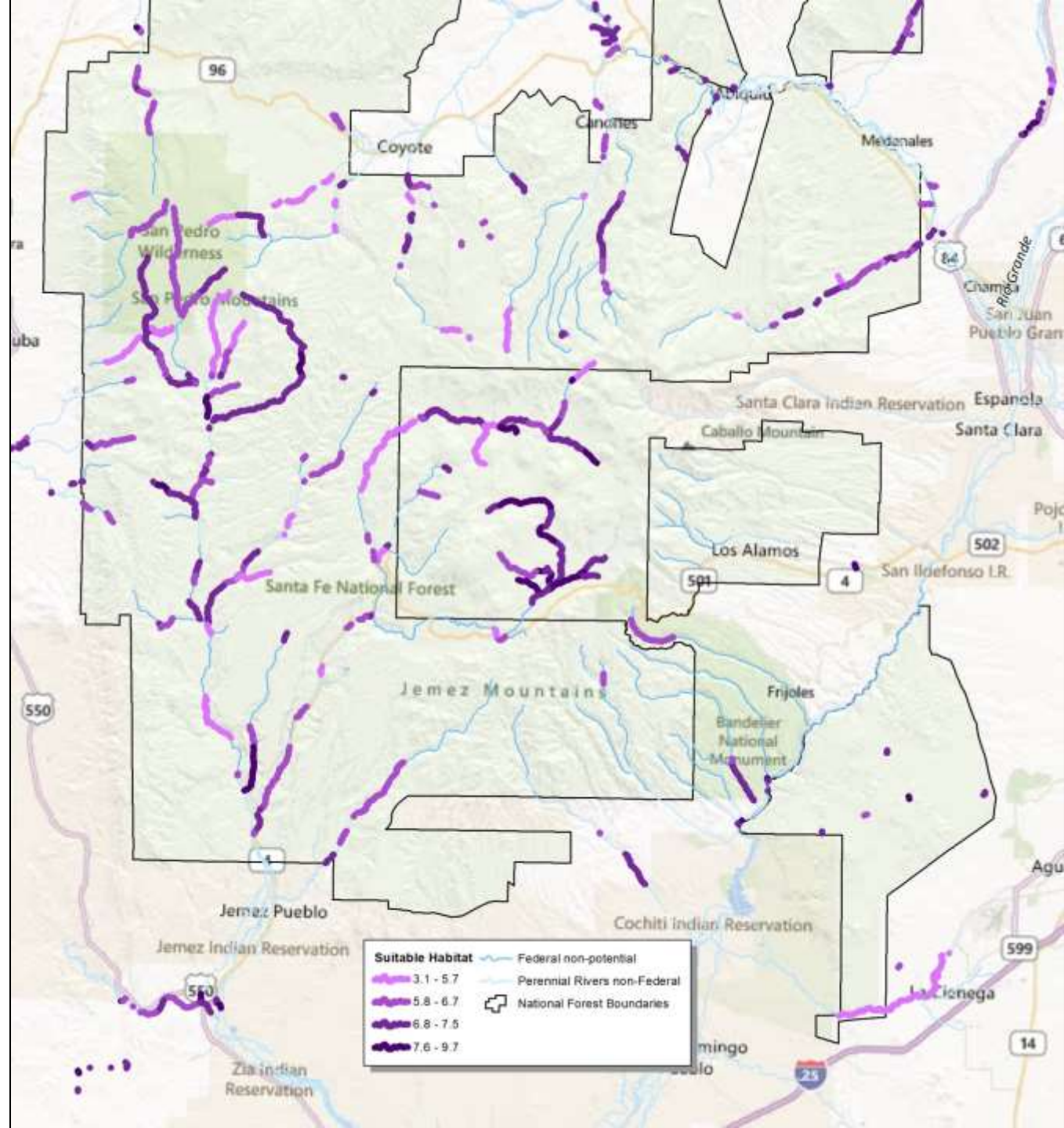| % Canopy Cover	Score
0	1
15	3
25	5
35	7
45	9
55	10
65	9
75	6
85	3
95	1

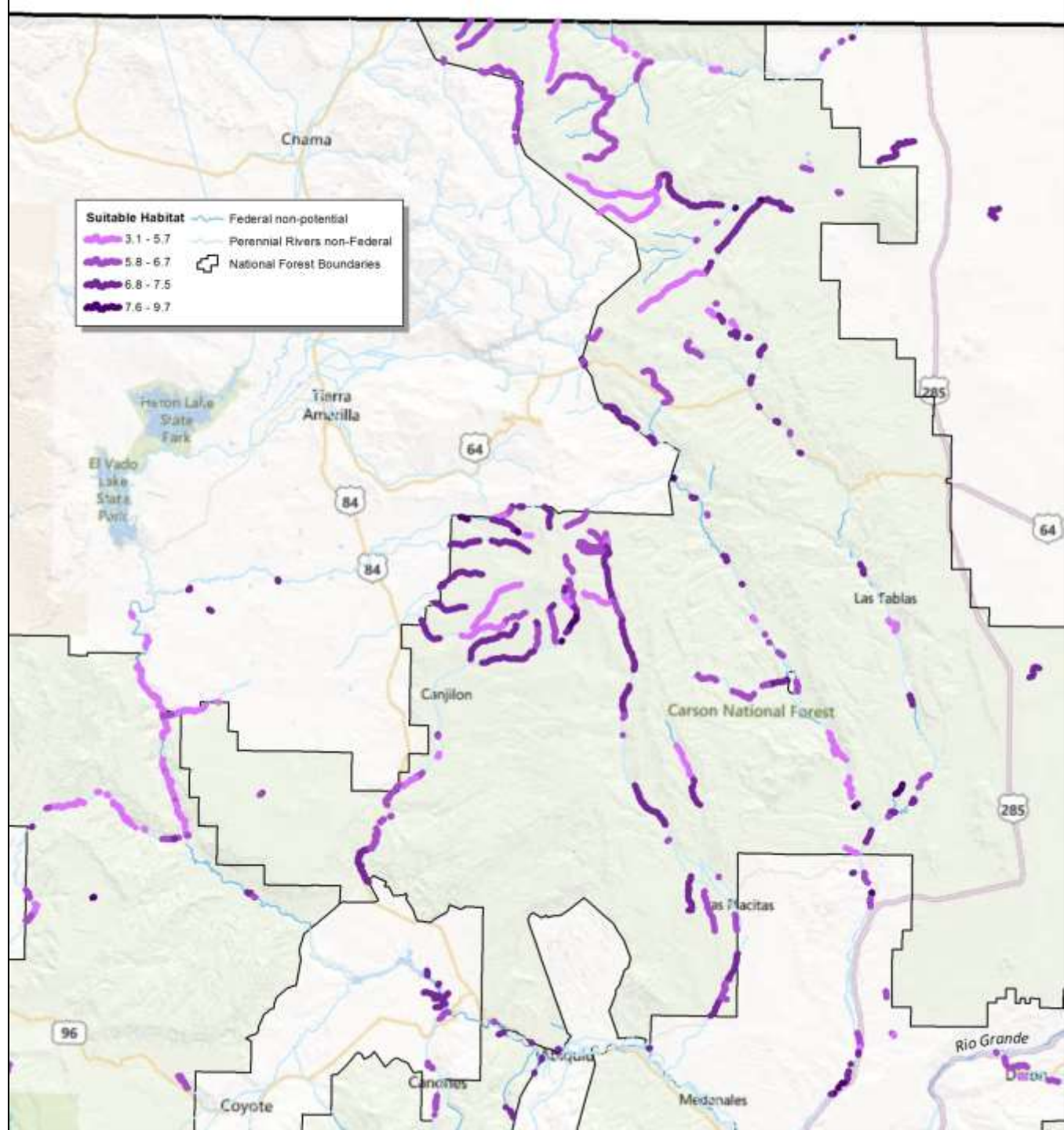| Grazing Status	Score
Ungrazed	10
Grazed	1

Suitable Beaver Habitat
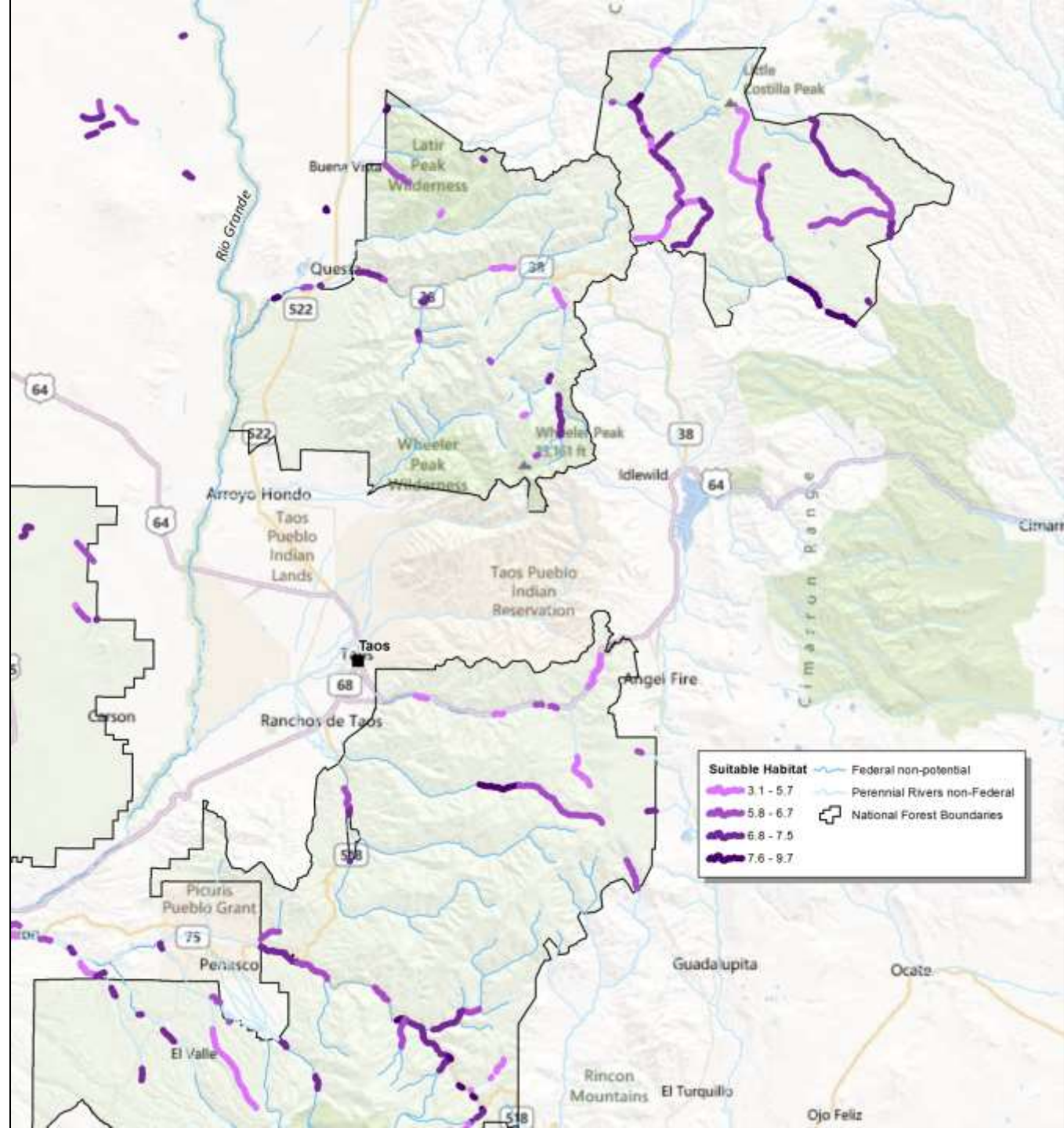
Suitable Beaver Habitat ~ Jemez

Suitable Beaver Habitat ~ Tusas Mountains
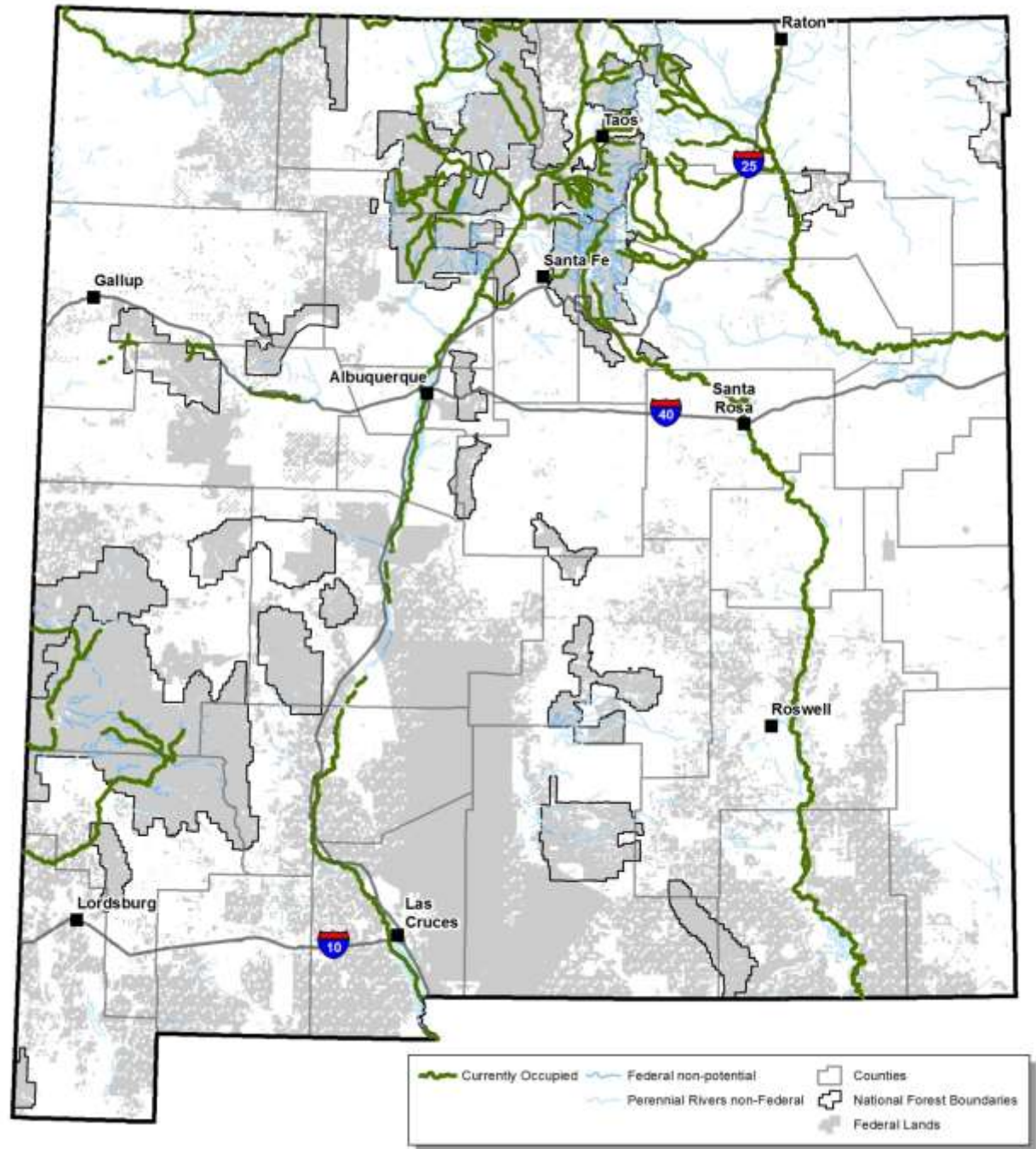
Suitable Beaver Habitat ~ Northern Sangre de Cristo's

Suitable Beaver Habitat ~ Gila

Suitable Habitat
- 3.1 – 5.7
- 5.8 – 6.7
- 6.8 – 7.5
- 7.6 – 9.7

Federal non-potential
Perennial Rivers non-Federal
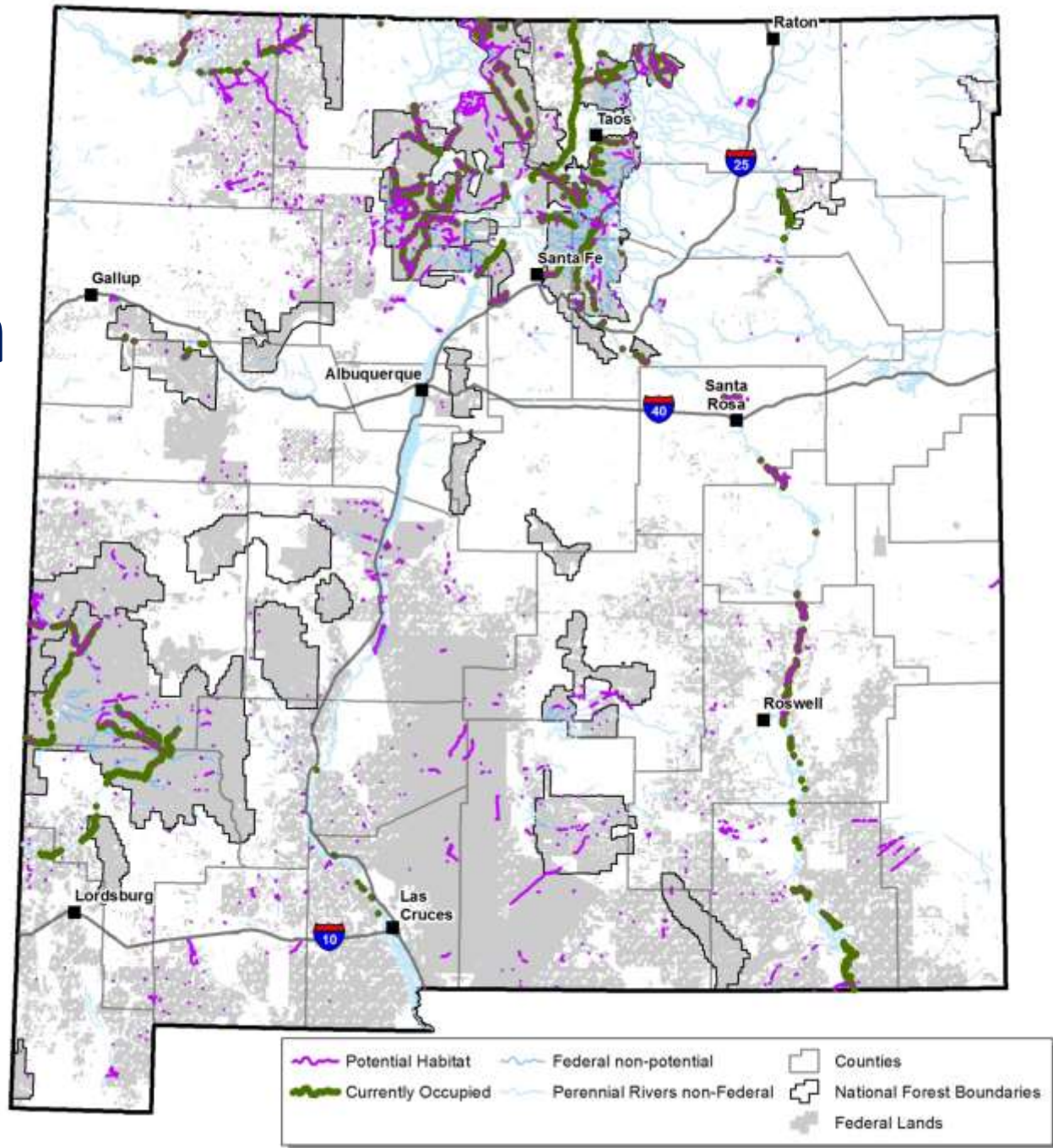National Forest Boundaries

Currently Occupied Habitat

➢ Dam and bank beaver

➢ Provided by Rick Winslow, Furbearer Biologist NMDGF

➢ Snapshot in time

Currently Occupied Habitat with Potential

Conclusions

➢ State and non-governmental organizations can use this information as a way to prioritize restoration projects and funding.

➢ Results helpful in developing a **statewide beaver management plan**. Knowing where beaver could be relocated will be important in developing a management plan and in annual work plans.

Next Steps

➢ Identify locales where wetlands can be reestablished with the presence of beaver.

➢ NMED Wetlands Program could direct funds for restoration of those sites.

Thanks!
Questions?

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