SOUTHERN ROCKIES
Landscape Conservation Cooperative

WELCOME!

Four Corners and Upper Rio Grande Vulnerability Assessment Webinar Series

- ✓ Phone audio: Dial: 866-620-8138; Passcode: 5952203#
- ✓ Mute your phone and turn off computer speakers (prevents echo issue).
- ✓ Introduce yourself in the chat box.
- ✓ Webinar recordings will be posted on the Southern Rockies LCC website.

United States Department of Agriculture

Webinar 3: Results of a Vulnerability Assessment for Sage Steppe Habitat in the Four Corners and Upper Rio Grande Landscapes

Mary Williams, Rangeland Ecologist, Rocky Mountain Research Station

Megan Friggens, Research Ecologist, Rocky Mountain Research Station

Agenda

Introduction to Four Corner and Upper Rio Grande Assessments

5 minutes

Methods

15 minutes

Focal Resource Results

30 minutes

Takeaways

5 minutes

Q&A

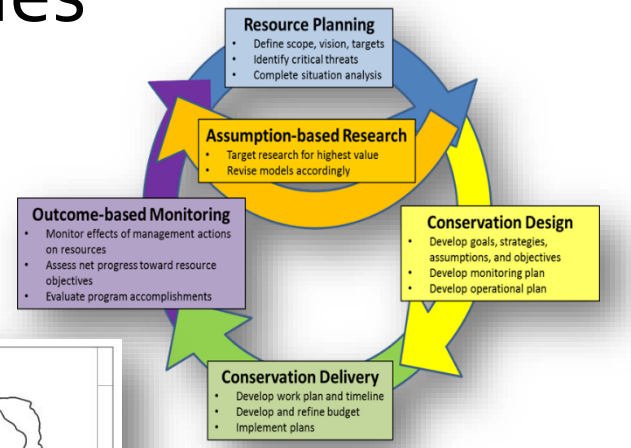
10 minutes

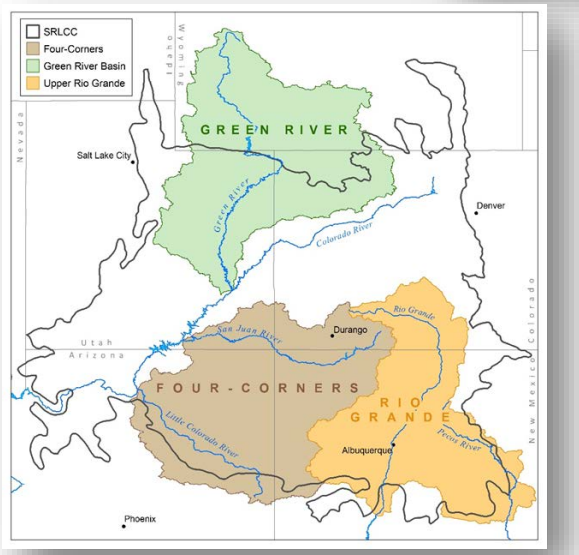
Goals for This Webinar

- Provide overview of assessment results
- Identify additional datasets/needs
- Incorporate feedback from today's discussion in preparation for upcoming Adaptation Forums

The SRLCC has engaged an adaptive management framework to collaboratively develop shared conservation objectives and landscape scale adaptation strategies

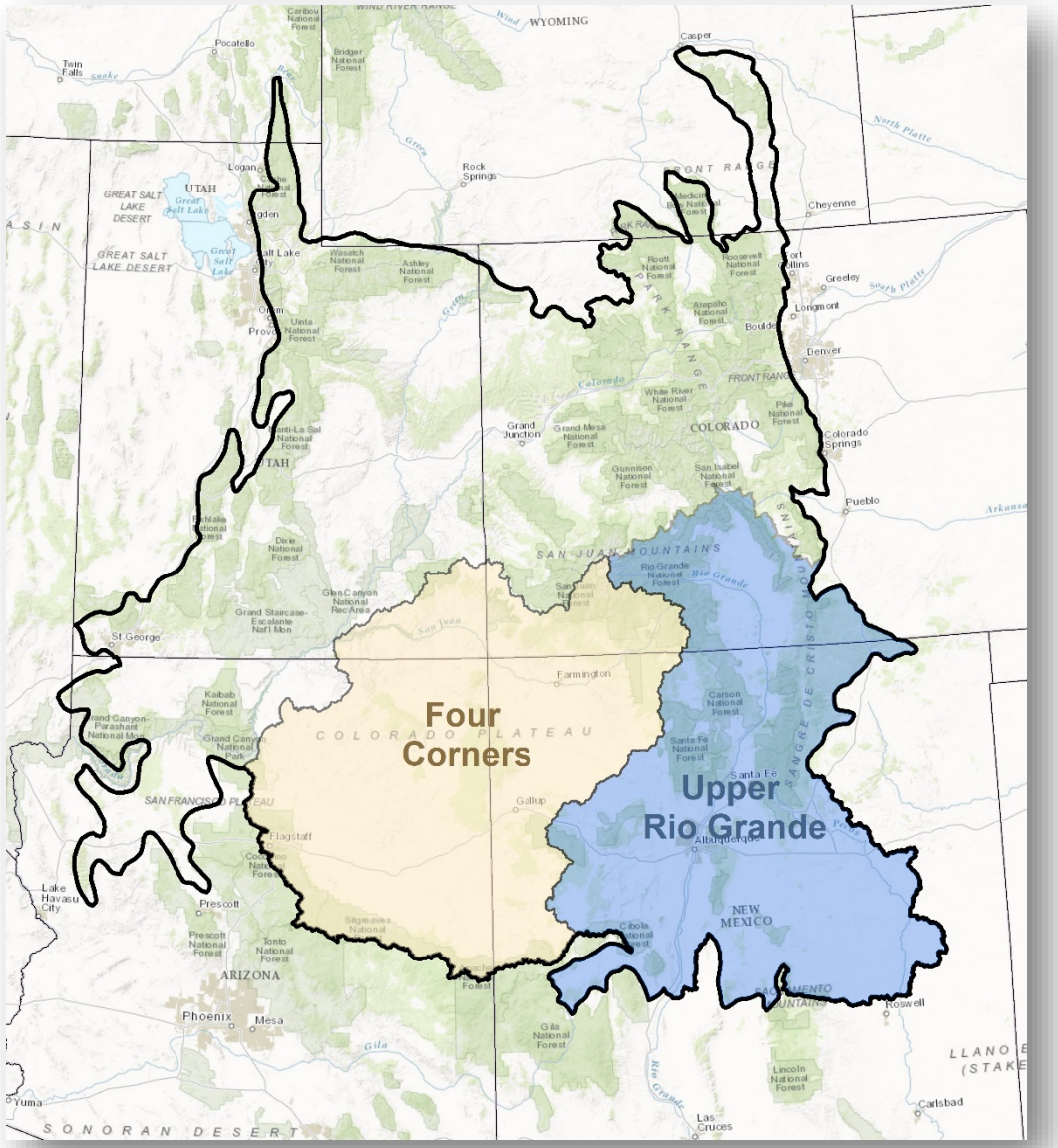
- Identified Focal Resources and Landscapes
- Partnered with RMRS to create Vulnerability Assessments for Focal Resources in Two Landscape
  - Spring 2016 Adaptation Forums
  - Fall 2017 Adaptation Forums





Focal Resources in 2 Landscapes

1. Streamflow/ Native Fish/ Riparian Corridors
2. Mule Deer & Elk
3. Sage-Steppe Habitat
4. Pinyon-Juniper Woodlands



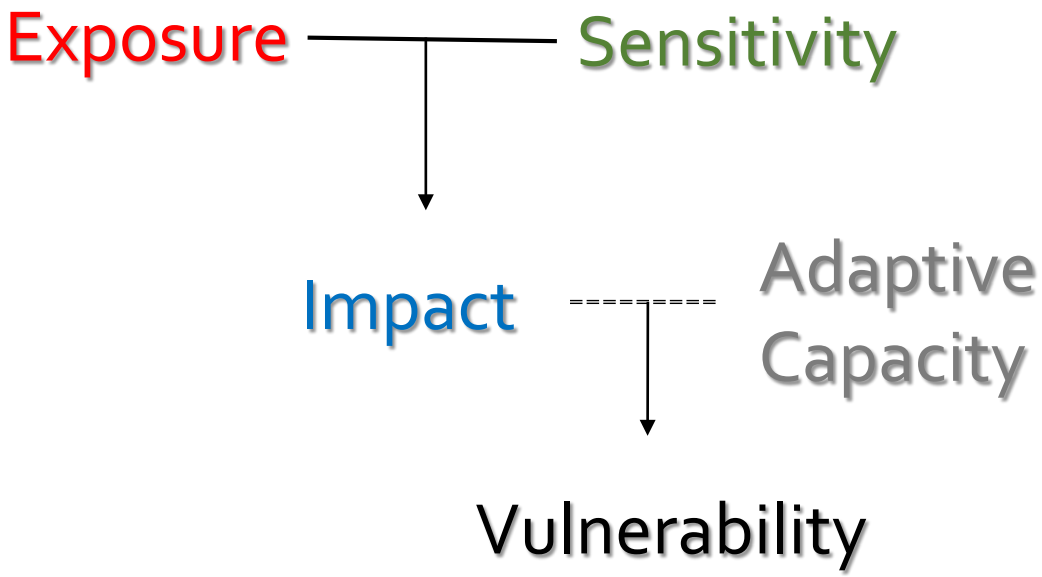
Methods

Framework for Landscape Level Vulnerability Assessment of Focal Resources

VA Element	Definition	Example Spatial Data/Indicators
Exposure	External threat to the target species, system, or place	• Human impacts • Natural disturbances • Climate change
Sensitivity	Qualities that make the target more susceptible to negative impacts from disturbance or threat	• Traits/Conditions associated with increased negative response • Indicators of potential cost of disturbance
Adaptive Capacity	The ability of the target to cope with disturbance or threat	• Traits/conditions associated with resilience • Potential for management intervention

Steps to Quantify Vulnerability

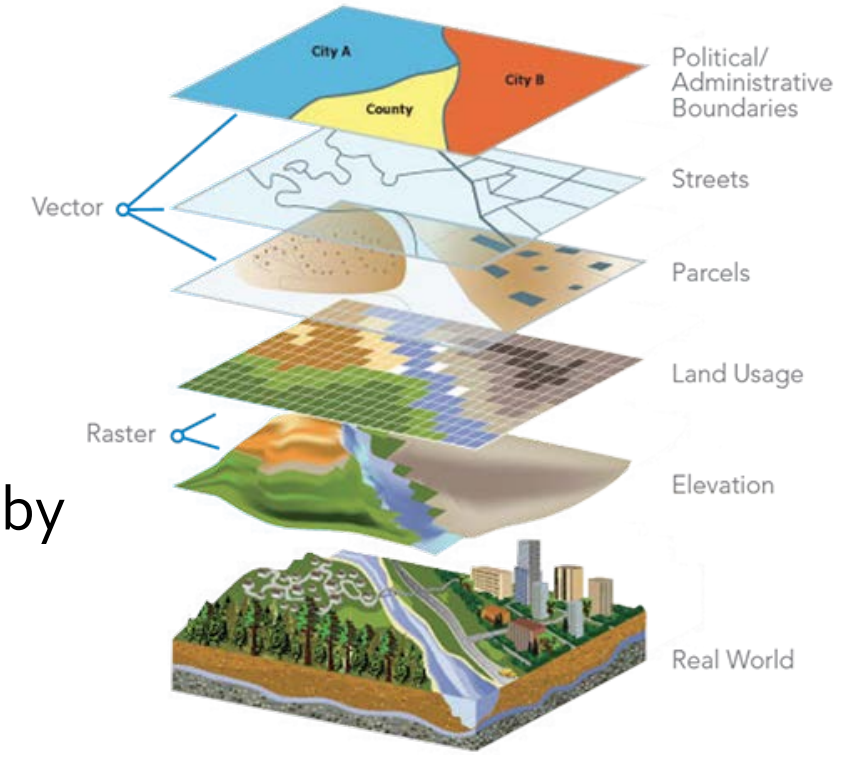
1. Gather data
   - Assess Relevance
   - Assign to Element
2. Create indices
3. Combine E, S, and AC indices to estimate Vulnerability



Step 1. Gather Data

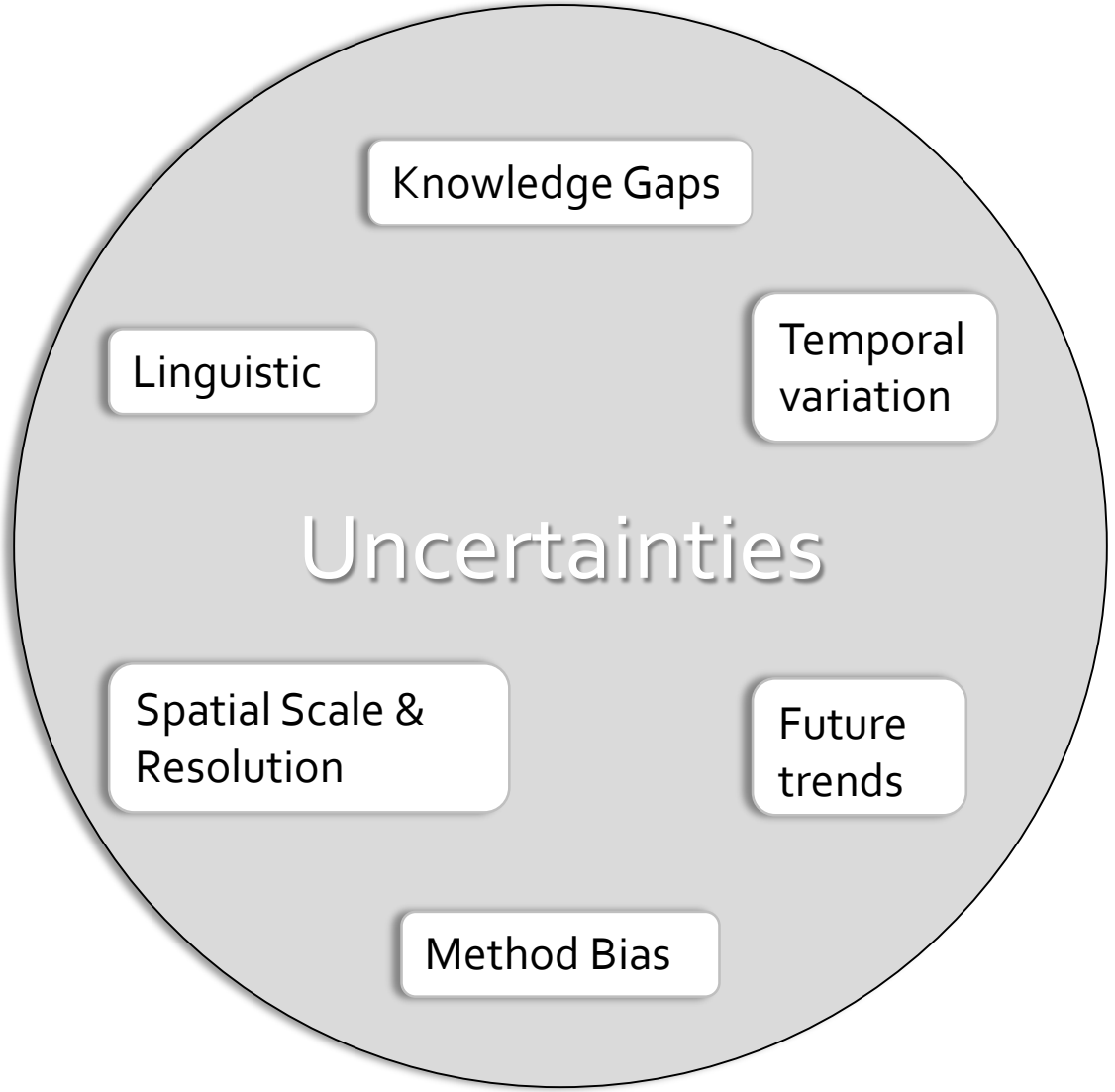
Criteria:

- Spatially explicit
- Available across focal landscape
- Meaningful
- Measurable uncertainty
- Tried to find datasets used and or produced by LCC stakeholders



Challenges with combining existing data

- Resolution and scale of datasets differ and may not match management needs
- Uncertainties and assumptions of underlying datasets
- Uncertainties related to climate projections



Step 2: Indices

1 + 1 + 1 + 1 = Cumulative score

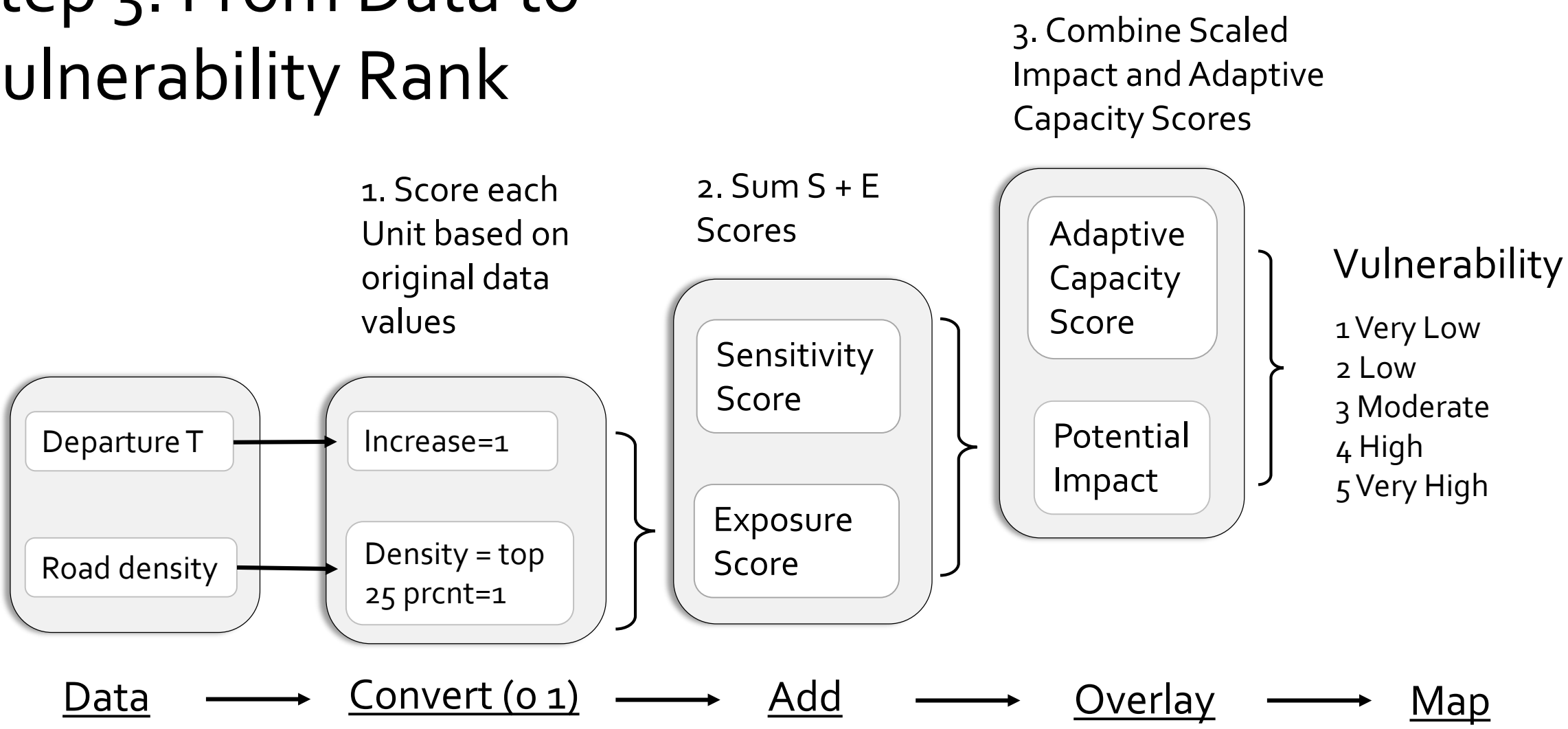
Pros

- Easy to interpret
- Easy to manipulate on the fly
- Are able to identify relative differences and more complicated interactions

Cons

- May be biased and/or misleading
- Not considering differential impacts
- Assumes equal certainty and quality of underlying data

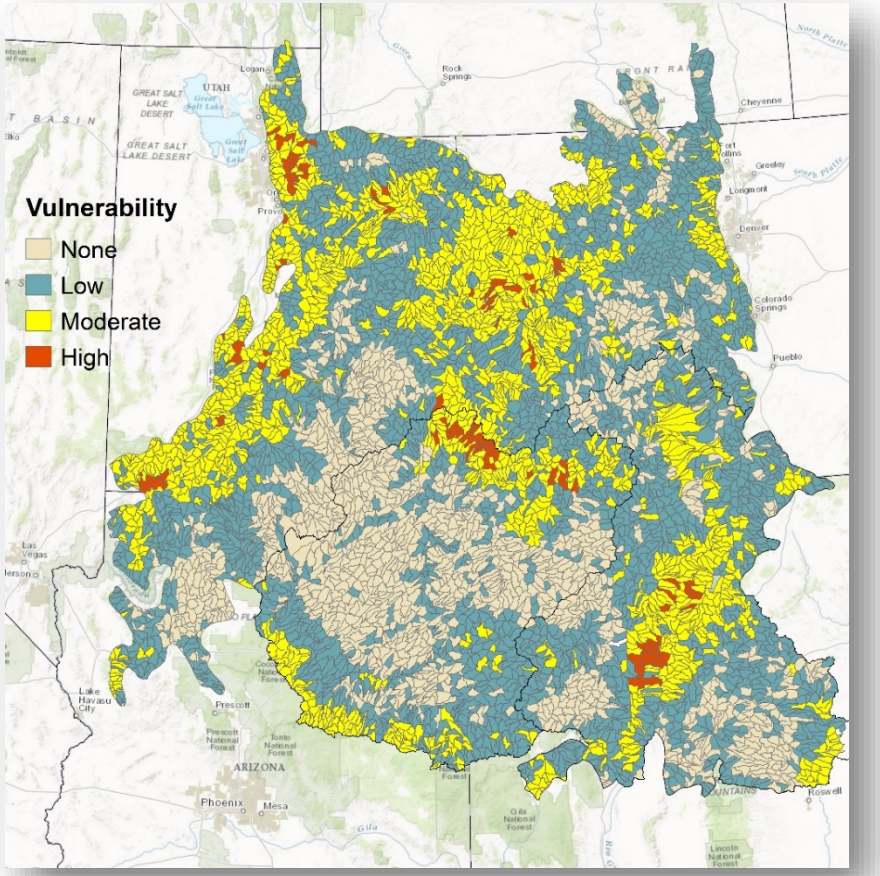
Step 3. From Data to Vulnerability Rank



Visualize Vulnerability

Vulnerability		Impact (E+S) Value				
Adaptive Capacity		1	2	3	4	5
	1	11	12	13	14	15
	2	21	22	23	24	25
	3	31	32	33	34	35
	4	41	42	43	44	45
	5	51	52	53	45	55

Vulnerability
Lowest
Very Low
Low
Moderate
High
Very High

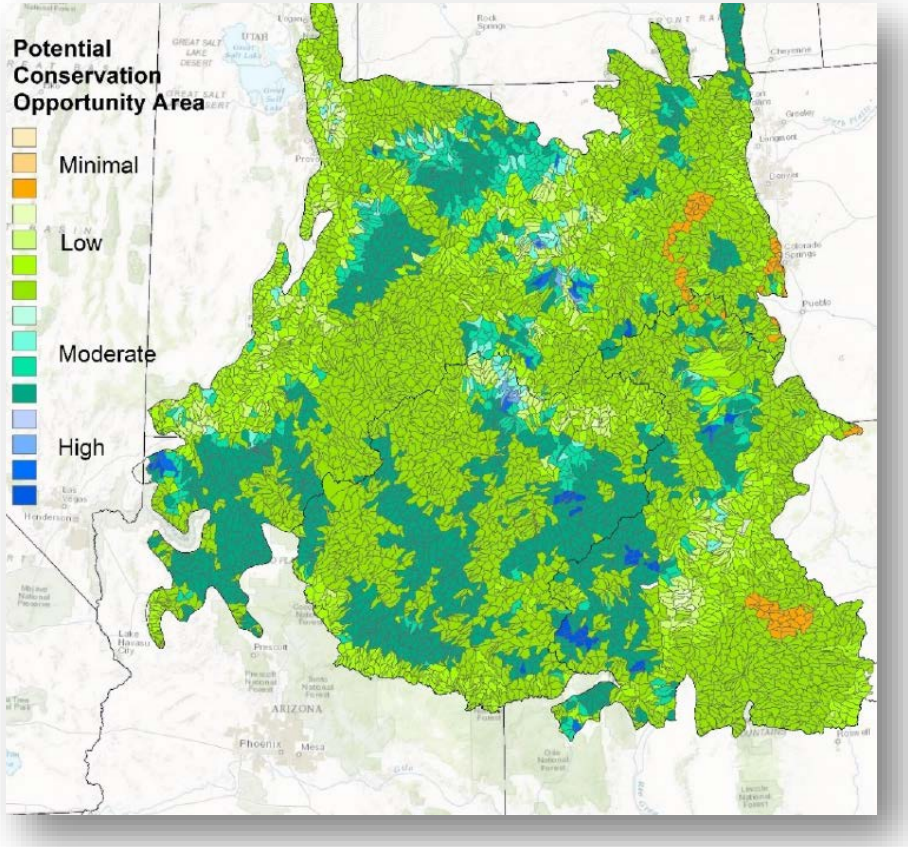


Highlight Opportunities

Opportunity		Adaptive Capacity				
		1	2	3	4	5
Impact	1	11	21	31	41	51
	2	12	22	32	42	52
	3	13	23	33	43	53
	4	14	24	34	44	54
	5	15	25	35	45	55

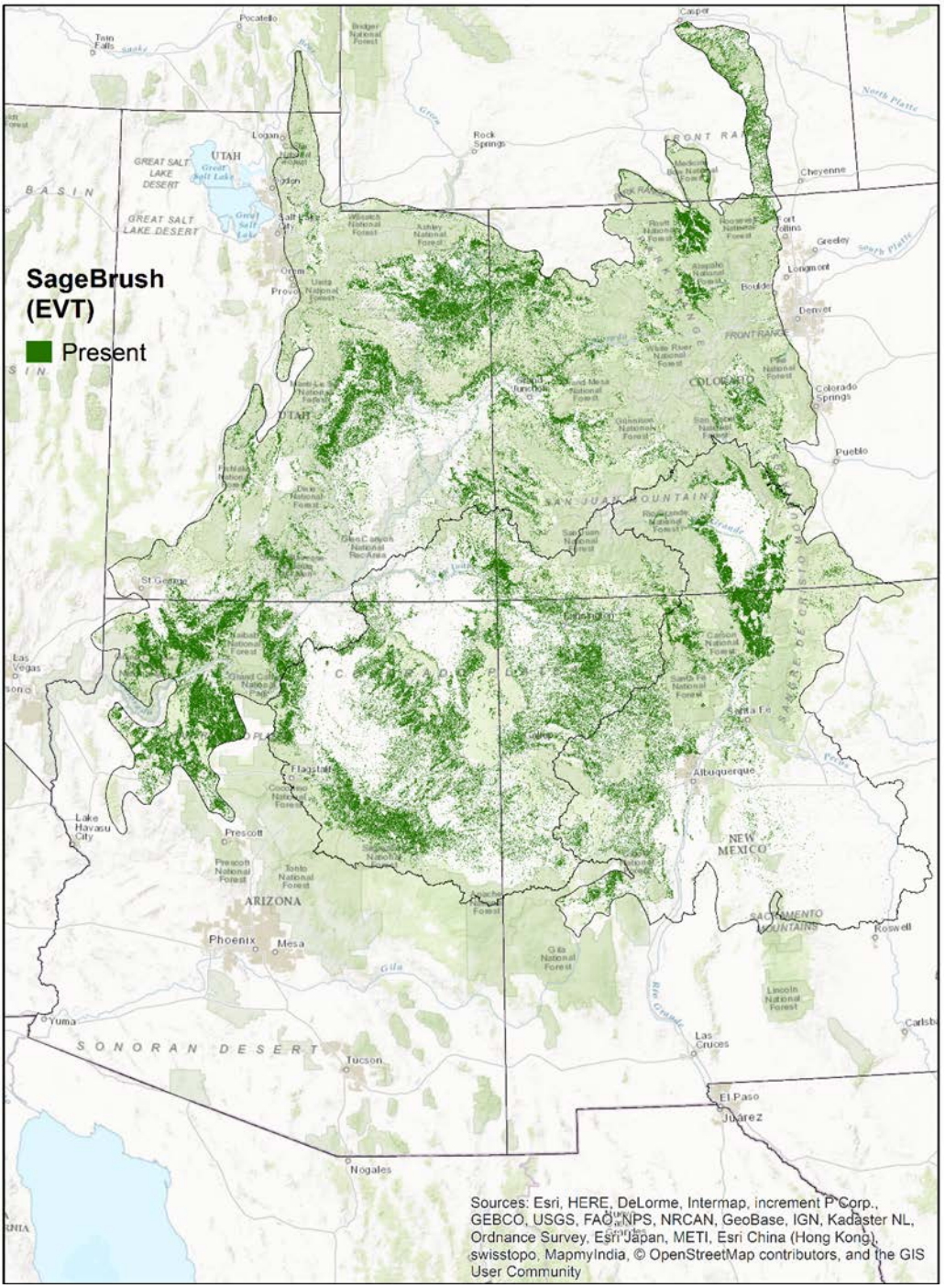
Opportunity

	Lowest
	Intermediate
	Highest



Assessment Results

Sagebrush Ecosystems



BACKGROUND

- In the focal areas, sagebrush ecosystems represent the southernmost reach of the greater sagebrush biome

- They are diverse ecosystems of sagebrush, grasses, and forbs; soil crusts are a key element

- Provide food and cover for wildlife, such as sage grouse, pronghorn, pygmy rabbit, and mule deer
- Provide cover and nesting sites for obligates, such as sage grouse, Brewer's sparrow, and sagebrush sparrow

Existing Conditions

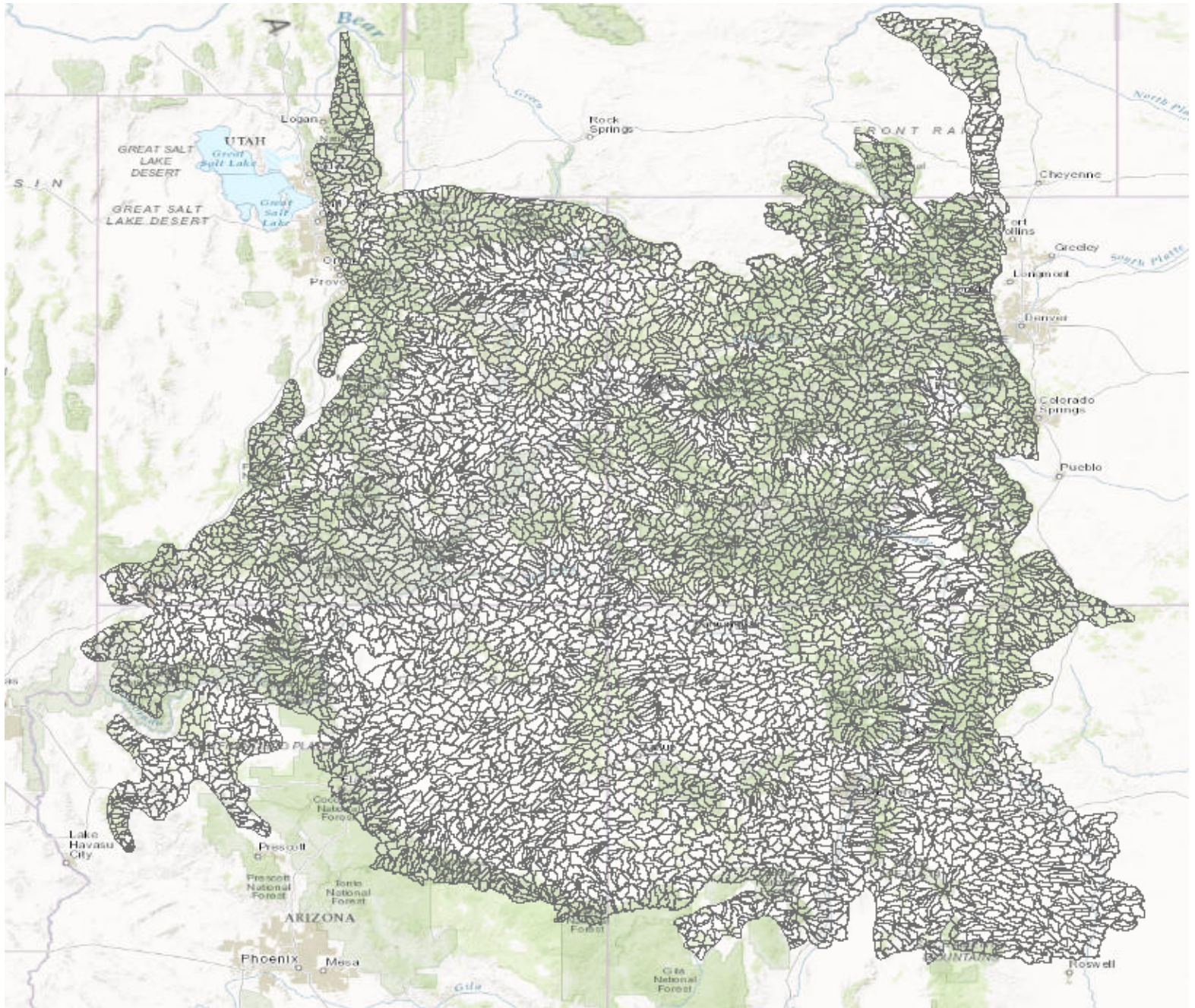
- Current ecosystems tend to have decadent big sagebrush with cheatgrass understories
- Overgrazing, invasion by non-native annual grasses, energy development, encroachment by pinyon-juniper, agriculture, and residential development cause departure from desired conditions
- Shrub removal or thinning, prescribed fire, and revegetation are common practices

Data used

Exposure	Sensitivity	Adaptive Capacity
1. Wildfire Hazard Potential	1. Terrestrial T and E	1. Sagebrush Cover
2. Energy (wells, solar)	2. Wildlife Diversity	2. Core Areas
3. Change in Development	3. Pinon-Juniper Interface	3. Public Land Ownership
4. Change in Shrub Cover	4. Development Med-High	4. Soil Resistance and Resilience, High
5. Change in Crop Cover	5. Road Density	
6. Vegetation Type Change	6. Soil Resistance and Resilience, Low	

Unit of Analysis

Watershed HUC 12



World Topographic Map - Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

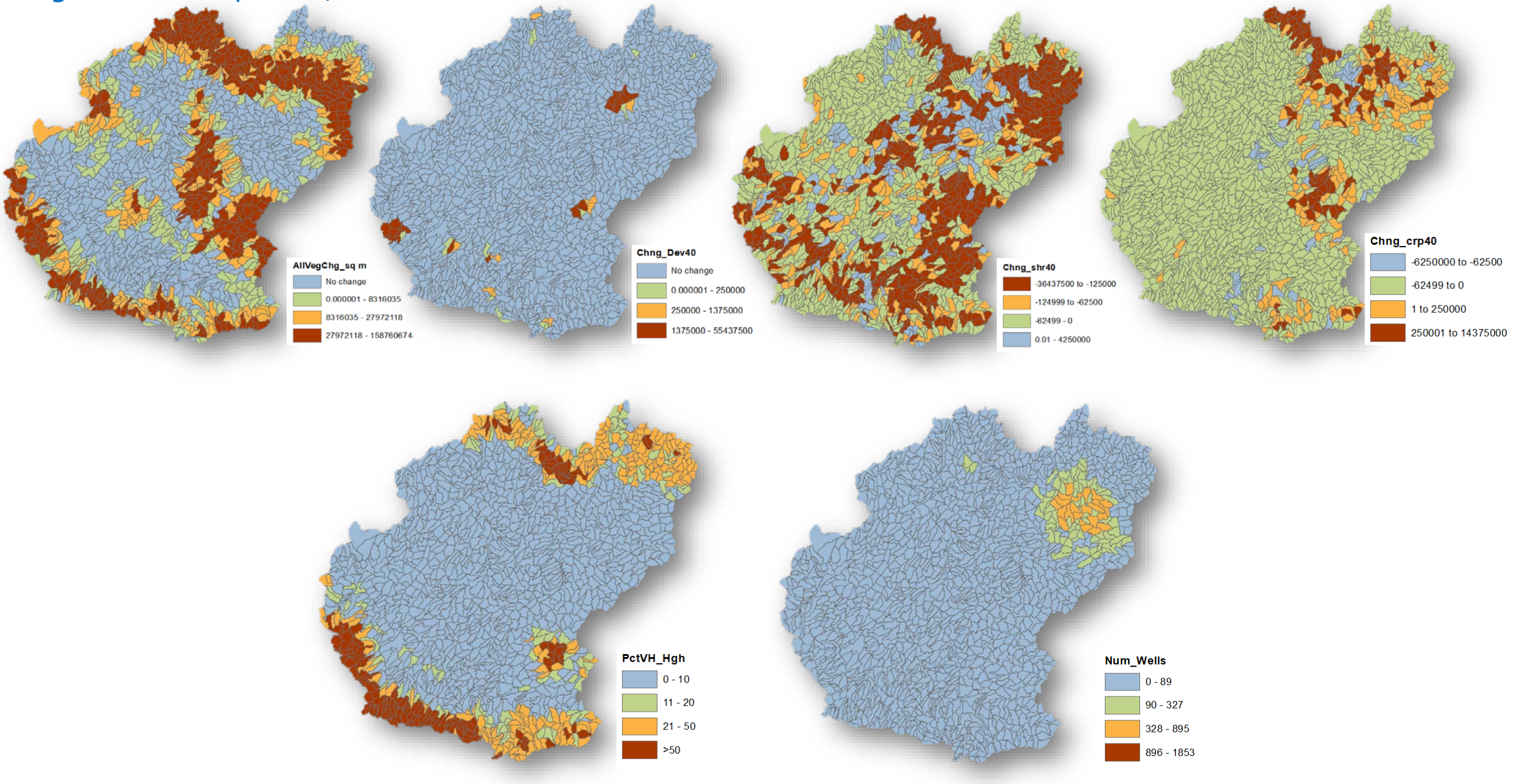
Relevant data not included in analysis

Data/Indicator	Reason
Conservation Easements	Coverage incomplete; some redundancy
Grazing Allotment Departure	Coverage incomplete
Population Growth	Not compiled yet
Cropland Conversion	Not compiled yet; coverage incomplete
Linear Features (fences, power lines)	Not compiled yet
Connectivity	Not compiled yet

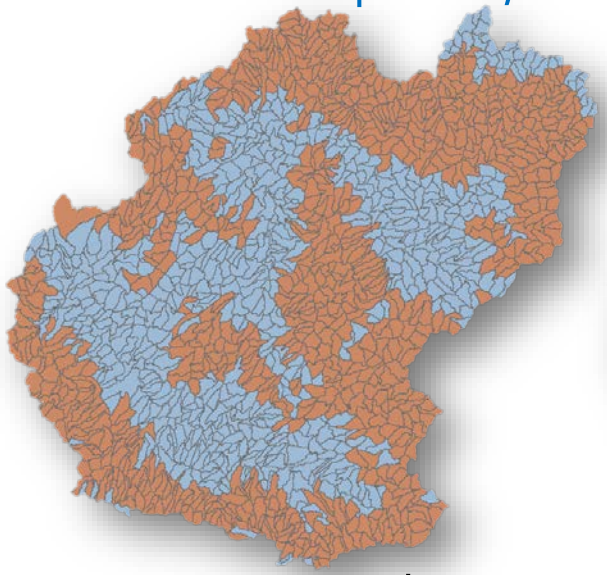
Data: Exposure

Description	How Used	% FC	% URG
Vegetation Type Change (Peterman et al. 2015)	Change = 1	58	56
Change in Development, 2040 (USGS 2014)	Increase = 1	3	6
Change in Crop, 2040 (USGS 2014)	Increase = 1	18	27
Change in Shrub, 2040 (USGS 2014)	Decrease = 1	43	45
High to Very High Fire Potential (USFS 2014)	> 20% = 1	23	17
Energy (oil & gas wells, solar) (ESRI 2015, BLM 2012)	Present = 1	18	7

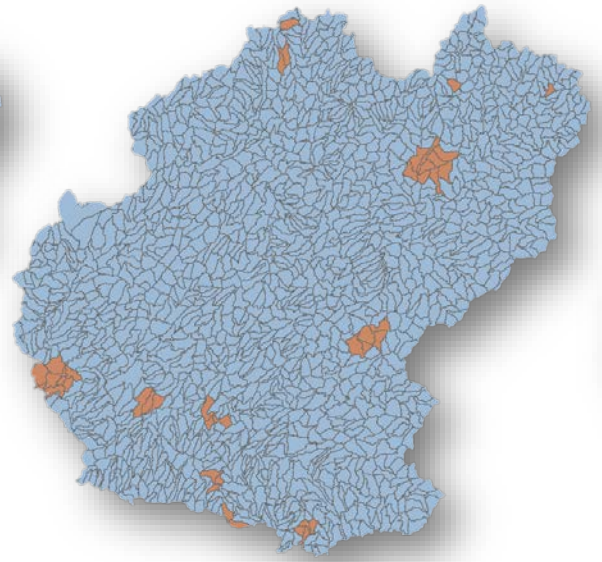
Original Data: Exposure, Four Corners



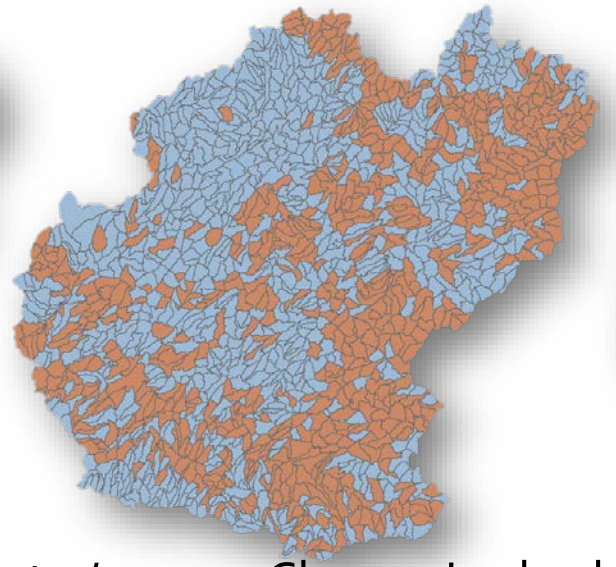
Coded Data: Exposure, Four Corners



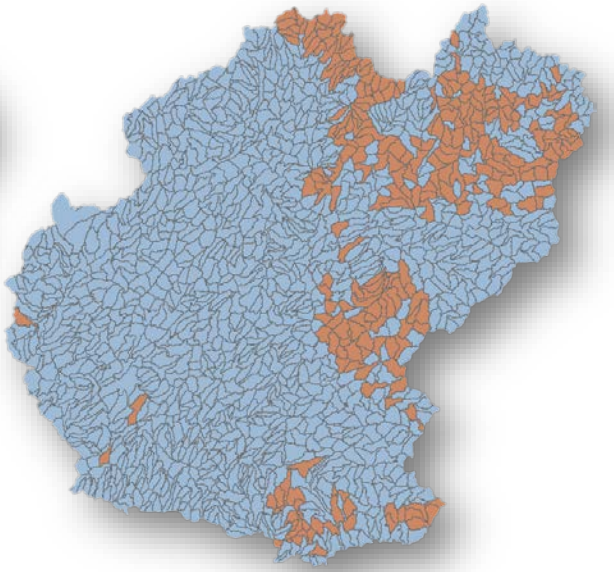
Vegetation type change 0/1



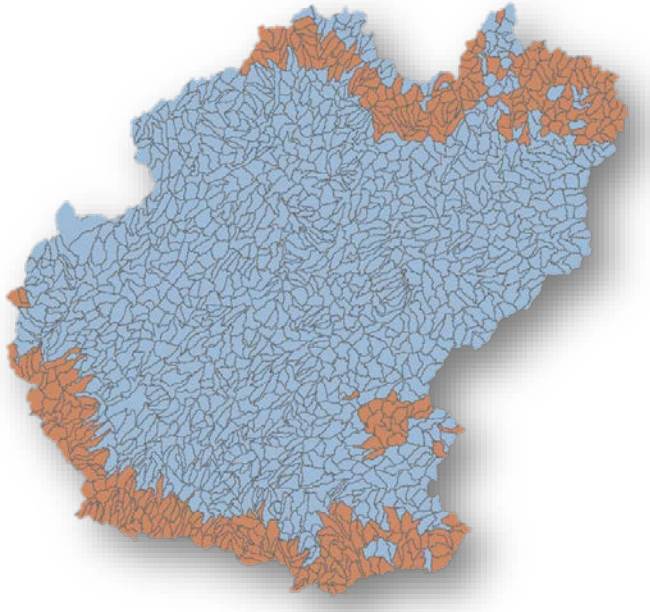
Change in development 0/1



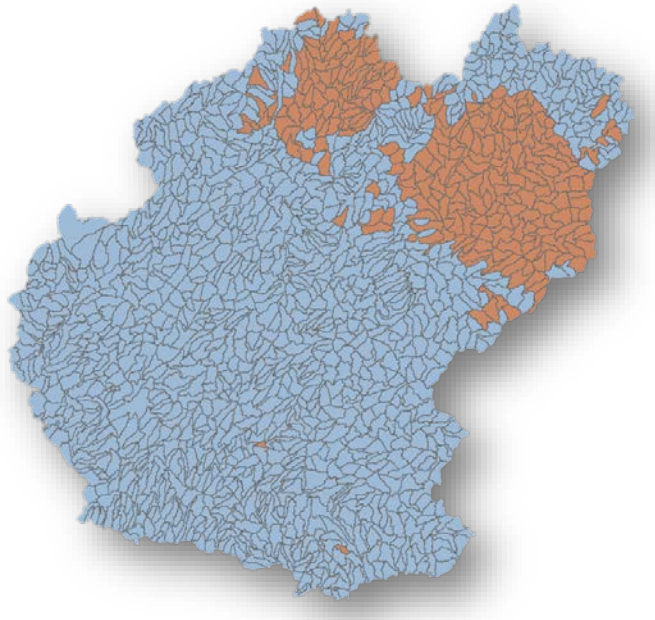
Change in shrub 0/1



Change in crop 0/1

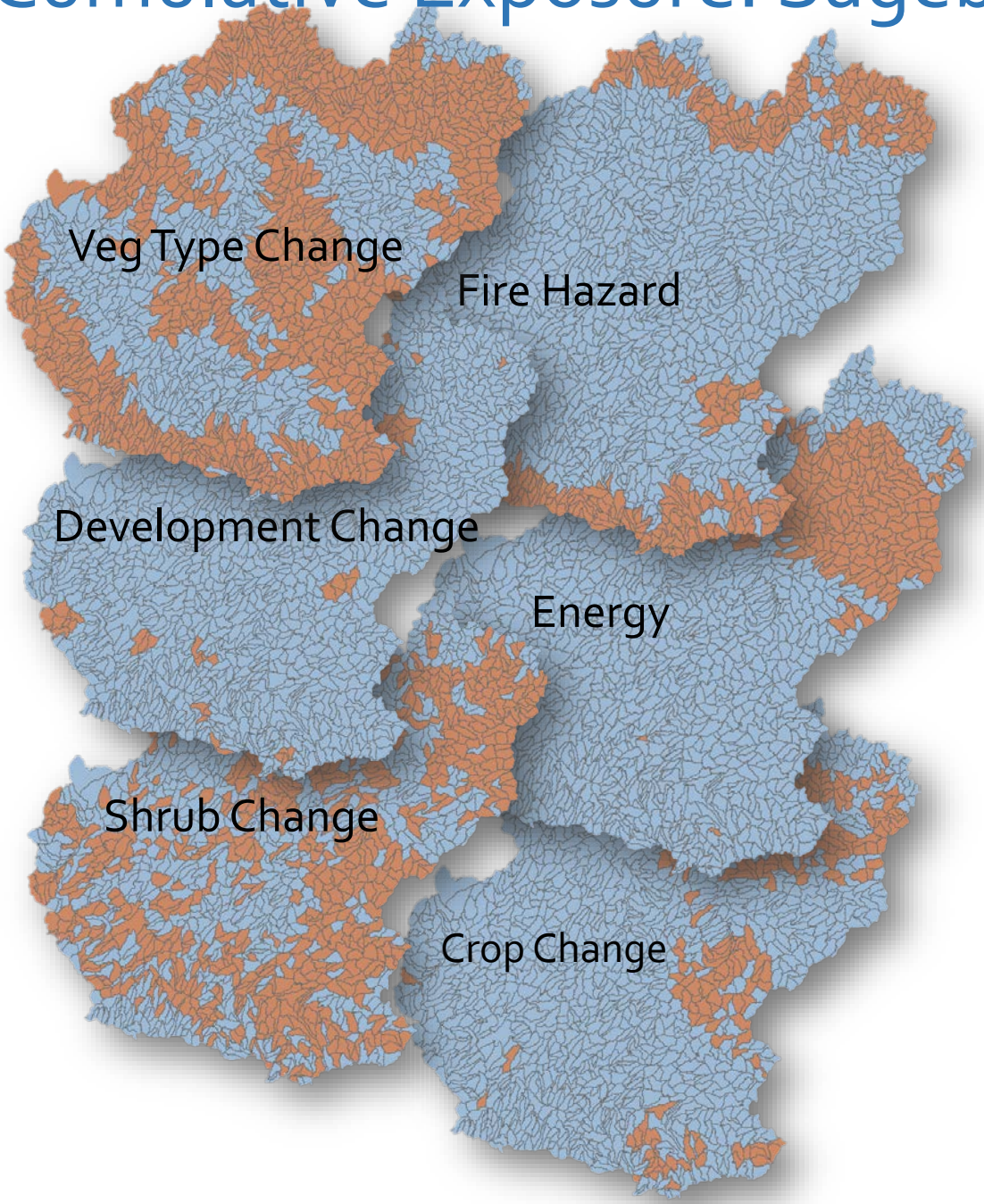


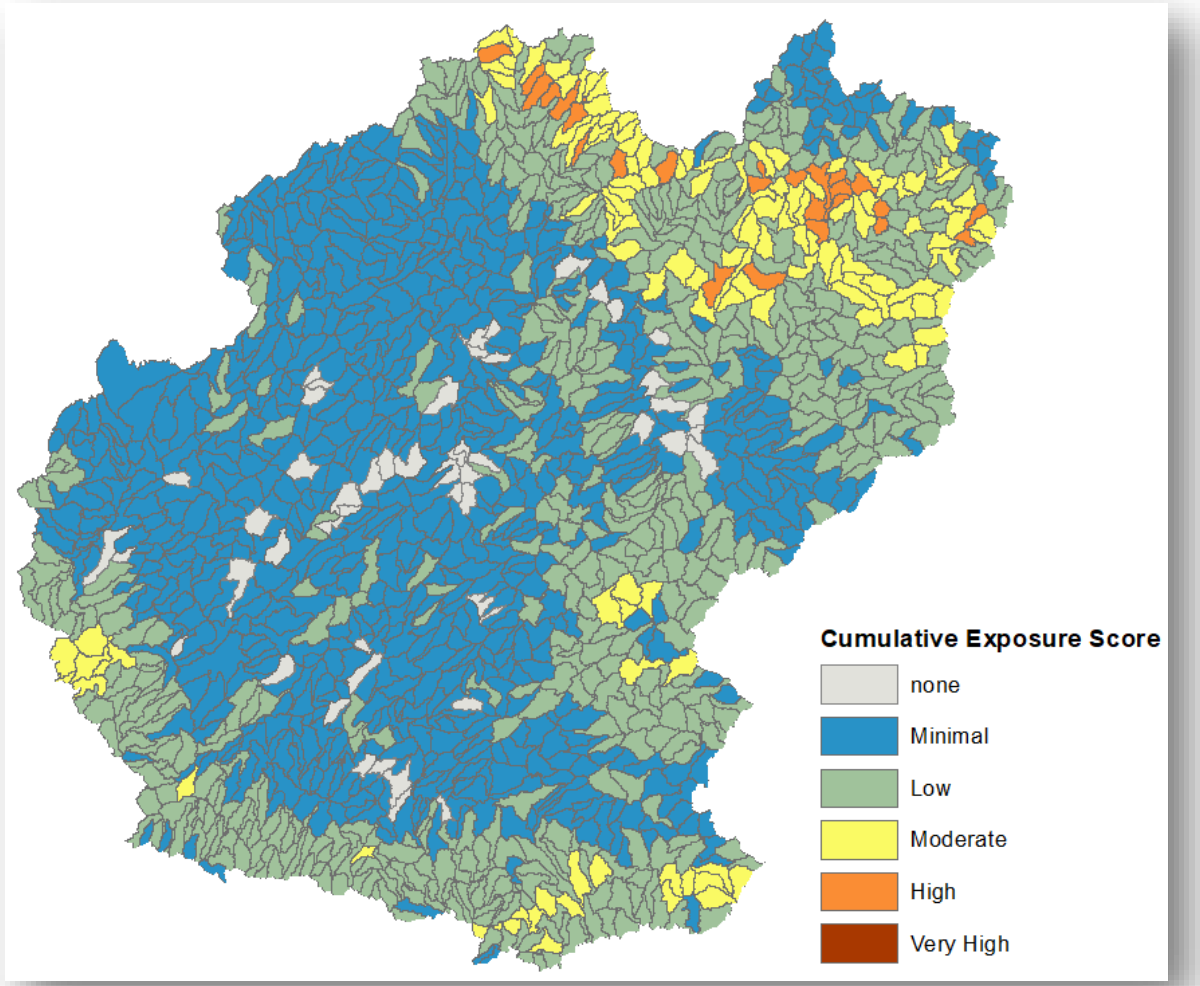
Wildfire hazard potential 0/1



Energy 0/1

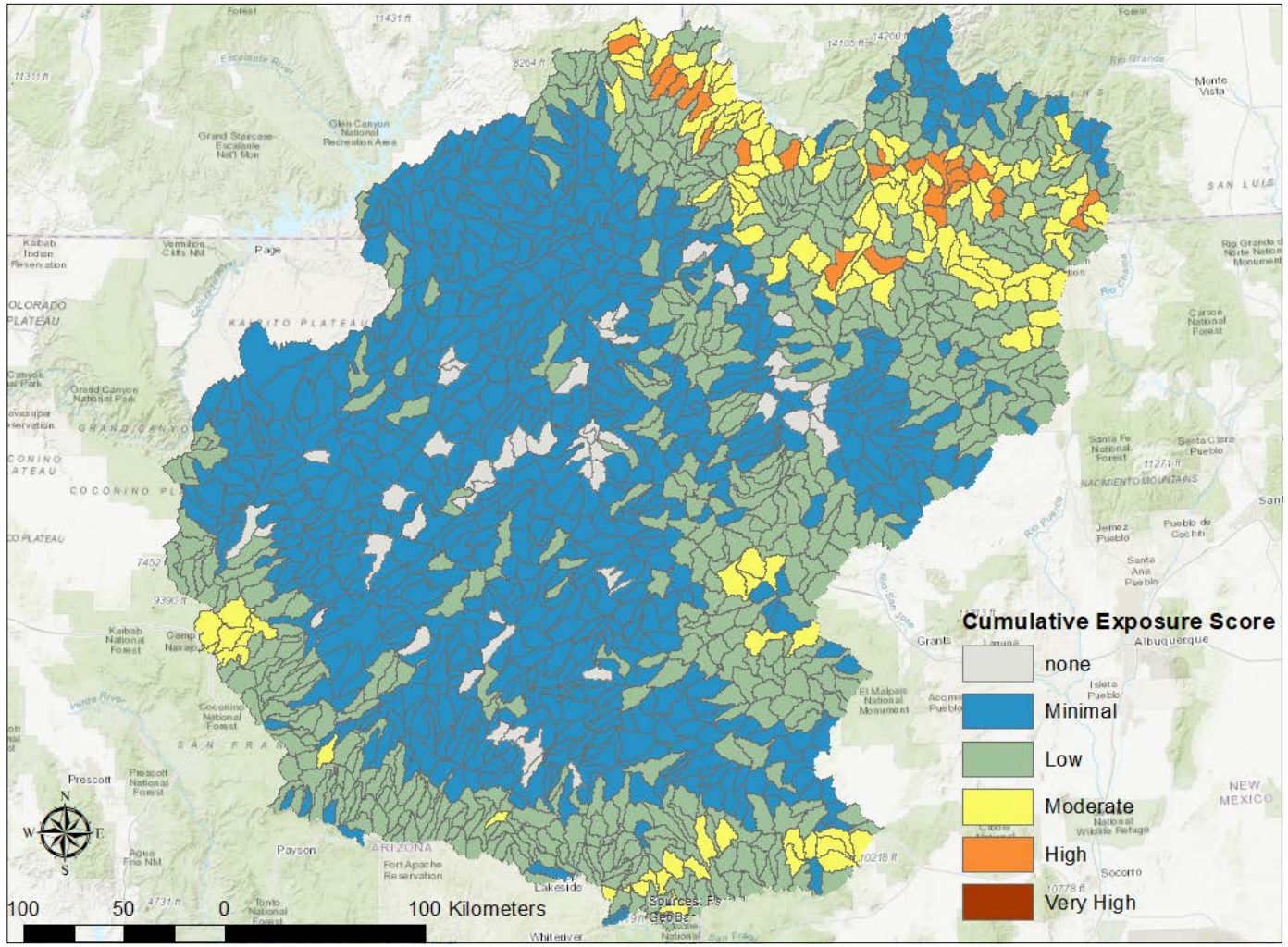
Cumulative Exposure: Sagebrush, Four Corners



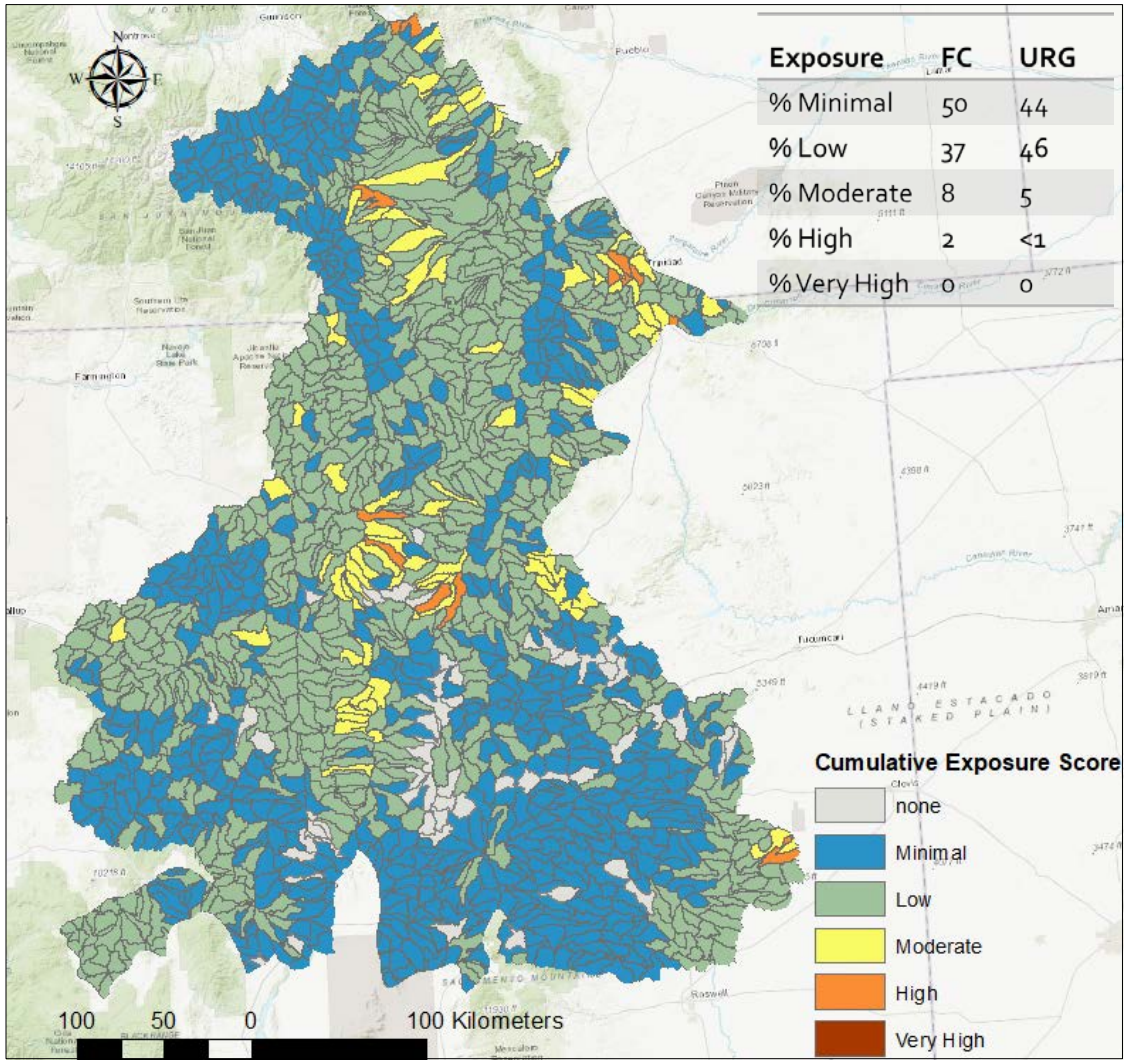


Cumulative Exposure: Sagebrush

Four Corners



Upper Rio Grande

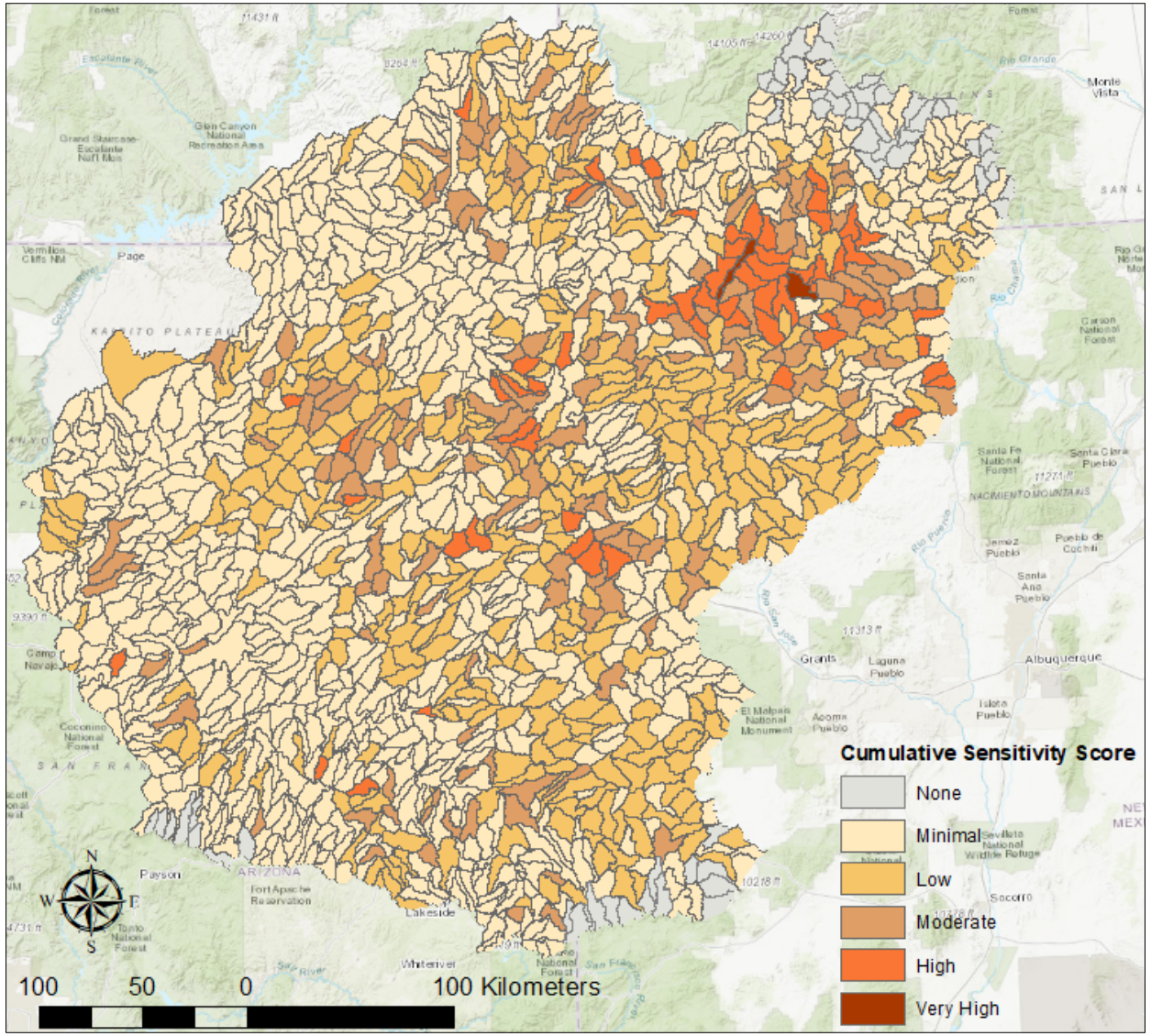


Data: Sensitivity

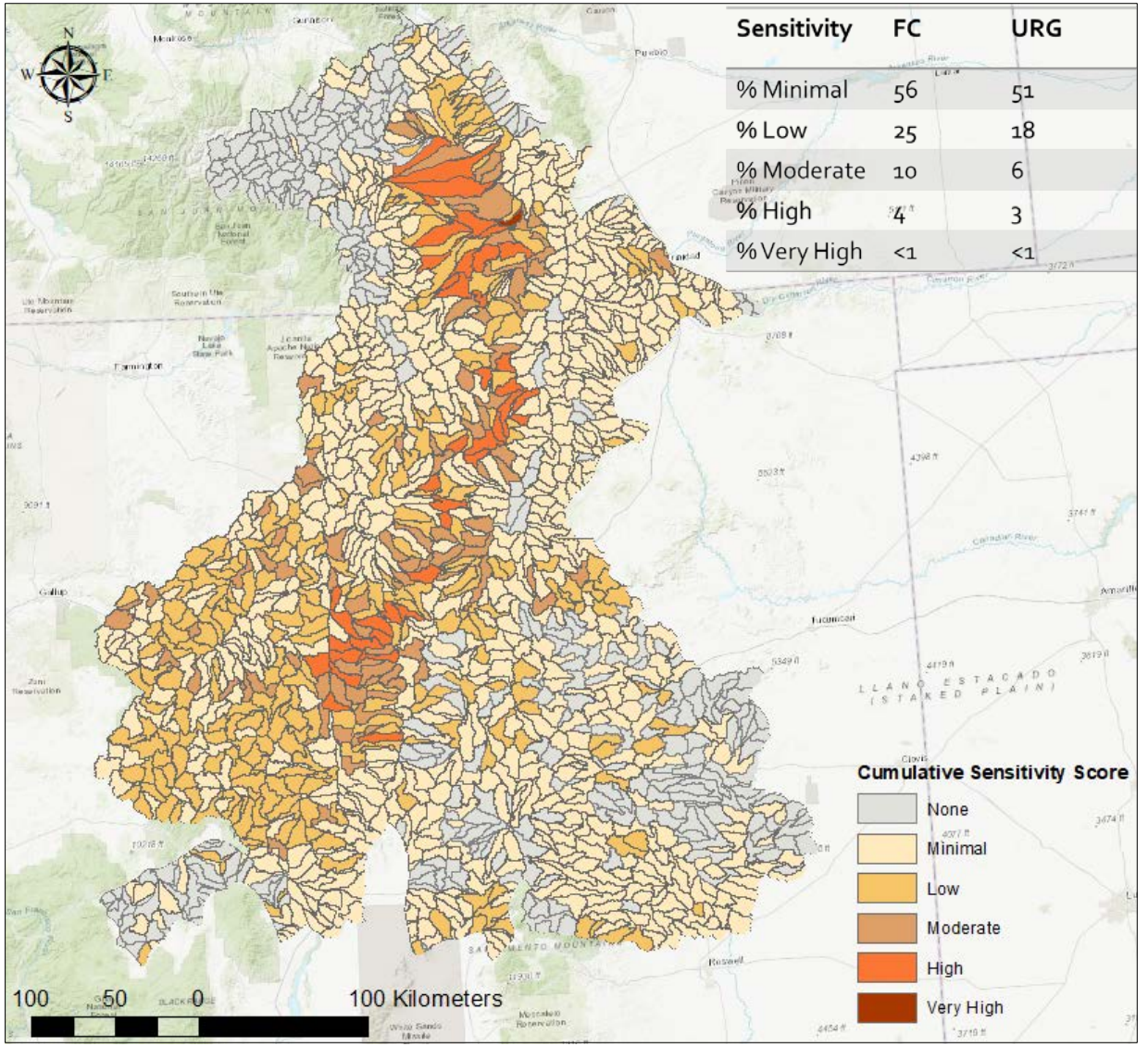
Description	How Used	% FC	% URG
Terrestrial T and E (USFWS 2017)	Present = 1	5	12
Wildlife Diversity, n=15 (USGS/GAP 2017)	> 8 species = 1	93	63
Pinon-Juniper Interface (LANDFIRE EVT)	> 25th percentile = 1 (>5%)	18	6
Development Med-High (NLCD 2011)	>25th percentile = 1 (>0.1%)	10	11
Road Density (Tiger 2016)	>25th percentile = 1 (>0.1 km/km^2)	31	18
Low Soil Resistance	Present = 1	29	28
Low Soil Resilience (Chambers 2014,2016, Maestas 2016)	Present = 1	30	29

Cumulative Sensitivity: Sagebrush

Four Corners



Upper Rio Grande

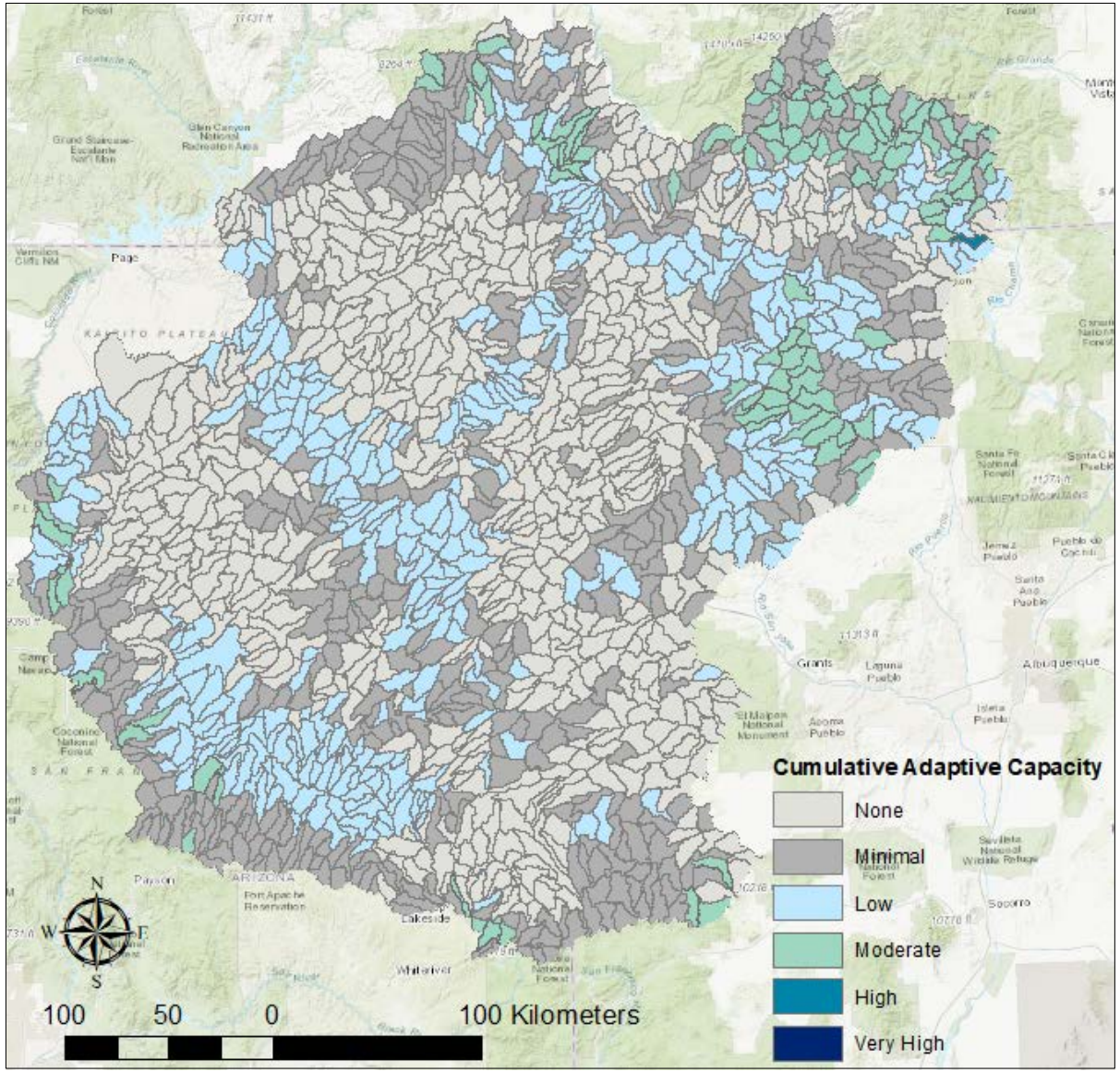


Data: Adaptive Capacity

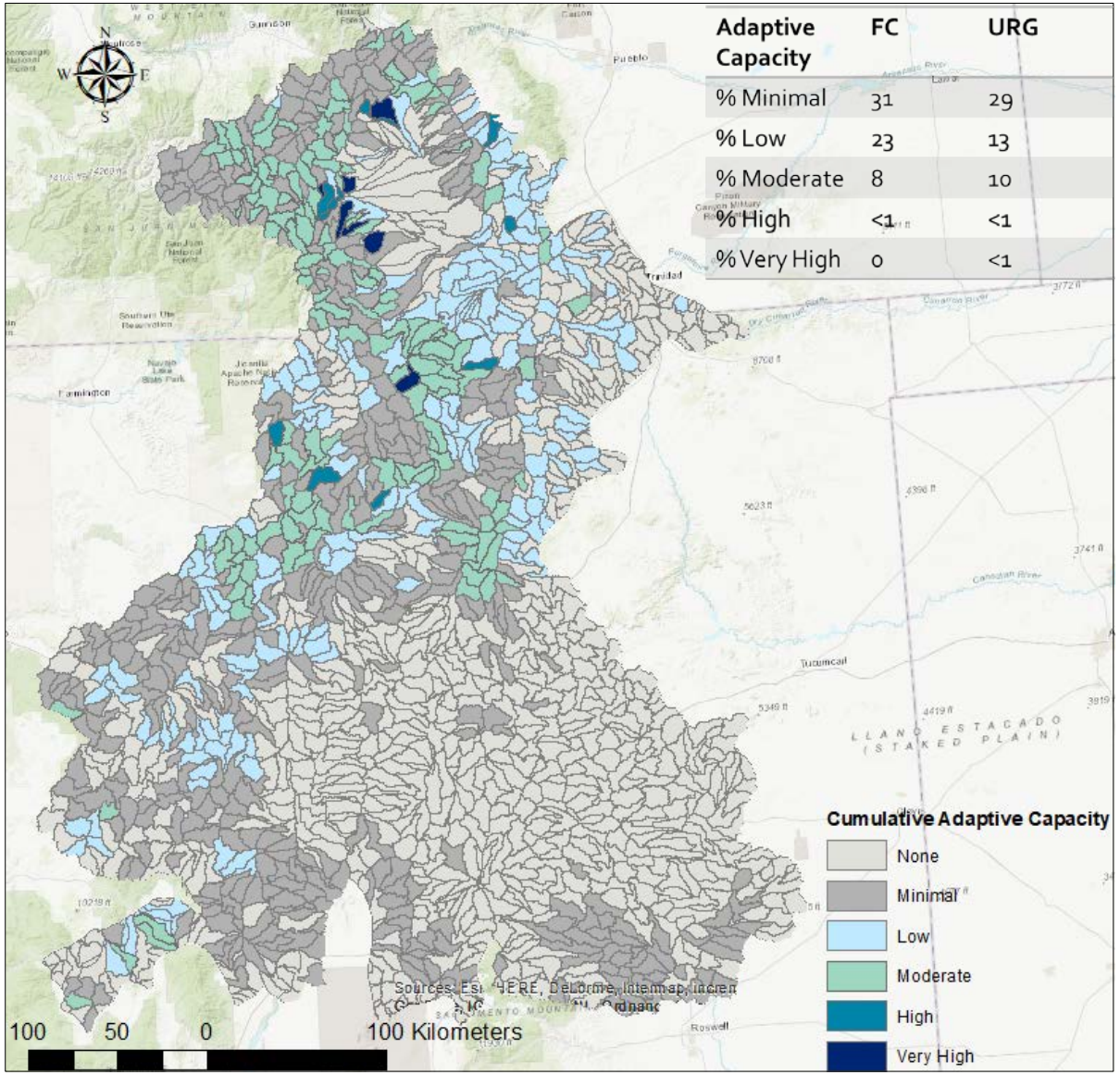
Description	How Used	% FC	% URG
Sagebrush Cover (LANDFIRE EVT)	> 25% = 1	36	17
Core Areas (LANDFIRE EVT)	>25th percentile = 1 (>18%)	21	11
Public Land (USGS PAD 2014)	>50% = 1	29	37
High Soil Resistance	Present = 1	7	13
High Soil Resilience	Present = 1	7	13
(Chambers 2014,2016, Maestas 2016)			

Cumulative Adaptive Capacity: Sagebrush

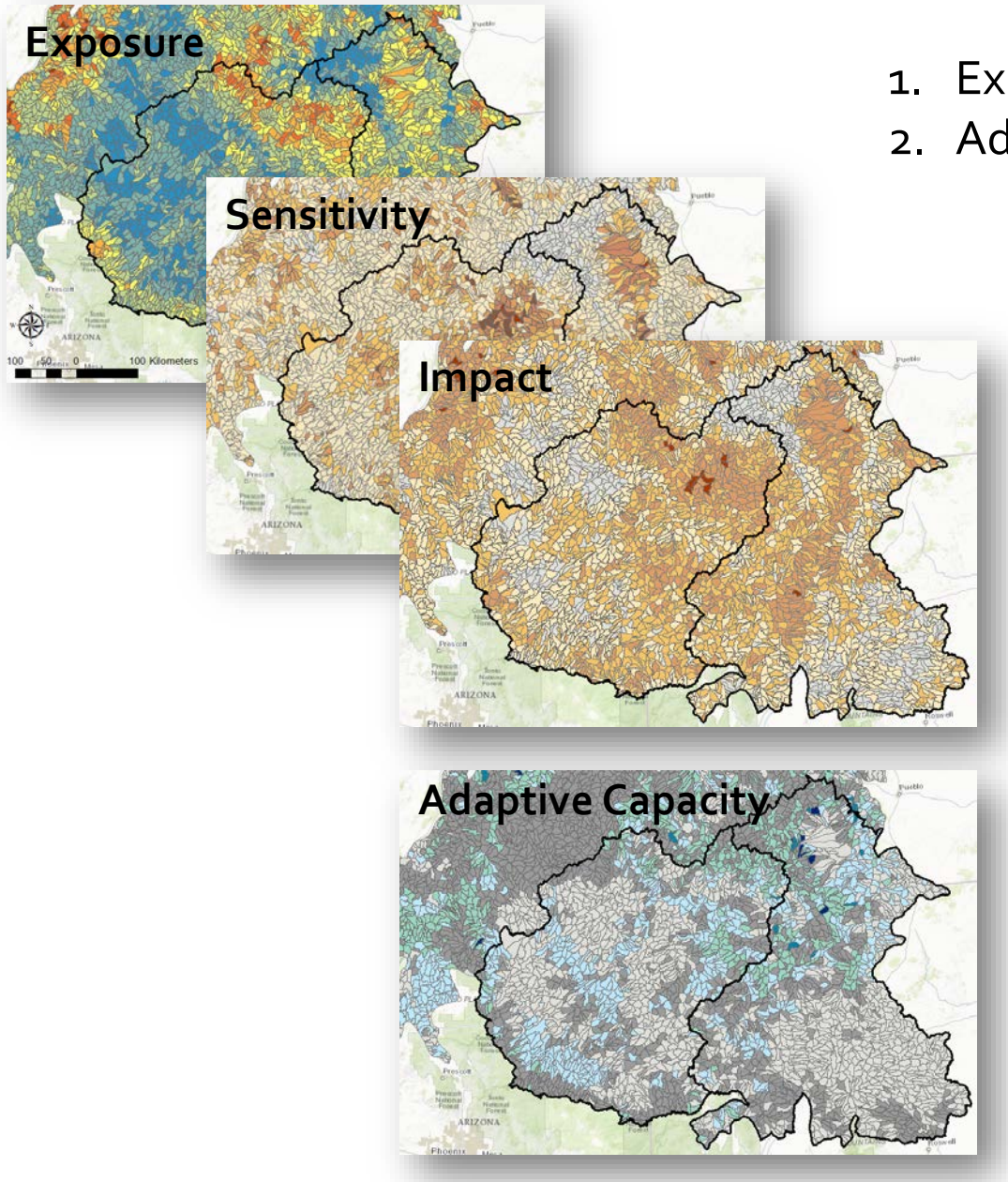
Four Corners



Upper Rio Grande



Calculate Vulnerability

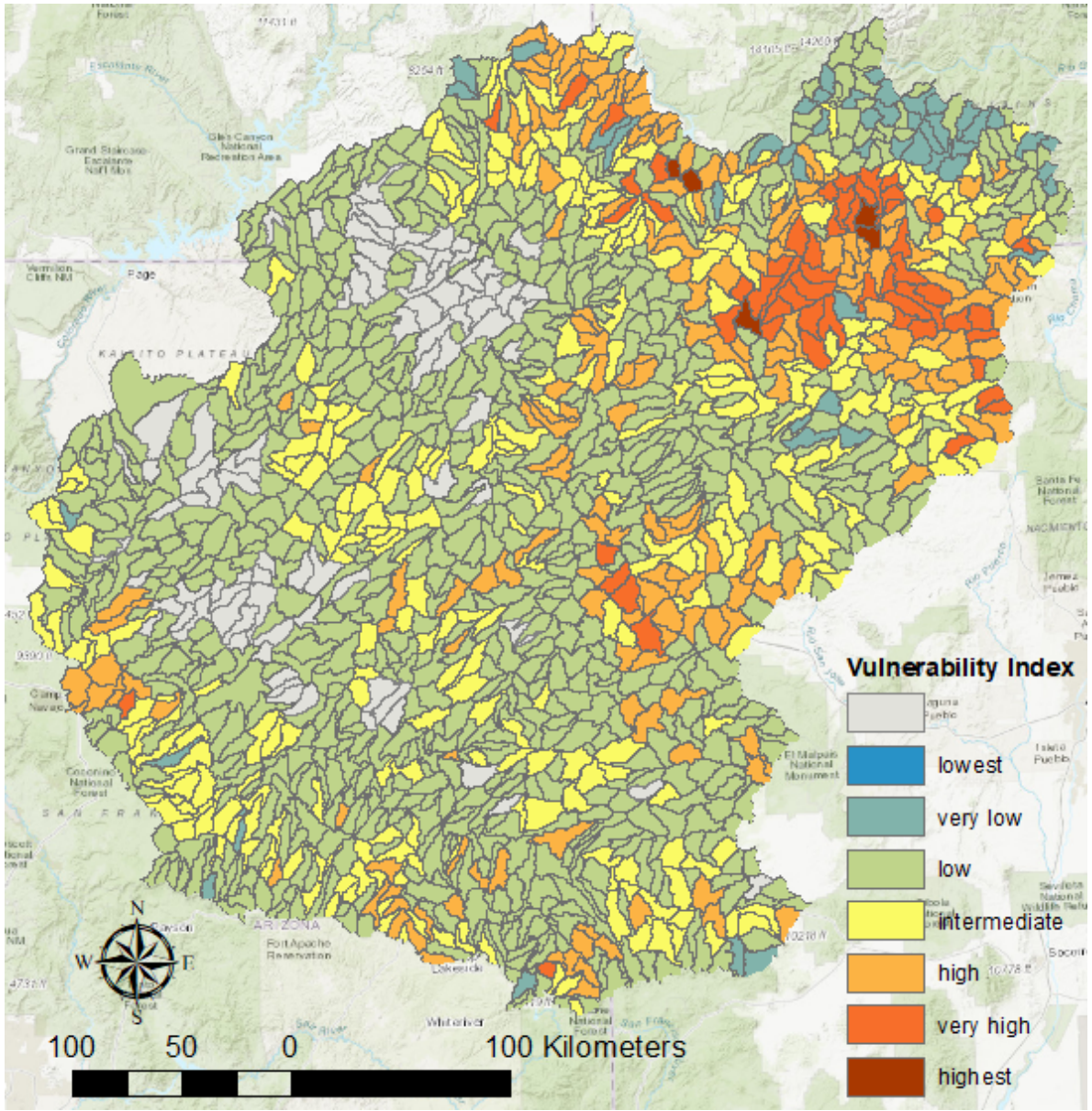


1. Exposure Score + Sensitivity Score = Impact Score
2. Adaptive Capacity Score + Impact Score = **Vulnerability Index**

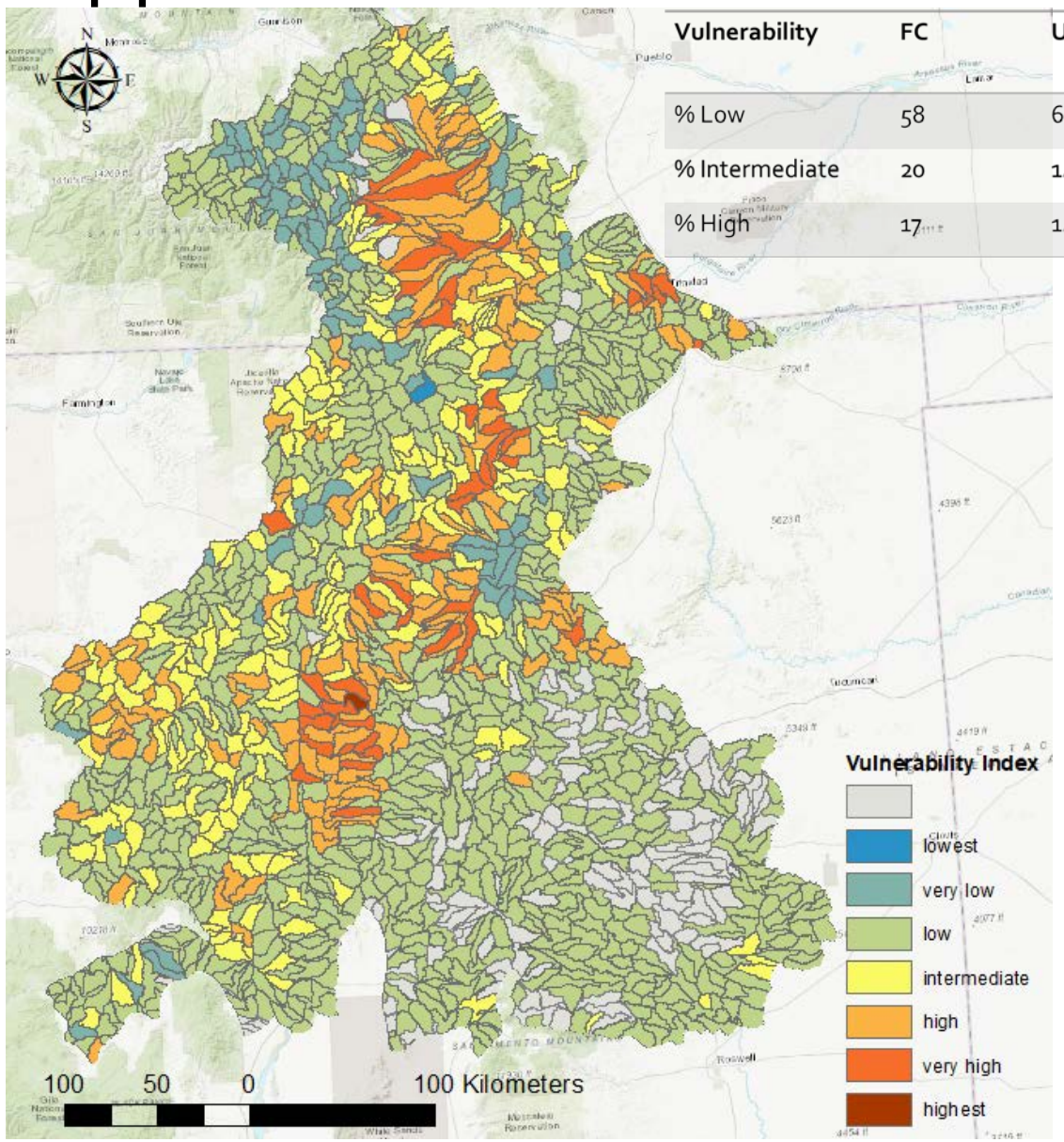
Vulnerability		**Impact (E+S) Value**				
		1	2	3	4	5
Adaptive capacity Value	1	Low	Intermediate	High	Very High	Highest
	2	Low	Intermediate	High	Very High	Very High
	3	Very Low	Low	Intermediate	High	Very High
	4	Very Low	Very Low	Intermediate	High	High
	5	Lowest	Very Low	Intermediate	Intermediate	High

Vulnerability

Four Corners



Upper Rio Grande



Vulnerability	FC	URG
% Low	58	62
% Intermediate	20	14
% High	17	14

Summary: Sagebrush

- Assessment reveals that >50% of subwatersheds have lower vulnerability scores in each focal area
- Subwatersheds with higher vulnerability scores occur in the Farmington area and along the Rio Grande corridor
- Four Corners has slightly more subwatersheds with moderate to high vulnerability scores

Takeaways

Creating Products to:

- Estimate Exposure, Sensitivity, and Adaptive Capacity of Focal Resources
- Assess Vulnerability and Opportunity
- Identify critical areas of interest, importance, or priority

Appropriate Uses:

- Output *cannot* support local scale management decisions or conclusions
- Output *can* distinguish relative vulnerabilities across landscapes and identify or prioritize:
  - Areas for additional, fine scale study
  - High action needs (e.g. critical threats or sensitivities)
  - Common areas of interest

Adaptation Forums

Using assessments to identify management priorities

How do the results of these assessments match with where you are already working and your current priorities?

How do we use this information to move forward to develop collaborative actions and implement LCD?

"This really is an innovative approach, but I'm afraid we can't consider it. It's never been done before."


Thank You!
meganfriggens@fs.fed.us
maryirene75@gmail.com