Integrating Climate Futures into Central New Mexico Transportation Planning

Project Overview

Ben Rasmussen & Chris Cutler

Federal Remediation Technologies Roundtable – Fall Meeting

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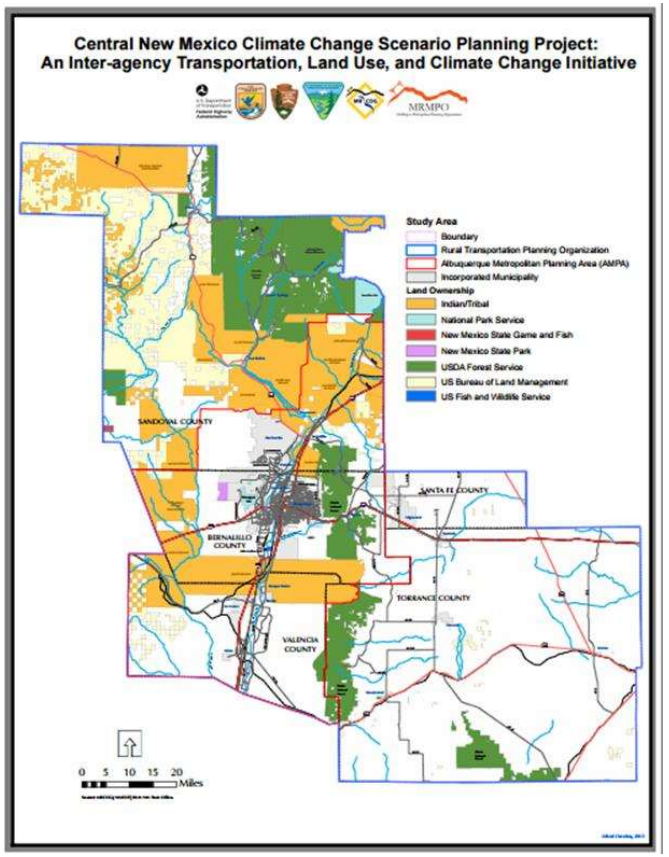
Climate Change Scenario Planning Projects

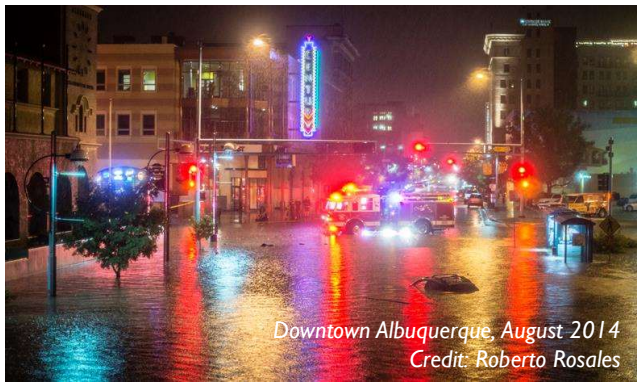
- Purpose
  - Focus: 50% adaptation and 50% mitigation
  - Uses scenario planning as a framework
  - Integrates into long range transportation plans
  - Involves multiple agencies with different priorities; not just transportation
- Two locations
  - Coast: pilot project on Cape Cod, Massachusetts (2010-11)
  - Non-coastal: Central New Mexico (2013-15)



Downtown Albuquerque, August 2014
Credit: Roberto Rosales

CCSP Goals

- Identify:
  - Regional climate change impacts
  - The effect of these impacts on transportation, land use, and natural resources
  - The effect of transportation and land use policy choices on climate change impacts
- Example adaptation strategies:
  - Increased densities in areas at less risk
  - Buffers around high risk areas



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How will these strategies be affected by climate change impacts?

How will these strategies improve or reduce resiliency?

CCSP Partnerships

- Federal funding sponsors

- Supporting federal agencies

- Regional and local agencies / governments

- Private and academic entities

Developing Climate Futures

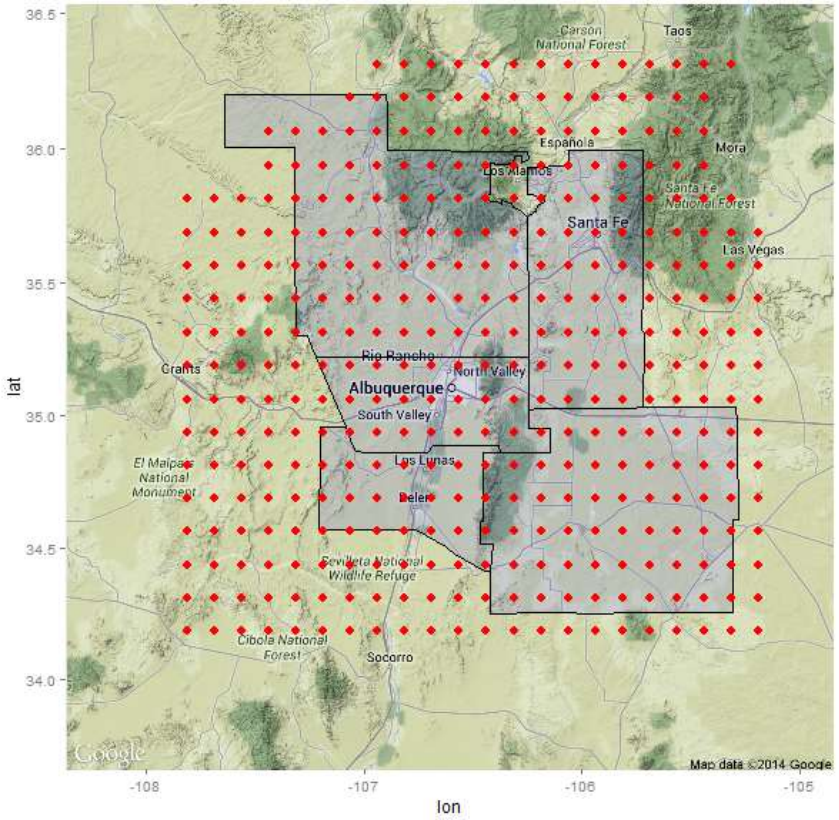
Variables
Precipitation (mm/day)
Maximum daily temperature (°C)
Minimum daily temperature (°C)
Average daily temperature (°C)—*derived by averaging max & min*
Average daily wind speed

Projections Range
1950-2099

- Downscaled (fine spatial resolution translations) of CMIP3 climate projections
- Based on 112 model runs: 9 models, 3 emissions scenarios
- Supplied by Bureau of Reclamation Technical Services Center

Developing Climate Futures

- 369 grid cells with 1/8th degree downscaled CMIP3 climate projections
- Any year up to 2099 can be selected for analysis with desired range/average
  - Analyses used these inputs:
    - Baseline period is 1950-1999
    - Future period is 2025-2055 (± 15 years around 2040)
  - And produced these outputs:
    - Change in Average Monthly Max and Min Temperatures
    - Change in Average Monthly Precipitation
    - Maximum Consecutive and Total Days > 100°F
    - Maximum 24-hour Precipitation
    - Maximum Drought Length (Consecutive Days w/ No Precipitation)



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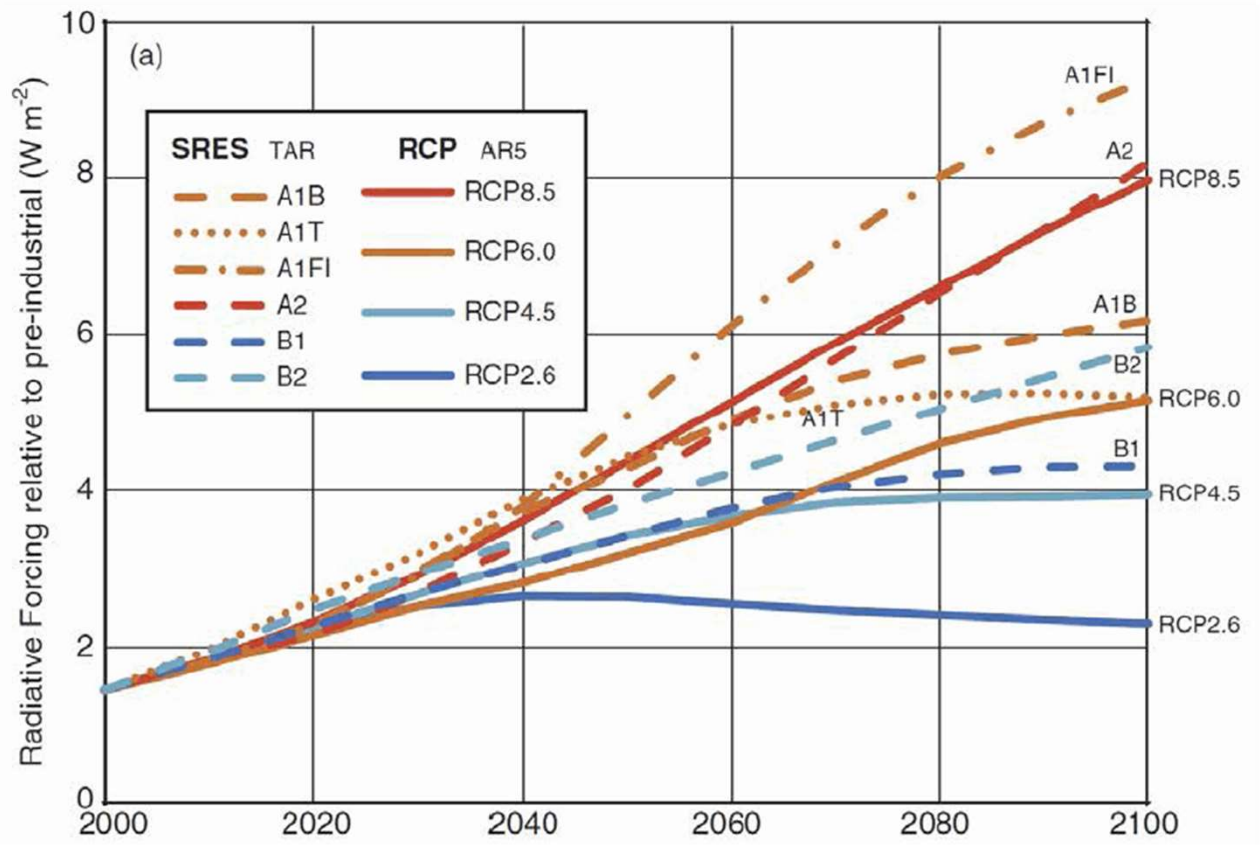
Emission Scenarios

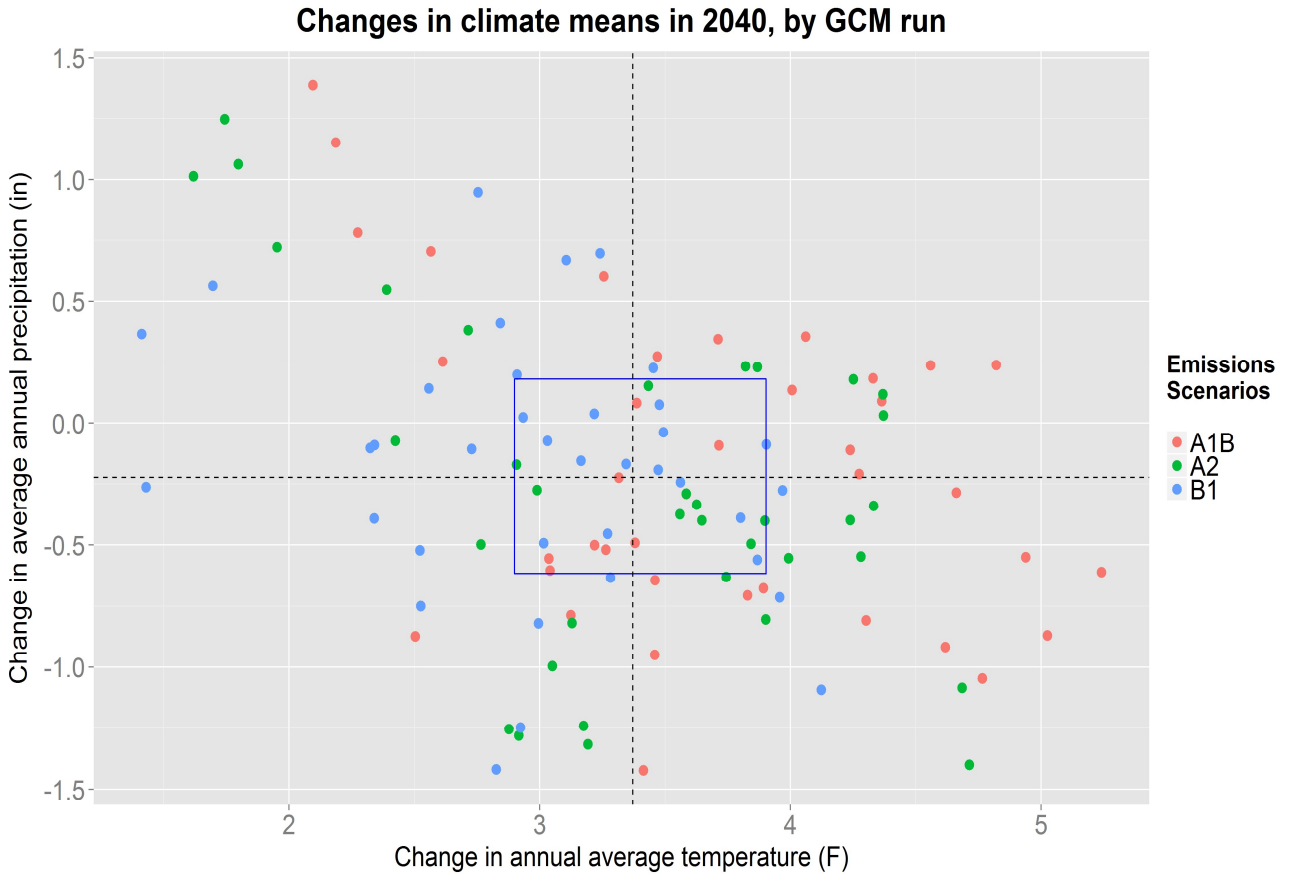


CMIP3
A2: high
A1B: medium
B1: low

Note: A1B and A2 cross in 2060

Developing Climate Futures

- Changes in annual climate averages for all GCMs at selected grid cell in selected year from 20th century baseline (1950-1999)



Developing Climate Futures

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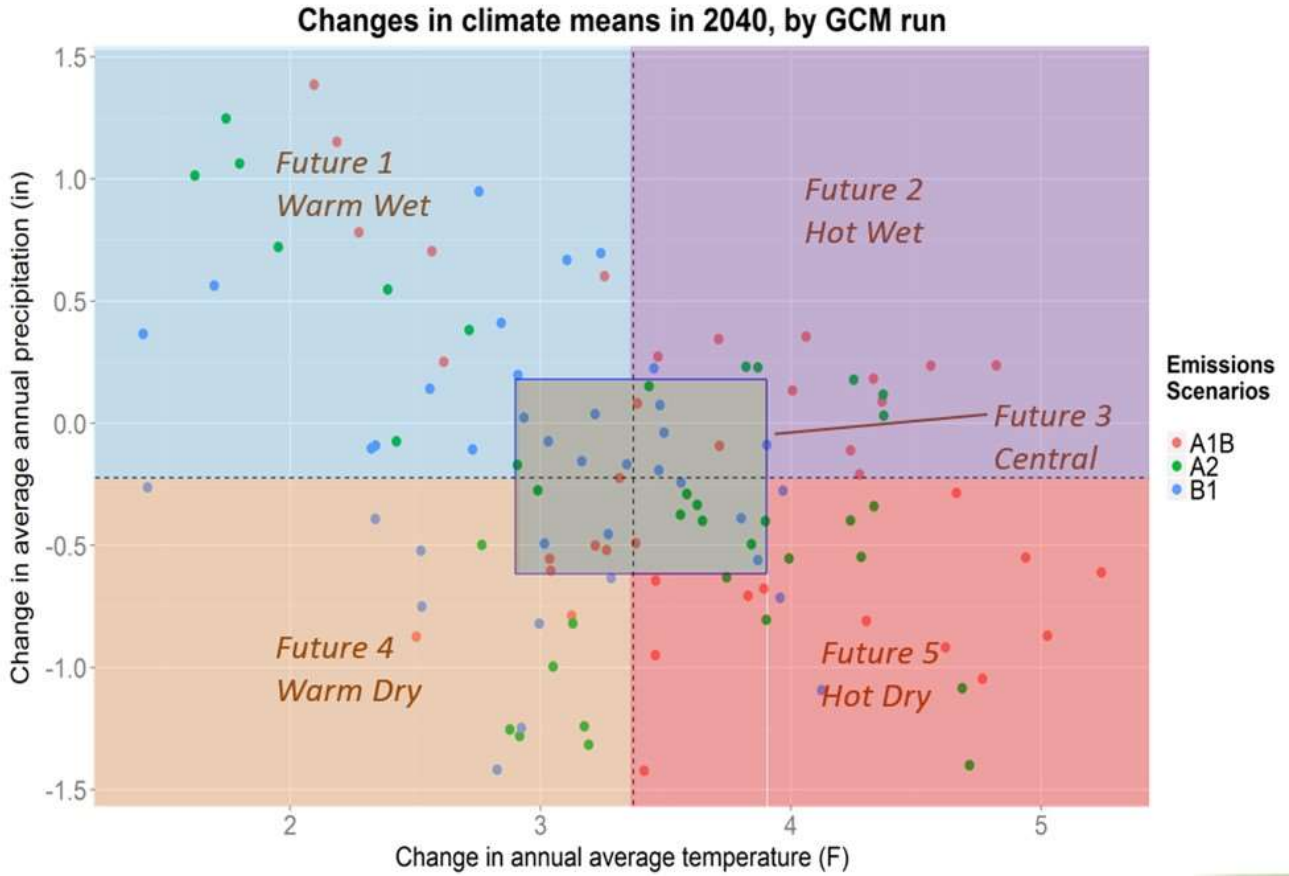


Grid Cells of Interest

Grid Cell #1

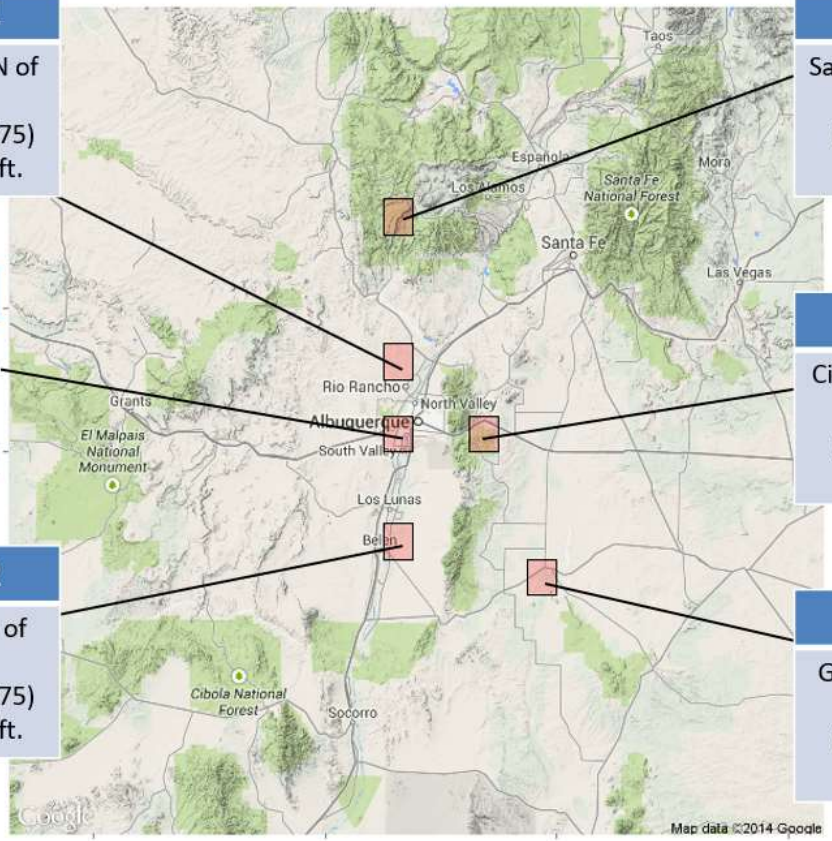
Rio Rancho area, N of Albuquerque
(35.3125, -106.6875)
Elevation: 5,615 ft.

Original Grid Cell

SW quadrant of Albuquerque
(35.0625, -106.6875)
Elevation: 4,940 ft.

Grid Cell #2

Los Lunas area, S of Albuquerque
(34.6875, -106.6875)
Elevation: 5,005 ft.



Grid Cell #5

Santa Fe National Forest, N of Albuquerque
(35.8125, -106.6875)
Elevation: 7,435 ft.

Grid Cell #3

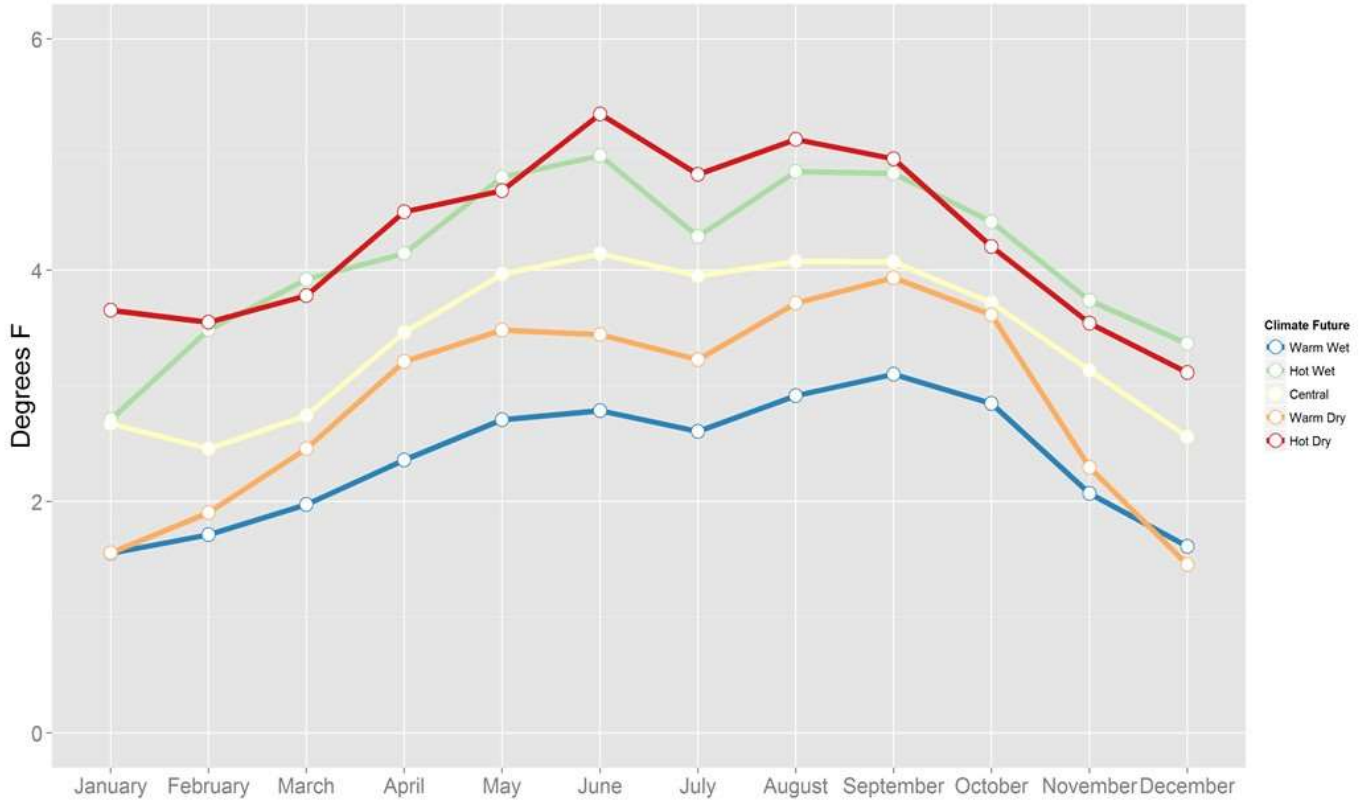
Cibola National Forest, E of Albuquerque
(35.0625, -106.3125)
Elevation: 7,025 ft.

Grid Cell #4

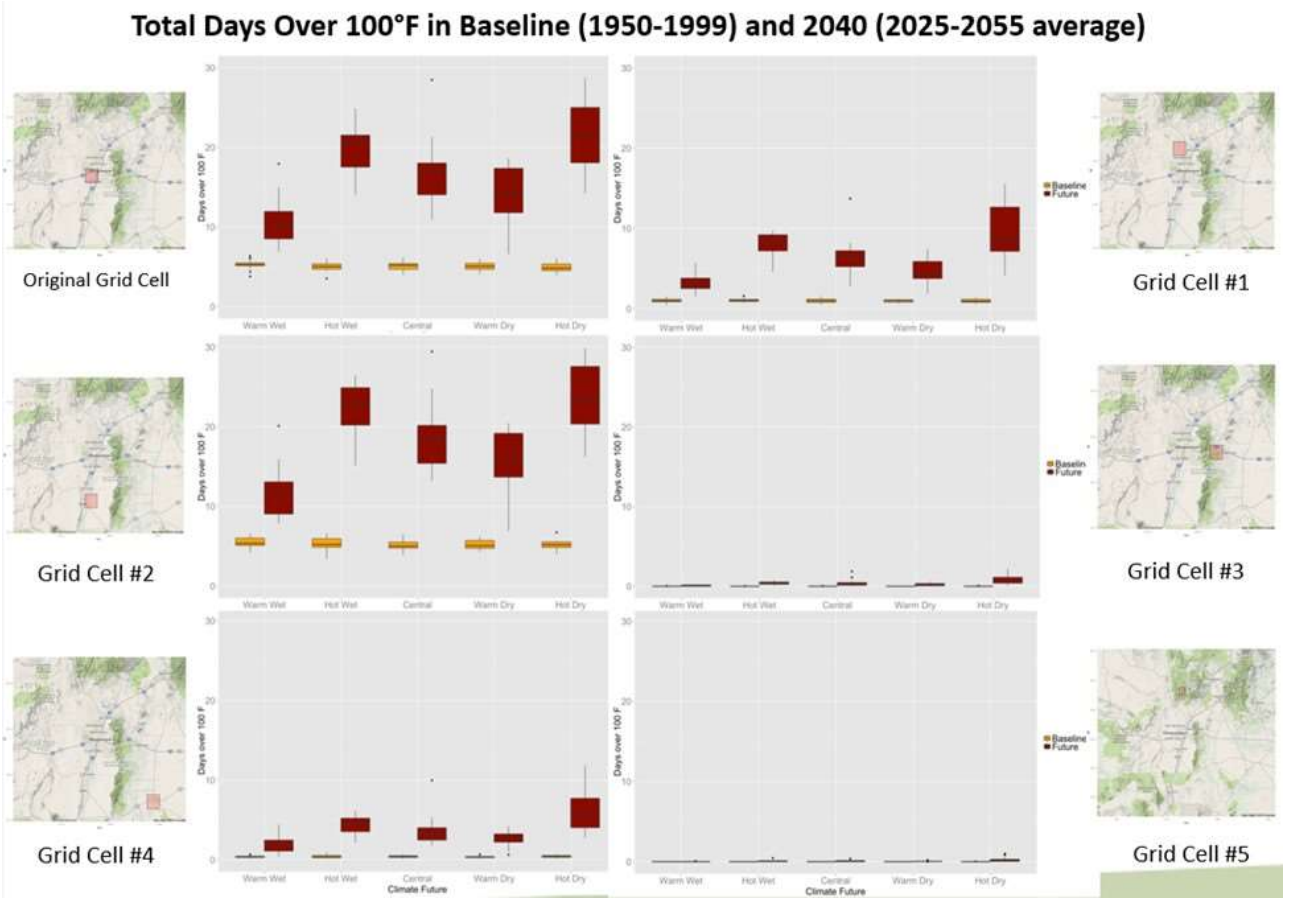
General desert area, SE of Albuquerque
(34.5625, -106.0625)
Elevation: 6,155 ft.

Climate Futures Results

Change in Average Daily Maximum Temperature in 2040 (2025-2055) vs. 1950-1999



Climate Futures Results



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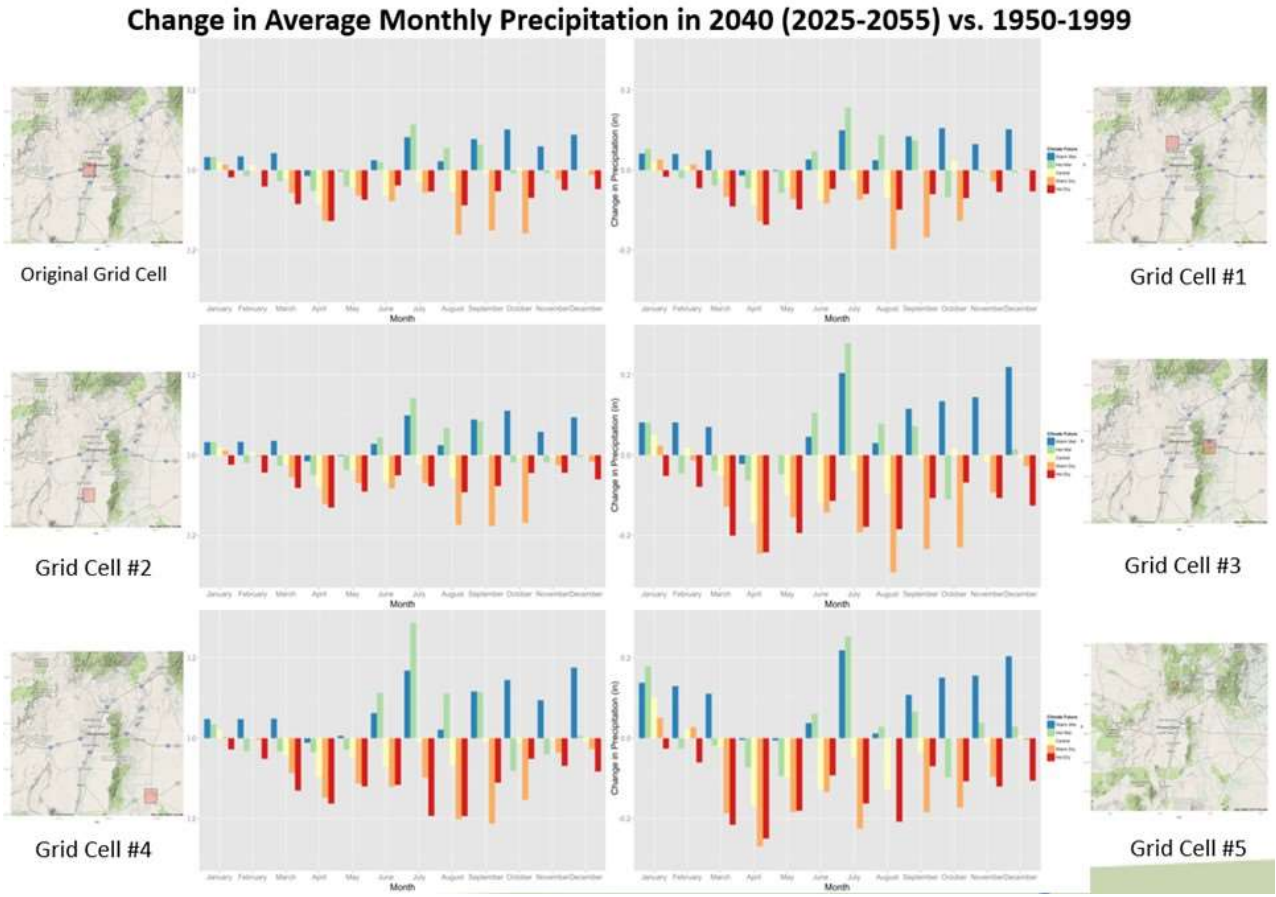
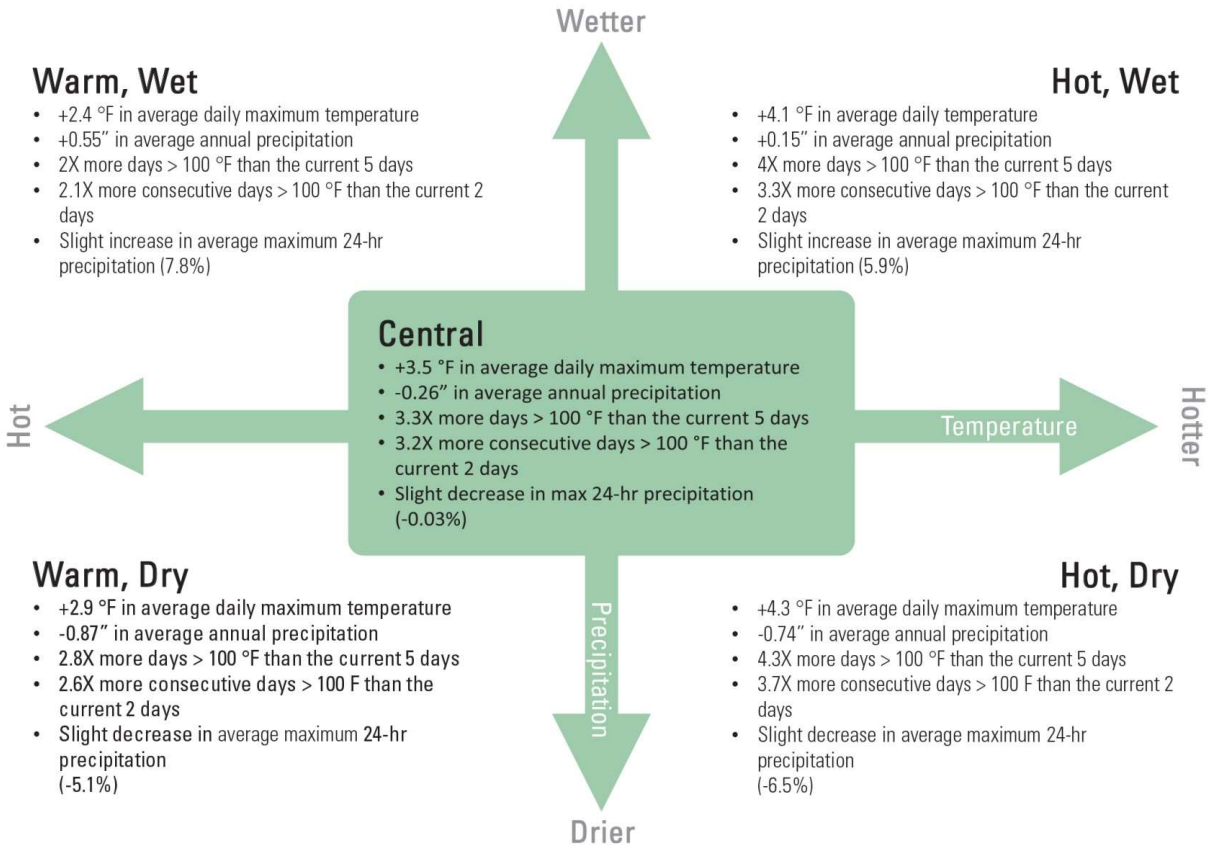


Climate Futures Results



Climate Futures Results

- Informed:
  - Where existing development is at risk
  - Where future development should be minimal
  - Energy: increase in cooling degree days
  - Impacts for natural and cultural resources
    - Riparian habitats
    - T&E species

Downtown Albuquerque, August 2014
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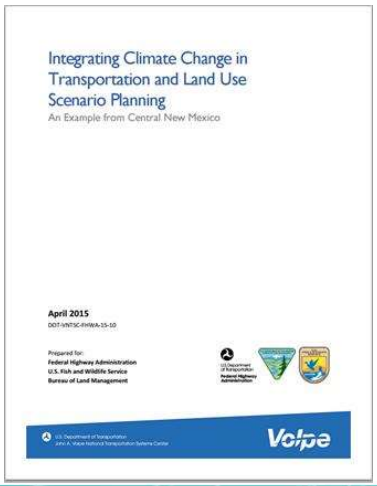
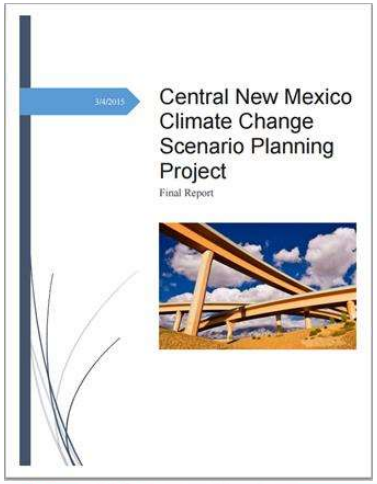
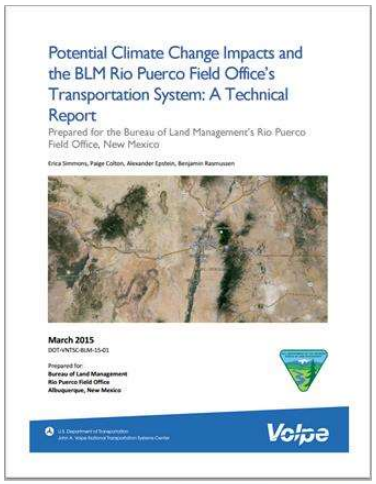
More Information

- Contact:
  - benjamin.rasmussen@dot.gov, 617-494-2768
  - chris.cutler-wood@dot.gov, 617-494-2817
- More information:
  - https://www.volpe.dot.gov/transportation-planning/public-lands/central-new-mexico-climate-change-scenario-planning-project







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