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TAMEST NATURAL HAZARDS SUMMIT

Responding to and Mitigating the Impacts

LUBBOCK, TEXAS
05.16.2022

#NATURALHAZARDSSUMMIT

Panel: Climate Change, Drought, and Economics of Warning

MODERATOR

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Texas Tech University

SPEAKERS

KATHARINE HAYHOE, PH.D.

Paul Whitfield Horn Distinguished Professor
Texas Tech University

KEN RAINWATER, PH.D.

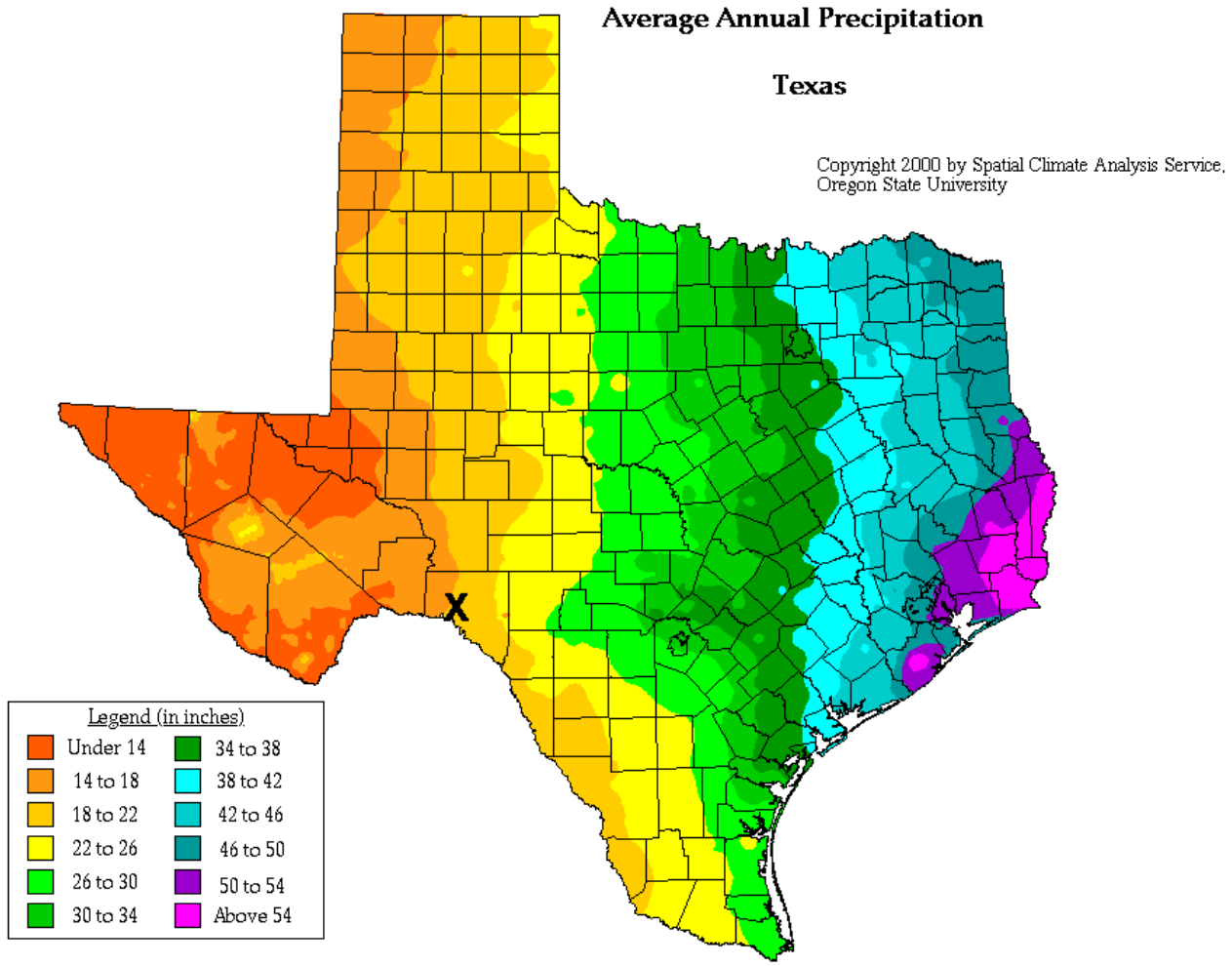
Professor
Texas Tech Univeristy

KEVIN SIMMONS, PH.D.

Professor Emeritus of Economics
Austin College

Challenges for Resilient Drought Responses in West Texas

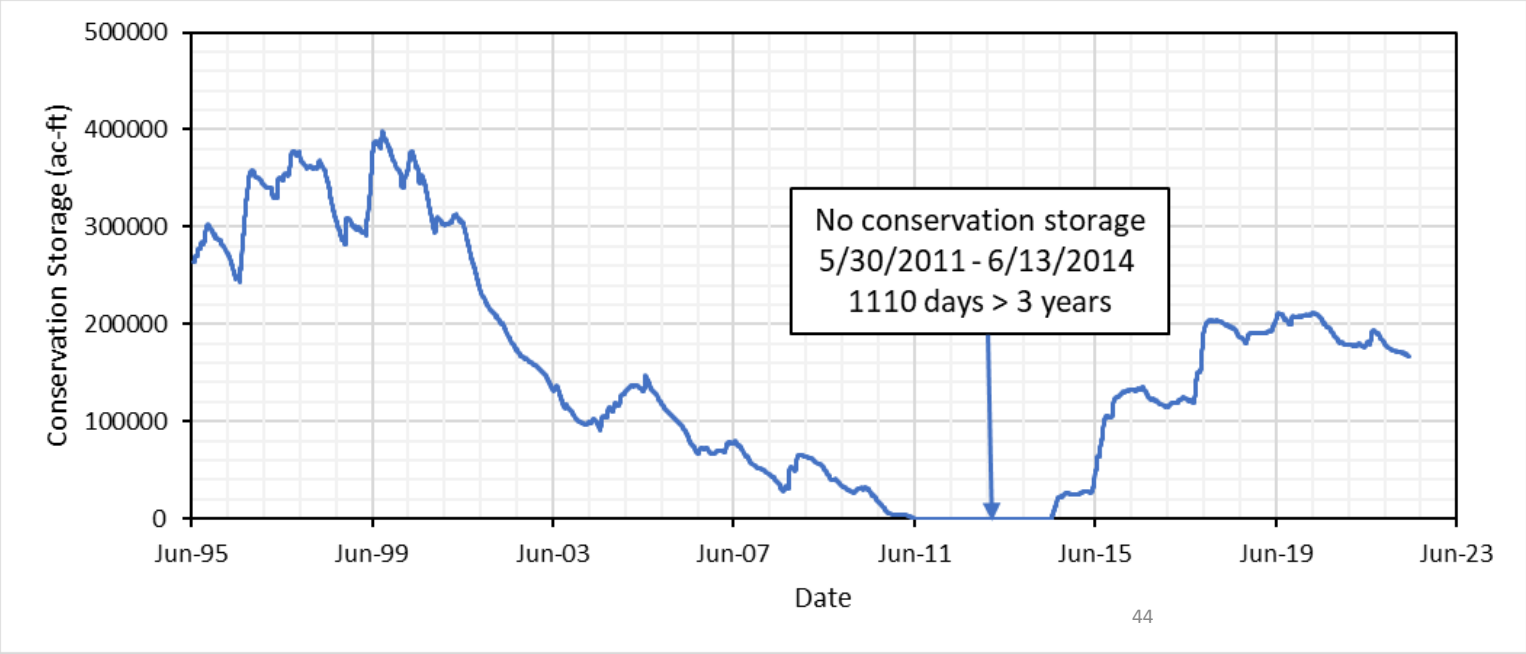
Ken Rainwater, Ph.D., P.E., D.WRE, BCEE, CFM
Texas Tech University

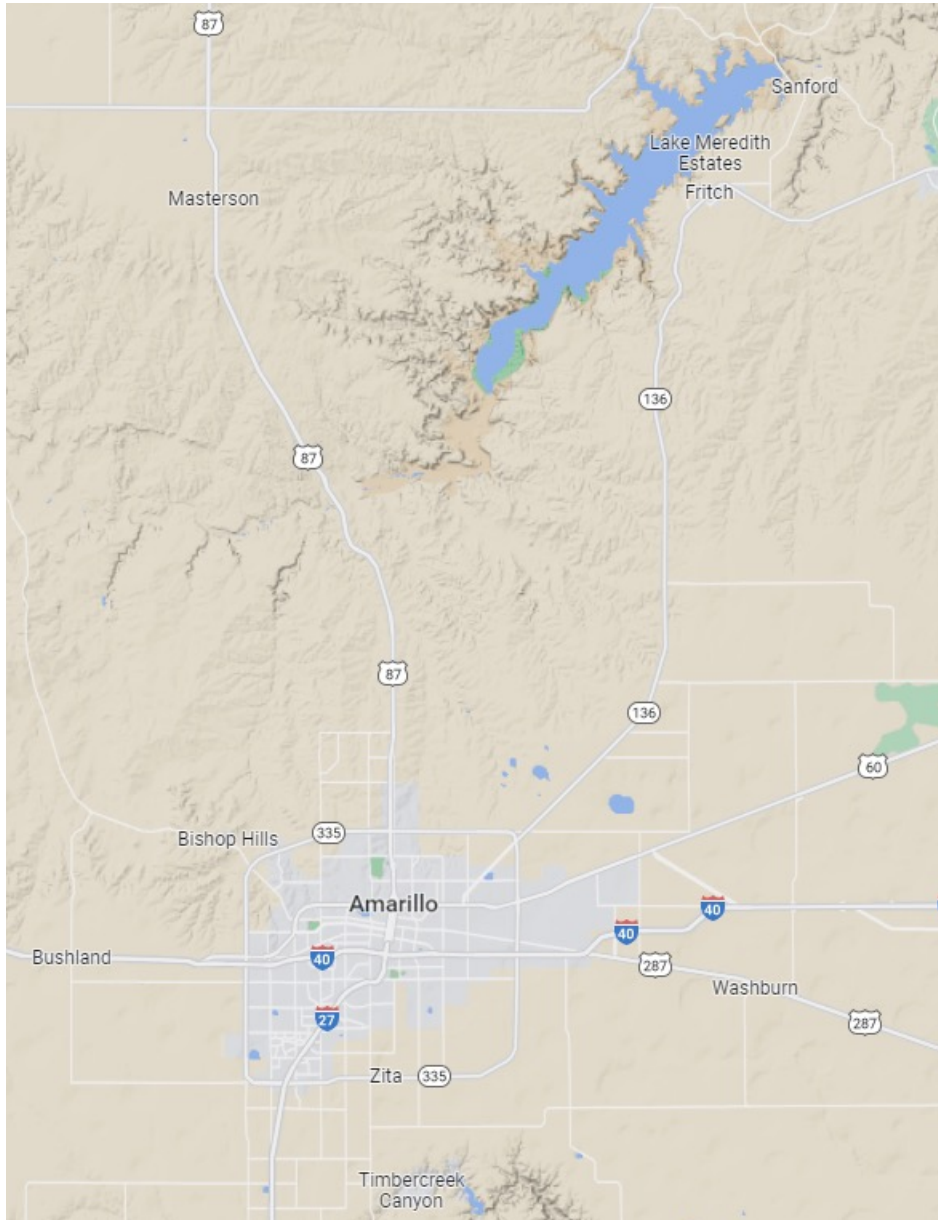


Impacts of Drought of 2011 – 2014

- Only 14.8 inches of rainfall in Texas in 2011, lowest in historical record (La Niña)
- By June 2014, 70% of Texas still in drought, reservoirs down to 67% full
- Multiple wildfires in September 2011
- Spicewood Beach (population 1100) ran out of water from wells
- Farm and ranch losses above $8 billion
- Tree stress, road damage, rising crop prices

Lake Meredith – Supply for Eleven High Plains Cities

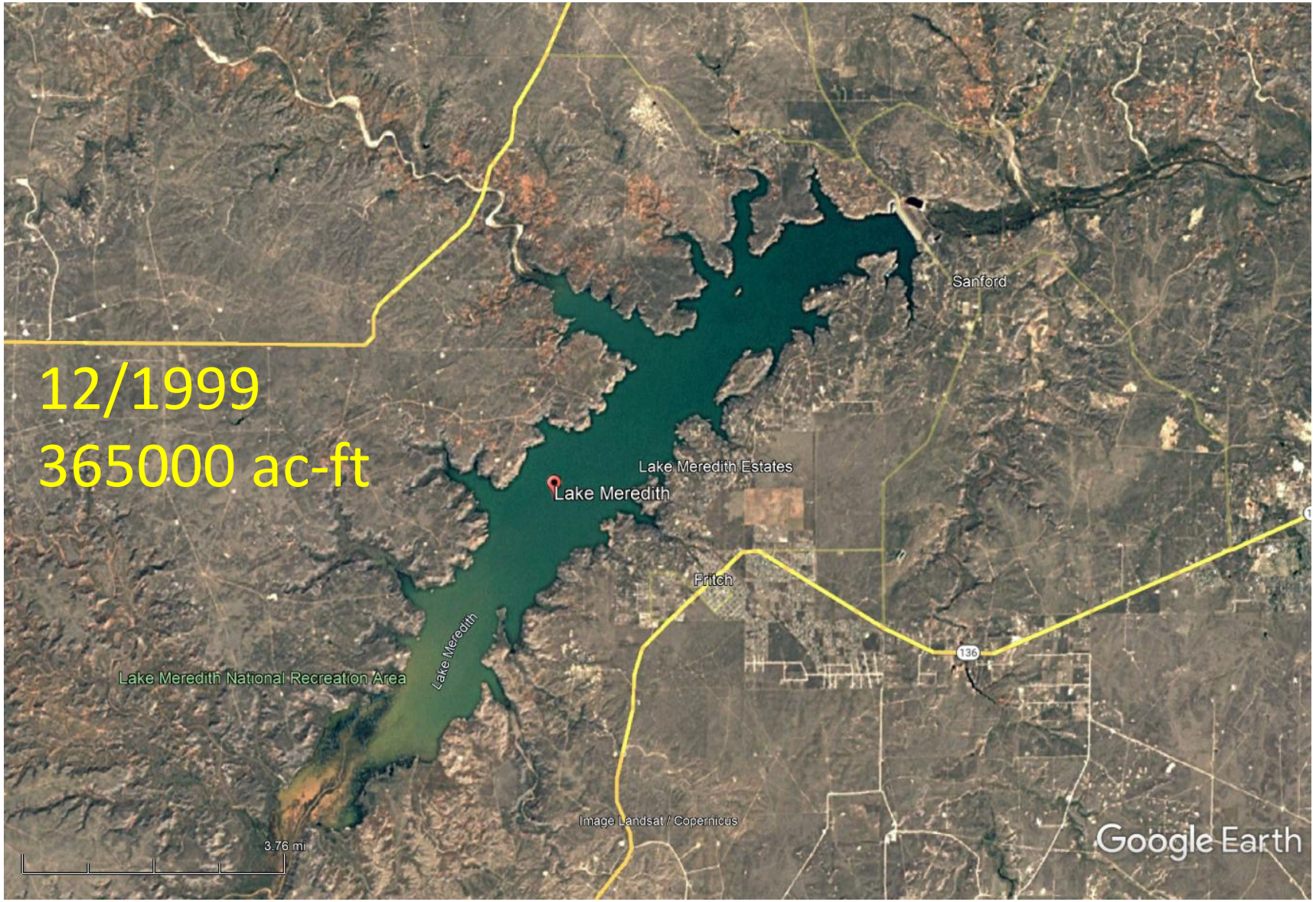




Canadian River Compact

Ute Reservoir – release after 200,000 ac-ft

Lake Meredith – release after 500,000 ac-ft


12/1999
365000 ac-ft
Sanford
Lake Meredith Estates
Lake Meredith
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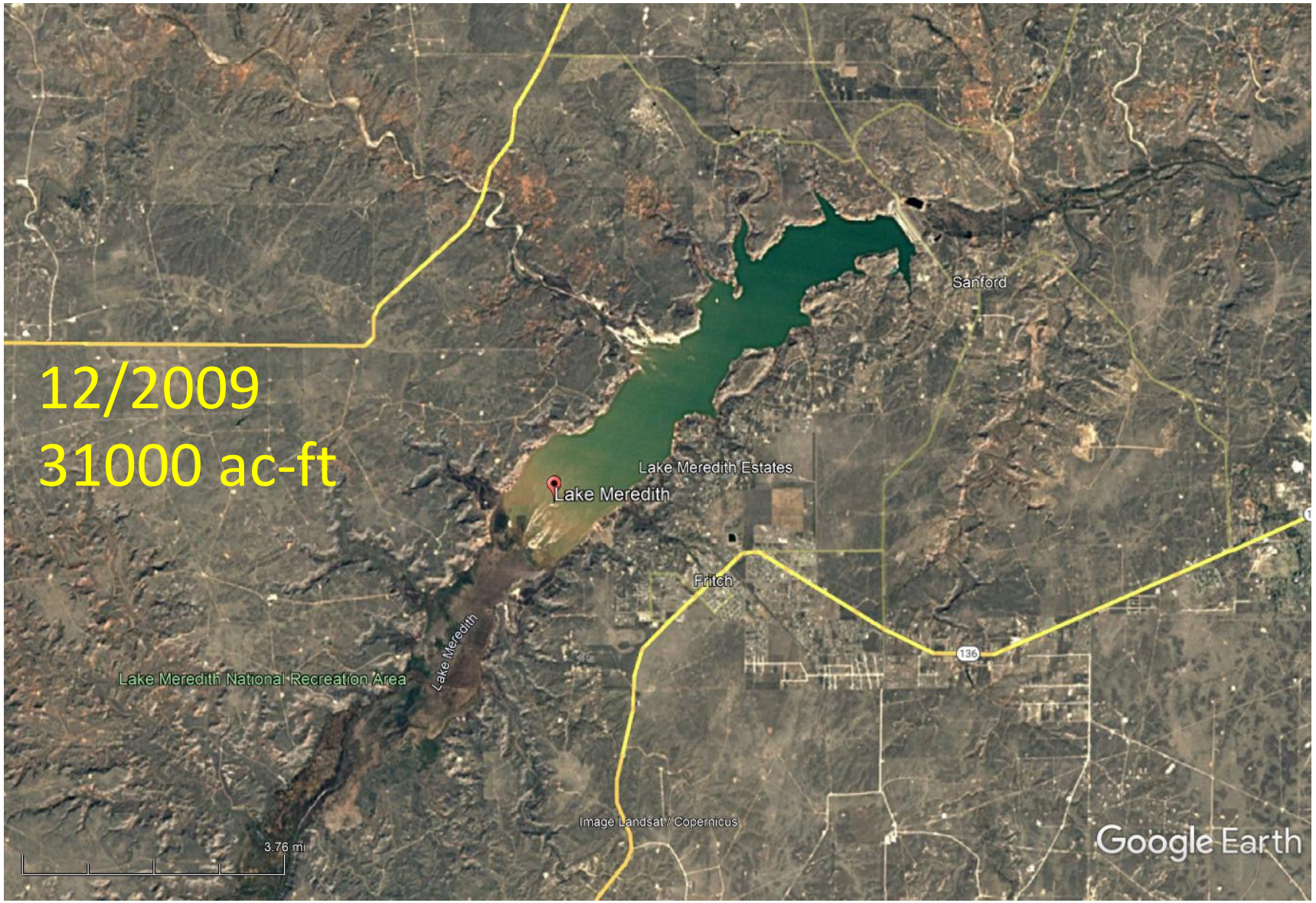
Lake Meredith
Lake Meredith National Recreation Area
Image Landsat / Copernicus
3.76 mi
Google Earth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Lake Meredith National Recreation Area
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Image Landsat / Copernicus
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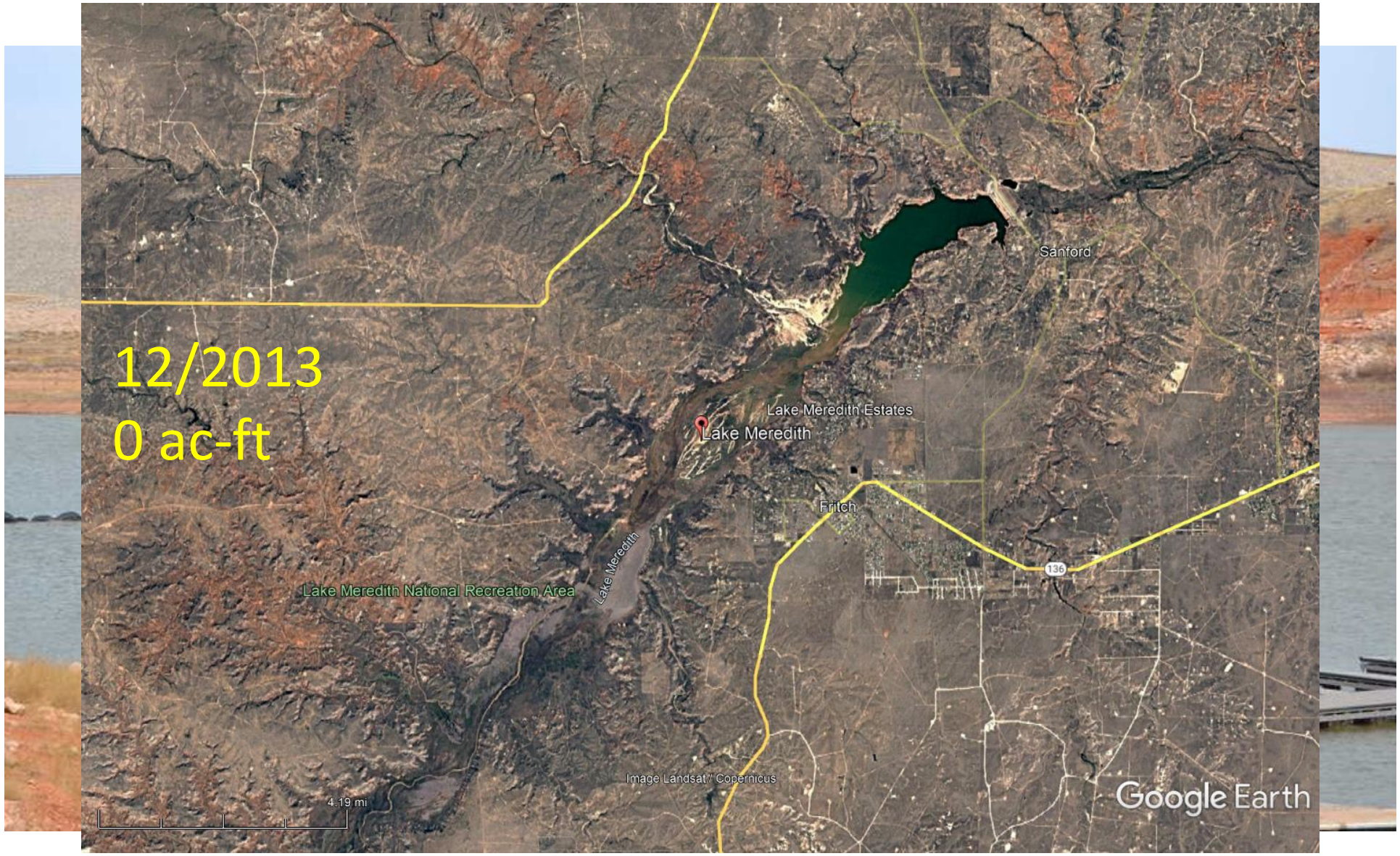
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Sanford
Lake Meredith Estates
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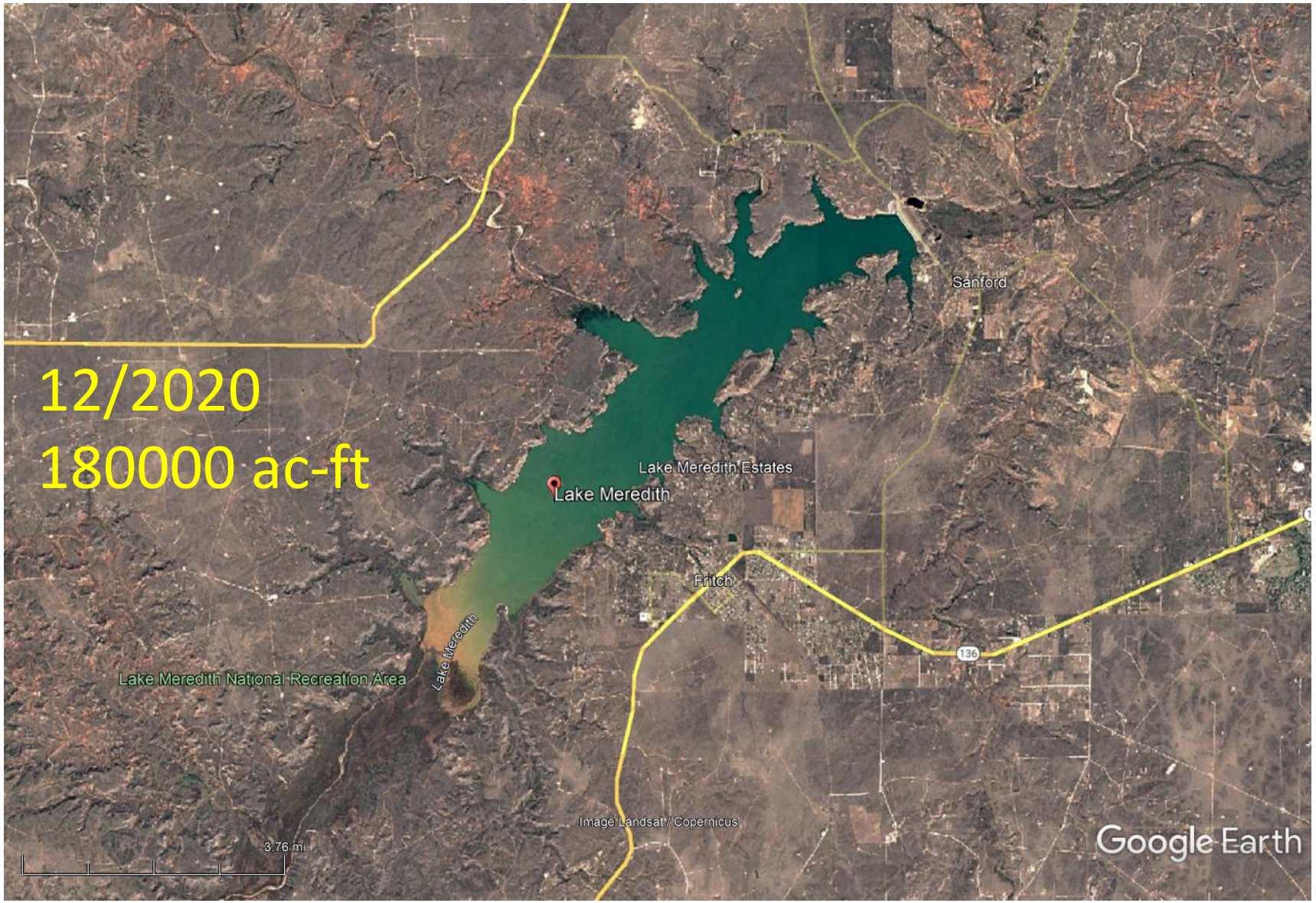
Lake Meredith
Lake Meredith National Recreation Area
Image Landsat / Copernicus
4.19 mi
Google Earth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Lake Meredith Estates
Lake Meredith
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Lake Meredith
Lake Meredith National Recreation Area
Image Landsat / Copernicus
3.76 mi
Google Earth

Drought Planning in Texas

- State Water Plan targets water availability if drought of record happens again
  - Drought of the 1950s used in 1997 initial planning led by Texas Water Development Board
  - Other local drought data may be used if worse than 1950s
  - Compare future projected demands to available supplies for next 50 years
  - Shortages for municipal needs must be countered with water management strategies
  - Strategies for non-municipal needs normally identified for all but irrigation demands
  - Concentrates on water user groups (WUGs) that use more than 100 ac-ft/yr
  - Emergency interconnections

Drought Planning in Texas

- Five 5-yr planning cycles have been completed
- Texas Legislature appropriated State Water Implementation Fund for Texas (SWIFT)
- 16 regional planning groups identify projects for present and future funding
- Political subdivision must apply for and manage funds (mostly loans, some grants)
- Some rural water providers/consumers are reluctant to assume debt

Drought Planning in Texas

- Lubbock Water Utilities – example of short-term and long-term accomplishments (Aubrey Spear, Director)
  - 265,000 people in semi-arid location with average annual rainfall of 19 in
  - 100-year strategic water supply plan published in 2013
    - Roadmap for cost-effective and sustainable water supplies over the next 100 years
    - Diversifies City's water supply portfolio to minimize risk with variable climate conditions
      - Canadian River Municipal Water Authority (Lake Meredith and Roberts County well field)
      - City's Bailey County well field
      - City's Lake Alan Henry
      - Aquifer storage and recovery
      - Future recycling of treated wastewater effluents

Drought Planning in Texas

- Lubbock Water Utilities – example of short-term and long-term accomplishment
  - Conservation strategies keep potable water demand level even as population increases
    - Continuous Stage 1 home lawn irrigation restrictions
    - Low flow appliances
    - Leak repairs and metering updates
    - Allows delay of future infrastructure capacity updates
- All municipalities must consider capacity and redundancy

Drought Planning in Texas

- Water Needs for Agricultural Producers and Ranchers
  - Irrigation demands > 95% of groundwater use in High Plains
  - Over 50% of cultivation is rainfed/dryland
  - Irrigation part of producer's risk management
  - Groundwater belongs to landowners, consumption may be limited by local groundwater conservation districts
  - Conservation practices in cultivation practices and irrigation equipment are encouraged by districts
  - Few political subdivisions willing to access SWIFT funds for agriculture

Drought Planning in Texas

- Other Industrial Demands
  - Local needs for power plants, oil & gas exploration, and other industries
  - Varying demand needs and schedules
  - Economics leads to conservation eventually
- Lessons from Drought Considerations
  - Long-term planning necessary
  - New water supply opportunities are limited
  - Conservation is most cost-effective option