

TOTAL WATER PREDICTION

Driving Decisions for a Water-prepared Nation

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WATER EXTREMES



WATER SECURITY



Interrelated Grand Challenges



Lake Texoma, July 2007



St. Angelo, Texas August 2011



Lake Texoma, March 2014



San Marcos, Texas May 2015

Lake Oroville, CA



July 20, 2011

Folsom Lake, CA



46% Capacity

January 16, 2014



32% Capacity

Mississippi River Above Memphis, TN

May, 10, 2011



November 28, 2012



Stakeholder Priorities



Flooding



**Water
Quality**



**Water
Availability**



Drought



**Climate
Change**

Need integrated understanding of near- and long-term outlook and risks

Actionable Water Intelligence

Key Elements of TWP

- **New and improved water prediction services**
 - Connect risk and vulnerability analyses and total water predictions to communicate street level community impacts
 - Establish initial TWP operations at the National Water Center
- **New service delivery model for coastal and inland communities**
 - Provide enhanced services and products to local decision makers
 - Engage technical experts from multiple disciplines to provide integrated information and services needed by a spectrum of stakeholders
- **Model integration**
 - Link the current state-of-the science system of models and data together to form robust TWP capability
 - Begin development of the next generation integrated Earth System model for TWP

National Water Center

Initial Operating Capacity: May 26, 2015

A catalyst to transform NOAA's water prediction program



VISION: Scientific excellence and innovation driving water prediction to support decisions for a water resilient nation.

BENEFITS:

- State-of-the-science water modeling with fully integrated water resources program
- Operations Center to establish common operating picture within NOAA and among water agencies; decision support for floods to drought
- Proving ground to accelerate research to operations
- Data integration and service backup

NATIONAL WATER CENTER OPERATIONS CENTER



“Street Level” Water Prediction and Impact-Based Decision Support

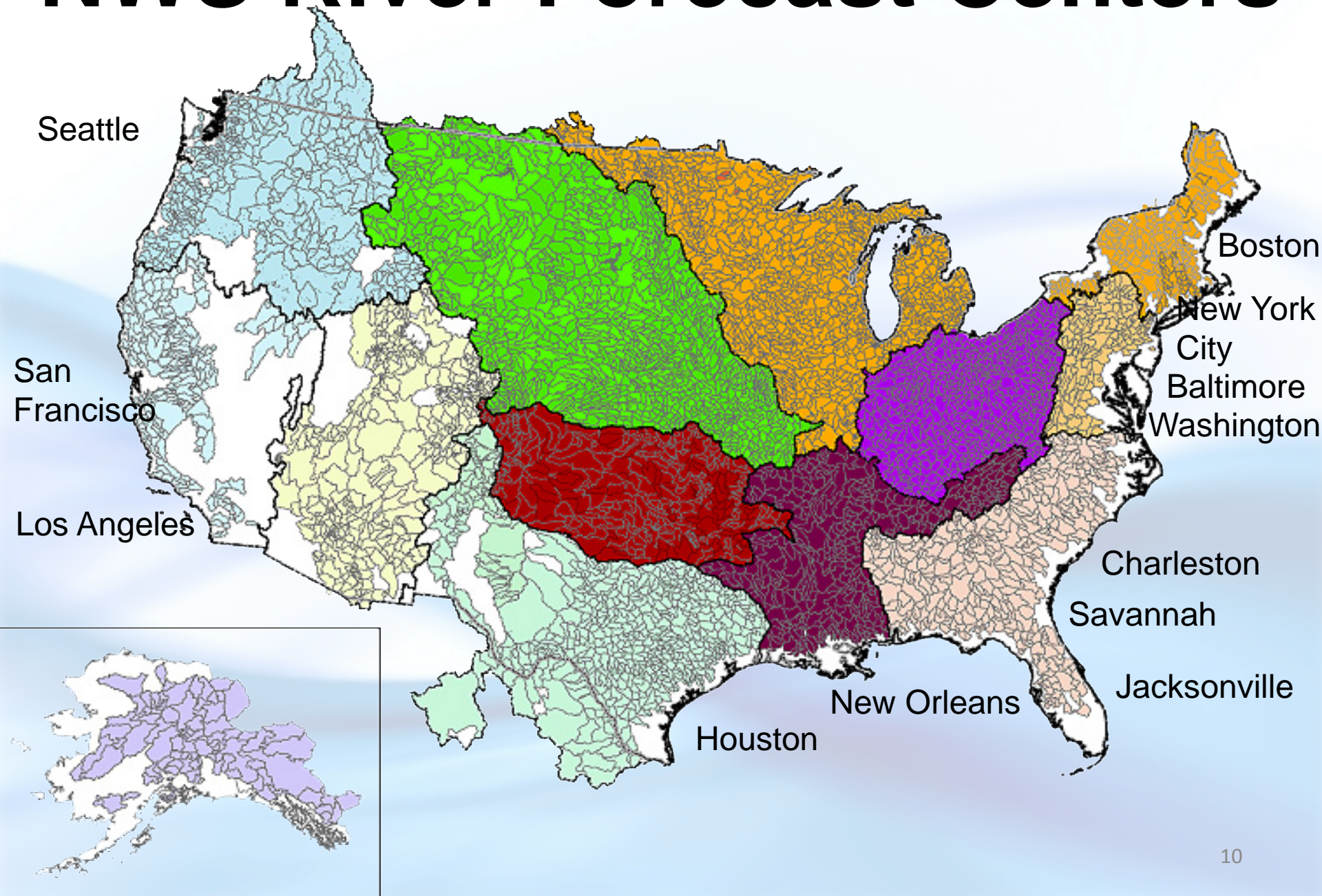
WATER PREDICTION

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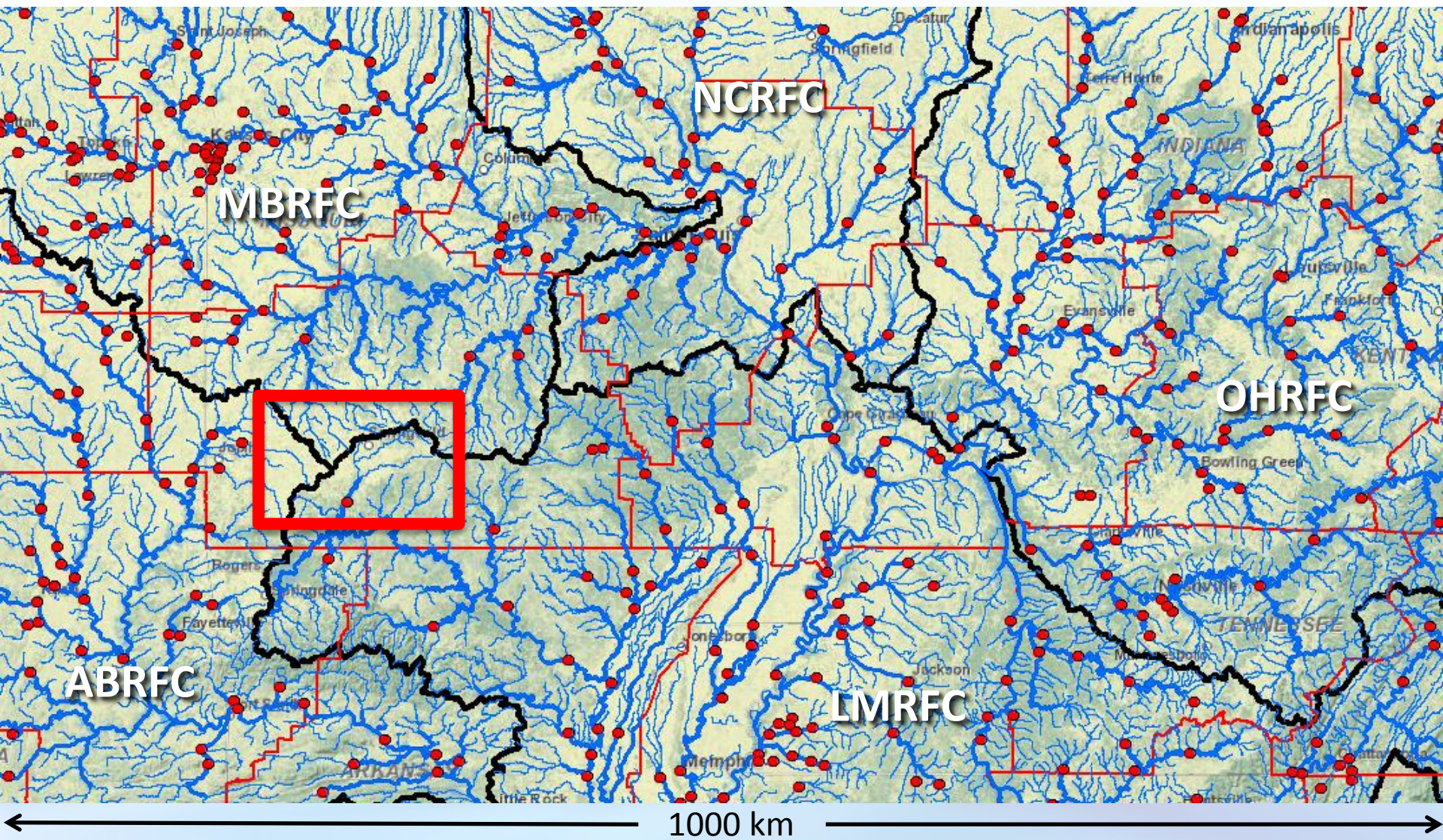
GEO-INTELLIGENCE



NWS River Forecast Centers

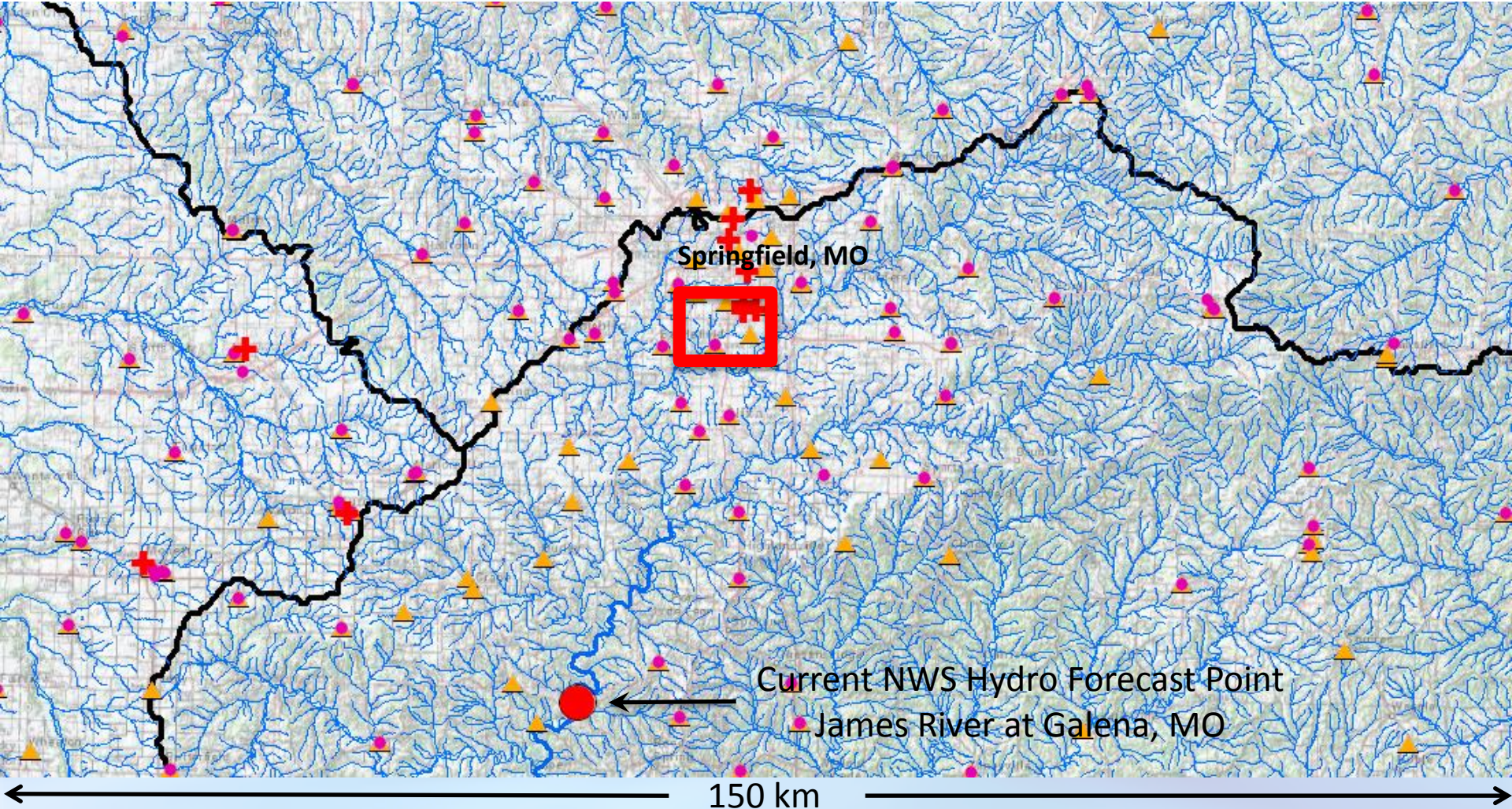


Major Rivers and NWS Hydrologic Forecast Points (Today)

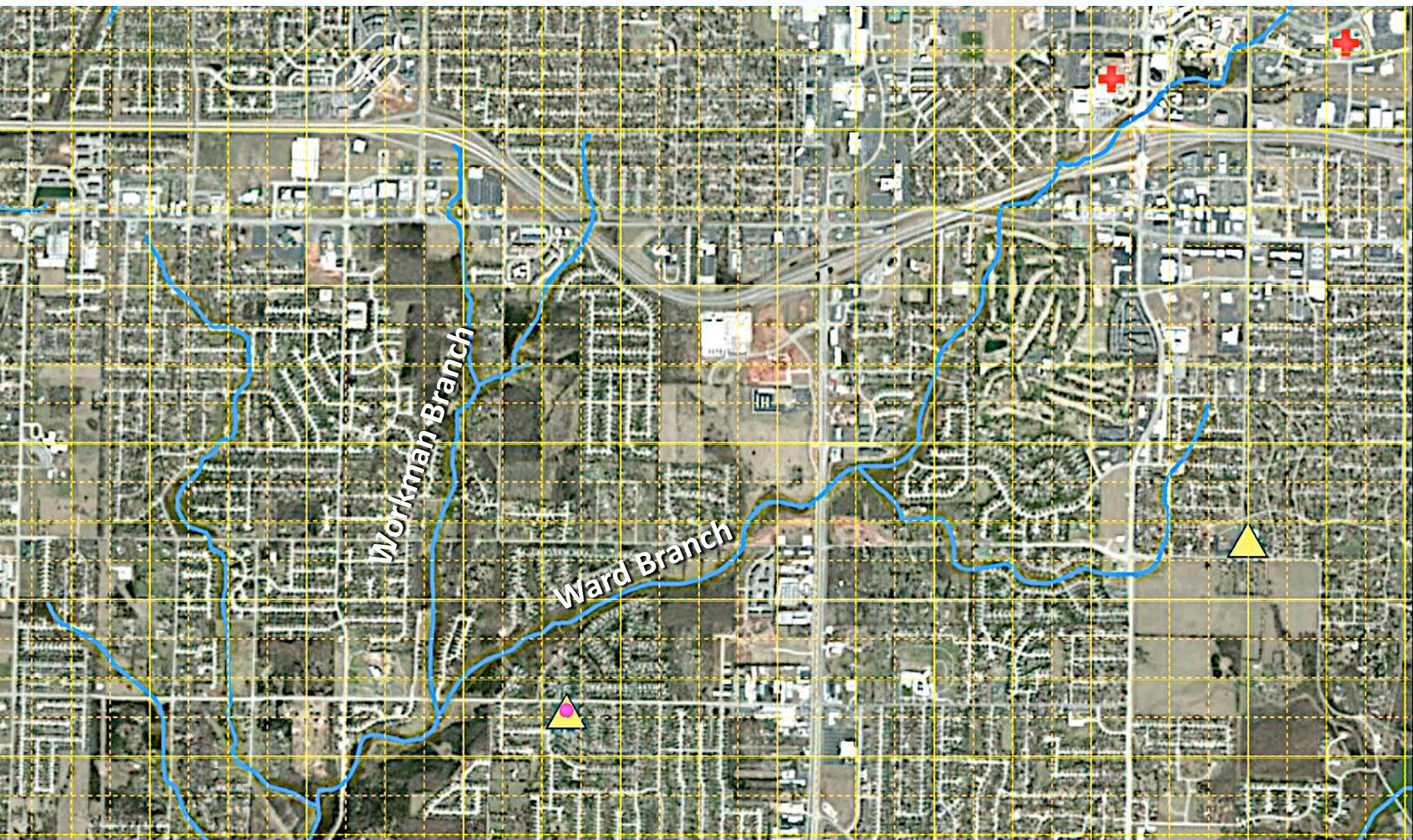


Hospitals, EMS & Fire Stations

Full Resolution National Hydrography Dataset NHD+



Hospitals, EMS & Fire Stations



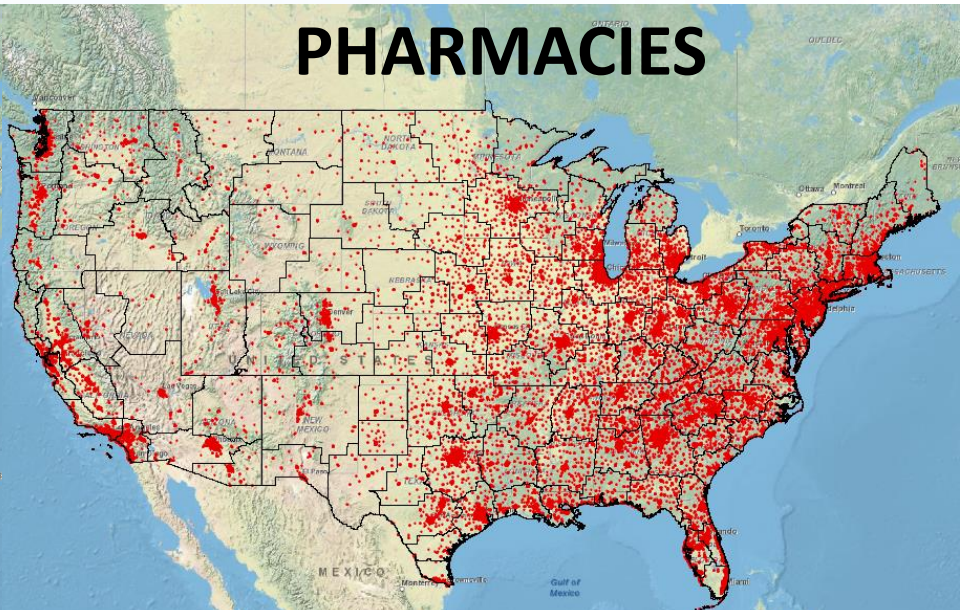
NATIONAL INFRASTRUCTURE

Emergency Services

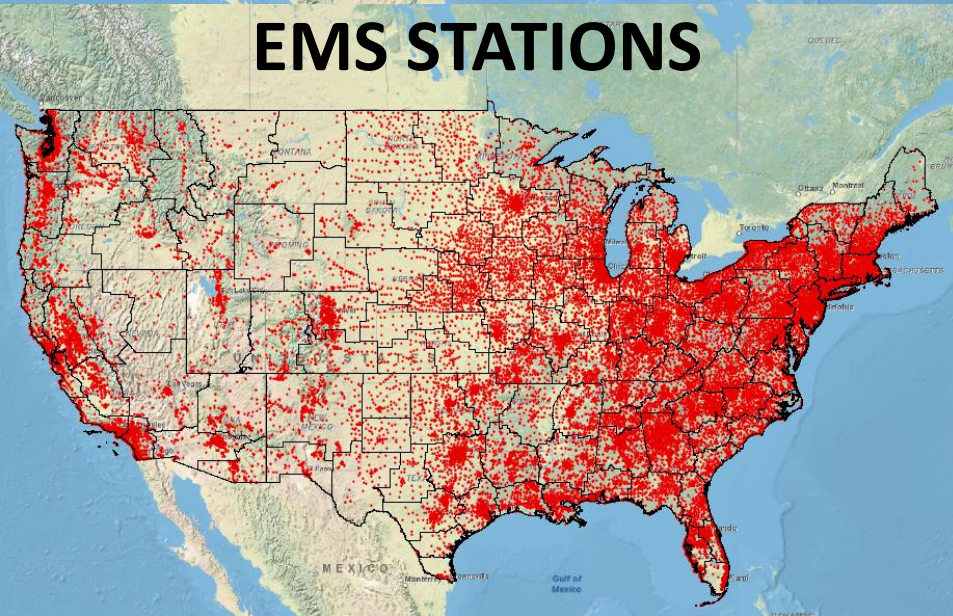
HOSPITALS



PHARMACIES



EMS STATIONS

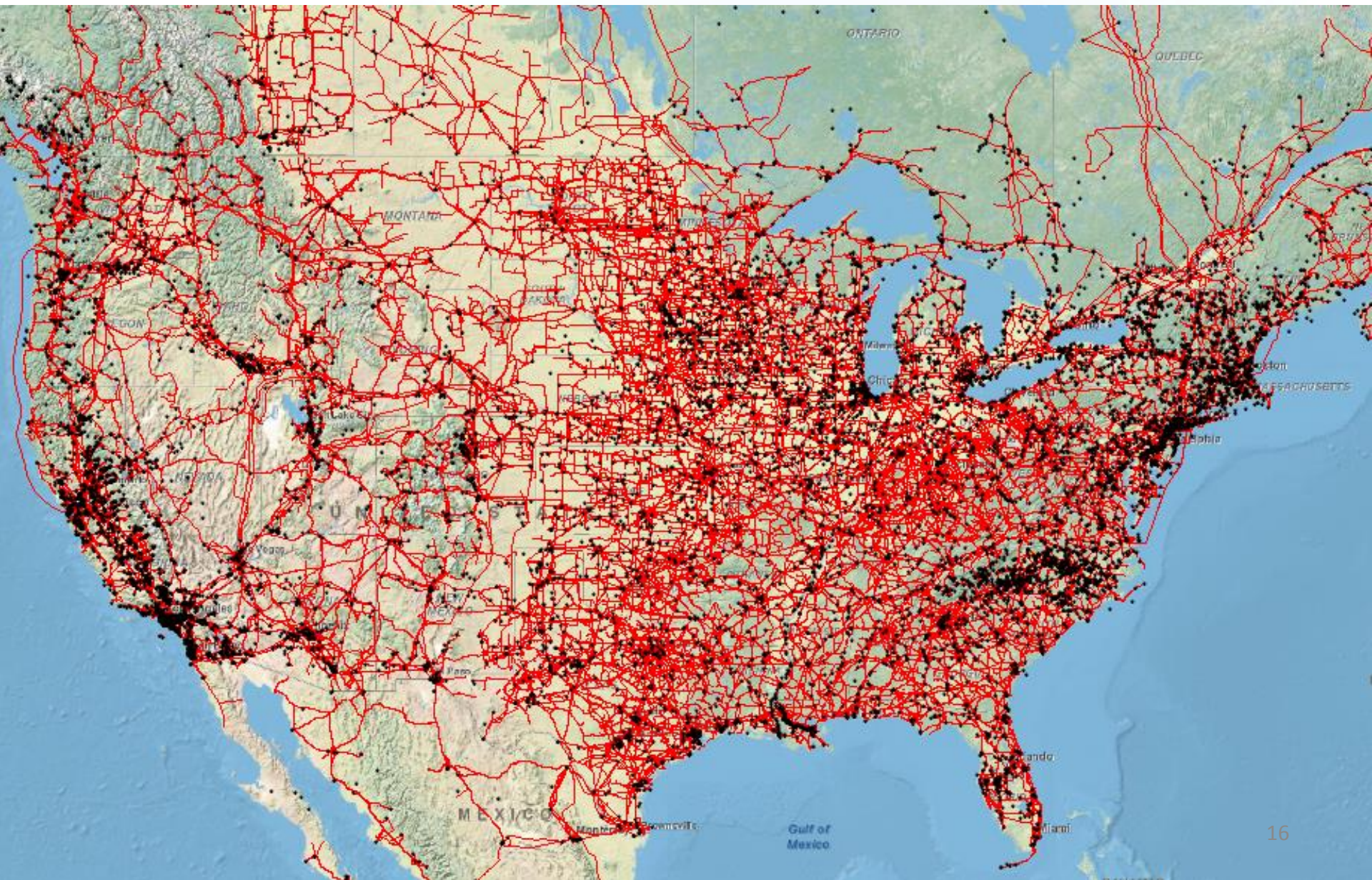


FIRE STATIONS



NATIONAL INFRASTRUCTURE

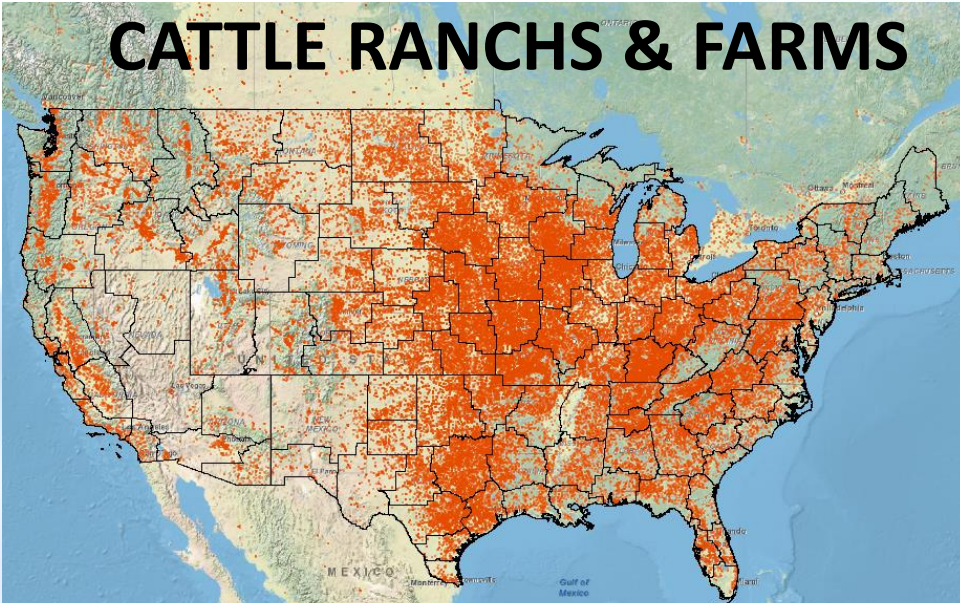
Electric Power Grid



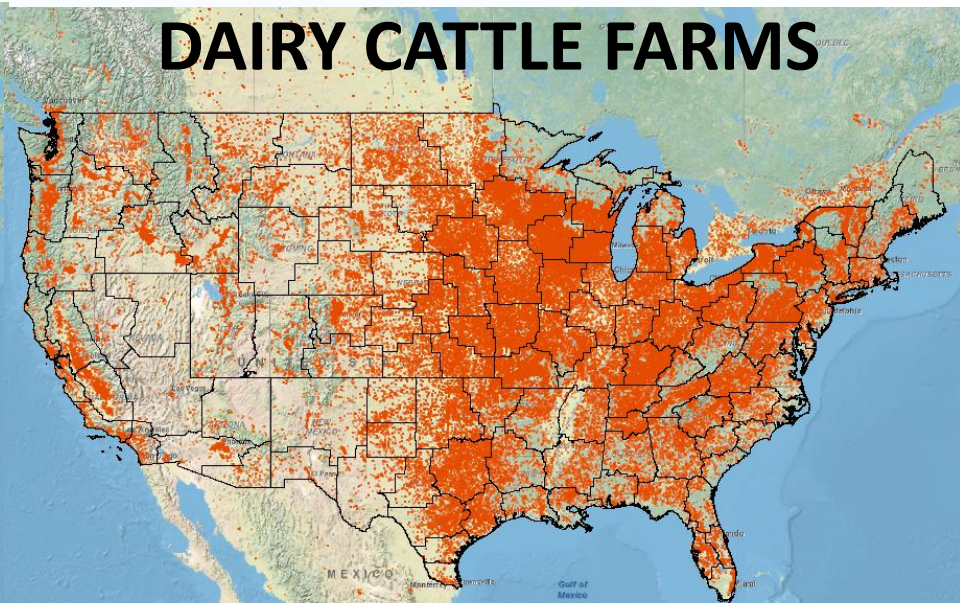
NATIONAL INFRASTRUCTURE

Livestock

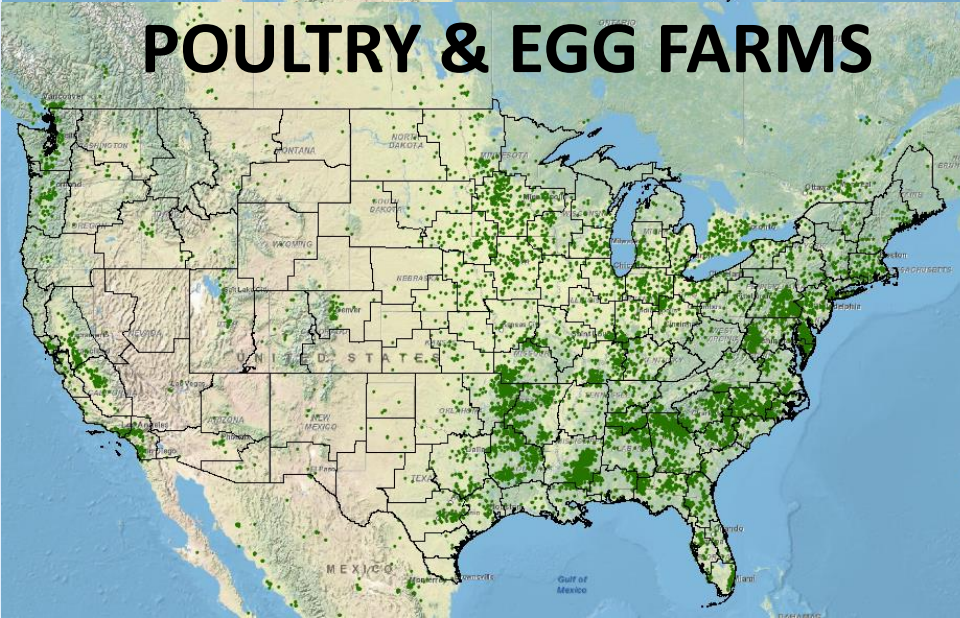
CATTLE RANCHS & FARMS



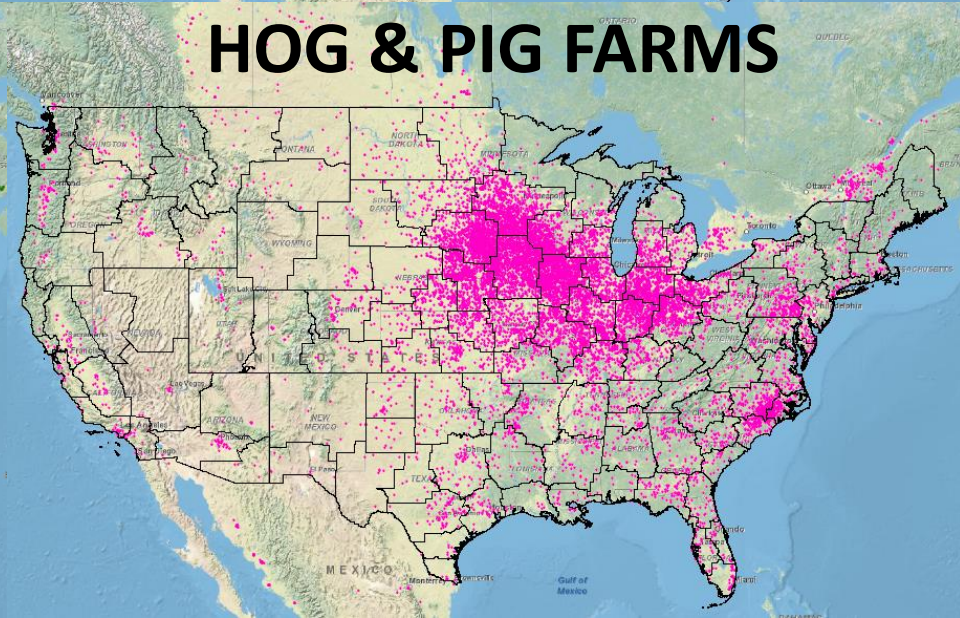
DAIRY CATTLE FARMS



POULTRY & EGG FARMS

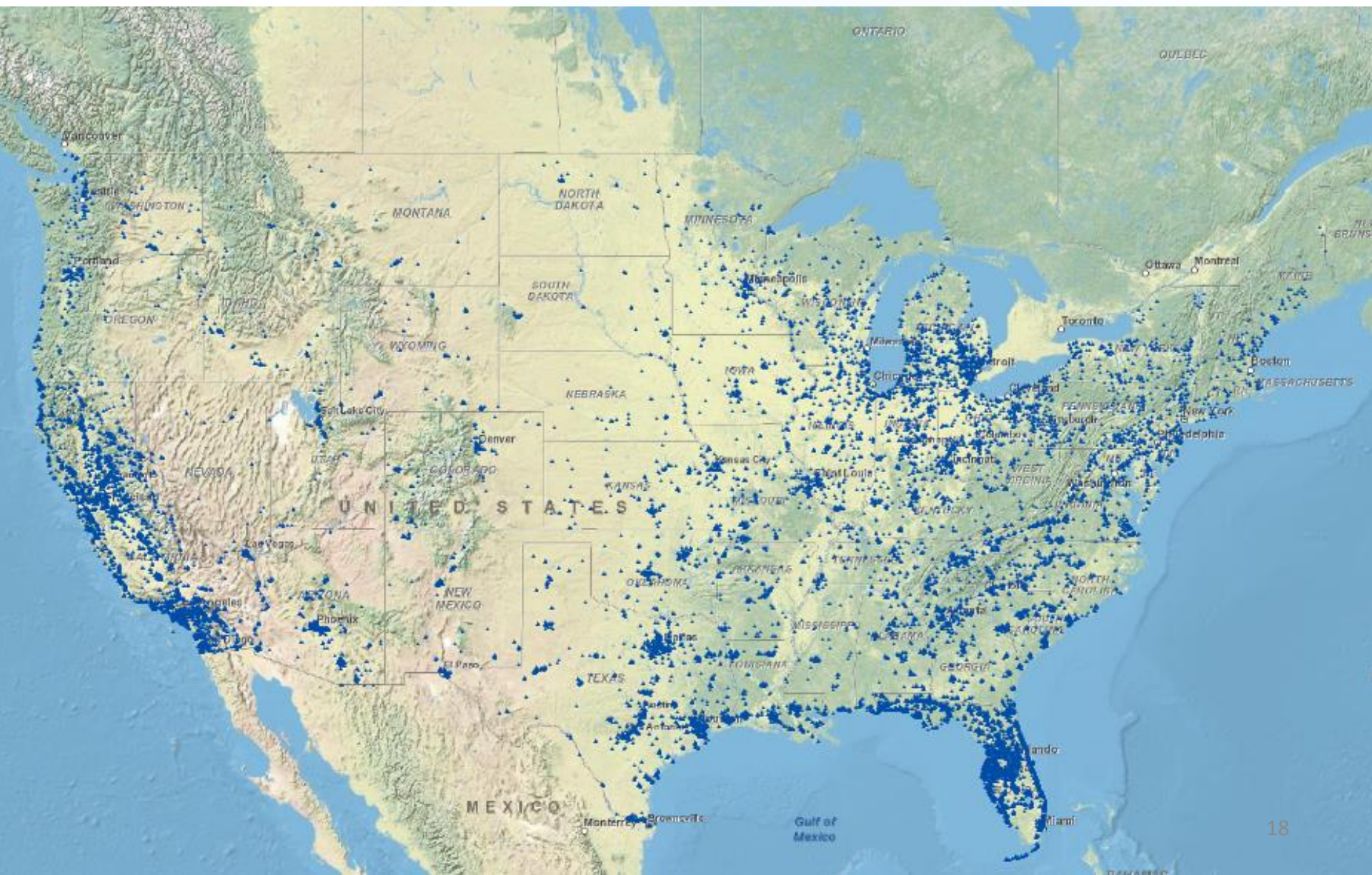


HOG & PIG FARMS



NATIONAL INFRASTRUCTURE

Mobile Home Parks



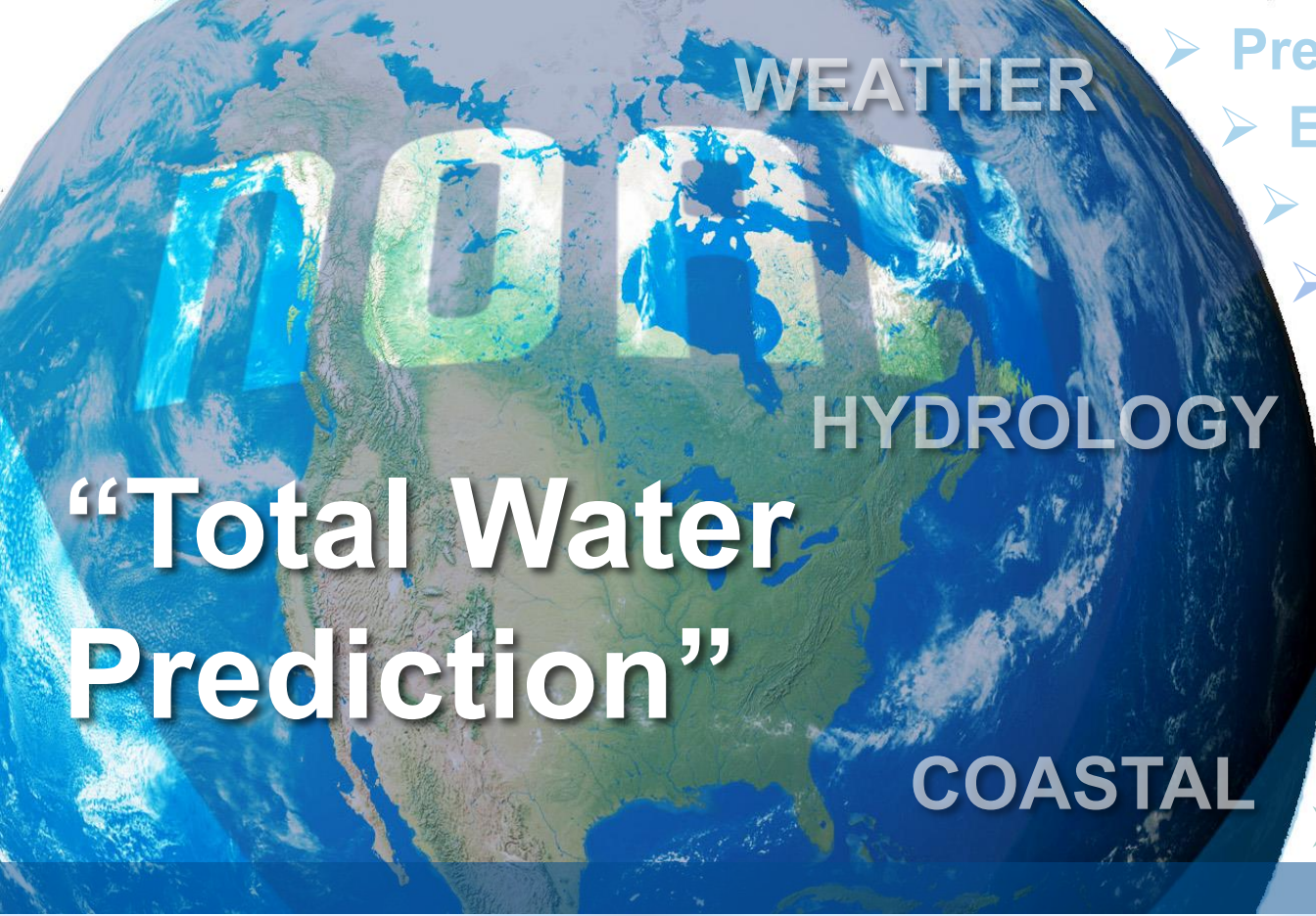
Future of NOAA Water Prediction

TODAY

- **Approximately 4000 forecast locations at points**
- **Driven by large catchment “lumped” modeling**
- **Impact-based forecasting at selected points**

TOMORROW

- **Approximately 2,700,000 forecast stream reaches**
- **Driven by high/hyper resolution Earth System modeling**
- **Predictions linked with detailed local infrastructure data to communicate street level impacts and provide information at the scale needed by local decision makers**
- **Fully integrated decision support for multiple socioeconomic sectors, in all regions, from summit to sea**



“Total Water Prediction”

WEATHER

HYDROLOGY

COASTAL

- Precipitation
- Evaporation
- Snowmelt
- Runoff
- Channel Flow
- River Flooding
- Flash Flooding
- Drought
- Storm Surge
- Tides
- Sea Level Rise

- **Summit-to-Sea Modeling Array:** Atmospheric, Hydrologic, Estuarine and Marine (plus capabilities external to NOAA)
- **Multi-Scale:** Global to Street Level
- **Multi-Physics:** Conceptual to First Principles
- Moving towards integrated **Earth System Prediction**

