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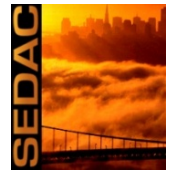

What's the Value of Integrating Socioeconomic and Earth Observations Data?

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Tucson, Arizona

Session: Quantifying Value of EO Data Via Socioeconomics
Thursday, 19 July 2018 9:30 a.m. - 11:00 a.m.

Abstract

Socioeconomic data are often key to making Earth Observations data relevant to applied and policy users, for example by linking understanding of hazards and extremes, resource locations, land use change, and other phenomena to human settlements and activities, and to human decision making. With better data on who may be affected and how, decision makers should be able to target their actions more narrowly, improving impact and return on investment. Humanitarian responses and public health interventions can focus more quickly and effectively on those most in need during an emergency; investments in infrastructure can be tailored to existing or planned patterns of human settlement and movement; resource managers can better match available resources with demand. Quantitative assessment of the net benefits of improved data requires detailed information on how the data were used to guide decisions and adjust actions, leading to outcomes with different direct and indirect benefits or losses. We discuss here a use case on the integration of population data into decision making about deployment of utility crews after severe storm events, based on SEDAC's collaboration with StormCenter Communications as part of the ESIP Disaster Cluster's work with the All Hazards Consortium.

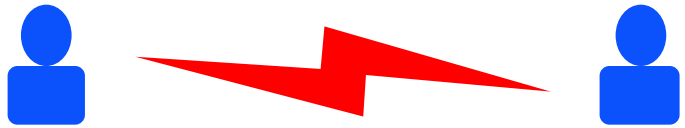
Benefits to People, Including Populations at Risk

- Improving decision making capabilities
  - Target actions more narrowly to precise locations
  - Identify specific resource needs for affected populations
  - Increase timeliness of resource delivery
  - Improve impact and return on investment
  - Improved situational awareness under rapidly evolving, uncertain conditions
- Improving humanitarian responses and public health interventions
  - Prioritize locations to receive specific resources, services, and expertise
  - Identify individuals and groups most in need during an emergency
  - Focus more quickly and effectively
- Investing in infrastructure
  - Tailored to existing or planned patterns of human settlement and movement
  - Resource managers can better match available resources with demand

Challenges for Quantitatively Assessing Net Benefits of Integrating Socioeconomic and EO Data

- Identifying costs of data and data services
  - Acquiring socioeconomic and EO data products to be integrated
  - Investment of resources, time, and capacity to use data effectively
  - Timeliness, reliability, need for data integration, analytical tools
  - Ongoing training, infrastructure, investment to continue data use
- Determining risks of data use
  - Risks associated with changes in workflows, bad or misleading data
  - Risks to business of sharing data or creating data dependencies
- Assessing benefits from use of data
  - Influence on decisions made and actions completed
  - Separating out the impact of different data, factors influencing outcomes
  - Identifying and comparing direct and indirect benefits or losses
  - Monetization of value from different impacts of data use

Selected Emergency Management Challenges



- Communications
  - Contacting and coordinating professionals
  - Sharing data and information between different organizations, levels of government, public/private sector
  - Disseminating status of hazards and people at risk
  - Notifying populations in proximity to hazards
- Logistics
  - Providing resources where and when needed
  - Acquisition of available resources that are needed
  - Facilitating transportation, housing, fuel/energy, medical care, supplies etc. of both responders and affected populations

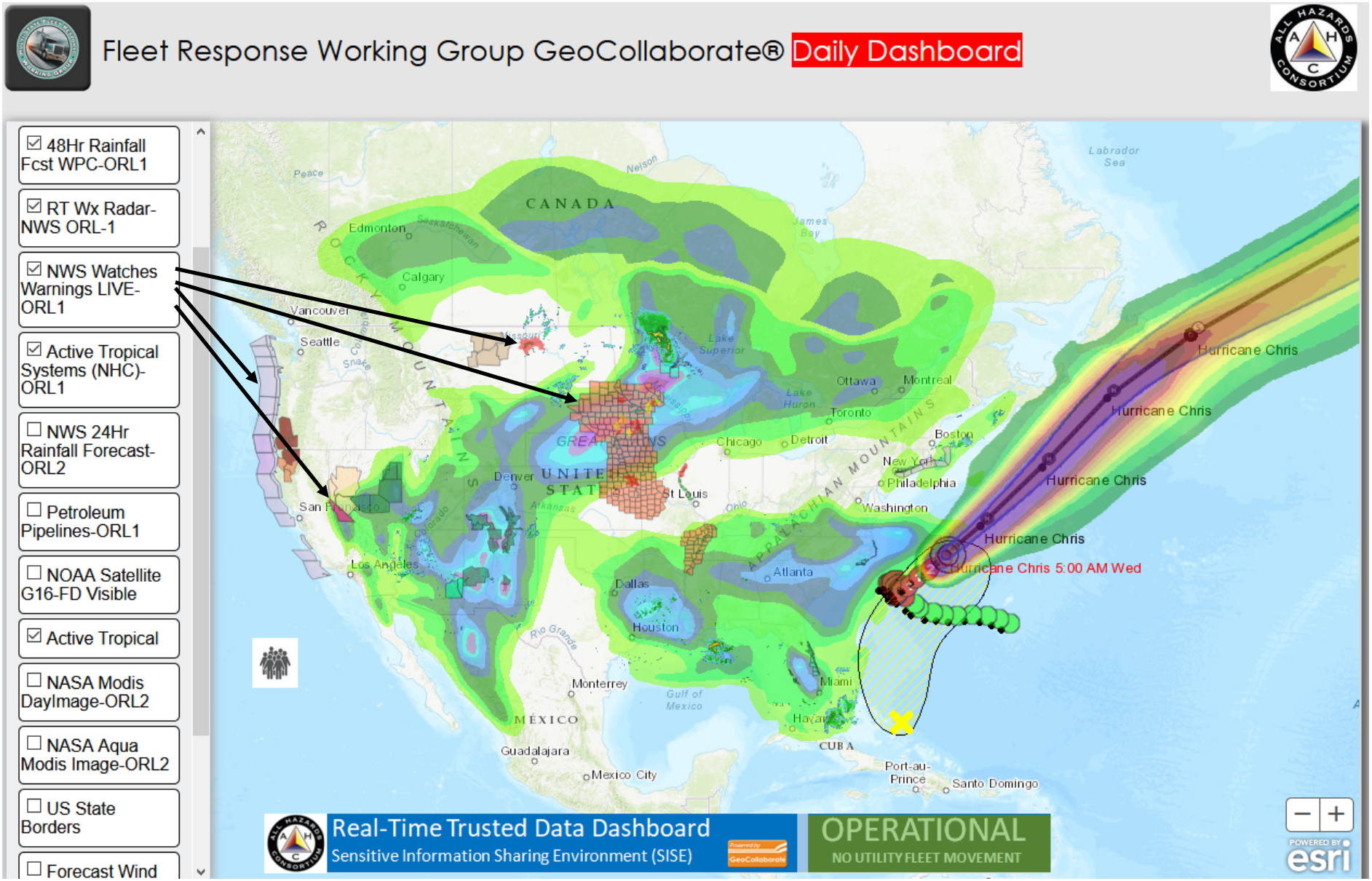
EO and Socioeconomic Data for Emergency Response

- Hazard conditions and affected locations
- Short- and medium-term forecasts (storm tracks)
- Transportation (roads, railroads, airports, heliports, gas stations, bridges, tunnels, road & traffic conditions)
- Other infrastructure (power plants, electrical grid, storm drains/sewers, dams, reservoirs, pipelines, underground utilities, cell towers, Internet network)
- Hospitals, clinics, staging areas, storage depots
- Residential populations (urban, suburban, rural, institutional)
- Daytime (working) populations (industrial, office, agricultural)
- Temporary populations (campers, beachgoers, event participants)
- Topography, hydrology, land cover (vegetation, impervious surfaces)
- Vulnerable ecosystems/wildlife, cultural/historical sites

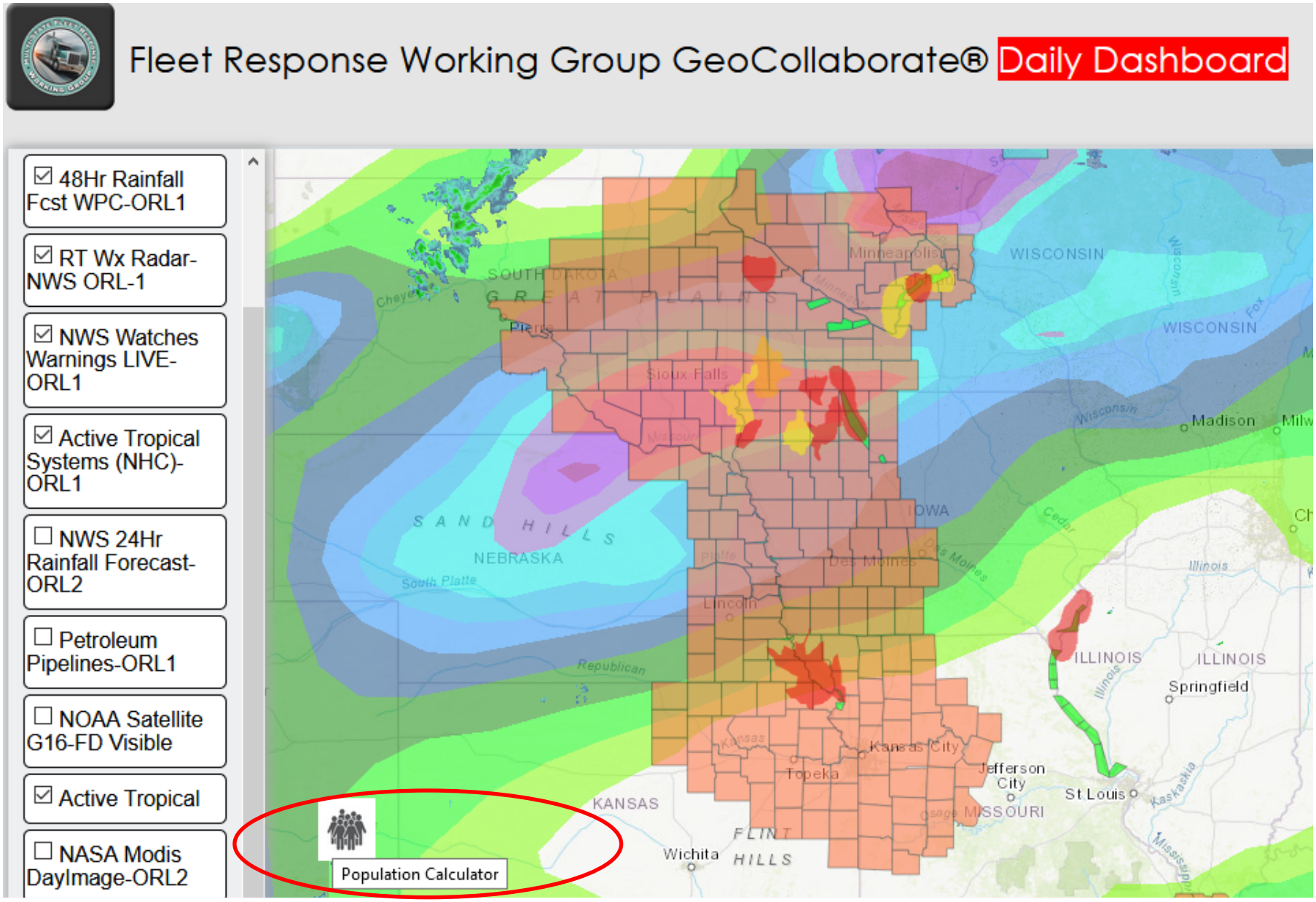
Use Case: Severe Storm Response Decision Making by Electric Utilities

- Severe storm events and floods disrupt electric power grids
- Utilities try to deploy repair crews in advance of storms and to respond more quickly and efficiently after storm passes
- Utilities have mutual assistance agreements to bring repair crews across State lines for rapid power restoration after storm passes; important to minimize delays and time lost in transit (Time=$$!)
- GeoCollaborate tool deployed by StormCenter Communications supports utilities' access to and sharing of key data and information
  - **Response managers** dealing with deployment decisions for repair crews
  - **Individual utility crews** assessing local/regional conditions
- SEDAC provides GeoCollaborate users with option to estimate residential population potentially affected by a recent, ongoing, or forecasted hazard event

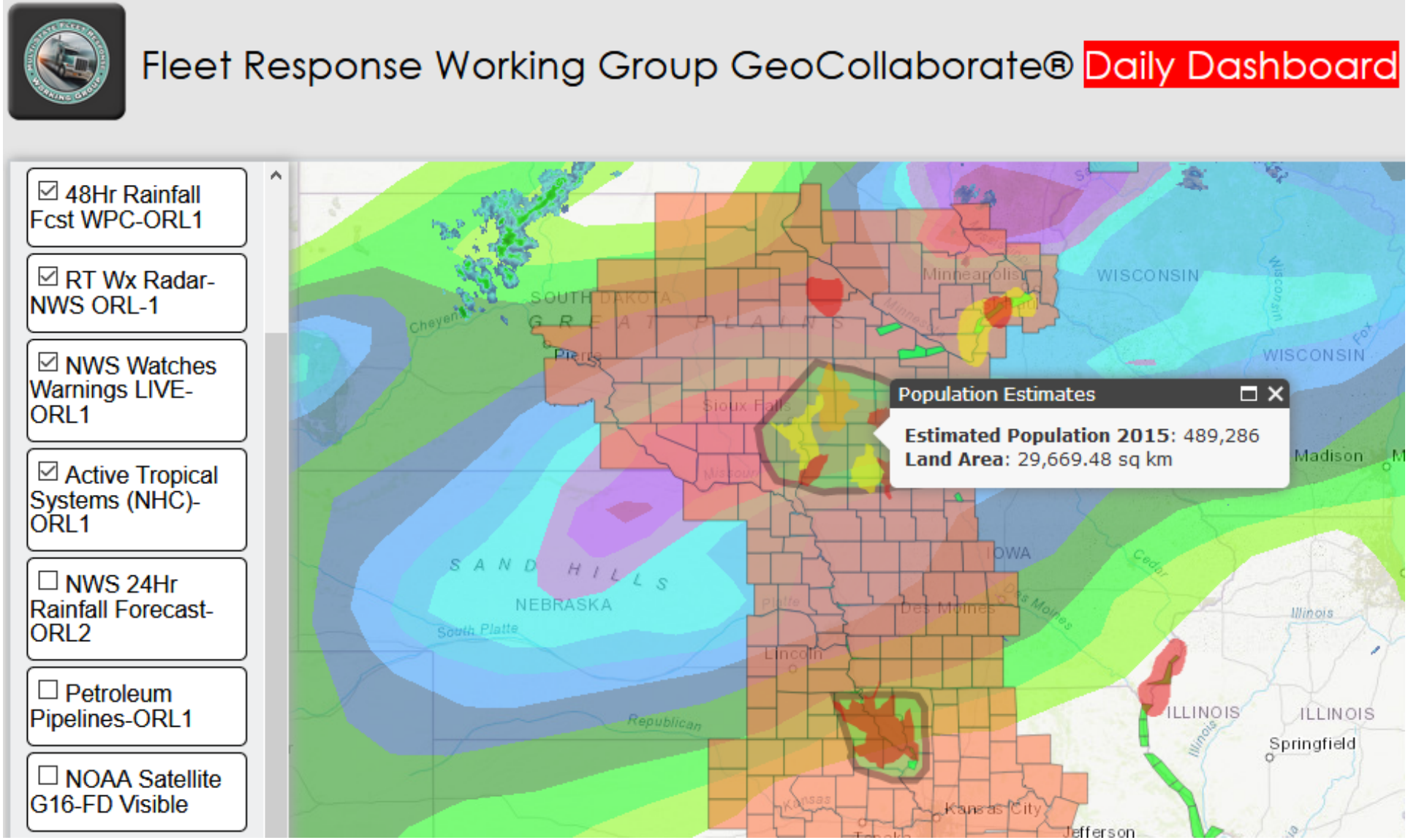
Weather Warnings Enable Planning



Population Estimates for Planning



Estimating Populations at Risk



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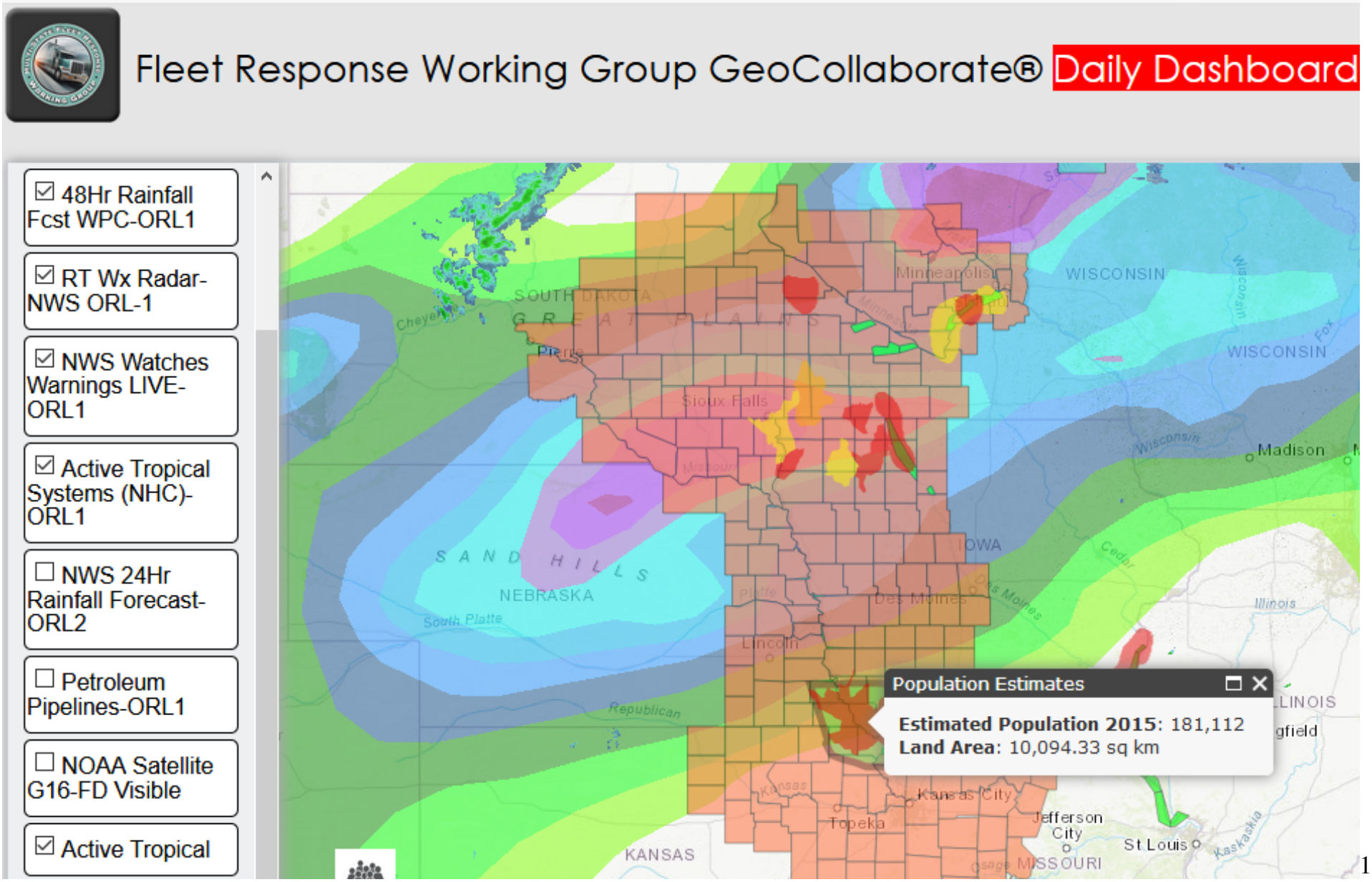
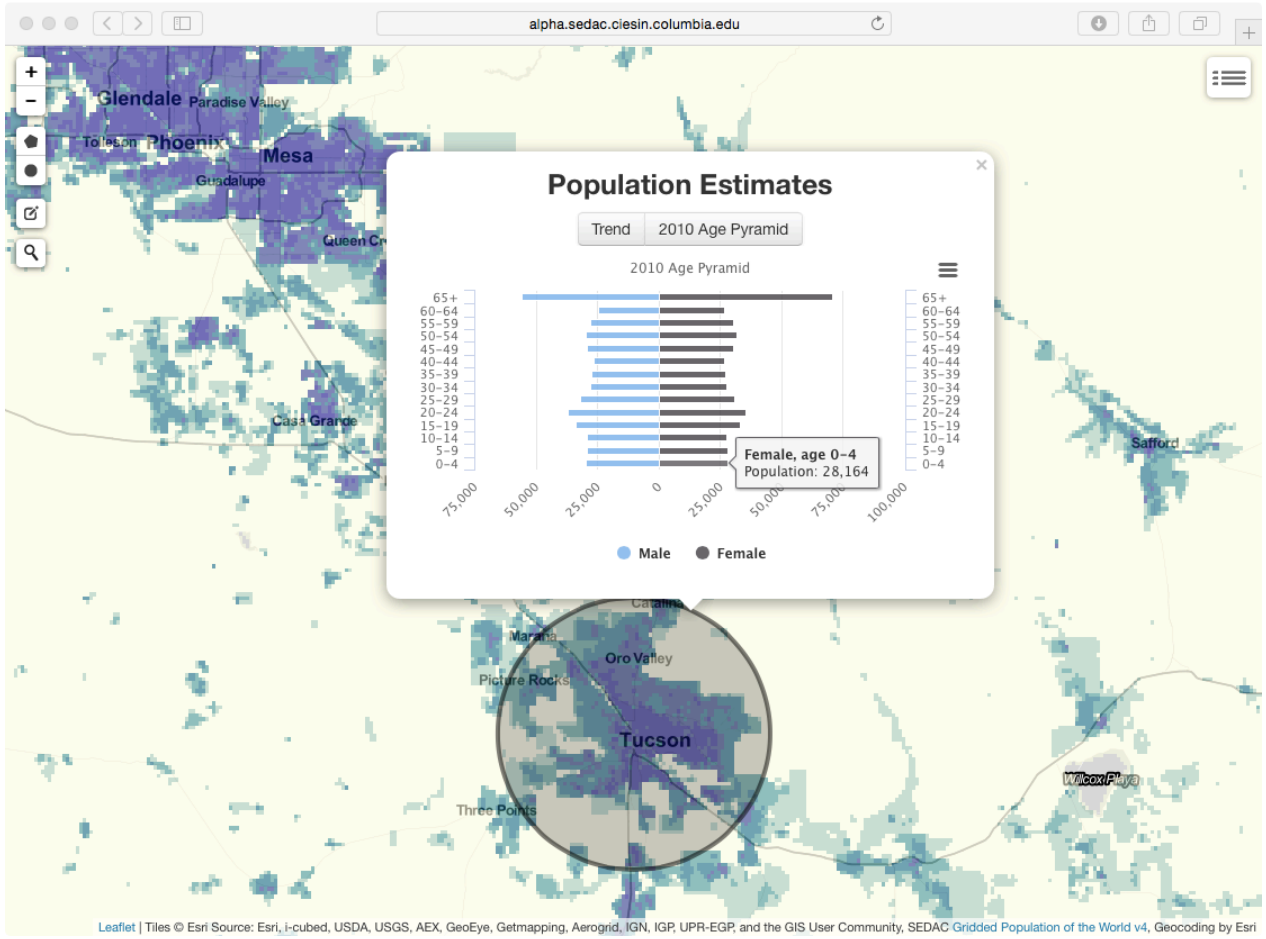


Potential Use of This Capability

- Utility Response Manager
  - How densely populated are the areas recently affected by severe storms or areas likely to be hit soon?
  - If a power plant may be affected by an extreme event in the near future, how many people live downwind under different wind conditions?
- Individual Utility Crew
  - If my crew is being routed through these areas, are they lightly, moderately, or heavily populated?

Future Capability: Population by Age and Sex

- More detailed age structure information, e.g., to identify elderly population, children, women of child-bearing age
  - Enable emergency responders to prioritize areas with vulnerable populations and better estimate needs



Quantifying Potential Value

- Improvement in Deployment and Effectiveness of Utility Crews
  - Higher ratio of repair time vs. transit/unproductive time
  - Faster, more complete restoration, especially for more vulnerable areas/population groups
  - Improvement in situational awareness of utility crews and ability to respond appropriately to unfolding events
- Some Analytic Challenges
  - ➢ How can we correct for differences in storm location, timing, impact, etc.?
  - ➢ How can we attribute net improvements to specific data sources and decisions?
  - ➢ Can usage statistics shed light on changes in situational awareness and decision making processes?

Thanks!

- **Special thanks to the All Hazards Consortium, StormCenter Communications, and the ESIP Disasters Cluster for encouraging and sponsoring interactions between data stakeholders and providers**

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