



Transportation Research Board Future Interstate Highway System Study

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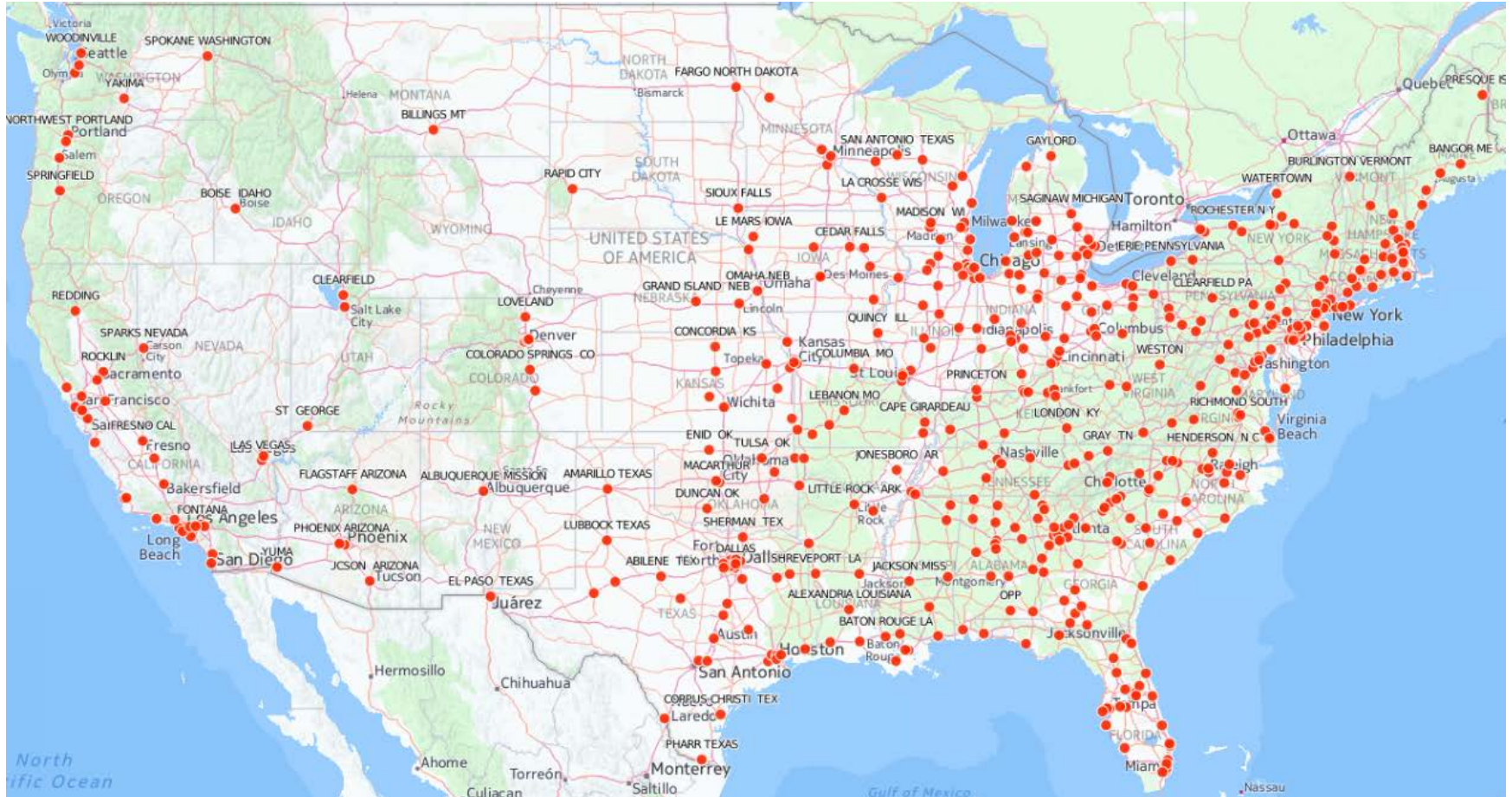


Ryder's Business (R)

- \$6.8 billion revenue
- 234K vehicles
- 800+ locations
- 5,900 technicians
- 7,700+ drivers
- 5.7 B miles traveled annually
- 50,000+ customers



Ryder Service Network



Emerging Technology Impacts on Interstate System

- Autonomy will likely occur in Long-Haul/Highway duty cycles first
 - Platooning can dramatically increase freight efficiency (Tesla definition)
- Growing shift toward electrification will extend to Commercial Vehicles and create need for en-route Charging Infrastructure
- Connected Vehicles will limit or eliminate the need for basic enforcement (weigh stations, roadside inspections).
- Greater efficiency and lower cost of Solar PV allows Interstate System to get into the Renewables game

Interstate System Potential Development Areas

- Dedicated Autonomous Vehicle Lanes
 - High Speed Lanes for Autonomous Vehicles
 - Higher GCVW's
 - Longer trailers (no tractor cabs)
- Staging Centers for 'Ramp-to-Ramp' Autonomy
- Conversion of Weigh Stations to high volume, Automated, Fast-Charging Stations (without drivers the need for snack machines, restrooms will be mitigated).
- Creation of en-route fast-charging 'e-ports' along highways
- Use of Interstate Right-of-Ways for solar arrays (to power charging stations and e-ports)

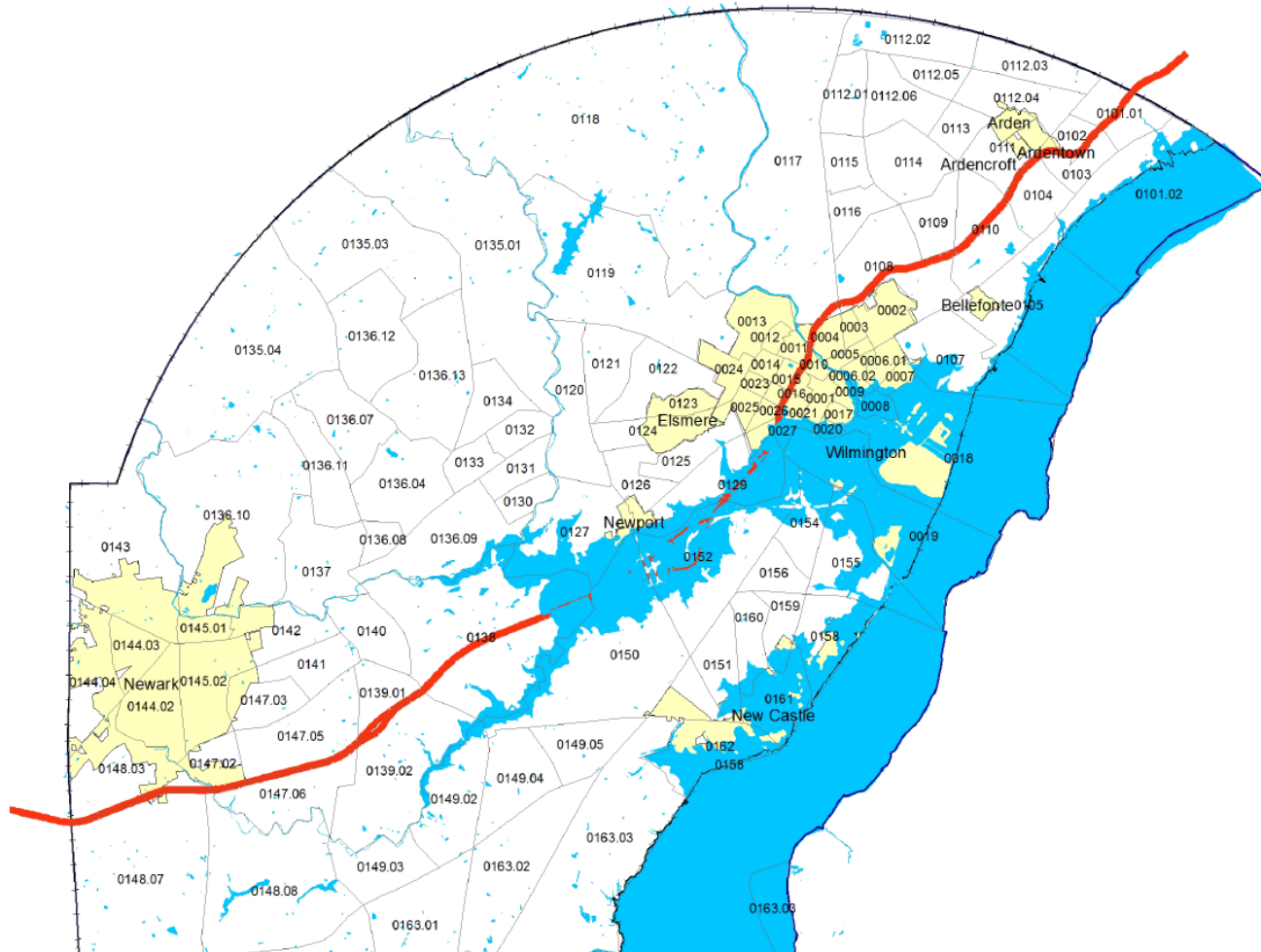
Interstate Network's Exposure to Sea Level Rise

Average Daily Long-Haul Traffic on the NHS: 2011

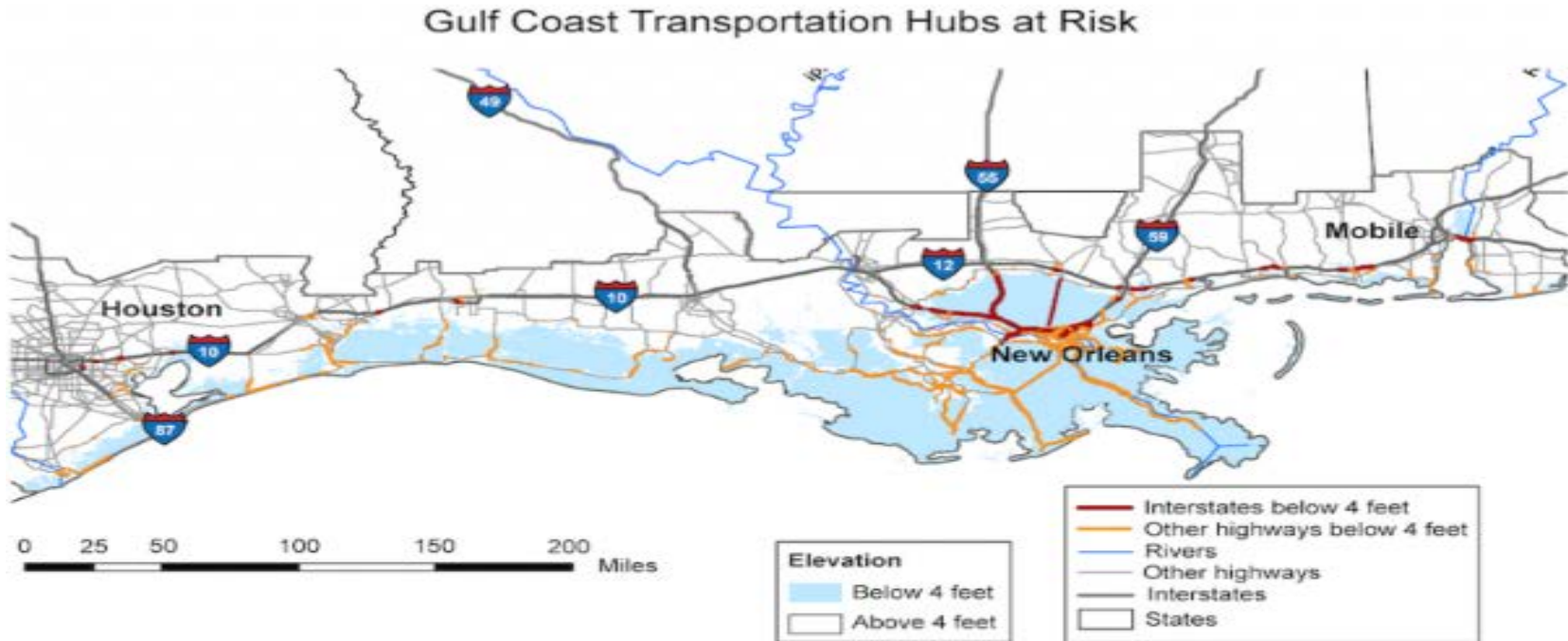


Notes: Long-haul freight trucks typically serve locations at least 50 miles apart, excluding trucks that are used in movements by multiple modes and mail. NHS mileage as of 2011, prior to MAP-21 system expansion.
Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, *Freight Analysis Framework*, version 3.4, 2013.

I-95 Impacts of Sea Level Rise

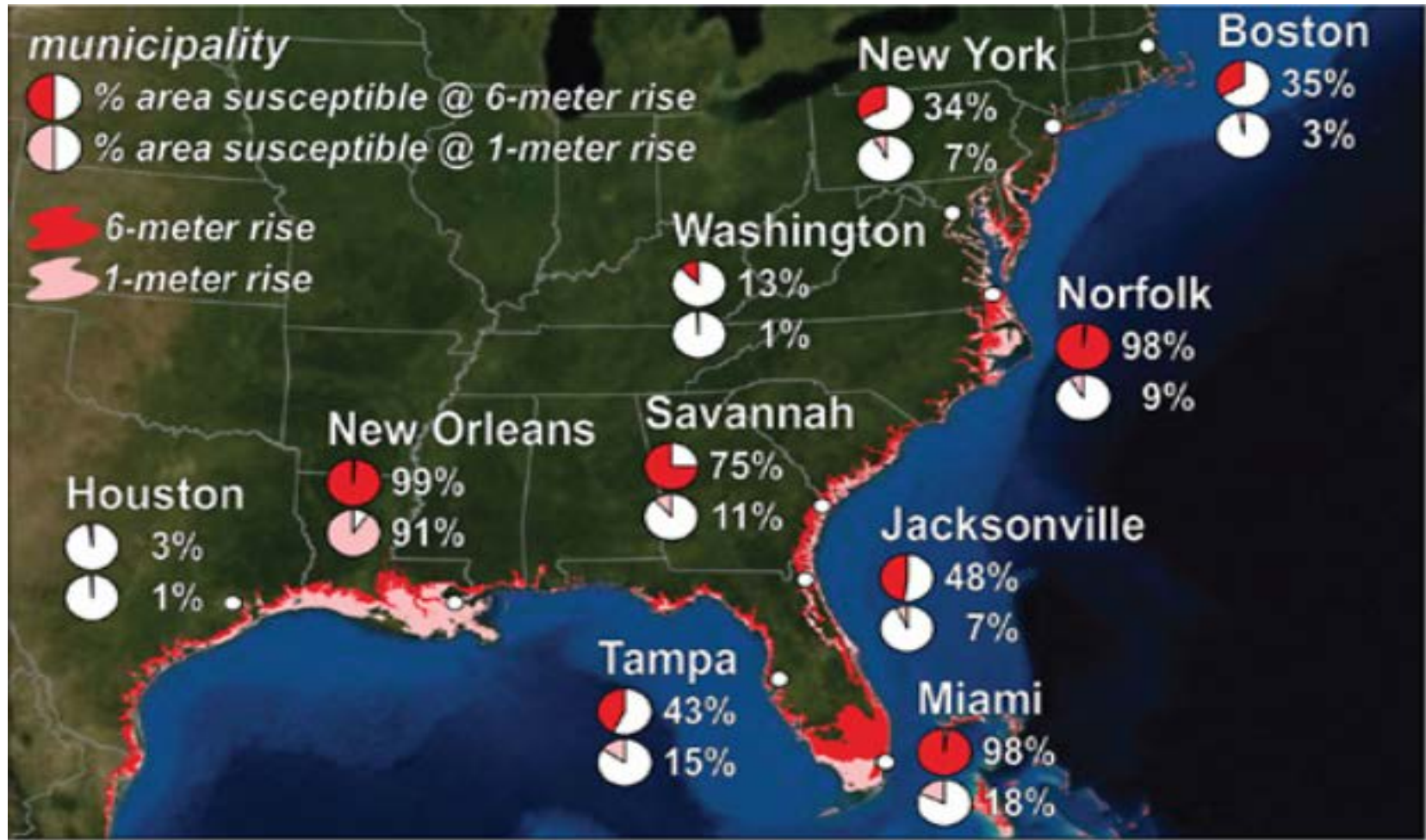


I-10 Impacts of Sea Level Rise

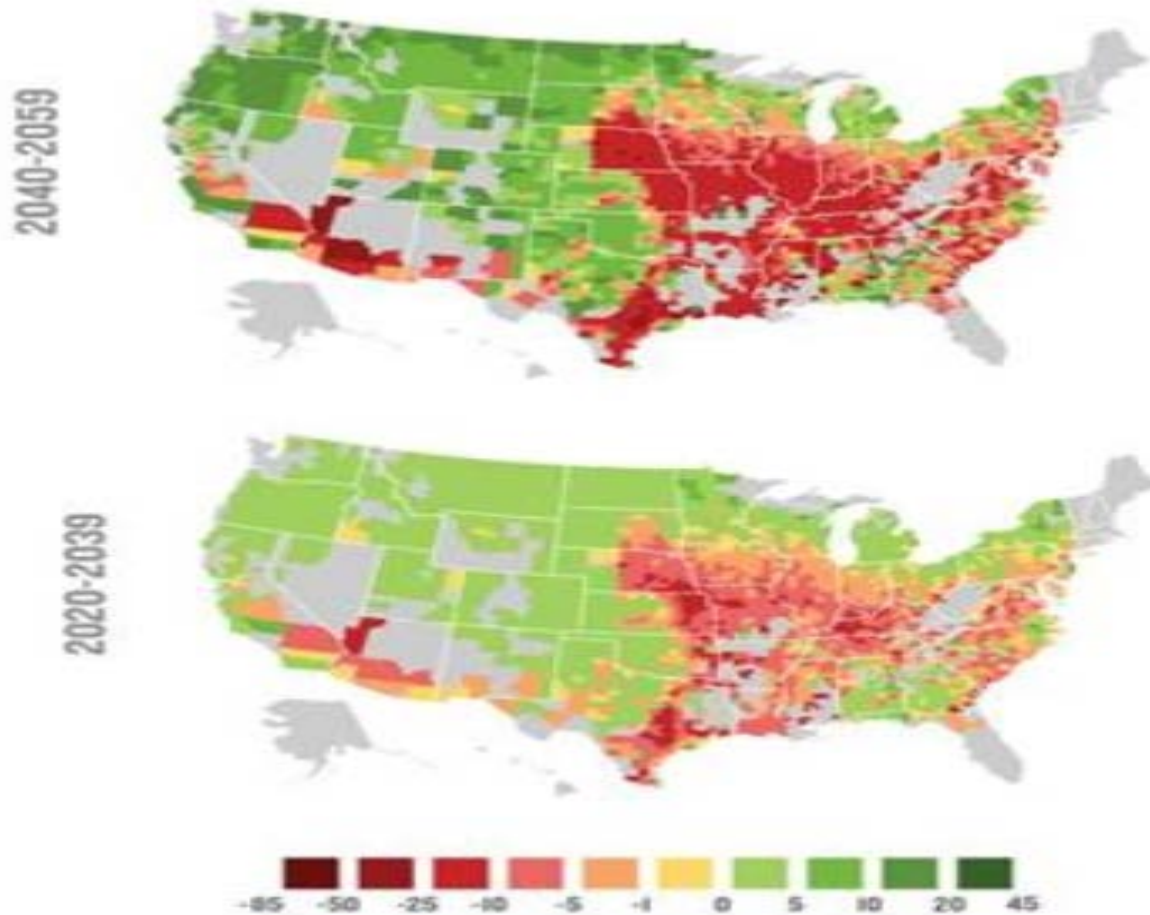


In the Gulf Coast region, 2,400 miles of major roadway are projected to be inundated by sea level rise within this century. The map shows roadways at risk in the event of a sea level rise of about four feet, which is within the range of projections for this region during this time frame.

Impacts of Sea Level Rise on Major Ports



Major shifts in Agriculture Production (needed interstate expansion into NW)



Cargill

Closing Thoughts

- Advanced Vehicle Technologies will place pressure on Interstate system for Lane Design/Usage as well as how charging infrastructure can and should be developed.
- Emerging Technologies and Vehicle Connectivity will render traditional services obsolete (scales, Hours of Service, Safety Checks, Tractor parking for DOT breaks).
- Climate change will require an entirely new look at interstate system routing (expansion into new agricultural/population centers), access to ports, alternative road surfaces/materials (higher temperatures), and heavier loads.

