

# FHWA Climate Change Activities



**May 4, 2011**  
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# Adaptation

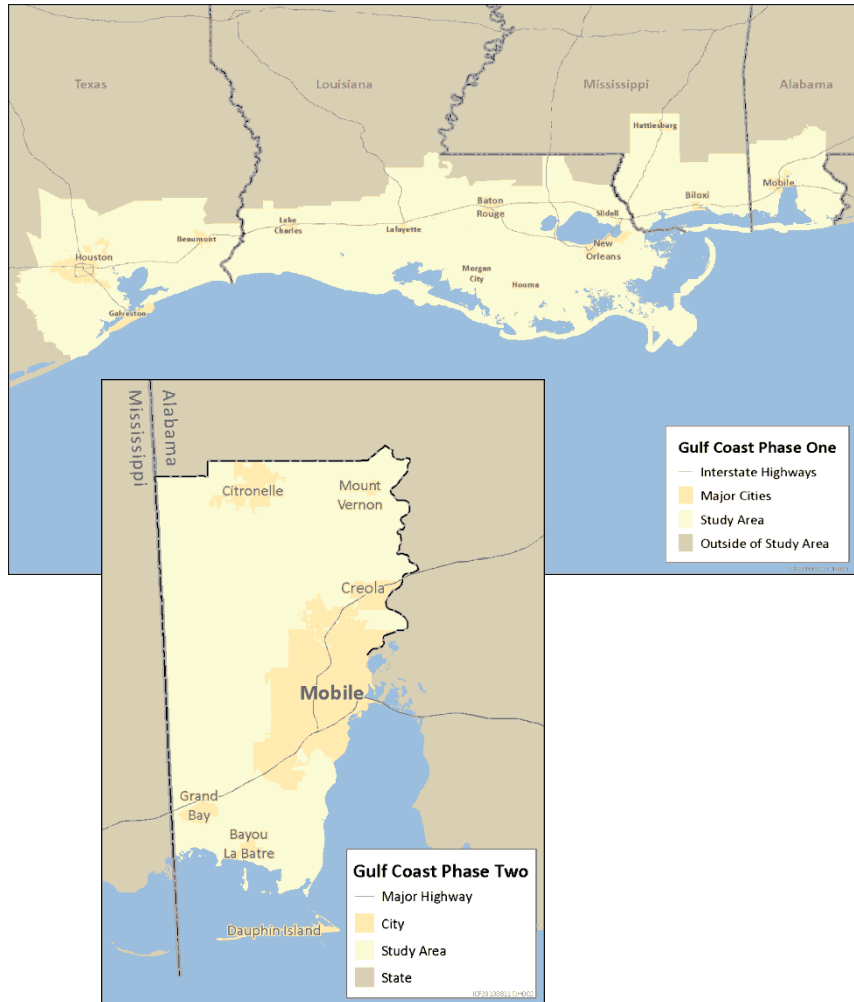
# FHWA and Climate Change Adaptation



**Goal: systematic consideration of climate change vulnerability and risk in transportation decision making**

- **Systems level (Metropolitan, Statewide planning) & individual projects, as appropriate**
- **Motivations**
  - **Internal: protect integrity of transportation investments, safety**
  - **External: CEQ guidance on addressing climate change in NEPA and Adaptation Planning**
- **Interdisciplinary cooperation is key to effort**
  - **Represents cooperative effort of multiple offices in FHWA, U.S. DOT, AASHTO, AMPO, and partnerships with science agencies such as USGS and NOAA**

# Gulf Coast Study: Phase 2 Underway

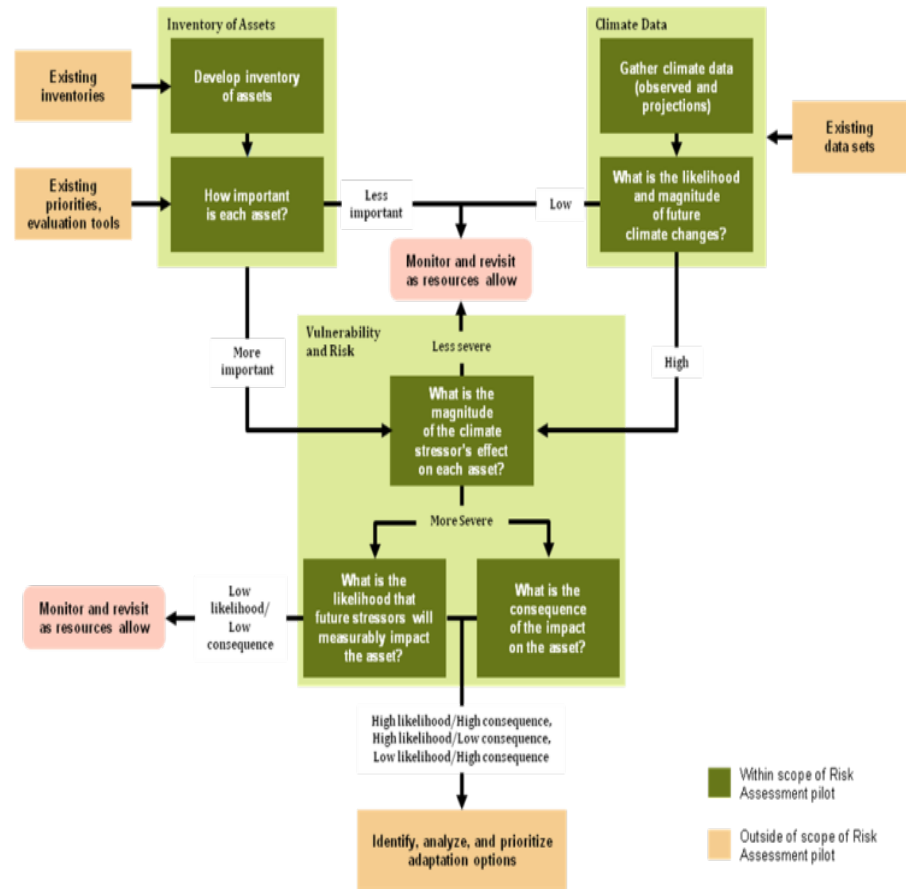


- **Phase 1 – Overview of impacts on central Gulf Coast transportation infrastructure**
  - Completed 2008
- **Phase 2 – Examines issues at metropolitan scale (Mobile, AL)**
  - **Task 1: Identify critical assets in Mobile**
  - **Task 2: Assess climate changes and sensitivities**
  - **Task 3: Determine vulnerability of critical assets**
  - **Task 4: Develop risk management tools**

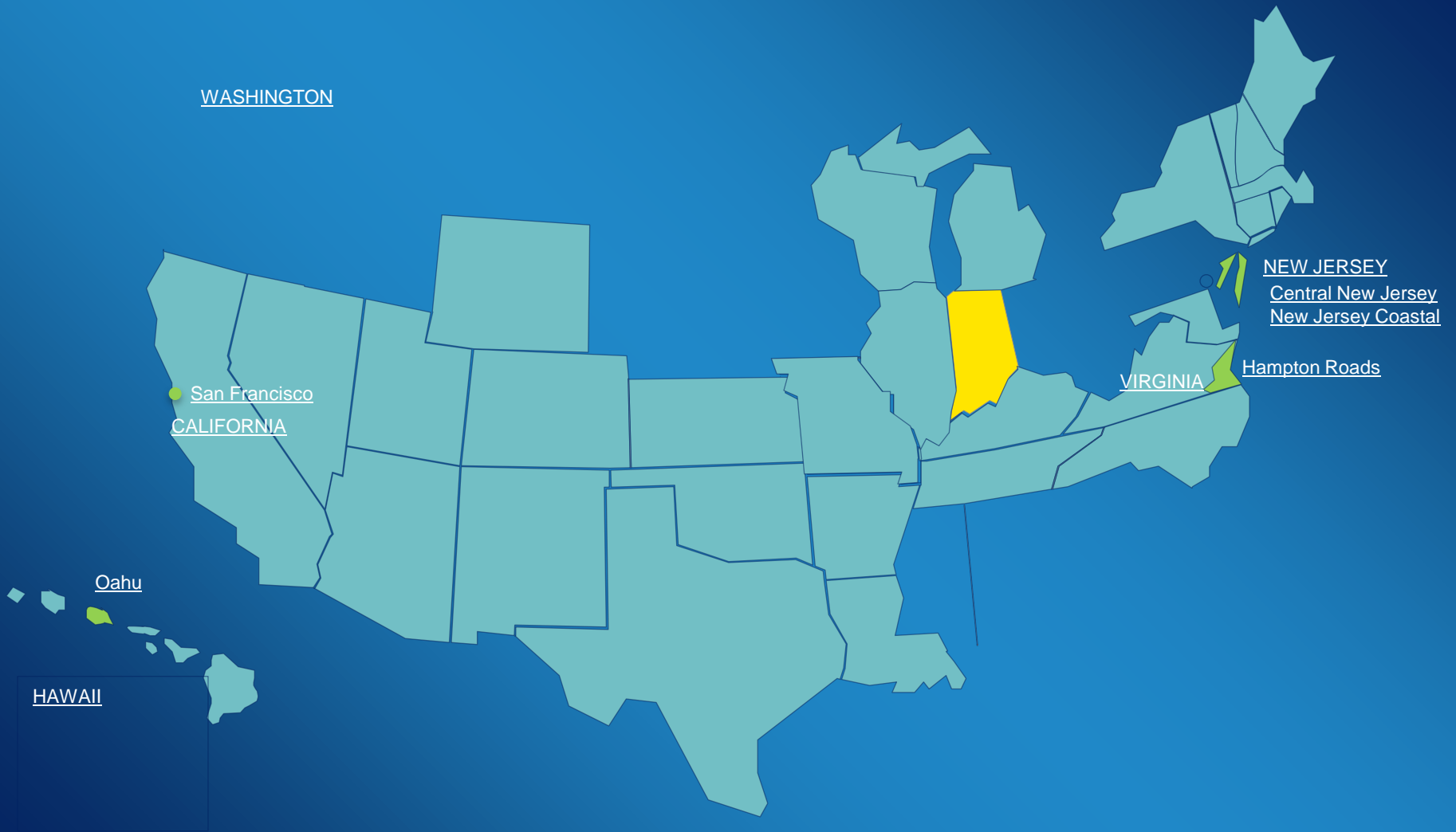
# Vulnerability/Risk Assessment Conceptual Model



- **Goal: Identify vulnerable assets and adaptation strategies**
  - Assets most exposed to climate change threats; and
  - Resulting in most serious consequences from those threats
- Conceptual model complete
- Pilot testing by State DOTs and MPOs (2010-2011)
- Update the conceptual model



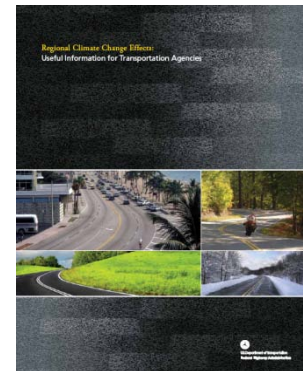
# Climate Change Vulnerability and Risk Assessment Pilot Locations



# Regional Climate Change Effects Report (2010)



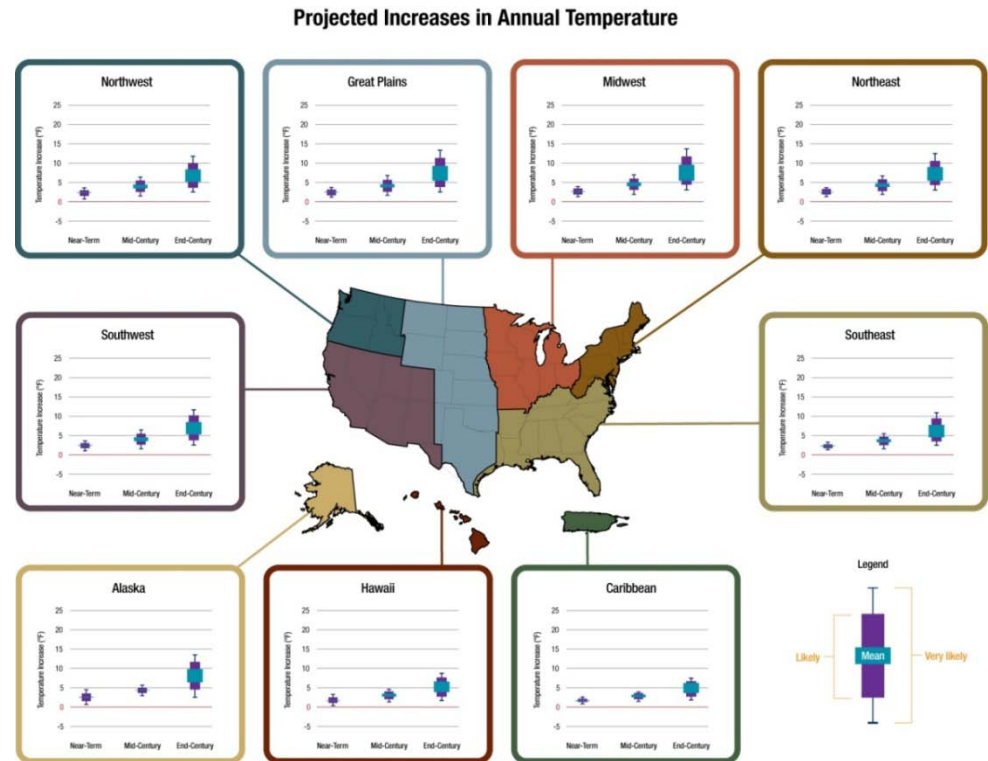
- **Report synthesizes information on climate change projections for transportation decision makers**
  - **Snapshot: Summarizes recent science**
- **Projected *changes* by region**
  - **Annual, Seasonal Temperature (change in °F)**
  - **Seasonal Precipitation (% change)**
  - **Where information exists:**
    - Sea level rise, Storm activity
- **Also includes information at local, state scales**
- **Received assistance from climate experts at NOAA, USGS, DOE, etc.**



# How Can This Information Be Applied?



- Inform planning efforts with a consistent set of projections
- Inform consideration of vulnerability of key assets
- Not detailed/certain enough for definitive decisions on specific projects





# Lessons Learned From FHWA Adaptation Activities (So Far)



- **Interdisciplinary cooperation is key**
  - Need to include science information, engineering specifications, planning processes, etc.
  - Multi-disciplinary stakeholder communication is not easy
  - Understand existing decision-making processes and frameworks
- **Embrace the uncertainty**
  - Must be comfortable with range of climate projections
  - Not all climate trends are clear
- **Community priorities are an integral part of a climate vulnerability assessment**
- **Impacts and concerns will vary by region – no one-size-fits-all answers**

# Next Steps: FHWA Adaptation Strategy



- **Council on Environmental Quality (CEQ) guidance directs all federal agencies to develop adaptation plans, based on 2009 Executive Order. Requirements:**
  - **High-level analysis of agency vulnerability to climate change**
  - **3-5 priority adaptation actions for implementation in FY2012**
  - **Submit adaptation plan to CEQ for implementation in 2013**
- **FHWA is already working on an overall strategy that will meet CEQ's guidance**
- **U.S. DOT's complete plan will be released June 2012**
- **CEQ draft NEPA guidance also includes adaptation component**





# Mitigation



# Mitigation Strategies



- **The strategies to reduce transportation GHG emissions are organized into four major groups:**
  - ✓ **Introduce low-carbon fuels**
  - ✓ **Increase fuel efficiency**
  - ✓ **Improve transportation system efficiency**
  - ✓ **Reduce travel activity**

# FHWA Mitigation Research/Activities



- **Mitigation Guidebook and Web-Based Tool**
  - ✓ **Mitigation Guidebook will review and analyze a variety of transportation strategies to reduce GHG emissions (Completion date: summer 2011)**
  - ✓ **Web-Based Tool is being developed to model a large number of GHG reduction policy scenarios and alternatives (Completion date: summer 2011)**
- **GHG Reductions from Operations Strategies**
  - ✓ **This research will further investigate the GHG reduction potential of highway operation and management strategies (Preliminary results: fall 2011, Completion date: 2012)**



# FHWA Mitigation Research/Activities (Con't)



- **State DOT Climate Change Workshops – In coordination with AASHTO, seven workshops have been scheduled to take place between April and July (NC, AZ, CT, VT, MA, DC, and IL)**
- **Peer Exchanges - 3 mitigation and 3 adaptation peer exchanges will take place in 2011 and 2012**
- **Electric Vehicle Research – In coordination with the Pew Climate Change Center and AASHTO – goal of the project is to layout a short, medium and long-term action plan to integrate plug-in electric vehicles with the U.S. electricity grid nationwide**



# Thank you.



[www.fhwa.dot.gov/hep/climate](http://www.fhwa.dot.gov/hep/climate)

# Gulf Task 1: Identifying Critical Assets



- **Purpose: Determine subset of transportation network for vulnerability assessment and adaptive measures**
  - What is “critical” will vary by region
  - Important to consider community priorities as well as traditional measures

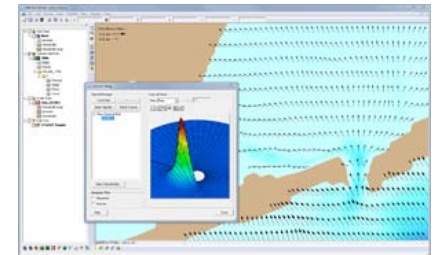
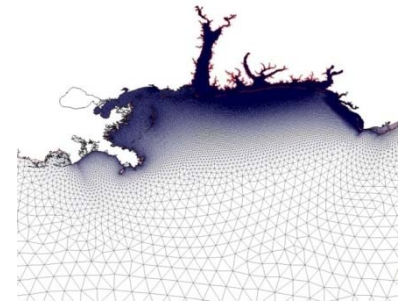
Facility	Socioeconomic				Operational			Health and Safety			Score
	Locally Identified Priority Corridors	Functions as Community Connection	System Redundancy	Serves Study Regional Economic Centers	Functional Classification (Interstate, etc.)	Usage	Intermodal Connectivity	Identified Evacuation Route	Component of National Defense System	Provides Access to Health Facilities	
Airport Blvd (West of Snow Rd)	1	1	3	1	2	2	1	3	1	1	M
Airport Blvd (East of Snow Rd)	1	3	3	3	3	3	3	3	1	2	H
Argyle Rd	1	1	2	1	1	1	1	1	1	1	L
Beauregard Street	1	1	3	2	3	2	3	3	1	1	M
Bel Air Blvd	1	1	2	1	2	2	1	1	1	1	L
Bellcase Rd	1	1	2	1	2	2	1	1	1	1	L
Bellingrath Rd (North of Laurendine Rd)	1	1	2	3	2	2	1	3	1	1	M
Bellingrath Rd (South of Laurendine Rd)	1	1	2	1	1	2	1	3	1	1	L
Beverly Rd	1	1	2	1	1	1	1	1	1	1	L
Broad St 2	1	1	3	3	3	2	2	1	1	1	M
Broad Street	1	1	3	3	3	2	2	3	1	1	M
Canal St	1	1	3	3	2	1	1	2	1	1	M
County Road 24 - Half Mile Rd	1	1	2	2	1	1	1	1	1	1	L
County Road 28 - Old Pascagoula Rd	1	1	2	1	2	2	1	1	1	1	L
County Road 32 - Union Church Rd/3 Notch Rd	1	1	2	1	2	2	1	1	1	1	L
County Road 33 - Dawes Rd	1	3	2	1	2	2	2	1	1	1	M
County Road 36 - Jeff Hamilton Rd	1	3	2	1	2	1	1	1	1	1	L
County Road 37 - Cody Rd	1	3	2	3	1	2	1	1	1	2	M
County Road 40 - Cottage Hill Rd	1	3	2	1	2	2	1	1	1	2	M
County Road 70 - Old Shell Rd	1	3	2	3	2	2	2	1	1	1	M
County Road 70 - Tanner Williams Rd	1	1	2	1	2	2	2	1	1	1	L
County Road 72 - Howells Ferry Rd	1	1	2	1	1	2	1	1	1	1	L
Craft Hwy	3	3	2	3	3	3	3	3	1	1	H
Dauphin Island Pkwy (North of Hamilton Blvd)	3	3	2	3	3	2	2	3	1	1	H
Dauphin Island Pkwy (Hamilton Blvd to Baumhauer Rd)	3	3	2	3	2	2	1	3	1	1	H
Dauphin Island Pkwy (South of Baumhauer Rd)	3	3	2	1	2	2	3	3	1	1	H
Dekle St	1	1	2	3	1	2	3	3	1	1	M
Demetropolis Service Rd	1	3	2	1	3	2	1	1	1	1	M
Government Blvd/US 90W (North of I-10)	1	1	3	2	3	2	1	3	1	2	M
Government Blvd/US 90W (South of I-10)	1	1	2	1	3	2	1	3	1	1	M
Government St	1	3	3	3	3	2	2	3	1	1	H
Grand Bay Wilmer Rd S	1	1	2	1	2	2	1	3	1	1	L
Halls Mill Rd	1	1	2	1	2	2	1	1	1	1	L



# Gulf Task 2: Projecting Climate Data



- **USGS providing statistically downscaled projections for temperature and precipitation**
  - Provides a way to translate global climate models into local data
  - Up to 7 climate models used
  - 3 emission scenarios examined
- **Sea level rise analysis**
  - Range of recent global SLR scenarios used
  - Accounts for local subsidence
- **Storm Surge Modeling**
  - Range of storm intensities
  - Output includes surge distribution and dynamics
- **Wave Modeling**
  - Outputs include key aspects of wave energy
- **Exposure of transportation systems will be assessed using a GIS analysis**



# Example of Conceptual Model Pilot: New Jersey DOT



- Study Areas:
  - New Jersey Coastal
  - Central New Jersey
- Partners:
  - New Jersey DOT
  - North Jersey Transportation Planning Authority,
  - South Jersey Transportation Planning Organization,
  - Delaware Valley Regional Planning Commission,
  - New Jersey Department of Environmental Protection

