FHWA Climate Change Vulnerability Assessment Pilots: *Lessons Learned*

Getting on the Right Track: Real-World Approaches to Climate Change Adaptation

March 22, 2012

Becky Lupes
Sustainable Transport and Climate Change Team
Office of Planning, Environment, & Realty
Federal Highway Administration

Pilot Program Goals

- Help DOTs and MPOs more quickly advance existing adaptation assessment activities

- Assist FHWA in test driving our climate change vulnerability and risk assessment framework

Climate Change Vulnerability and Risk Assessment Pilot Locations

Pilot: Metropolitan Transportation Commission

- Focused on a portion of San Francisco Bay
- Sea level rise only
- Looked at subset of road, transit, facility, and ped/bike assets
- Created “asset risk profiles”
- Explored potential near term and long term adaptation strategies
- Next Steps:
  - Communicate findings
  - Further Analysis, more detailed adaptation planning
  - Move toward implementation

Asset Risk Profile

Coliseum / Oakland Airport BART Station (T-04)

Asset Location / Jurisdiction
Oakland / BART
Summary The Coliseum / Oakland Airport BART Station is a transit facility serving East Oakland neighborhoods and includes bus transfer and parking facilities. Pedestrian connections are available to Oakland Coliseum Amtrak Station, and frequent and direct bus service is provided from the BART station to Oakland International Airport. The future Oakland Airport BART Connector, currently under construction, will provide an automated guideway transit connection between the station and the airport. Due to lack of data, this asset was not rated with respect to sensitivity. Exposure is rated low, due to inundation under only 100-year SWEL + wind waves for both the 16" and 55" SLR scenarios. No adequate alternative station exists for the Coliseum / Oakland Airport BART Station, resulting in a medium vulnerability rating. Consequence is rated high for capital improvement costs, commuter use, and socioeconomic impact; moderate for time to rebuild; and low for public safety and goods movement, which does not apply. The overall consequence rating is 3.33, making this a medium-risk asset.
Characteristics: • Elevated • Commuter route • Transit routes [3 BART Lines; AC Transit: 45, 46, 73, 98, 356, 805]

Sensitivity	
Data unavailable in project timeframe.	
Liquefaction Susceptibility	Medium
Exposure: Low	
Maximum Inundation Depths	
16" + MHHW	0 ft
16" + 100-yr SWEL	0 ft
16" + 100-yr SWEL + wind waves	YES
55" + MHHW	0 ft
55" + 100-yr SWEL	0 ft*
55" + 100-yr SWEL + wind waves	YES
Inadequate Adaptive Capacity (16" SLR): High No adequate alternative station	
Vulnerability Rating (mid century): Medium	

*The asset is inundated to 0.3 ft at 55" + 100-yr SWEL SLR scenario, which was rounded down to 0 ft due to resolution limitations of the mapping

Projected Inundation with 16 inch SLR + 100-yr SWEL

Projected Inundation with 55 inch SLR + 100-yr SWEL

Pilot: Virginia DOT –Hampton Roads

- Developed a priority setting model
- For use in transportation planning
- Multicriteria analysis included climate change impact scenarios
- Model is available for use by other regions
- Results being used by Hampton Roads PDC as they update their transportation plan.

Dam Neck Road

Baseline Ranking	**18**
Highest Ranking	**3** (S5. Traffic Scenario)
Lowest Ranking	**20** (S4. Ecology Scenario)
Influential Criterion	PU-HW.C1 Congestion Level

Laskin Road

Baseline Ranking	**20**
Highest Ranking	**15** (S1. Climate Scenario)
Lowest Ranking	**42** (S2. Economy Scenario)
Influential Criterion	PU-HW.C3 Cost Effectiveness

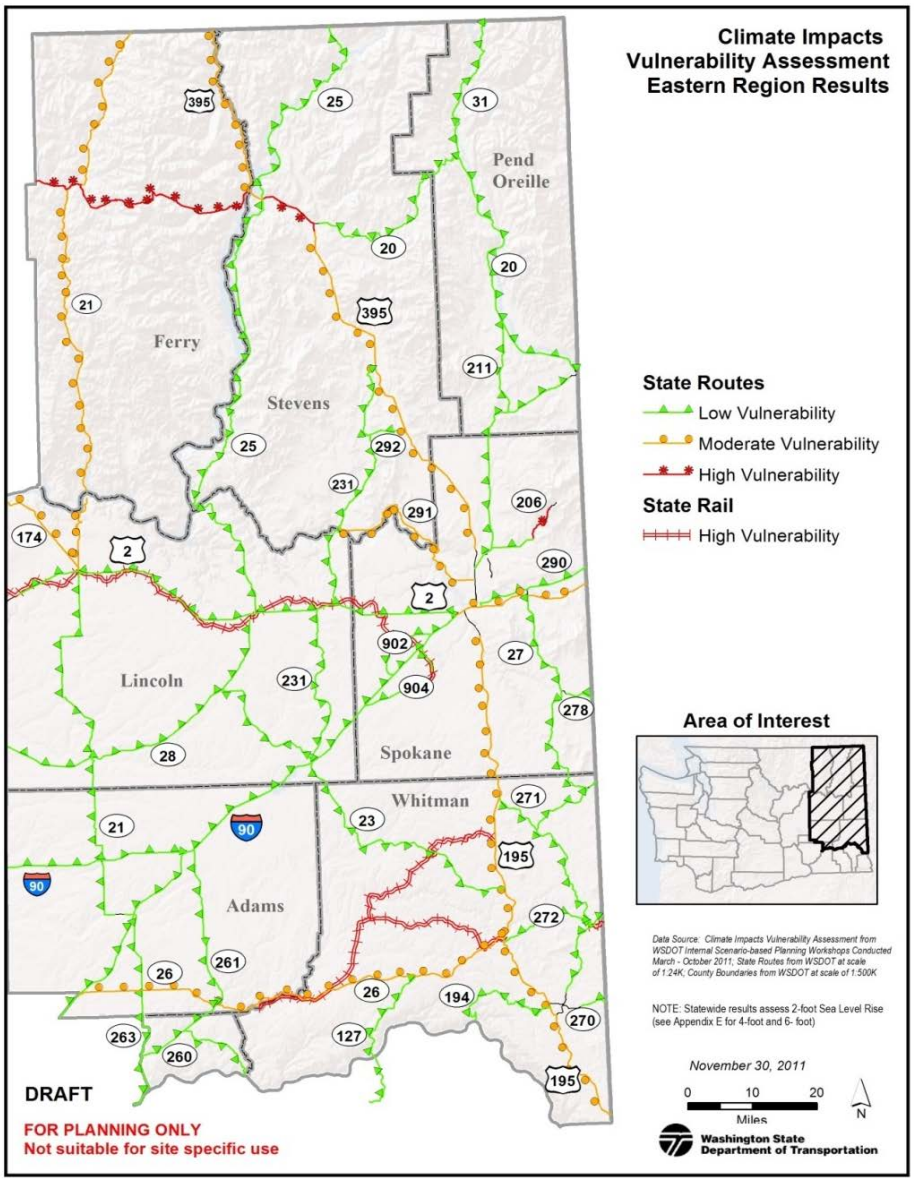
Pilot: Oahu MPO

Asset	Overall Value	Impact to Society from:		
		Storm Surge	Sea Level Rise	Heavy Rain/Storm Events
Honolulu Harbor		Moderate	Low	Low
Honolulu International Airport				
TheBus (811 Middle Street)	High	Low	Low	Low
Oahu Baseyard (727 Kakoi Street)	Low	Low	High	Low
Honolulu International Airport and Access	High	High	Low	Low
Kalaeloa/Barbers Point				
Kalaeloa Airport	Low	Low	High	Low
Campbell Industrial Park	High	High	Low	Low
Kalaeloa Barbers Point Harbor	High	High	Low	Low
Three Waikiki Bridges	Moderate	High	High	Low
Farrington Highway on Waianae Coast	High	High	High	Low

- Held 2 day interagency workshop to select assets for further study
- Performed qualitative risk assessment on each asset
- Low budget
- Emergency management and interagency collaboration focus

Pilot: Washington State DOT

- Statewide geographic scope
- Studied WSDOT owned and managed facilities
- Workshops covering the state.
  - “What keeps you up at night?”
- Putting information in one comprehensive, searchable format.
- Next Steps:
  - Develop a focused strategy to define how the agency will incorporate results
  - Further analysis
  - Communicating Internally and Externally



Lessons Learned

- **These studies can take a lot of time!**
  - Allocate more than one year
  - Assume at least a half an FTE for the study time period
- **Define study objectives and scope up front**
  - Who is the target audience? What products are needed? What level of detail is required?
  - Select and characterize relevant assets- so you don't spend time collecting data on assets you aren't going to study
  - Identify climate impacts of concern, and identify thresholds for impacts.
- **There are multiple approaches**
  - Depending on specific objectives, geographies, available funding…

Lessons Learned

- **It's an iterative process**
  - Findings in one area influence data gathering or analysis in another.
  - Not linear step by step
- **Increased emphasis on vulnerability rather than criticality**
  - Political
  - Consider your objectives
- **Collecting data on assets was challenging**
  - Inconsistent availability
  - Piecing together networks, differing formats
- **Likelihood and risk challenges**

Lessons Learned - Messaging

- **Focus on extreme events now and those being more common in the future**
  - "What keeps you up at night?"
- **Focus on solutions and asset management**
  - Emphasize strategies that work rather than always "disaster"
- **Use maps and pictures to share results**

Thank you

For more information:

www.fhwa.dot.gov/hep/climate/pilots.htm

www.fhwa.dot.gov/hep/climate

Becky Lupes
Sustainable Transport and Climate Change Team
Office of Planning, Environment and Realty
Federal Highway Administration
202-366-7808
Rebecca,Lupes@dot.gov