

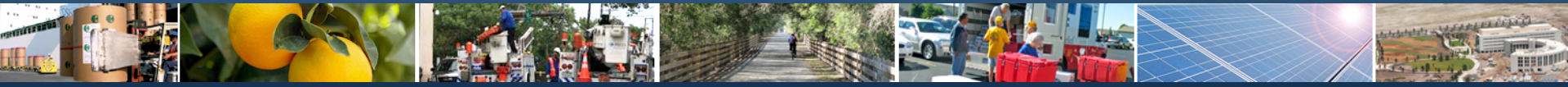


River to Sea TPO Sea Level Rise Vulnerability Assessment

Presentation to the BPAC
November 9, 2016



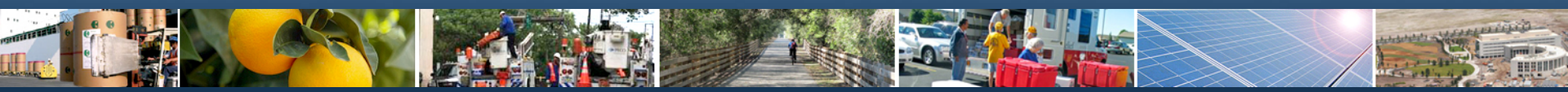
What is a Vulnerability Assessment?



Assessment of vulnerability of various aspects of land-use, assets, society and ecosystems to certain hazards with the end goal of enhancing resiliency.

Includes findings, tangibles of assessment, maps, and recommendations.

What is Resiliency?

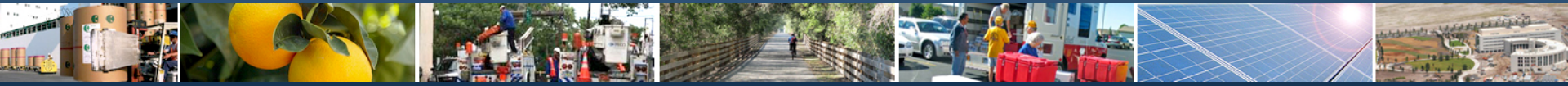


Bouncing back – return to its pre-shock condition or continue on its pre-shock path.

Ability to absorb shock – systems that continue to function after a shock even though their structure and organization may change.

Positive adaptability – systems that are in states of constant adaptation in anticipation of and in response to shocks.

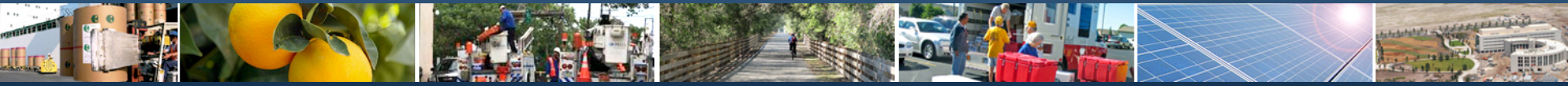
Why have a Vulnerability Assessment?



Conditions resulting from climate change have included higher temperatures, increased precipitation and/or severe drought, and an overall rise in sea level worldwide.

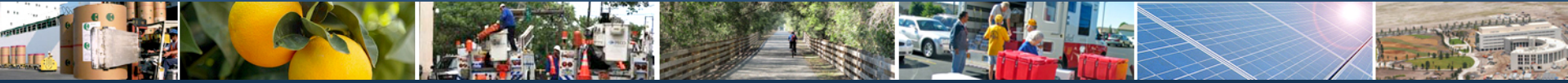
The purpose of a vulnerability assessment is to provide a preliminary examination of potential sea level rise, erosion, and coastal flooding impacts.

Vulnerability Assessment Directives



- Executive Order 13653: Preparing the United States for the Impact of Climate Change (November 2013)
- FAST Act: expands the focus on the resiliency of the transportation system and requires strategies to reduce the vulnerability of existing transportation infrastructure to natural disasters
- Florida Statutes, Section 163.3178: includes sea level rise as one of the causes of flood risk that must be addressed in “redevelopment principles, strategies, and engineering solutions.”

Areas of Assessment



River to Sea
Transportation Planning Organization
Sea Level Rise
Vulnerability Assessment

July 2016

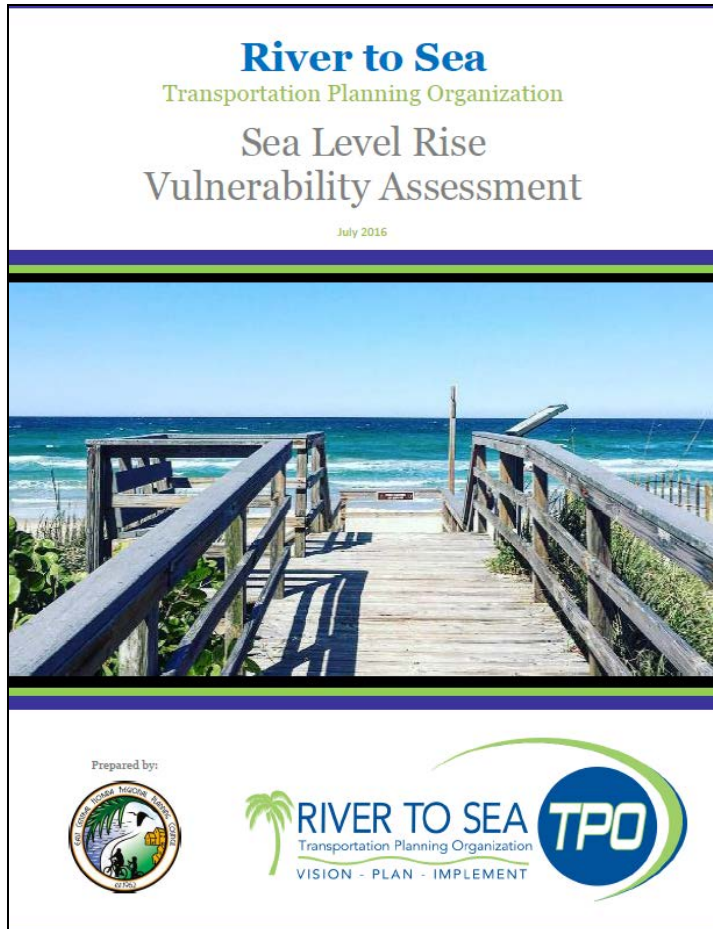
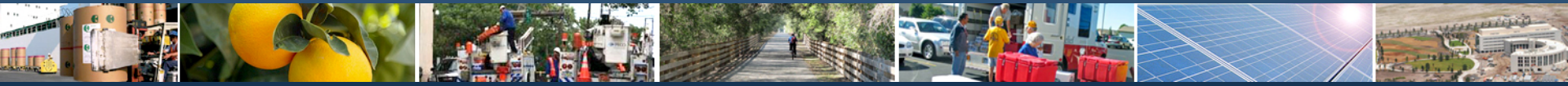


Prepared by:



- Designated evacuation routes
- Major roadway network
- Fleet storage facilities
- Public Works facilities
- Emergency Management Centers
- Other storage facilities necessary for transportation or evacuation purposes
- Sidewalks and Trails

Importance to River to Sea TPO



Increased flooding of transportation infrastructure (tidal and heavy rainfall)

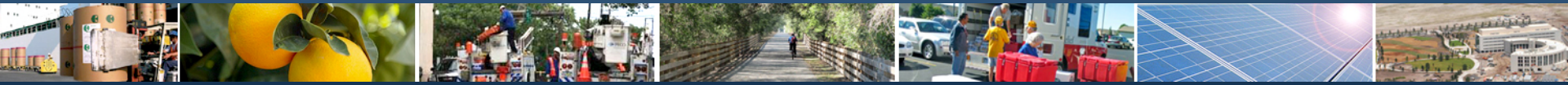
- *Loss of roadway, sidewalk and trail capacity*
- *Loss of evacuation routes*
- *Degradation of infrastructure*
- *Loss of access to/utilization of facilities (fleet fueling/storage; evac centers)*

Compromised stormwater systems

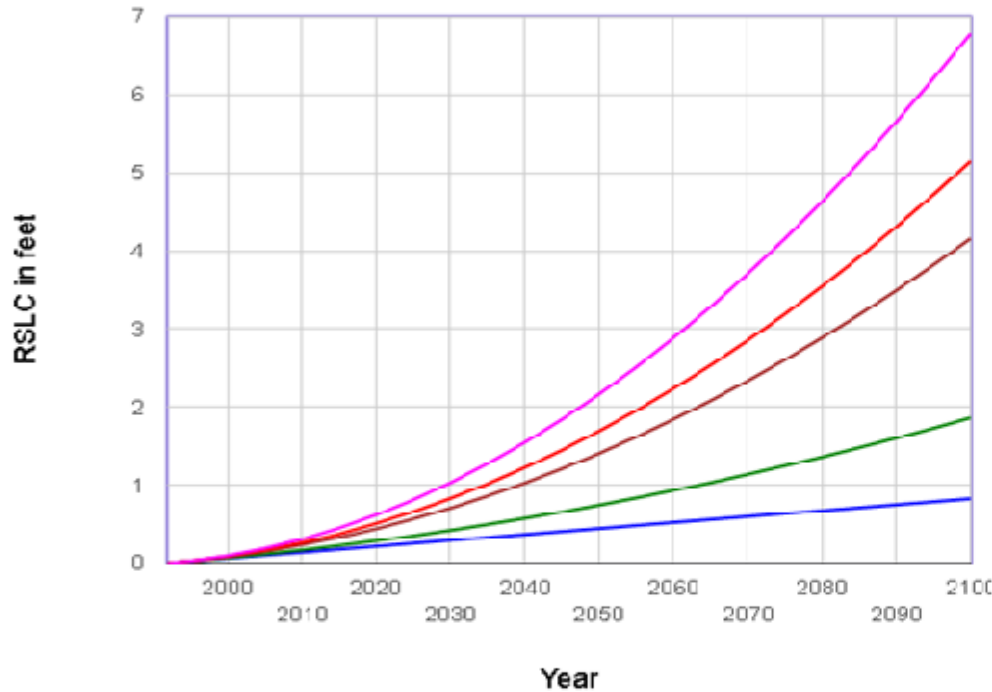
- *Limited stormwater storage (ponds and groundwater)*
- *Malfunctioning canals and drainage*

Solutions and planning take time.

Sea Level Rise Projections



Estimated Relative Sea Level Change Projections From 1992 To 2100 -
Gauge: 8721120, Daytona Beach Shores, FL (2.32 mm/yr)



[Print Curves](#)

- █ NOAA High Rate
- █ USACE High Rate
- █ NOAA Int High Rate
- █ NOAA Int Low Rate/USACE Intermediate
- █ NOAA Low Rate/USACE Low

Sea Level Rise (inches) - Daytona Beach Shores: 8721120			
Year	Low	Intermediate	High
2040	4.38	6.84	14.63
2070	7.12	13.62	34.19
2100	9.86	22.31	61.76

Army Corps of Eng. Curves

Projection Rate Curves NOAA VS USACE

Volusia County | Evacuation Routes

Year and Estimated Miles Inundated (by Projection Rate Curve)

Roadway	Year and Estimated Miles Inundated (by Projection Rate Curve)								
	Low			Intermediate			High		
	2040	2070	2100	2040	2070	2100	2040	2070	2100
CR 4019 (LPGA Blvd.)						0.2 mi			0.6 mi
CR A1A (Atlantic Ave./Turtle mound)			<0.25 mi			0.9 mi			8 mi
State Highway A1A			<0.25 mi			<0.25 mi	0.5 mi		8.5 mi
Interstate 4			<0.25 mi			<0.25 mi			0.3 mi
Interstate 95			<0.25 mi			<0.25 mi			0.3 mi
Silver Beach / Orange Ave.			<0.25 mi			<0.25 mi			0.3 mi
State Road 40						<0.25 mi			0.4 mi
State Road 415			<0.25 mi			<0.25 mi			0.9 mi
State Road 421									<0.25 mi
State Road 430						<0.25 mi			0.8 mi
State Road 44									0.7 mi
State Road 48			<0.25 mi			<0.25 mi			<0.25 mi
State Road 5A									<0.25 mi
US Highway 1			<0.25 mi			<0.25 mi	<0.25 mi		11 mi
US Highway 92						<0.25 mi			0.5 mi

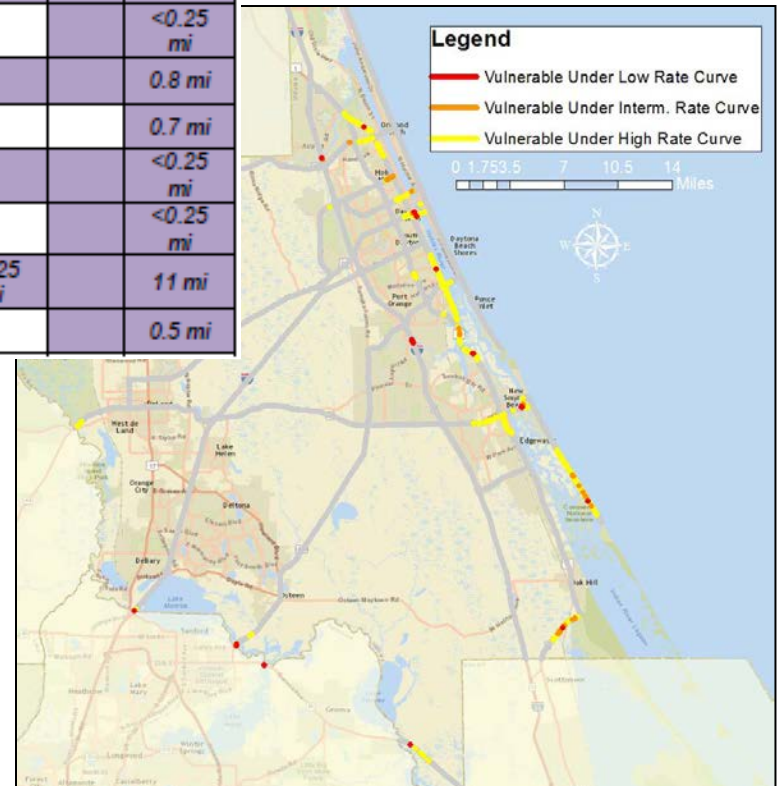
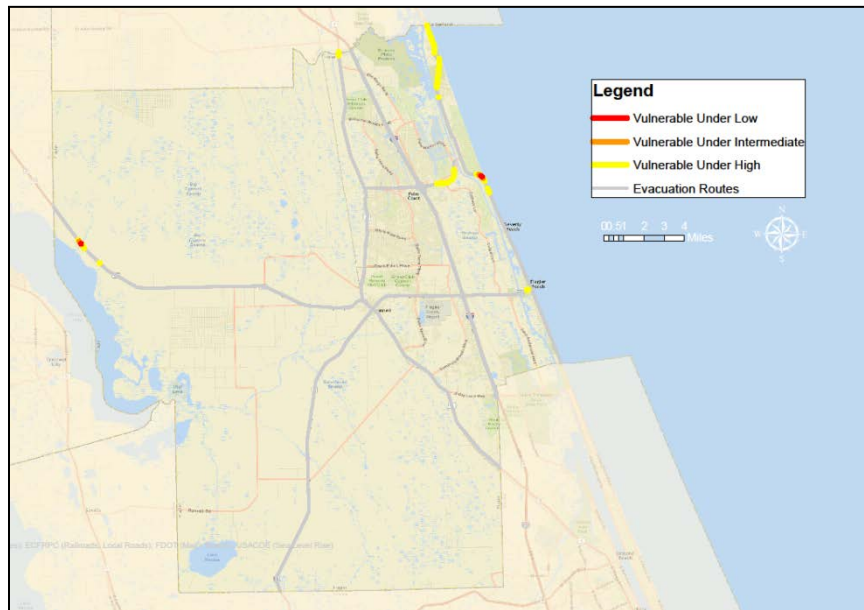


Table 2: Evacuation Route Projected Impacts from Sea Level Rise - Flagler County

Flagler County Evacuation Routes									
Roadway	Year and Estimated Miles of Potential Inundated (by Projection Rate Curve)								
	Low			Intermediate			High		
	2040	2070	2100	2040	2070	2100	2040	2070	2100
Hammock Dunes Parkway									0.18 mi
Oceanshore Boulevard									0.31 mi
Palm Coast Parkway									0.58 mi
State Highway 100/Moody Boulevard			<0.25 mi			<0.25 mi			0.9mi
State Highway 5									<0.25mii
State Highway A1A			<0.25 mi			0.3 mi			4.31 mi
Surfview Drive									0.41 mi



Next Steps

- Adopt a standard for modeling the impacts of sea level rise
- Incorporate transportation system resiliency and reliability into TPO plans and priorities
- Continue to assess impacts to include storm surge



Contact Information:

Tara McCue

Tara@ecfrpc.org

East Central Florida

Regional Planning Council

Stephan Harris

SHarris@r2ctpo.org

River to Sea TPO

