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TRB TRANSPORTATION RESEARCH BOARD

TRB Webinar: Community- Based and Equitable Transportation Response in Disaster

July 19, 2023

12:00 – 1:30 PM



PDH Certification Information

1.5 Professional Development Hours (PDH) – see follow-up email

You must attend the entire webinar.

Questions? Contact Andie Pitchford at TRBwebinar@nas.edu

The Transportation Research Board has met the standards and requirements of the Registered Continuing Education Program. Credit earned on completion of this program will be reported to RCEP at RCEP.net. A certificate of completion will be issued to each participant. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the RCEP.

ENGINEERING



REGISTERED CONTINUING EDUCATION PROGRAM

AICP Credit Information

1.5 American Institute of Certified Planners Certification Maintenance Credits

You must attend the entire webinar

Log into the American Planning Association website to claim your credits

Contact AICP, not TRB, with questions

Purpose Statement

This webinar will center on equity in vulnerable populations, community resilience, and transportation resources across all phases of a disaster.

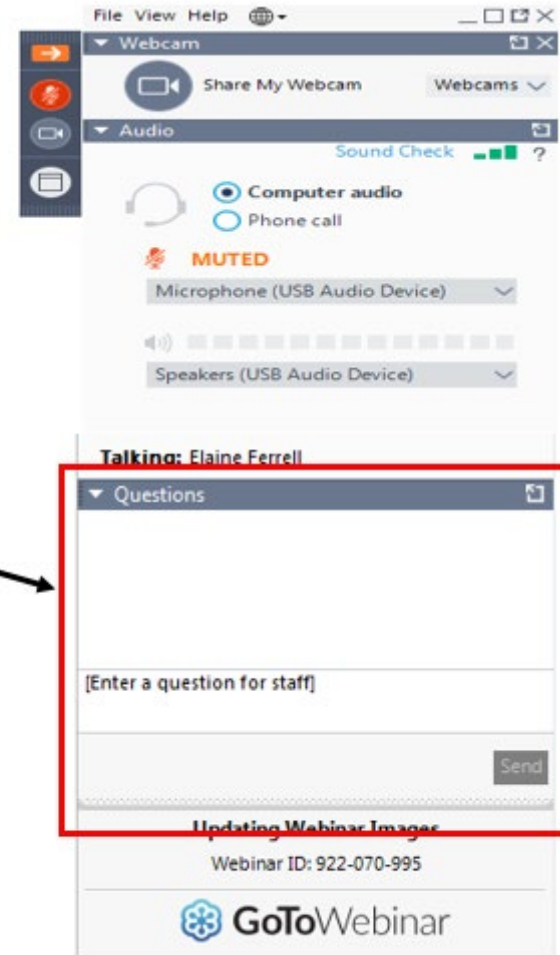
Learning Objectives

At the end of this webinar, you will be able to:

- (1) Identify key elements of equitable transportation planning in response to a disaster
- (2) Utilize research tools and techniques for practical applications and identify research needs
- (3) Support equity-centered public safety policy

Questions and Answers

- Please type your questions into your webinar control panel
- We will read your questions out loud, and answer as many as time allows



Today's presenters

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ENGAGING COMMUNITIES TO PLAN FOR COASTAL FLOODING USING VIRTUAL REALITY

John L. Renne, Ph.D., AICP

Professor and Director

Center for Urban and Environmental Solutions

Department of Urban and Regional Planning

School of Environmental, Coastal, and Ocean Sustainability (ECOS)

Charles E. Schmidt College of Science

Florida Atlantic University

Research Associate (Fall 2023)

Transport Studies Unit

School of Geography and the Environment

University of Oxford



Downtown West Palm Beach

November 17, 2021





HURRICANE IAN

Hurricane Ian destroyed sections of the Sanibel Causeway in Florida, cutting off access to the island community

“We are counting five major breaches,” one local official said.

A1A, scenic road along Florida's coast, washed out by Tropical Storm Nicole

By Kiah Armstrong | Published November 10, 2022 | Hurricane Nicole | FOX 35 Orlando

Owners of Florida beachfront homes left heartbroken from Hurricane Nicole's destruction

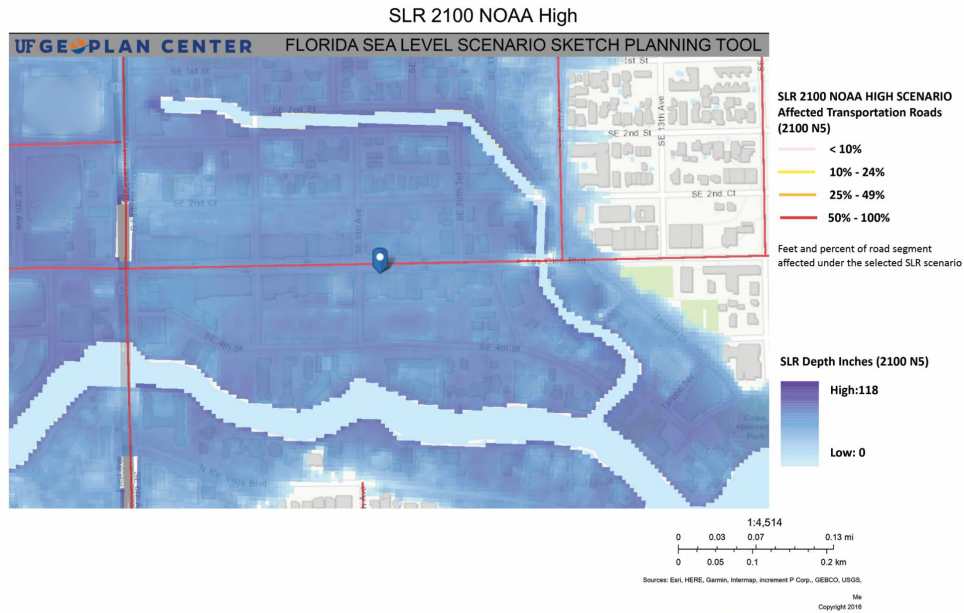
At least 25 beachfront houses have been deemed unsafe along Wilbur-by-the-Sea. It's been difficult for residents living there trying to protect their homes.

FLAGLER COUNTY, Fla. - A1A - a typically picturesque scenic road that travels alongside Florida's eastern coast - has been severely damaged in wake of Hurricane Nicole.

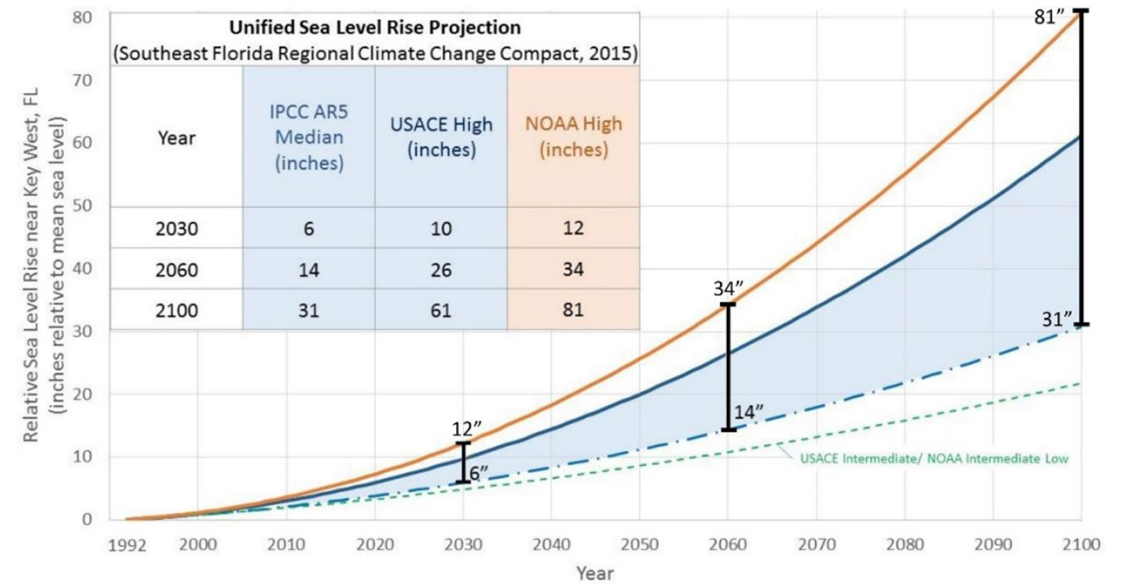




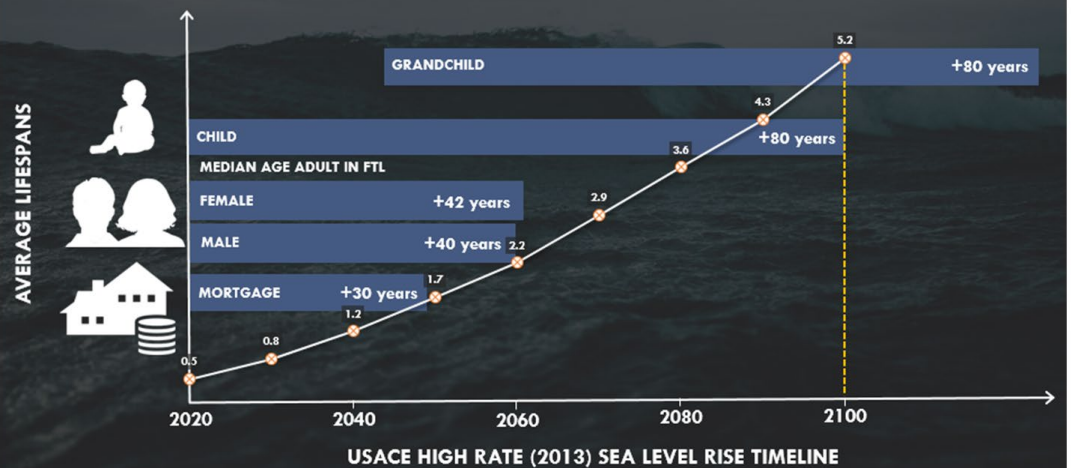
Success for *All*



Fort Lauderdale



SEA LEVEL RISE TIMELINE VS. AVERAGE LIFESPAN SPECTRUMS





Success for *All*

Waikiki, Honolulu, Hawaii



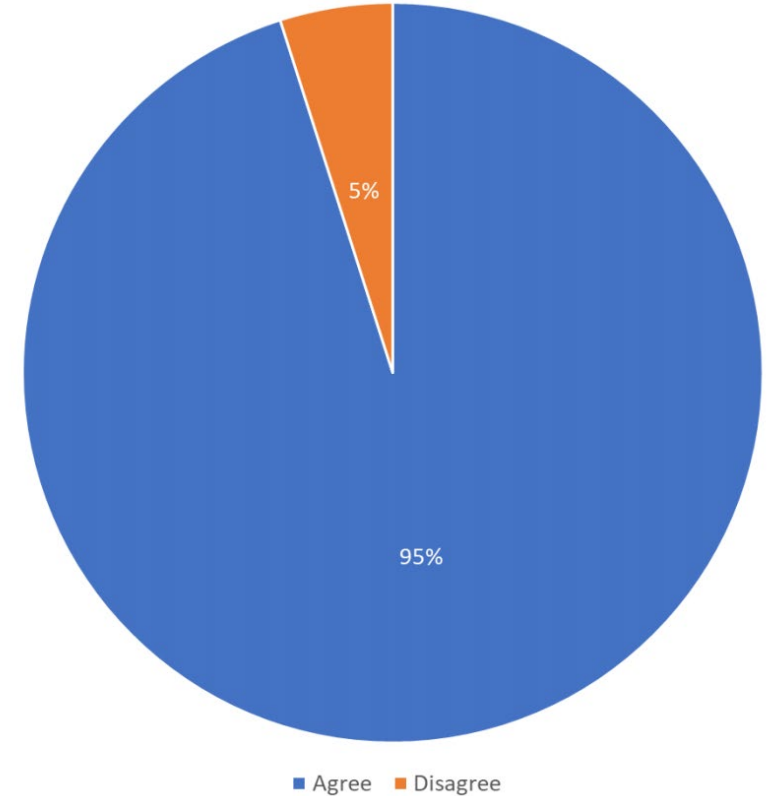
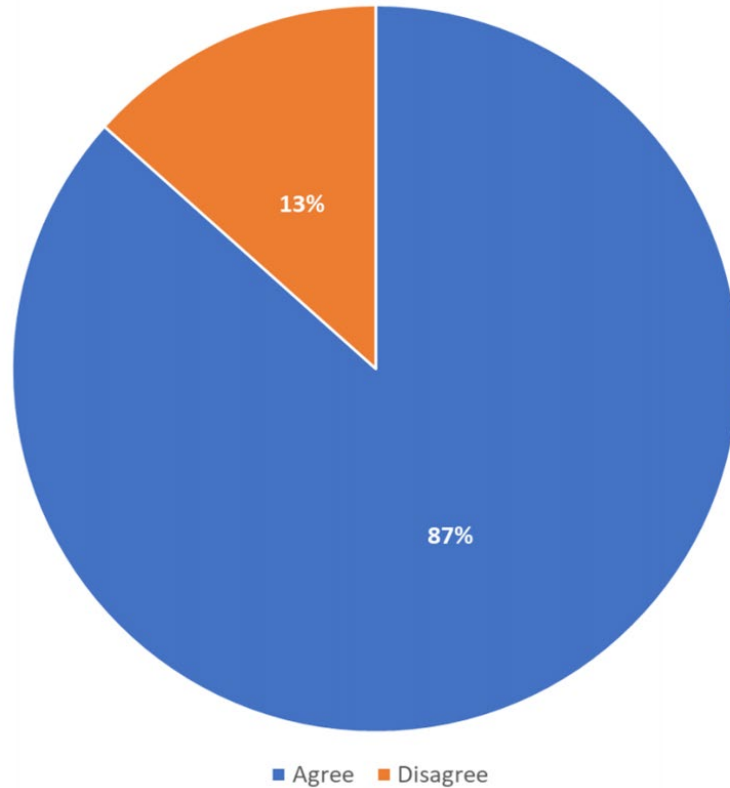


Success for *All*

Waikiki, Honolulu, Hawaii

After visualizing the street in the video simulation, I am better able to understand the data depicted in the charts/graphs.

People in my community would benefit from the video simulation.





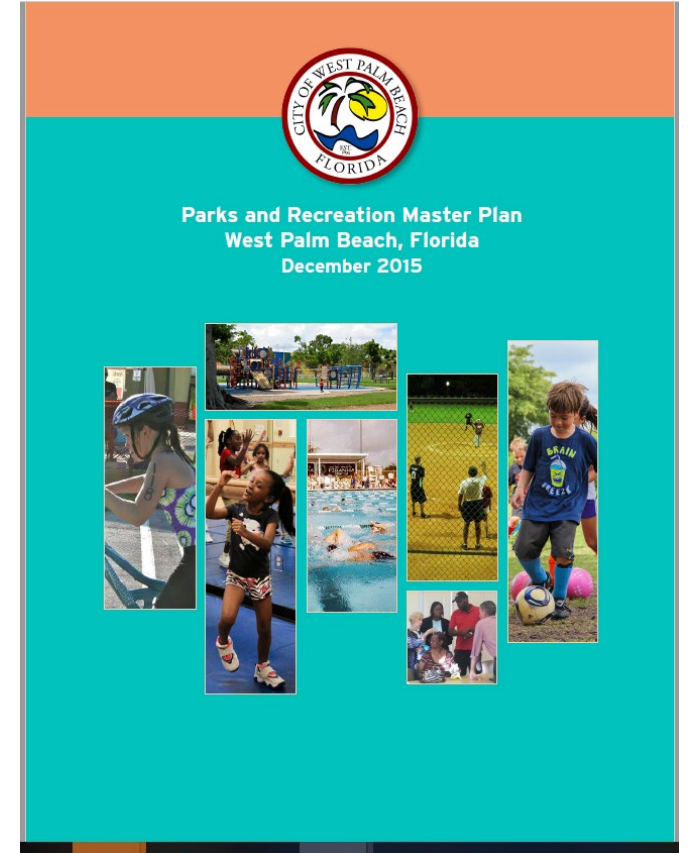
Success for *All*

Project Purpose

Visualizing Sea Level Rise in West Palm Beach

The City of West Palm Beach has been awarded \$450,000.00 funding for a participatory planning project to act on mitigation strategies that enhance overall resilience.

The project engages the community on the topic of sea-level rise using immersive technology.





Success for *All*

Project Team Members



**Chris
Roog**
City of
West Palm Beach



**Penni
Redford**
City of
West Palm Beach



**John
Renne**
FAU



**Serena
Hoermann**
FAU



**Fred
Bloetscher**
FAU



**Juliano
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Virtual Planet
Technologies



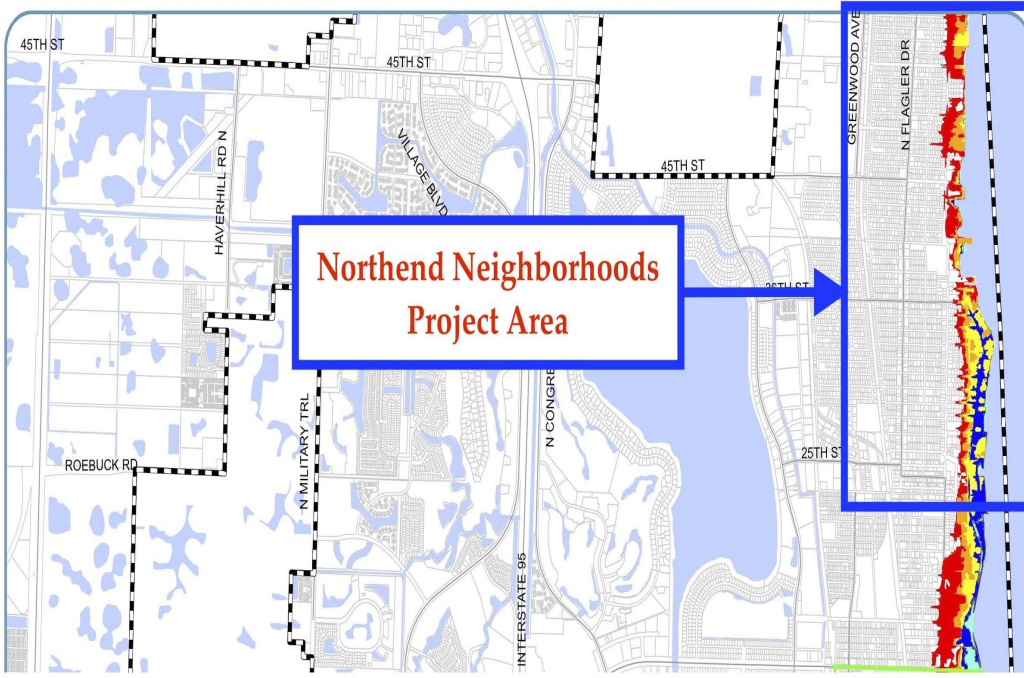
**Anna Carolina
Muller**
Stanford University

Jonathan Paine, Paine Productions
Amir Koleini, Nanda + Partners, LLC



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Study Area



**Northend Neighborhoods
Project Area**

- Legend**
- 2014 TCRPC Coastal Storm Surge Areas
 - Category 1 Hurricane
 - Category 2 Hurricane
 - Category 3 Hurricane
 - Category 4 Hurricane
 - Category 5 Hurricane
 - Downtown Area
 - City Limits
 - Water
 - Owner Parcels

WEST PALM BEACH

The Data is provided "as is" without warranty or any representation of accuracy, timeliness or completeness. The burden for determining accuracy, completeness, timeliness, merchantability and fitness for or the appropriateness for use rests solely on the requester. The City of WPS & Palm Beach County make no warranties, express or implied, as to the use of the licensed Data. There are no implied warranties of merchantability or fitness for a particular purpose. The requester acknowledges and accepts the limitations of the Data, including the fact that the Data is dynamic and is in a constant state of maintenance, correction and update.

Comprehensive Plan Map Series

PLANNING DIVISION

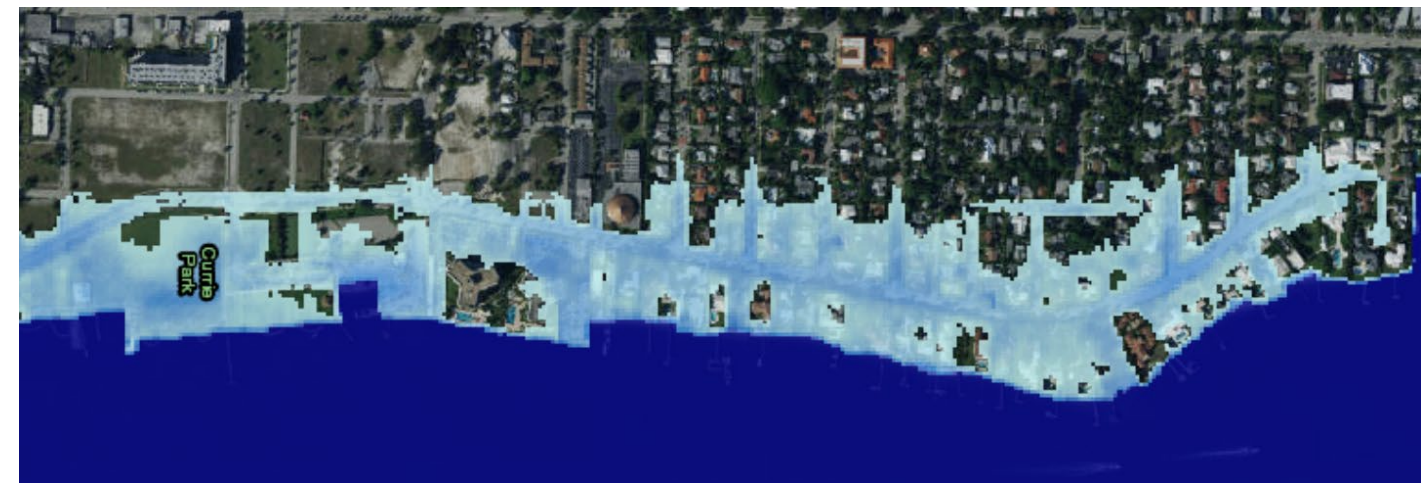
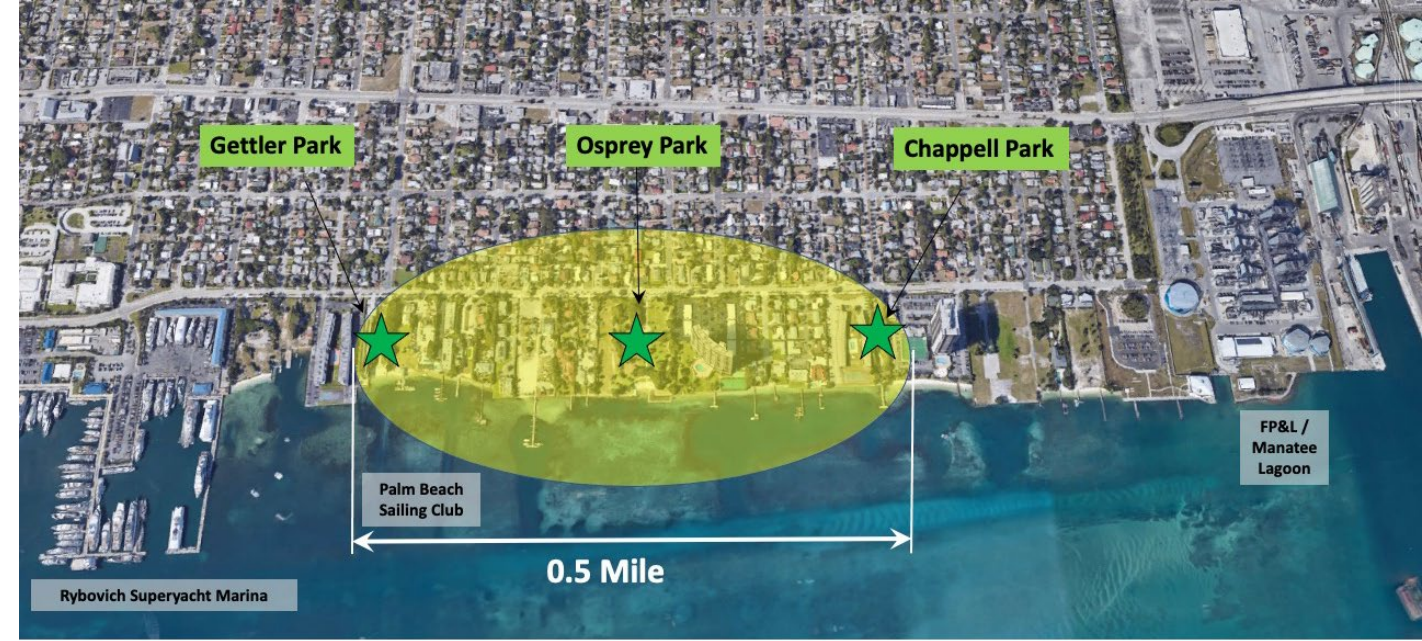
Source: Florida Hurricane Evacuation Study - Treasure Coast Regional Planning Council; 2014

File: 8_CoastalHighHazardArea_0705_2016.mxd / pdf

Date: 9/8/2016

Map 8: Coastal High Hazard Area (Category 1-5 Hurricane Surge Area)

K:\Planning\Comp_Plan_Maps\MAPS2016_Comp_Plan_Maps\Final_Draft_EAR_GIS_Maps\8_CoastalHighHazardArea_0705_2016.mxd

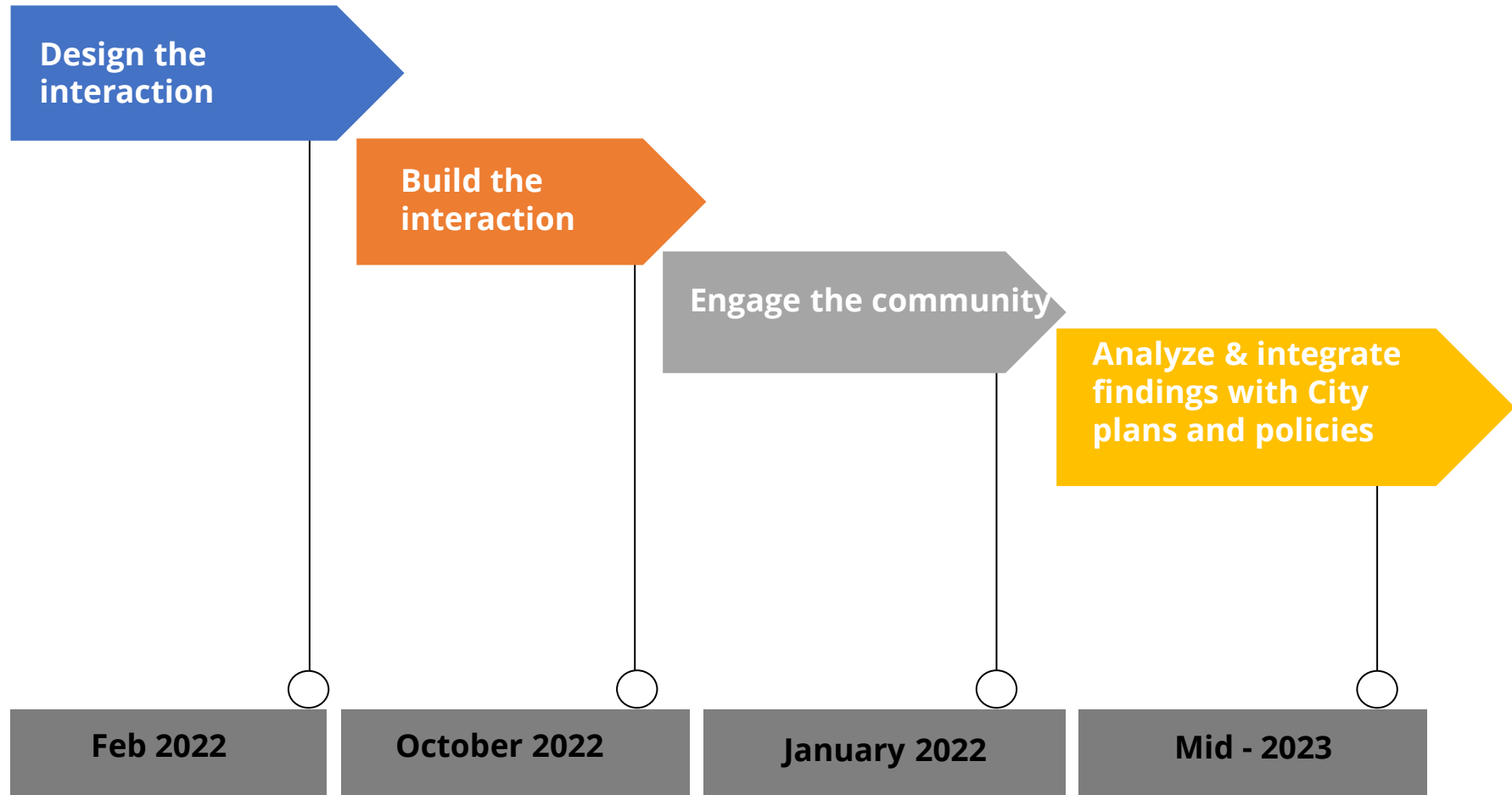


National Oceanic and Atmospheric Administration sea level projections at 4 feet



Success for *All*

Project Timeline





Success for *All*

VR ENGAGEMENT EVENTS		
October 29	9 am – 1 pm	WPB GreenMarket
November 5	9 am – 3 pm	Lagoonfest
November 8, 9, 12	1 pm – 4:30 pm	Mandel Public Library/Urban Living Room
November 9*	6 pm – 8 pm	Meet the Chief at Boys & Girls Club
November 11	7 pm	Screen on the Green
November 15**	Poster session	Lake Worth Lagoon Science Symposium
November 19, 21	11 am—2 pm	Cox Science Center
December 8-9**	9 am – 4 pm	Southeast FL Regional Climate Leadership Summit
December 10	10 am – 12 pm	FAU Pine Jog Environmental Education Center
January 7	10 am – 12 pm	NCON General Meeting at Manatee Lagoon
January 19, 20 ,21	1 pm – 4:30 pm	Mandel Public Library/Urban Living Room
January 27	6 pm – 9 pm	Norton Museum of Art/Art After Dark

** Cancelled - Hurricane Ian **Extending the project's impact*





Success for *All*

Methodology

- See the VR or 360-degree film
- Answer a survey
- 17 public engagement opportunities
- 269 completed surveys





Success for *All*

Findings

- **In VR, as opposed to the 360-video, people found the adaptation strategies (seawall and nature-based solutions) depicted to be more effective.**
- **In VR, as opposed to the 360-video, the emotional response was higher.**
- **In VR, as opposed to the 360-video, people were more receptive to be informed about future strategies to mitigate the impacts of flooding in my community.**



Success for **All**

Findings

“This is really amazing. It is just astonishing. I’ve never seen anything like it.”

Dr. Jennifer Jurado, Chief Resilience Officer, Broward County

“The Virtual Reality experience was quite enlightening. This technology demonstrated in unambiguously clear terms the devastating impact of sea level rise on our City. I was also impressed with the demonstration of the impact of mitigation measures that could be employed to counter the effects of sea level rise.”

Keith A. James, Mayor, City of West Palm Beach



**Mayor
Keith
James**

Thank You!

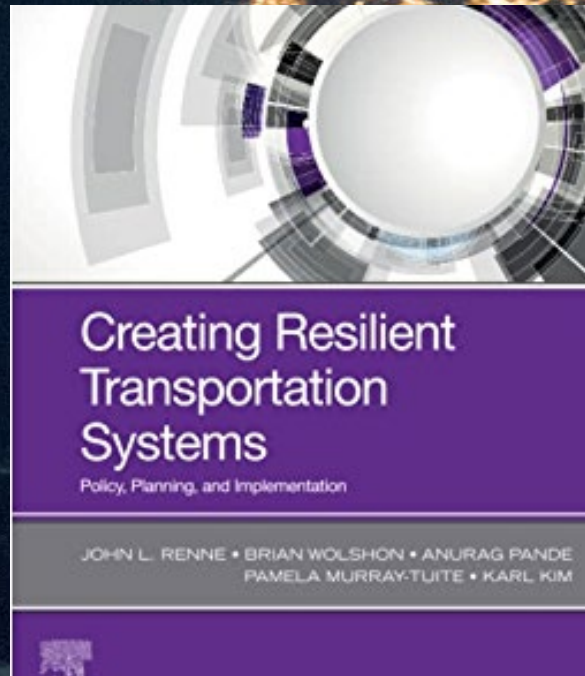
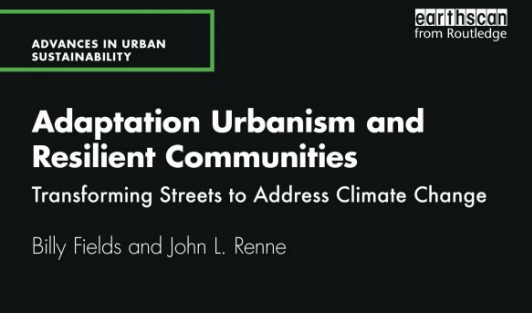
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Incorporating vulnerability and equity: Wildfire evacuation perspective

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Postdoctoral Researcher

Department of Civil &
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University of Vermont

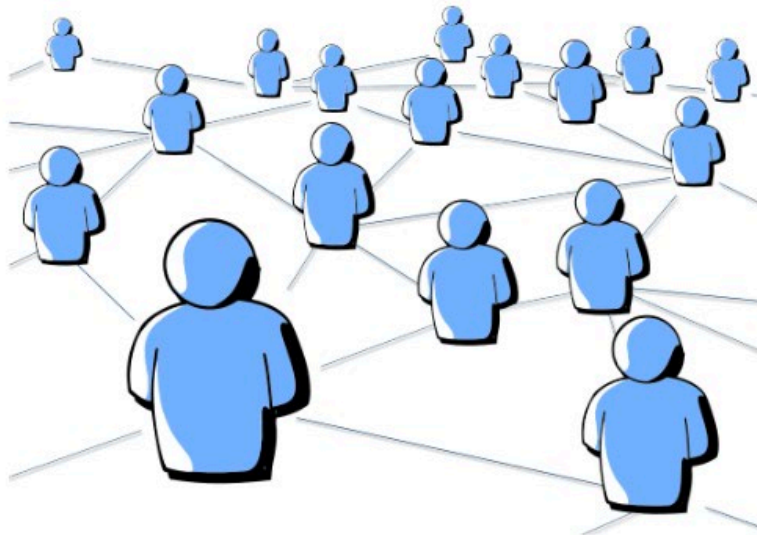
July 19th, 2023



THE UNIVERSITY OF VERMONT
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Introduction

- What is a community?
- What is vulnerability?
- What is equity?



Overview



Lessons from community-based flood risk management



Issues in wildfire evacuation



Post-evacuation and longterm effects

Learning from community-centered flood risk management

- "Complex, wicked problems"
- Proliferation of big data and maps
- Centering *people*, not the place
- Understanding community values
- Need new ways of connecting with communities



Learning from community-centered flood risk management

- Need to think of places as unique
- Focusing on the process of how communities have been made, historically
- Different types of equity to consider
- Need for outcome-related measures, beyond vulnerability and census metrics



Paradise, CA,
circa 1905

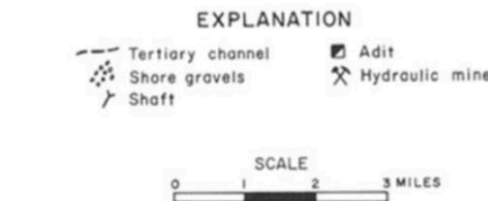


Figure 17. Sketch Map of Magalia District, Butte County. The northern part of the Butte Creek district is also shown. The channels are not all of the same geologic age.

Now, wildfires...



Kinkade Fire, 2019, Sonoma County, CA

Issues in Wildfire Evacuation

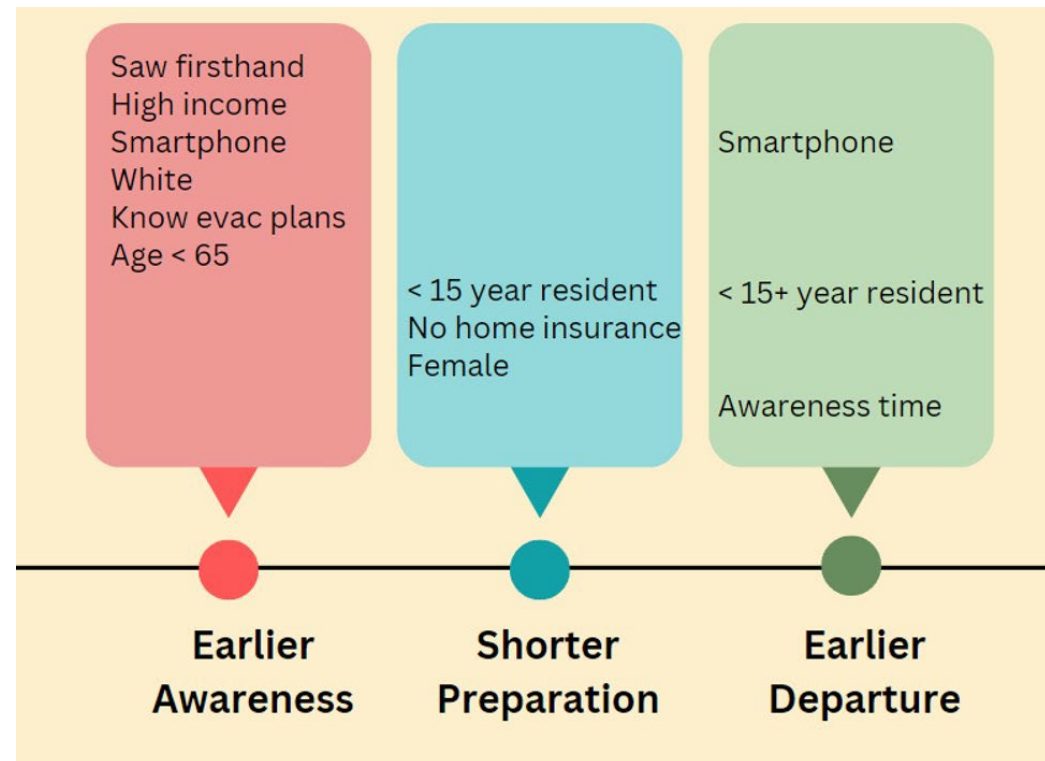
- Unequal exposure to risk
- Housing type
 - Renters
 - Mobile homes
 - Unhoused
- Emergency communications



Above: Camp Fire, Butte Co, CA, 2018
Below: Almeda Fire, Phoenix, OR, 2020

Issues in Wildfire Evacuation

- Evacuee response
- Vehicle access
- Medical/disability



Based on data from the 2018 Camp Fire, Butte Co., CA

Post-wildfire evacuation, short-term

- Securing housing
- Displacement
- Pets
- Housing quality
- Continued exposure to wildfire smoke
- Loss of vehicle and resources
- Mental stress and trauma



Tents outside East Avenue church, Chico, CA, 2018

Themes- Rapid 2018 Camp Fire qualitative study

- Difficulty securing shelter first few nights post-evacuation
- Transportation challenges while living at shelter
- Tensions with unhoused population in shelter
- Difficulty securing permanent housing (apartment, trailer, house, etc.)
- Uncertainty of when the shelter will close
- Shelter health conditions
- Concern over pets
- Government aid inadequate for low-income evacuees

“And then they want us to get temporary housing so when our money runs out, then what are we going to do? We're going to come back here?... We're not leaving until we get our money or they give us housing.” –Camp Fire evacuee and shelter resident

“FEMA divides the world pretty much into the homeowners with insurance and everybody else. So, I'm kind of in one of the favored few category. Not few, but a lot of people here didn't have insurance. They lost everything.” –Camp Fire evacuee and shelter resident

Post-wildfire evacuation, months-years-decades out

- Continued housing procurement issues
- Employment
- Displacement
- Loss of community, cultural heritage
- Land and water pollution



Cascading Risks: Calf Canyon/Hermit's Peak Blaze, 2022

- Historic indigenous communities
- Struggle to understand community's values and needs
- Demographics
 - Lower income, elderly
 - Living off the land
 - Language barriers
- Post-wildfire debris, flooding, poor air quality, livability of areas
- Ongoing process of repairing and compensating
- "Complex web of intergovernmental spending"

'Burning Down a Way of Life': Wildfire Rips Through a Hispanic Bastion

One of the largest wildfires in New Mexico's history is raging through a region where the culture stretches back longer than the United States has existed.

Final thoughts

- We don't know how to protect those with increased exposure (yet)
- Social science + engineering + indigenous knowledge
- Identifying unequally exposed groups varies and is not cookie-cutter
 - Medical/mobility needs
 - Language barriers
 - Cultural heritage communities
 - Non-property owners, Renters, Reverse-mortgage, Under-insured, Unhoused
 - Low social capital

Thank you!

Sarah Grajdura PhD, Postdoctoral Researcher
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Acknowledgements

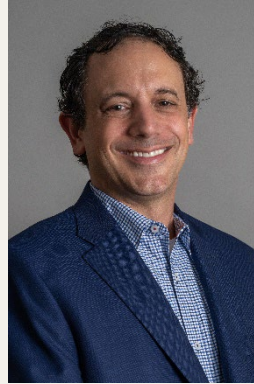
National Center for Sustainable Transportation
Deb Niemeier PhD, UMD College Park
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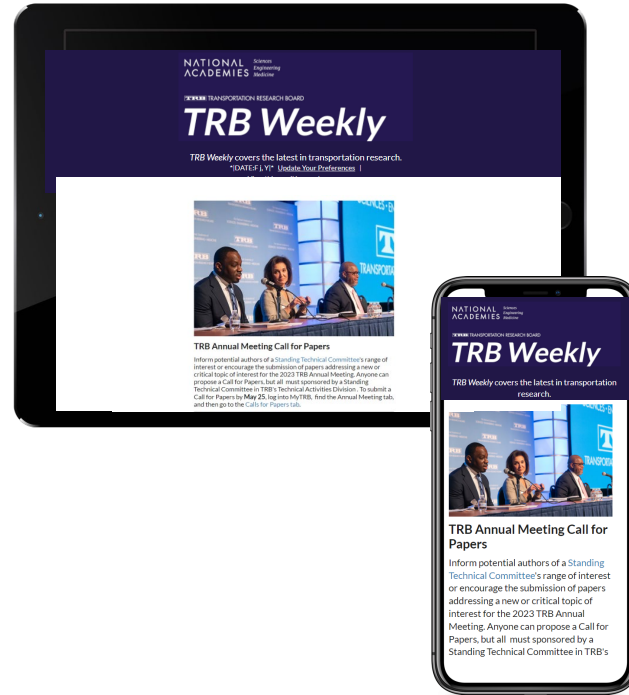
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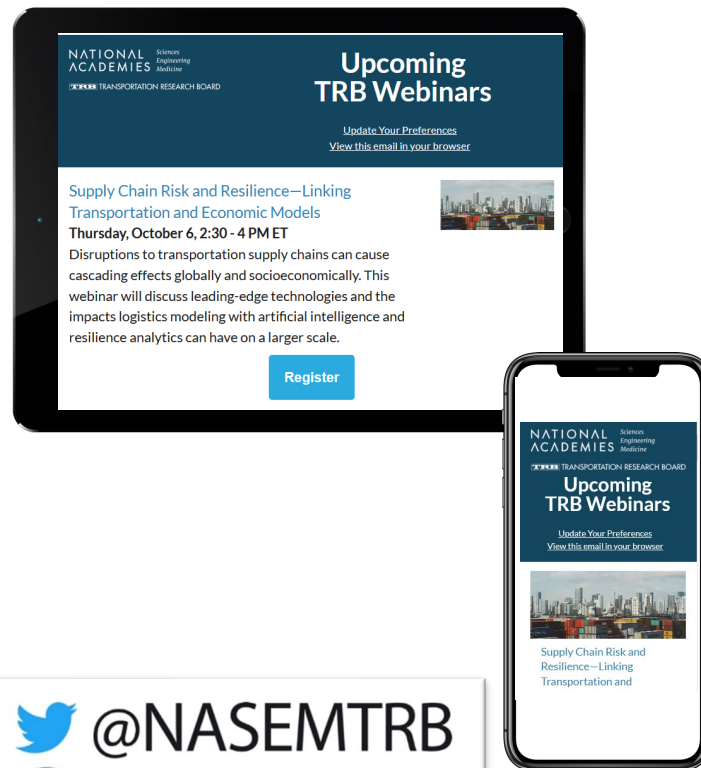
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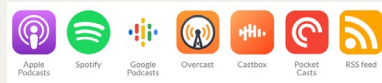
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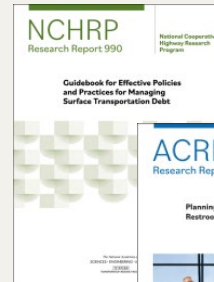
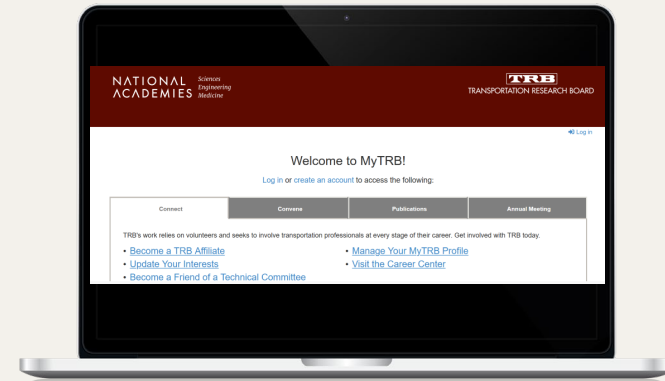
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