



Resilience Challenges for America's Seaports

Austin Becker, PhD

Associate Professor and Chair, Marine Affairs, URI

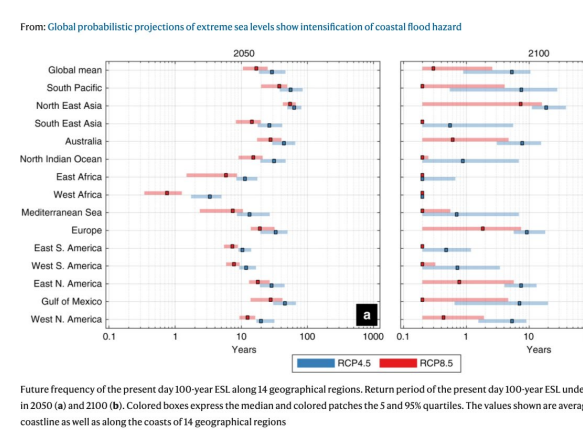
Program Director, Graduate Certificate in Coastal Resilience

NAS Marine Board

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Climate change presents big challenges



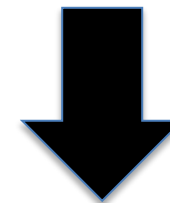
Graph from Vousdoukas et al, 2018, Hurricane Sandy photos courtesy Mary Lee Clanton, Port of NYNJ

Doubling of Cat 4 and 5 tropical storms

Sea levels to rise 0.75 – 1.9 meters by 2100

Increased precipitation

1-in-100 year storm event of today



Annual storm event of 2100

Storms impact ports inside AND outside the fenceline



Photograph GP_11

1) Direct damages

(e.g., structures, equipment, freight, land, etc.)



2) Indirect costs

(e.g., lost wages, business interruptions, cleanup costs, knock-on effects throughout supply chain)

Rotten Meat From Katrina Still in Gulfport Neighborhood

"It's nine months now. They say, 'Well, you ought to be used to it by now.' You ain't gonna get used to that smell. My gosh," said resident Gary Tatum.

The meat had been stored at the Port of Gulfport. Katrina washed it in to yards covering an eight block span. The meat in the yards has been picked up, but the meat in hard-to-see areas has not.

3) Intangible consequences

(e.g., quality of life, environmental damages, loss of essential services)

Responding to climate change is a “wicked problem”¹



Who should take the lead in implementing resilience strategies?

Barriers to adaptation

“...you can't control mo

“We need more information to run risk models...
(*Environmental Specialist*)

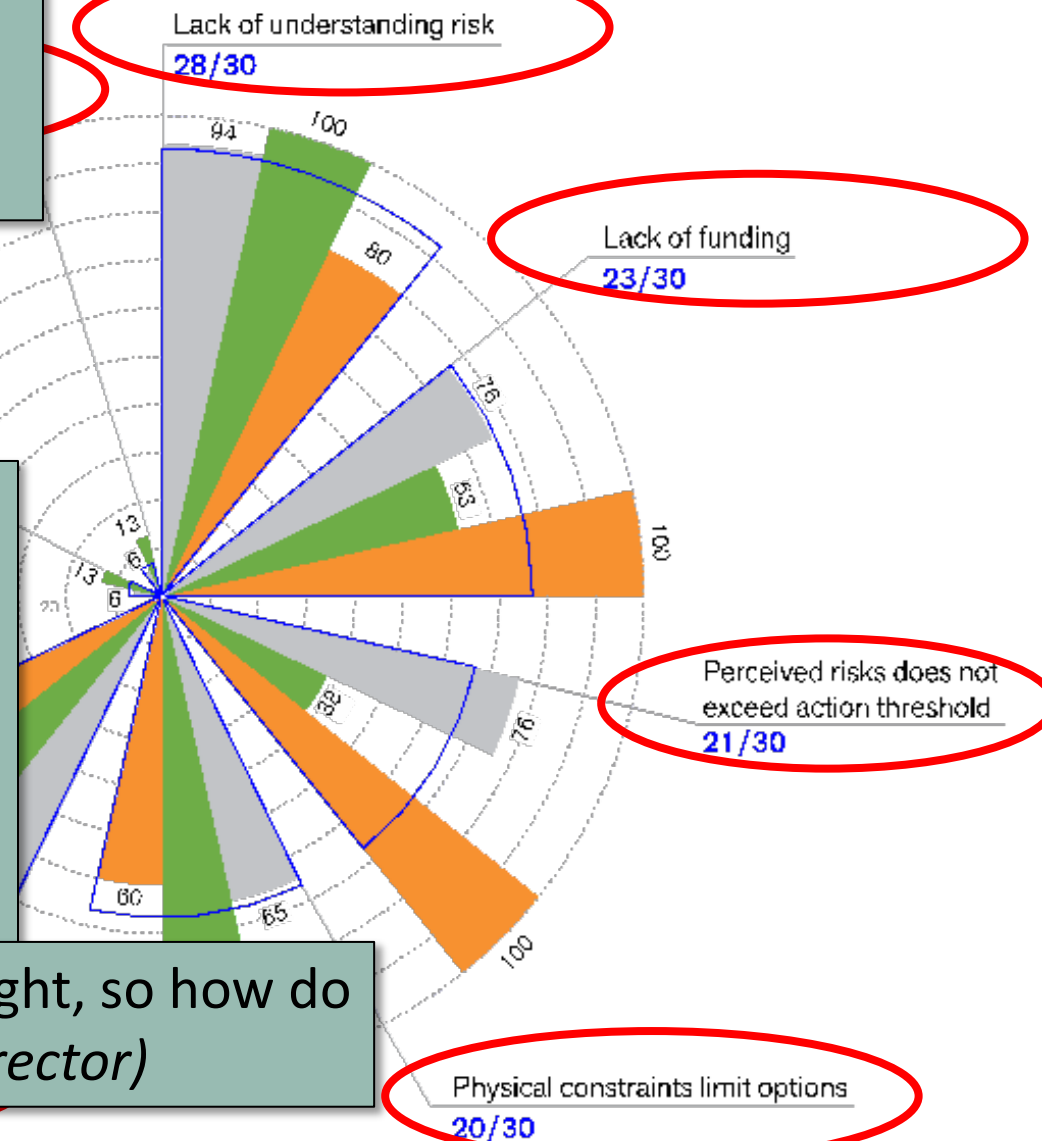
“Money! I think that is the magical answer to everything – if we had the money, or if we had

“For the last 7- 8 years, we had one side of the (half) of the agency where we couldn't say the words : global warming or climate change, where the other half bought in.”
(*Safety Planner*)

(*Safety Planner*)

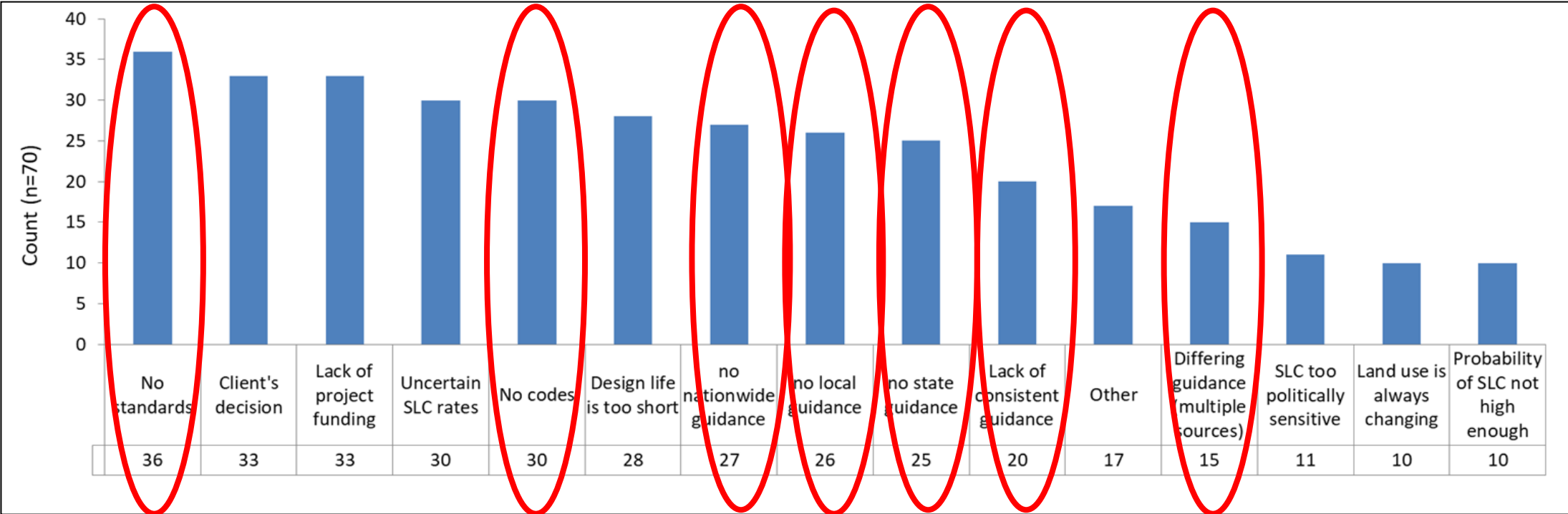
“The infrastructure is only a certain height, so how do you change that at this point?” (*Port director*)

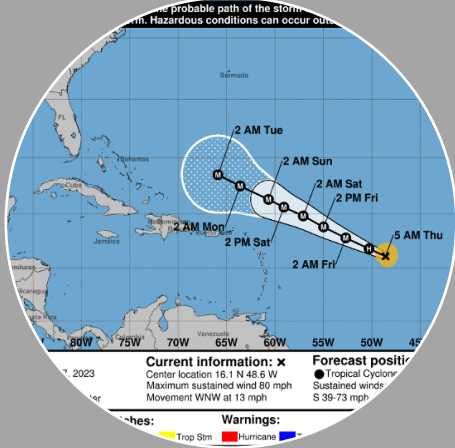
Interviews with 30 port staff from 15 North Atlantic seaports



No clear SLR guidance for infrastructure design

N. American maritime infrastructure engineers reported that only 9% of firms used a policy/planning document that communicates how SLC should be incorporated into design –





Emergency
Management



Environmental
Planning

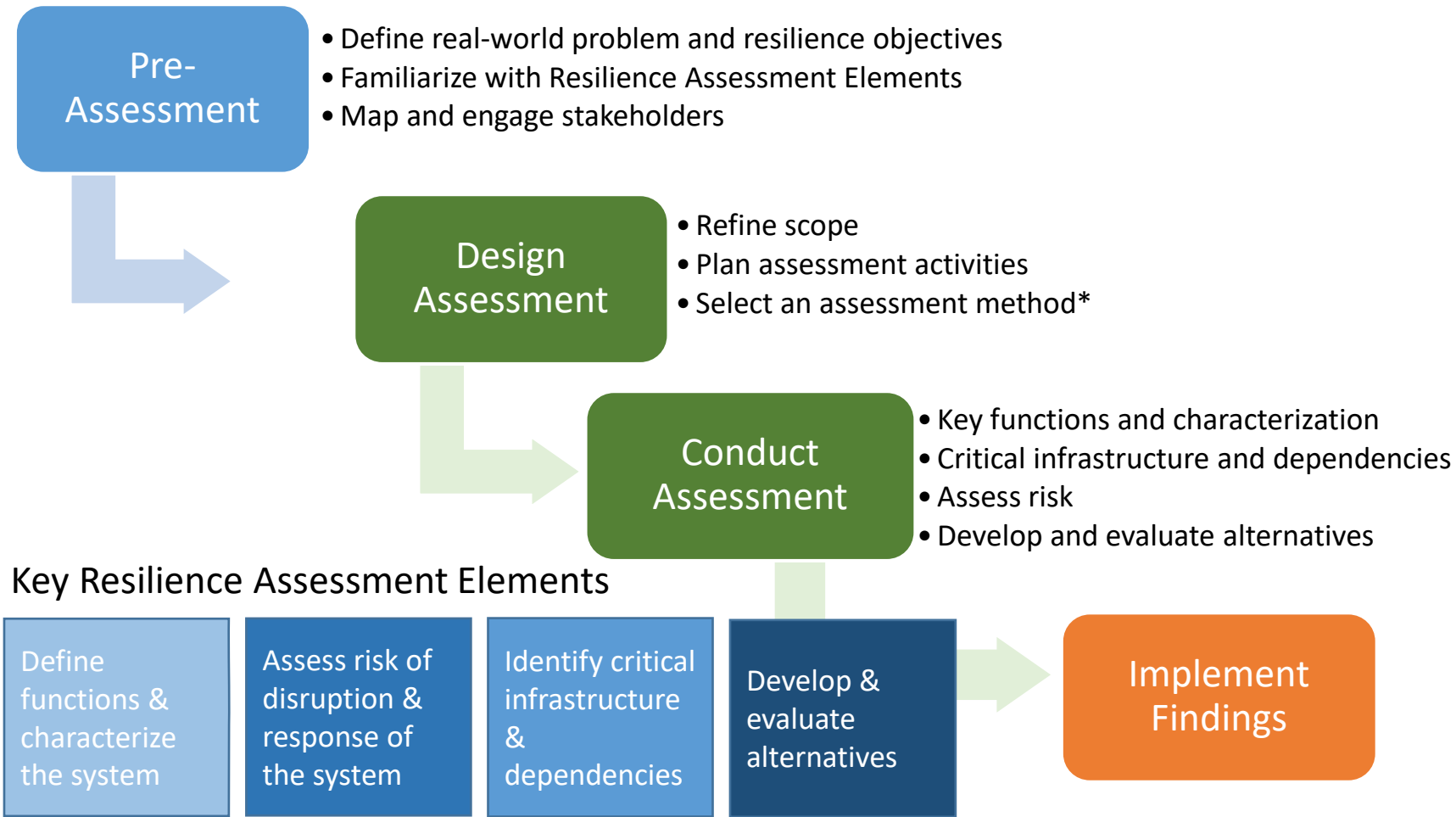


Strategic/
Master
Planning



RESILIENCE PLANNING & MANAGEMENT

The Port and Marine Transportation System Resilience Assessment Guide: A Collaborative Approach

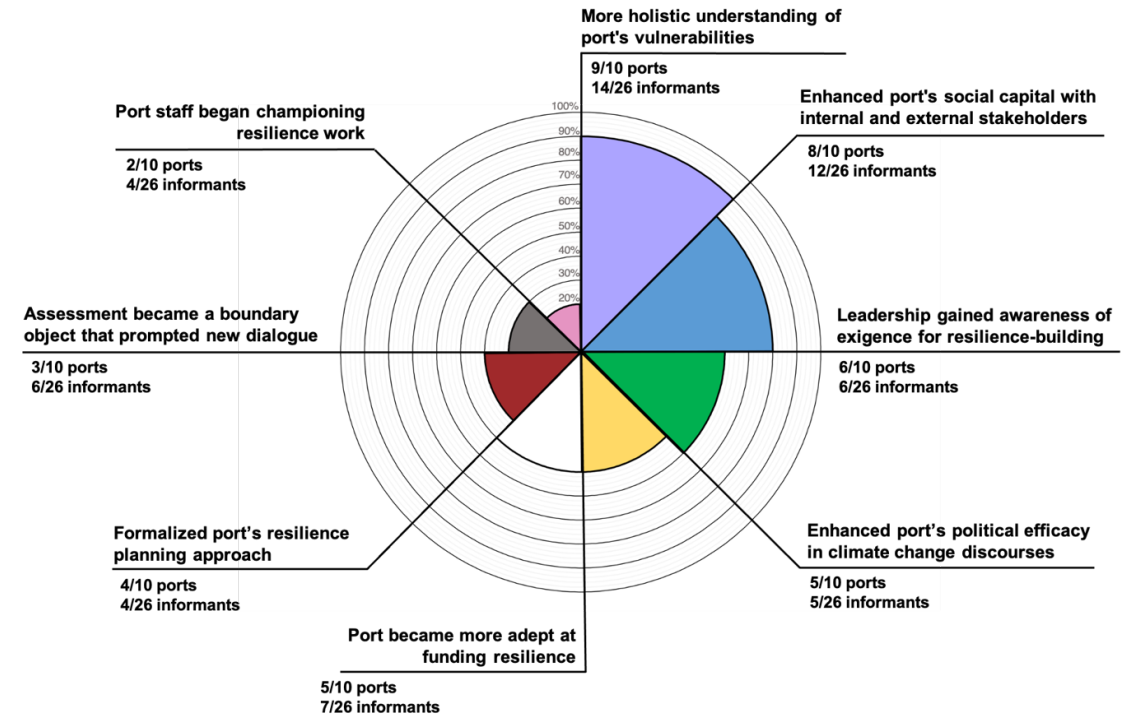


*Tools and methodologies are recommended according to 1) objectives and 2) funds and level of effort available to undertake study.

For questions and comments, contact Jevon Daniel (Jevon.Daniel@cisa.dhs.gov) or Katherine Chambers (Katherine.F.Chambers@usace.army.mil)



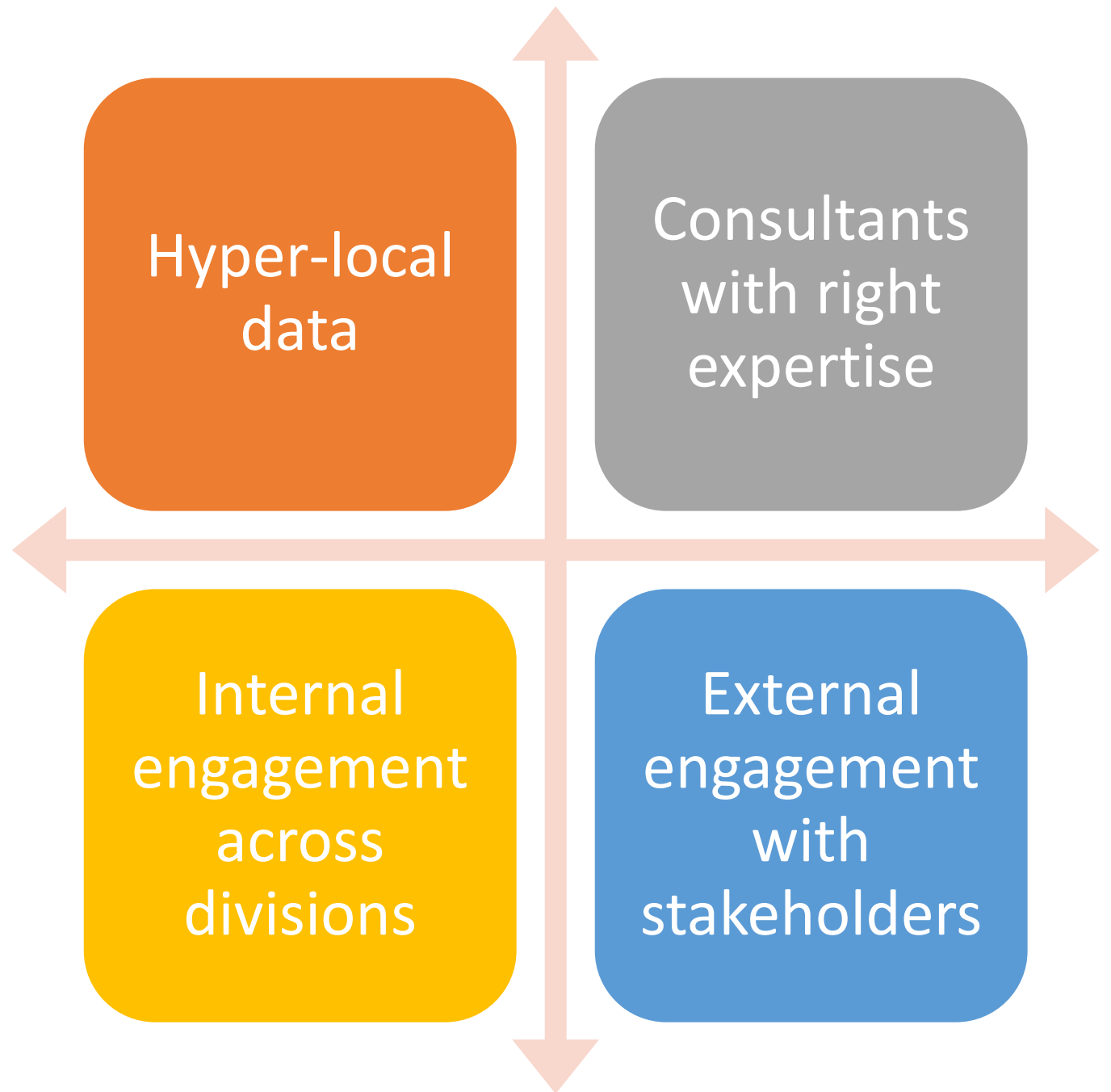
Resilience assessments increase adaptive capacity



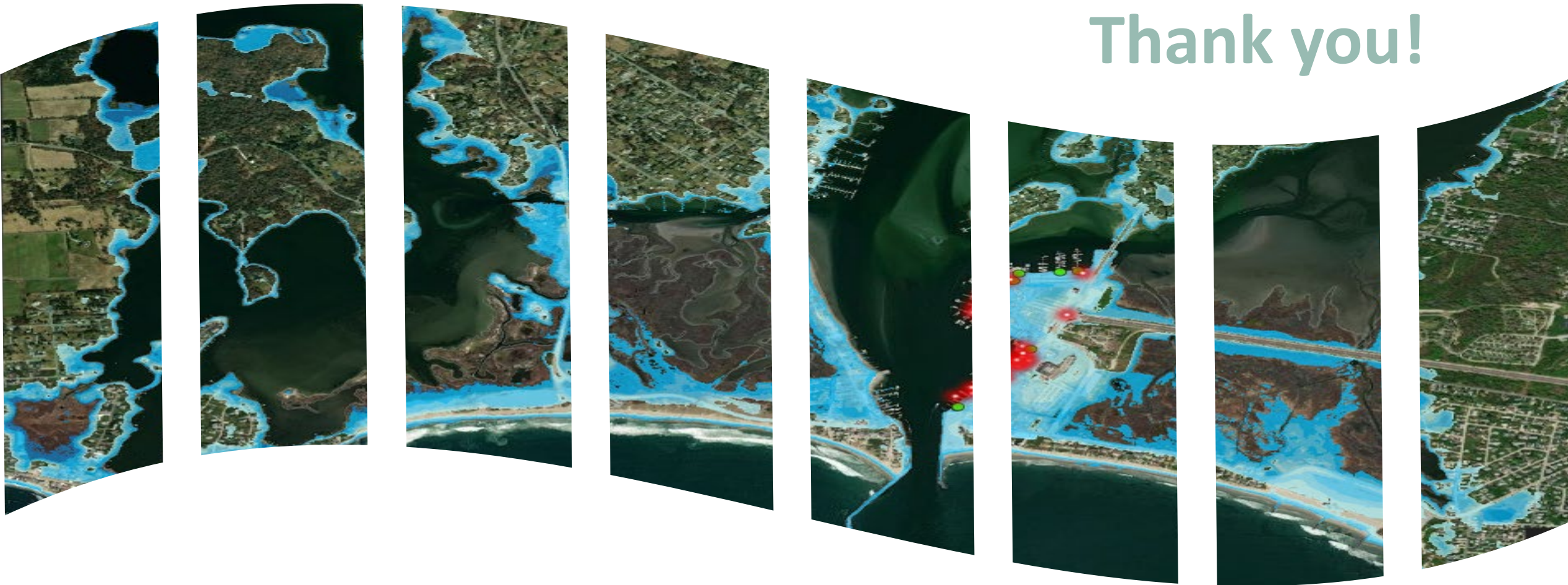
- Develop holistic understanding of vulnerabilities
- Enhance social capital with internal/external stakeholders
- Awareness building for upper leadership
- Enhance political efficacy in climate change discourses

Kalaidjian, E.*, Becker, A. (corresponding author), Pinel, S. (2022). Insights into resilience planning theory and practice: A case study of U.S. Seaports. *Frontiers in Sustainability*. DOI 10.3389/frsus.2022.963555

Four key needs for port resilience assessment



Thank you!



Austin Becker, PhD

e: abecker@uri.edu | p: 401-874-4192 | w: web.uri.edu/abecker

