

Port resiliency: overview, examples, and lessons learned

Daniele Spirandelli, Ph.D.
Climate Resilience Specialist

December 2024



Overview

- 1 Perspectives and definitions of resilience
- 2 External pressures and pain points
- 3 Strength, barriers, and opportunities
- 4 What ports are doing
- 5 Final thoughts

Perspectives on resilience from ports

- Port of Bellingham
- Port of Everett
- Port of Longview
- Port of Port Townsend
- Port of Seattle
- Port of Vancouver
- Port of Wahkiakum #2

Definitions of resilience

“ Bouncing back ”

“ Economic resilience ”

“ Redundancy ”



Physical risks



Systemic risks

“ Plan for unexpected, absorb, come back fully functioning ”

“ Nimble, adjust ”

“ Getting back up as quickly as possible ”

Defining resilience



Climate resilience is the ongoing process of anticipating, preparing for, and adapting to changes in climate and minimizing negative impacts to our natural systems, infrastructure, and communities”

WA. State Climate Resilience Strategy

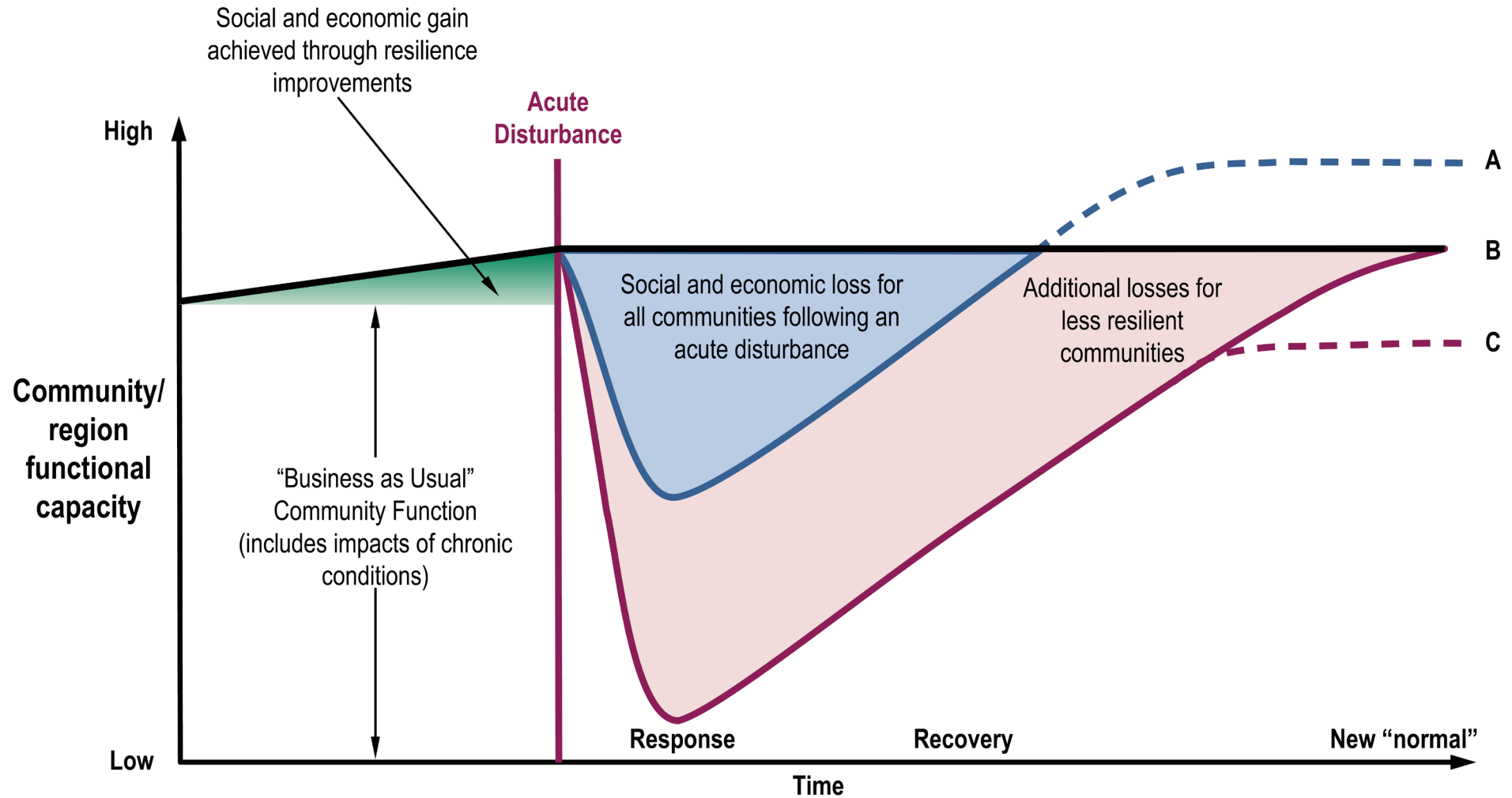


Washington State Climate Resilience Strategy

September 2024 | Olympia, Washington



Defining community resilience



Model: Dr. Mary Ellen Hynes, DHS (2001); Blair Ross, ORNL; CARRI 2008 ©

ORNL 2011-G00804/jcn

External pressures and pain points around resilience

Drivers for resilience

- Cascadia, earthquake, tsunami
- Landslide
- Severe weather
- Sea level, king tide, storm surge
- Riverine flooding
- Extreme heat
- Cyber attacks
- Clean Energy, energy resilience



Shocks

Systemic



- Human: lack of coordination
- Economic resources
- Changing regulations, need for guidance
- Funding availability
- Community needs at the forefront
- Social acceptance
- Public + federal regs on tackling climate change (net-zero; GHG reduction)

Pain points: How ports are experiencing vulnerability

- Financial, getting funding
- Lack of capacity, management & coordination

Hard to access funding



- Lack of data, context-specific modeling
- Not enough to support decision making
- Vulnerabilities are “existential”

Physical vulnerabilities of assets



- Stronger justifications needed for investments
- Ecosystem health

Competing priorities



- Reactive, ad hoc assessments and projects
- Challenges in communicating the science
- “There’s no guidebook for this”

Lack of clarity and unclear level of exposure



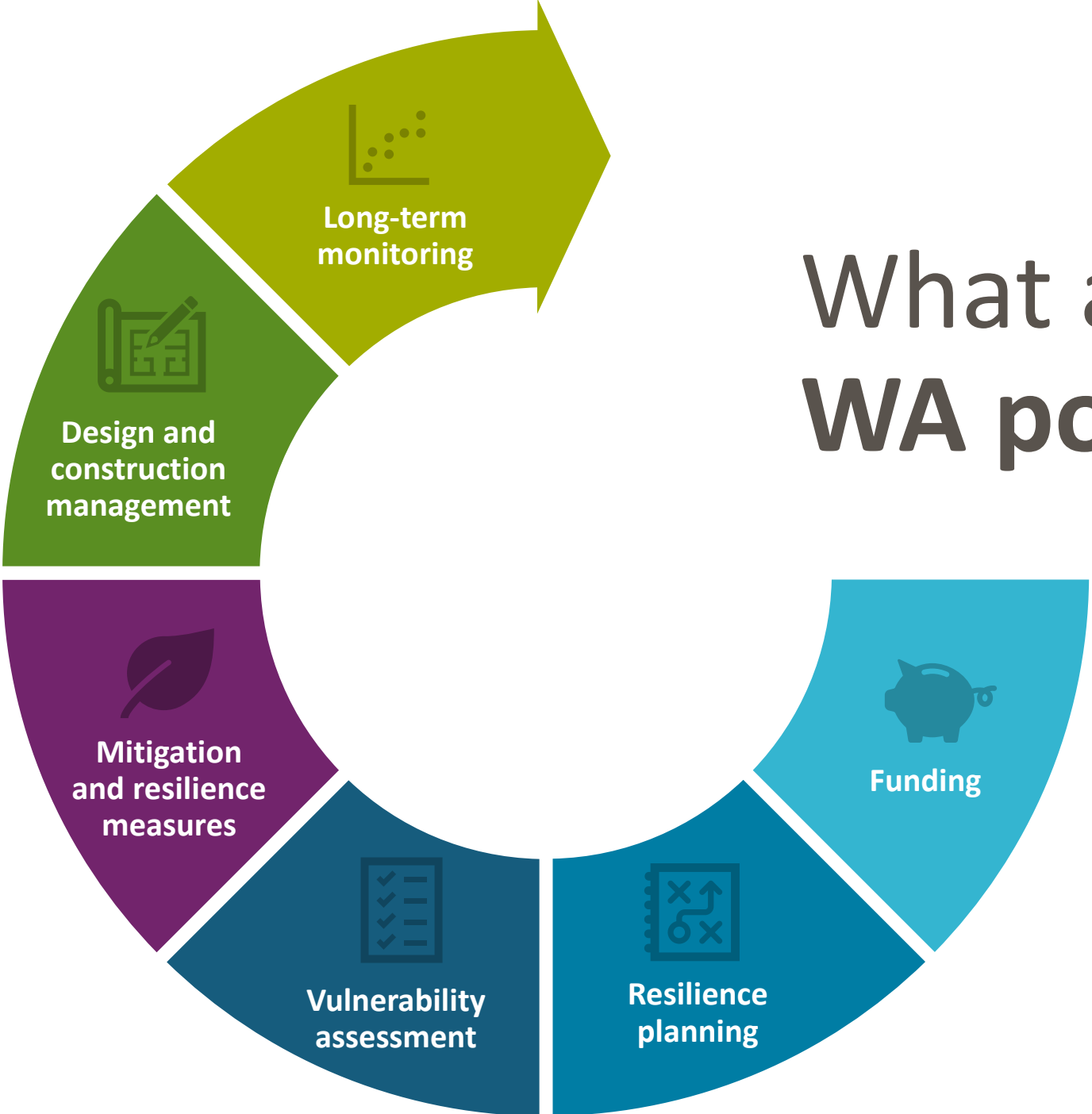
Reflecting on strengths, barriers,
and opportunities



Union Slough Flood Control Levee, Everett, WA

This project expanded an intertidal habitat area to 32 acres. It included design and construction of a new flood control levee inland of the existing levee so that the existing levee could be breached and the area between them could be converted into new habitat.

What are WA ports doing?





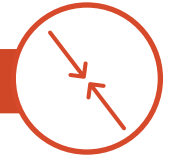
GOAL DEVELOPMENT

- Specify goals for resilience
- Set objectives



ASSESSMENT

- Identify hazards
- Understand sensitivities and capacities
- Rate risk: high to low, short- and long-term



MITIGATION

- Identify gaps between goals and vulnerabilities
- Screen mitigation & resilience measures



PRIORITIZATION

- Prioritize critical functions, short- and long-term impacts
- Address community and equity concerns



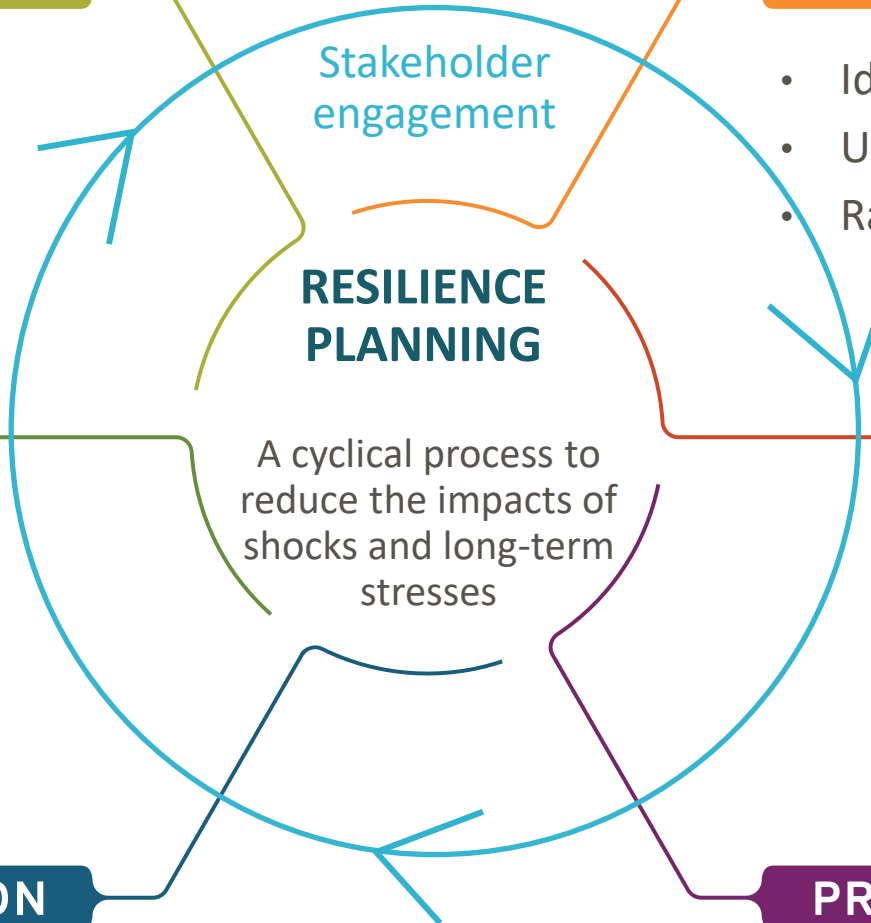
INTEGRATION

- Integrate into plans
- Budget planning



IMPLEMENTATION

- Identify projects
- Develop schedule
- Identify funding, grants, partners

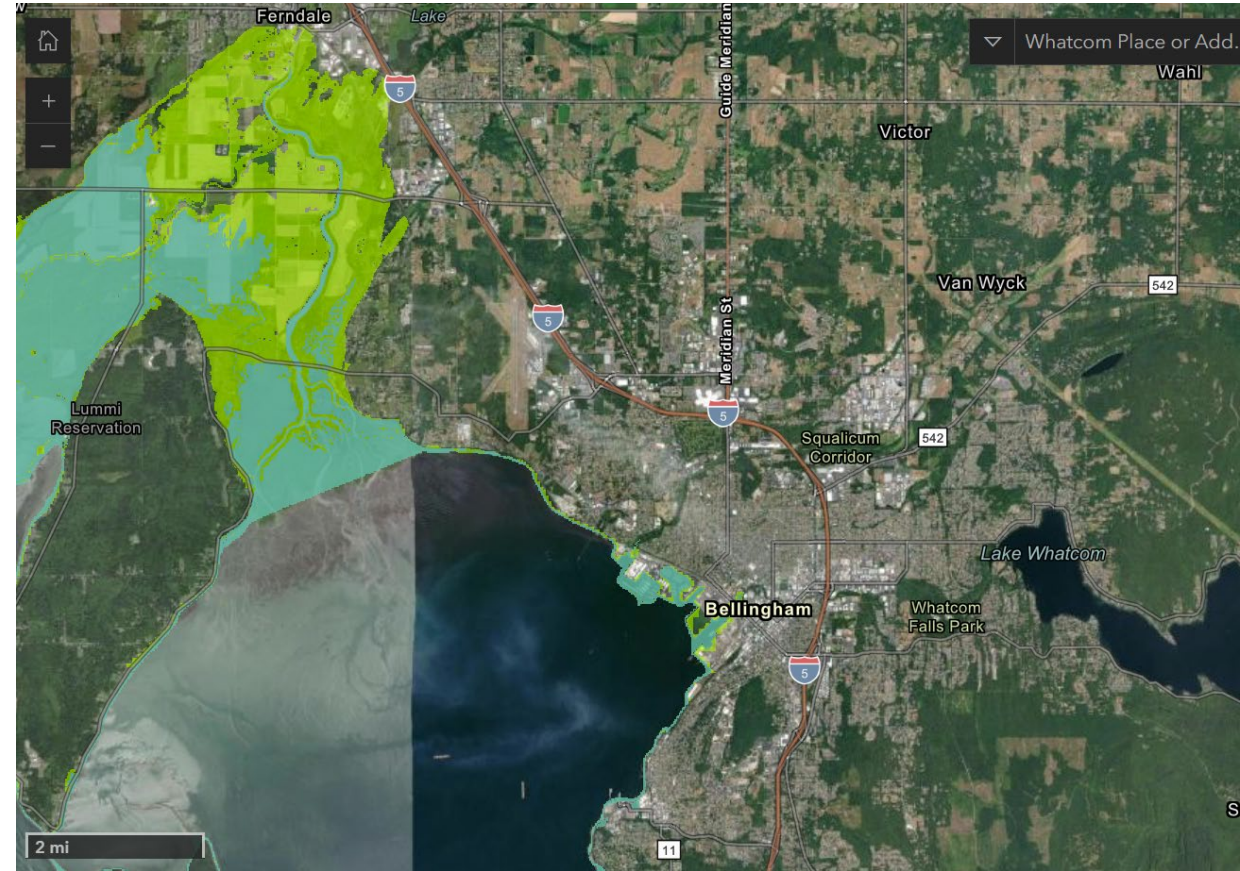


Vulnerability Assessments

- Port of Bellingham, Climate Action Strategy
- Port of Port Townsend, Capital Improvement Plan and Comprehensive Scheme
- Port of Seattle, maritime

Building partnerships

- AdaptSea partnership Port of Seattle with City of Seattle, King County, WSDOT
- Spirit Lake/Toutle-Cowlitz River Collaborative (SLTCRC)
- Port of Port Townsend, citizens collecting king tide data, building awareness
- Port of Bellingham regional dataset to inform Compound Flood Vulnerability Assessment to inform with city, Whatcom County, USGS
- County Emergency Management



<https://storymaps.arcgis.com/stories/1a4ab6ea76d74f03b71ca78d020c4334>

Other actions

Funding sources

- Clean Harbors/ports IJA funding
- Request for Congressional funding
- FEMA, BRIC
- Ecology Remedial Action Grants

Integrating resilience into CIP budgets

- Up to 50% of budget
- Use of checklists
- Prioritization of projects

Opportunities



Moving from ad hoc
to programmatic
and strategic



Building
partnerships



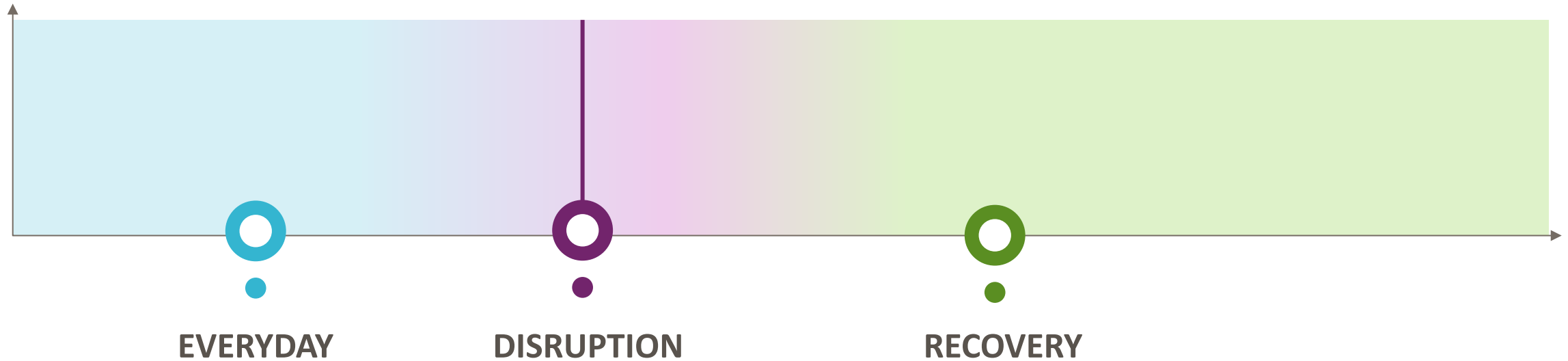
Support from
leadership



Learning from
other ports

Opportunities

“Role of Port for local community as a resource, a hub in the event of a disruption”



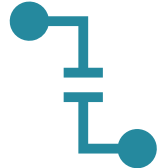
“Strategic doing”

Learning from other ports
Establish ILAs & MOUs

Final thoughts



No unifying
definition



Opportunity
to define for
WA ports



Ports are thinking
and implementing
resilience



Framing resilience
“must be careful,
deliberate”

Port resilience guidance

- NOAA, Sea Grant (2016) Port Resilience Index
 - Simple check list for plans, preparedness
- Inter-American Investment Corp (2021) Climate risk and ports: a practical guide on strengthening resilience
 - Scenarios and template for evaluation
- PIANC Report No. 178 (2020) Environmental Commission, Climate Change Adaptation Planning for Ports and Inland Waterways
 - Portfolio of measures



A Port Management Self-Assessment

Understanding How Prepared Your
Port Organization is for a Disaster



PIANC
The World Association for
Waterborne Transport Infrastructure

**HALEY
ALDRICH**

Questions?



Daniele Spirandelli

Climate Resilience Specialist

DSpirandelli@haleyaldrich.com

206.661.8089

Haley & Aldrich, Inc.