

Networking Break

The Oil Spill Act Advisory Committee (OSAAC) meeting
will begin at approximately **09:15**

Thank you for your patience!



Massachusetts Oil Spill Act Advisory Committee Meeting

Thursday, December 5, 2024

NOTE: This meeting will be recorded



Opening Remarks

Millie Garcia-Serrano

Assistant Commissioner

Bureau of Waste Site Cleanup (BWSC)

MassDEP



Introductions



Today's Speakers

Julie Hutcheson, Coordinator

Marine Oil Spill Prevention & Response (MOSPRA)
Program, *MassDEP*

Steve Mahoney, Environmental Analyst

MOSPRA Program & Technical & Financial Services,
MassDEP

Jim Collins, Contract Administrator

MOSPRA Program & Technical & Financial Services,
MassDEP

Andy Jones, Acting Response Chief

Southeast Regional Office, *MassDEP*

Elise DeCola, General Manager/Principal

Nuka Research

Sam Butler, Project Manager

Nuka Research



Meeting Agenda

Time	Agenda Item
9:00	Welcome, Coffee, and Networking
9:15	Introductions and Opening Remarks
9:30	MOSPRA Program Updates <ul style="list-style-type: none">• Financial and Trust Fund• Tug Escorts• Physical Oceanographic Real-Time Systems (PORTS)• MassDEP Trailers• Other Program Updates
10:00	MOSPRA Grant Program <ul style="list-style-type: none">• 2024 Recipients• 2025 Grants
10:15	First Responder Training & GRS Testing Program <ul style="list-style-type: none">• Recap of 2024 Exercises• 2025 Exercise Plans
10:30	Project Update: Evaluating and Adapting Oil Spill Preparedness and Response Capabilities for a Changing Climate <ul style="list-style-type: none">• Key Findings• Next Steps
11:00	Strategic Foresight Exercise (in-person only)
11:45	Closing Remarks



Committee Members

Name	Organization
Millie Garcia-Serrano	Mass Department of Environmental Protection
Capt. Jamie Frederick	USCG Sector Boston
Capt. Mimi Moon	USCG Sector SENE
John MacPherson	USACE-Cape Cod Canal Field Office
Joseph Mazzola	USACE-Cape Cod Canal Field Office
Capt. Chris Murray	Northeast Marine Pilot Association
Sam Haines	Mass EEA Coastal Zone Management
David Clemons	Mass Department of Fire Services
Ken Corson	Mass Harbormasters Association
Mark Rasmussen	Buzzards Bay Coalition
Michael Giaimo	American Petroleum Institute
Kirk Franklin	Frank Corp. Environmental Services
Roger Francis	McAllister Towing of Narragansett Bay
Paul DiGiovanni	Reinauer Towing and Transportation



MOSPRA Program Updates



Financial Update MOSPRA Trust Fund

Steve Mahoney

MassDEP



MOSPRA Updates

MOSPRA Website: <https://www.mass.gov/oil-spill-prevention-response>

Master Service Agreement

- How we get things done
- How long is the contract (12/2024 – 12/2027)
 - Options for two; 2-year renewals (up to 12/2031)

New Contractors (started in December 2024)

- Nuka Research & Planning
- Woods Hole Group



MOSPRA Trust Fund

Fiscal Year	Revenue
FY 17	\$3,100,119.51
FY 18*	\$3,911,287.97
FY 19*	\$4,430,647.04
FY 20*	\$4,057,536.09
FY 21*	\$3,121,096.59
FY 22*	\$3,515,055.75
FY 23*	\$4,599,591.42
FY 24*	\$5,296,330.86

MOSPRA Trust Fund

Fiscal Year	Expenditures
FY 17	\$1,401,696.40
FY 18	\$1,015,950.55
FY 19	\$1,029,143.70
FY 20	\$1,282,224.43
FY 21	\$718,169.13
FY 22	\$2,090,618.93
FY 23	\$963,875.78
FY 24	\$590,062.30

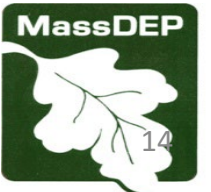
Expenditures FY24

Entity	Cost
MassDEP Staff	\$210,262
Trailer Maintenance	\$51,425
GRP Exercises	\$197,832
Other Contractor Expenses	\$130,543
PORTS (Narragansett/Cape Cod-BB/Boston)	\$
Grants	\$
Total	\$590,062

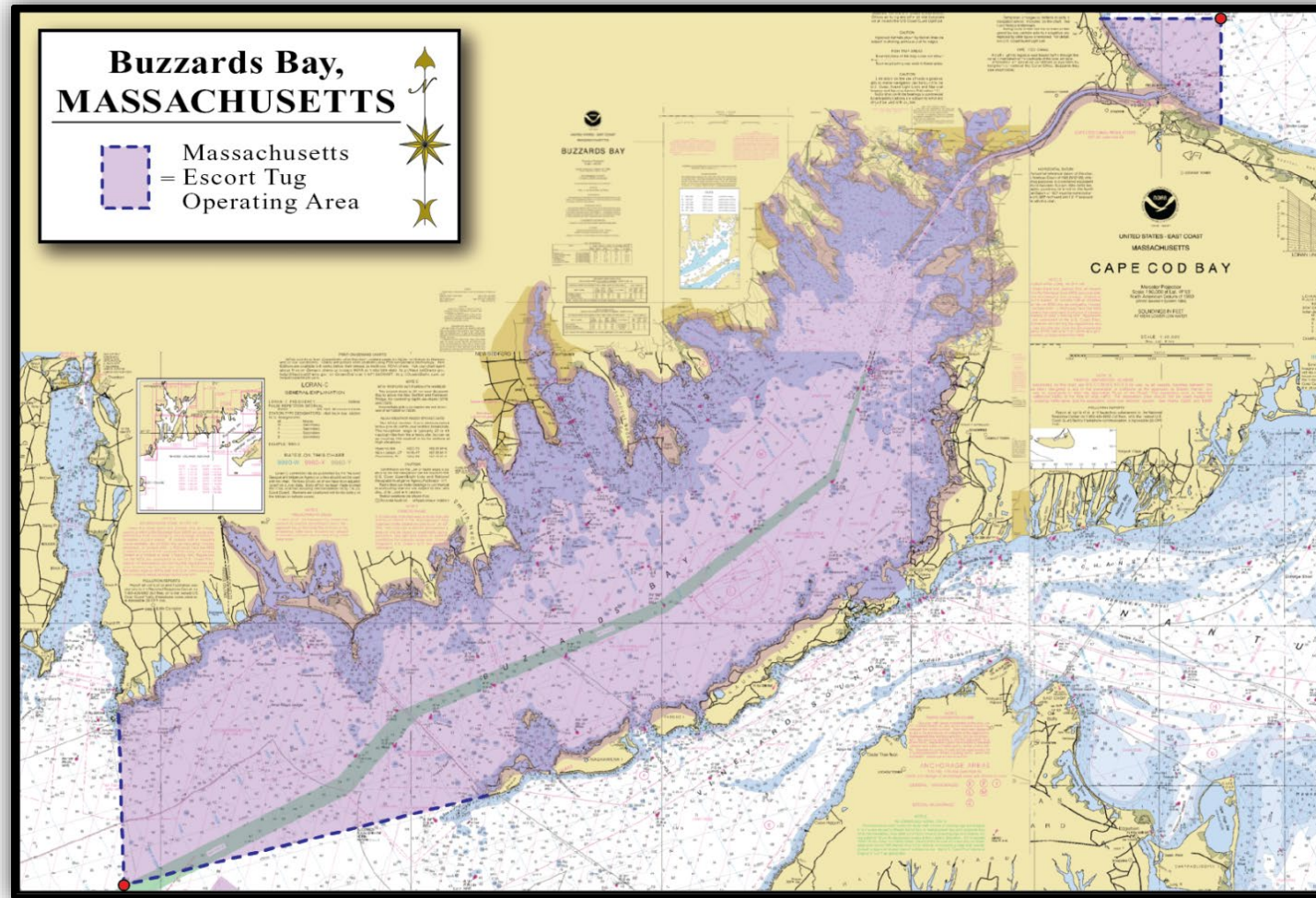
Tug Escort Program

Steve Mahoney

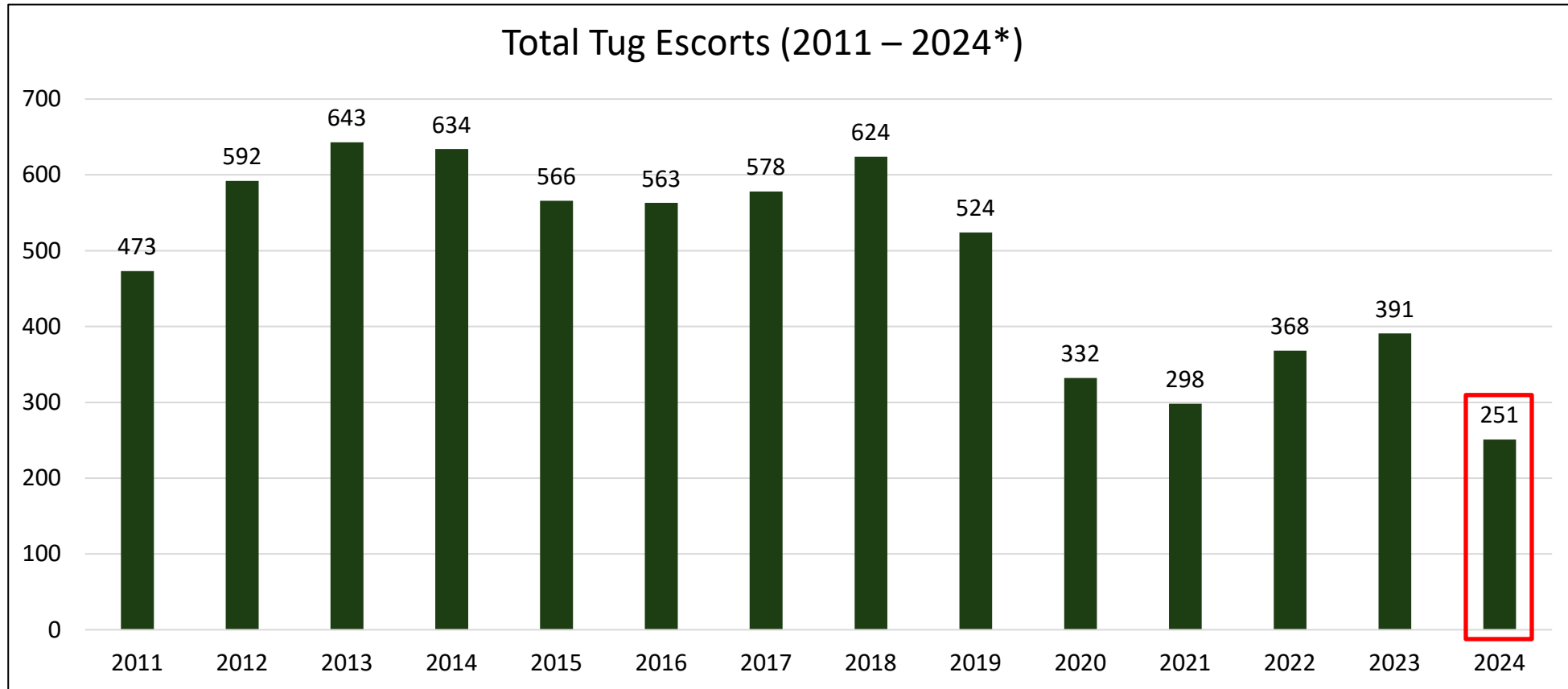
MassDEP



MA Escort Tug Operating Area

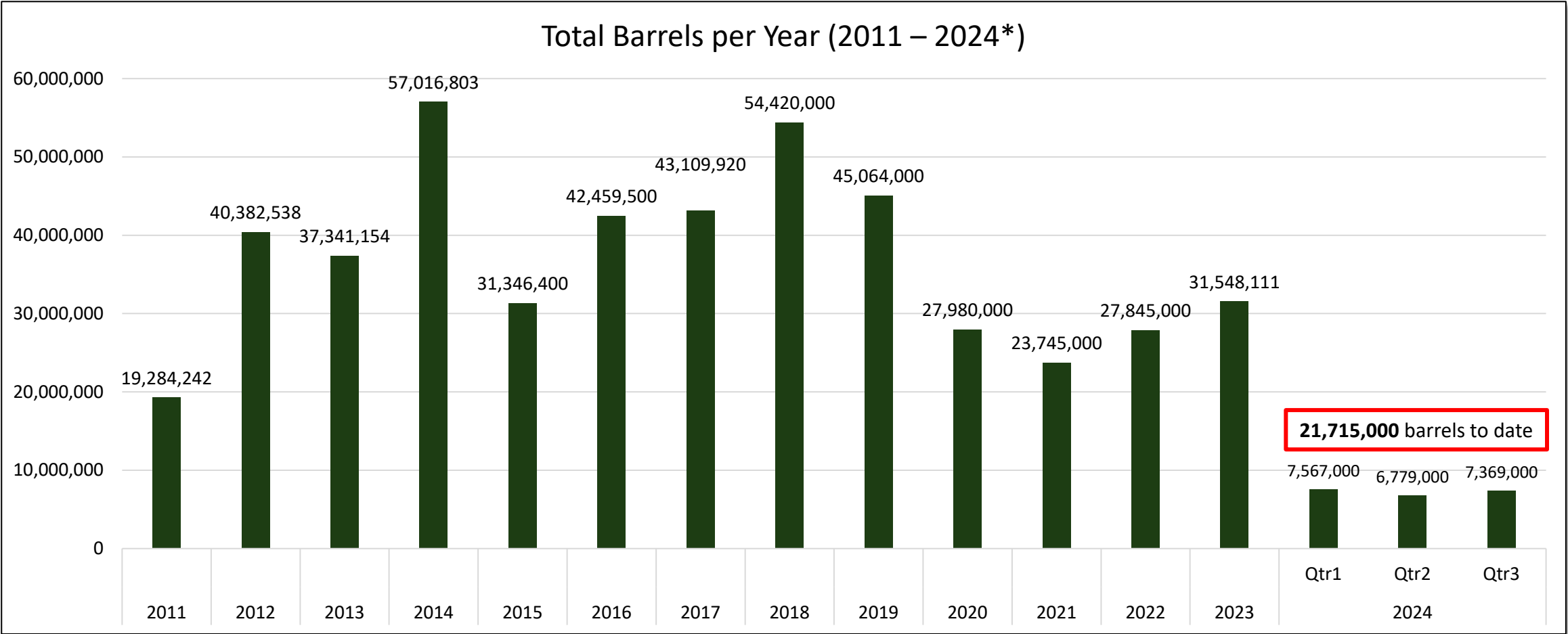


Tug Escorts by Year



* 2024 data includes all tug escorts through September

Barrels by Year



* 2024 data includes all transits through September



Physical Oceanographic Real-Time Systems (PORTS)

Jim Collins

MassDEP



Aids to Navigation

Physical Oceanographic Real Time System (PORTS)

- Partnership with NOAA & NERACOOS
- 5-year contract to provide equipment and O & M of all assets (\$905,000)
- Provides real time publicly available data

Link to website:

<https://tidesandcurrents.noaa.gov/ports/index.html?port=ca>



Locations

Cape Cod / Buzzards Bay PORTS

- Buzzards Bay Buoy - Deployed July 14, 2022
- C.C. Canal West End Buoy - MMA
- Cape Cod Bay Buoy - Deployed 2016

Narragansett PORTS

- Fall River - sensors

Boston PORTS

- Planning and implementation stage



Locations



Boston PORTS

Establishing Boston PORTS...

- Approached by Boston Docking Pilots & Boston Pilots
- 3 navigational aids:
 - Meteorological Station, Current Meter, Air Gap Sensor
 - Supported by USCG, MassPORT, MassDOT, Boston HM, NOAA



January 2022

Port of Boston welcomes “Biggest Ship”
Evergreen’s Ever Fortune (1,100 ft)

\$850 mil Port Project



Boston PORTS

Establishing Boston PORTS (continued)

- Currently evaluating locations for equipment (purchasing equipment and planning installation)
- Navigational aids (excluding air gap sensor) should be operational within 6 months
- Air gap sensor timeframe is dependent on permits and is being evaluated

MassDEP Trailers

Julie Hutcheson

MassDEP



Oil Spill Response Trailers

- 70 coastal communities
- 81 oil spill response trailers
- 81,000 ft of containment boom
- 2,000 ft of 36" boom staged at MMA and New Bedford
- MassDEP retains ownership
- MassDEP contractor (MER) maintains and restocks trailers



Moran Env Recovery



Trailer Equipment and Supplies

- Containment boom
 - 12-inch (200 ft)
 - 18-inch (800 ft)
- Anchors, buoys
- Ancillary equipment
- Personal protective equip. (PPE)
- Absorbent boom
- Pads and speedi-dri
- Culvert plugs, etc.



Trailer Damage/Issues



Trailer Damage/Issues



Trailer Damage/Issues



Trailer Damage/Issues

Lowell



Trailer Replacement Plans

Replacement Priorities:

- | | |
|-----------------|-----------------|
| 1. Provincetown | 9. Aquinnah #1 |
| 2. Falmouth | 10. Aquinnah #2 |
| 3. Marshfield | 11. Naushon #1 |
| 4. Orleans | 12. Naushon #2 |
| 5. Nantucket #1 | 13. New Bedford |
| 6. Nantucket #2 | 14. Truro |
| 7. Salem | 15. Wellfleet |
| 8. Chilmark | |

READY TO ROLL!



Foam-Filled Boom (FFB) Trailers

Per Trailer Estimate (x6): \$8,500

- 9 Tires /Mounted
- 4 Air Bags
- Mechanic / PM
- Driver & Tractor



Mashpee Wampanoag Tribe Spill Response Training

Andy Jones

MassDEP







New Bedford Bilge Pump-Out Program

Andy Jones

MassDEP



Port of New Bedford Mystery Spill Project & Clean Bilge Program

Program Resumed: July – December 2023

- Limited to working commercial fishing vessels and 1 pump out per vessel
 - 12 pump out dates completed
 - 48 unique vessels
 - 20,379 gals of liquids (~3,260 gals of oil) removed
 - **Cost:** \$40,030.51

Contact:

Andy Jones, MassDEP

SERO

508-965-5388

andy.jones@mass.gov



MOSPRA Grant Program

Jim Collins

MassDEP



MOSPRA Grant Overview

Round 1 (2021) - 9 Grants for \$214,308.59

Round 2 (2024) - 15 Grants for \$691,588.50

Round 3 (2025) - Grant announcement in Spring 2025

Grants...

- Are available to local governments, non-profits, academia, etc.
- Benefit coastal communities & advance the goals of MOSPRA



Grants Round 1 (2021)

- New England Wildlife Center – Training, Field Kits
- Plymouth Harbormaster – New Waste Oil Tank
- Scituate Fire Department (2 grants) – Drone Program and Forward-looking Infrared (FLIR) Camera
- Marion Fire Department (2 grants) – Drone Program and Oil Spill Preparedness Plan
- Fall River Fire Department – Sill Response Training
- Mass Maritime Academy – Aquatic Vegetation Sensor
- City of Everett – Three optical Oil Detection Sensors in Mystic River



TOWN OF
PLYMOUTH
MASSACHUSETTS



Grants Round 2 (2024)

- Barnstable Fire Department – FLIR Camera
- Battleship Cove – USS Massachusetts – Survey / Remove Oil
- NE Wildlife Center Weymouth – Training, Response Kits
- Boston Harbor Docking Pilots, Inc – Handheld Vessel Nav. System
- Boston Harbor Pilot Association, LLC – Handheld Navigation
- Buzzards Bay Coalition – NB Harbor Eval Dockside Bilge p/o
- Saugus River Watershed – Spill Response Plans & Training
- Lynn Fire Department & Plymouth Fire Department – Drones



Grants Round 2 (2024) - continued

- Bourne FD – Spill and Drone Training
- COMM Fire – Spill Response Training
- Fall River FD – Coastal Spill Response Training
- Hingham FD – Drone, Infrared Camera, Training
- Lynn FD – Drone Mapping Project
- Salisbury FD – Drones & Drone Pilot Training



Grant Highlight:

USS Kennedy Memorial Committee

USS Kennedy is a retired US Navy Gearing class destroyer commissioned in 1945 and decommissioned in 1973. It is located at Battleship Cove, Fall River.

Grant includes...

- Surveying the USS Kennedy to determine location and volume of petroleum products
- Removing and disposing of as much petroleum as possible (storage and machinery sumps)



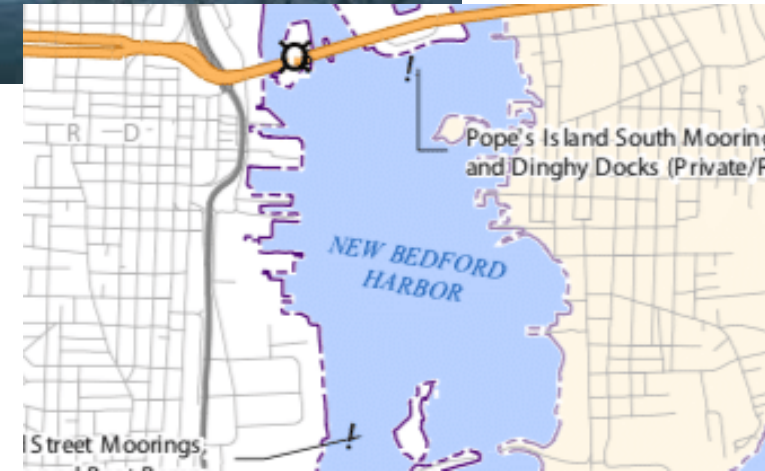
Grant Highlight:

Buzzards Bay Coalition

New Bedford Harbor requires a dockside pump-out facility to prevent the discharge of oily bilge water

Grant includes...

- Evaluating pump-out sites, ranking for suitability, evaluating best available technologies, and completing conceptual designs for three locations



Grant Highlight:

New England Wildlife Center (NEWC)

Grant includes...

- Providing additional training to wildlife first responders
- Providing additional wildlife response kits
- Addressing immediate need for veterinary “bed space” for oiled patients



Grant Highlight:

Saugus River Watershed Council

Grant includes...

- Developing site-specific spill response plans and preparedness training for Saugus and Pines Rivers
- Determining how an oil spill could be prevented from expanding into Saugus/Pines Rivers
- Collaborating with the U.S.C.G. to mark navigable reaches of Saugus/Pines Rivers with standard aids to navigation



Grants Round 3 (2025)

MassDEP will be soliciting MOSPRA Grants in 2025

- Grants need to be related to the MOSPRA program and coastal oil spill prevention and response (although relationship can be indirect)

Timeline:

- Announcement in Spring,
- Submittals due in Summer,
- Issued in late Summer - early Fall



Grants Round 3 (2025)- continued

MassDEP will reach out to coastal communities to encourage grant applications and plan to award over \$1 million in grants

Any questions on upcoming 2025 MOSPRA grant opportunities?

Feel free to contact:

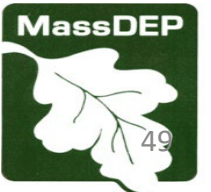
- Julie Hutcheson - Julie.Hutcheson@mass.gov
- Steve Mahoney - stephen.mahoney@mass.gov
- Jim Collins - james.collins2@mass.gov



First Responder Training & GRS Testing Program

Julie Hutcheson

MassDEP



Achievements

2024 marks 16 YEARS
of continuous

Development

160

**GRS
Developed**

Training

2,774

**First Responders
Trained**

Testing

108

**Exercises
Conducted**

47/160 GRS tested (29%)



71/560 tactics tested (13%)



44 tactic revisions



2024 Completed Exercises

Date	Region	Towns
10 APR	North Shore	Marblehead, Swampscott
25 APR	South Shore	Cohasset, Scituate
30 APR	Boston Harbor	Hingham, Hull, Weymouth
03 MAY	Buzzards Bay	Cuttyhunk, New Bedford
14 MAY	North Shore	Gloucester, Manchester by-the-Sea
10 SEP	Mount Hope Bay	Somerset, Swansea
17 SEP	Cape & Islands	Bourne, Sandwich
19 SEP	Cape & Islands	Barnstable, Hyannis, Yarmouth
23 SEP	Buzzards Bay	Onset, Wareham
28 OCT	Cape & Islands	Chatham, Eastham, Orleans

Exercise Highlights



Source: MassDEP Instagram page

mass_dep • Follow

mass_dep #Milestone Training: MassDEP Commissioner Heiple and team were in Scituate, where she addressed first-responders from Scituate, @townofcohasset and the @uscg ahead of their oil spill response training. MassDEP's Marine Oil Spill Prevention and Response Act (MOSPPRA) Program administers the training with the support of Nuka Research and Moran Environmental Recovery. The Program was created by the legislature in response to the catastrophic 98,000-gallon oil spill from a damaged barge that hit a rocky shoal at the entrance to Buzzards Bay in April of 2003.

The day's event in Scituate marked a milestone 100th training exercise since MassDEP's #MOSPPRA Program was created in 2004.

Through the program, and working with local officials, 160 Geographic Response Plans have been developed, which involve 560 testable tactics for use during a spill. More than 2,500 local first responders and others have been trained through these 100 exercises.

Click the link in our bio to learn more about the MOSPPRA program!

#environmental #MOSPPRA #oilspill #training #oilspilldrill #harbormaster #Scituate #ScituateMA #Cohasset #firedepartment #firstresponders #massachusetts

21 likes
April 25

Massachusetts Department of Fire Services
September 27 · 🌐

DFS Special Operations staff last week delivered and operated Rehab and #Drone units to assist Bourne Fire/Rescue & Emergency Services and supporting agencies at an oil spill drill. These and other Special Operations resources are always available to support local fire departments at emergency scenes and planned events. Visit <https://www.mass.gov/info-details/dfs-special-operations> to learn more!

Source: Massachusetts Department of Fire Services Facebook page

Yarmouth Fire Department, MA is with Yarmouth Division of Natural Resources and Barnstable Fire Department.
September 19 · 🌐

Good evening Yarmouth! Today your Yarmouth Firefighters, Yarmouth Division of Natural Resources, Barnstable Fire Department, Hyannis Firefighters, Town Of Barnstable Marine And Environmental Affairs Division, Mass DEP, USCG Sector Southeast New England, and several other responders participated in an Oil Spill Response Drill. It was an invaluable experience for all. YFD is prepared for all hazards response ensuring the highest quality of service and today's training refreshes the skills and familiarization with the regional DEP Supply Trailer that is kept at our HQ.

Source: Yarmouth Fire Department Facebook page

Exercise Highlights: Cohasset/Scituate

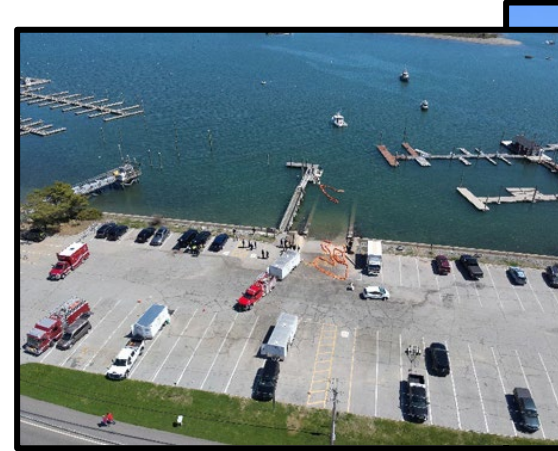
MassDEP's 100th Oil Spill Response Training

April 25th, 2024

Jericho Boat Launch (Scituate Harbor)

24 participants from:

- Scituate FD
- Scituate HM
- Cohasset FD
- USCG Sector Boston
- Scituate provided drone resources (received through MOSPRA grant)
- MassDEP Commissioner Heiple and team in attendance and addressed participants prior to on-water deployment



Source: MassDEP Instagram



Exercise Highlights: Swansea/Somerset

September 10th, 2024

Town Beach, Swansea (Cole River)

18 participants from:

- Swansea FD
- Somerset FD
- USCG Sector SENE
- USCG MSD New Bedford

- On-water deployment cut short due to nearby structure fire (visible from exercise staging area)



Source: MassDEP Instagram

Exercise Highlights: Chatham/Eastham/Orleans

October 28th, 2024

Orleans Yacht Club (Town Cove)

32 participants from:

- Orleans FD and DPW&NR
- Chatham FD and HM
- Eastham FD and DNR
- **Mass DOT Drone Operations Team**
- USCG Station Woods Hole

- UAS resources (drones, virtual command center); and online stream of operations (MassDOT)
- Successfully conducted two concurrent deployment plans



Source: MassDOT

2025 Planned Exercises

Date	Region	Towns
TBD	North Shore	Newbury, Newburyport, Salisbury
TBD	North Shore	Essex, Ipswich, Rowley
TBD	Boston Harbor	Braintree, Boston, Quincy
TBD	South Shore	Plymouth, Kingston
TBD	Cape & Islands	C-O-MM, Cotuit, W. Barnstable
TBD	Cape & Islands	Falmouth, Mashpee
TBD	Buzzards Bay	Fairhaven, New Bedford, Acushnet
TBD	Buzzards Bay	Marion, Mattapoisett
TBD	Mount Hope Bay	Berkley, Dighton

Contacts/Links

- Julie Hutcheson, Julie.Hutcheson@mass.gov
- Steve Mahoney, Stephen.Mahoney@mass.gov
- Jim Collins, James.Collins2@mass.gov
- Andy Jones, Andy.Jones@mass.gov
- Elise DeCola, Elise@nukaresearch.com
- Sam Butler, Sam@nukaresearch.com

Project Websites:

- [Marine Oil Spill Prevention & Response Program | Mass.gov](#)
- [Home | massdepgrp \(massdepgrp-nukaresearch.com\)](#)



Project Update:

Evaluating and Adapting Oil Spill Preparedness and Response Capabilities for a Changing Climate

Elise DeCola

Nuka Research



Evaluating and Adapting Oil Spill Preparedness and Response Capabilities for a Changing Climate

Summary of MOSPRA Threat Assessment Update and Climate-Ready Workshop

OSAAC Meeting – December 5, 2024

Elise DeCola, General Manager, Nuka Research

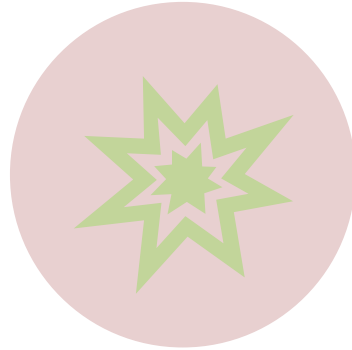
Image: WBUR



Topics for Today



**Massachusetts
Climate-Ready Oil
Spill Preparedness
and Response
Project**



**Key Findings and
Next Steps for
Incorporating
Climate Readiness
into MOSPRA
Program Activities**



**Strategic Foresight
Theory & Practice:
Report out from
May 2023 Climate-
Ready Oil Spill
Workshop**

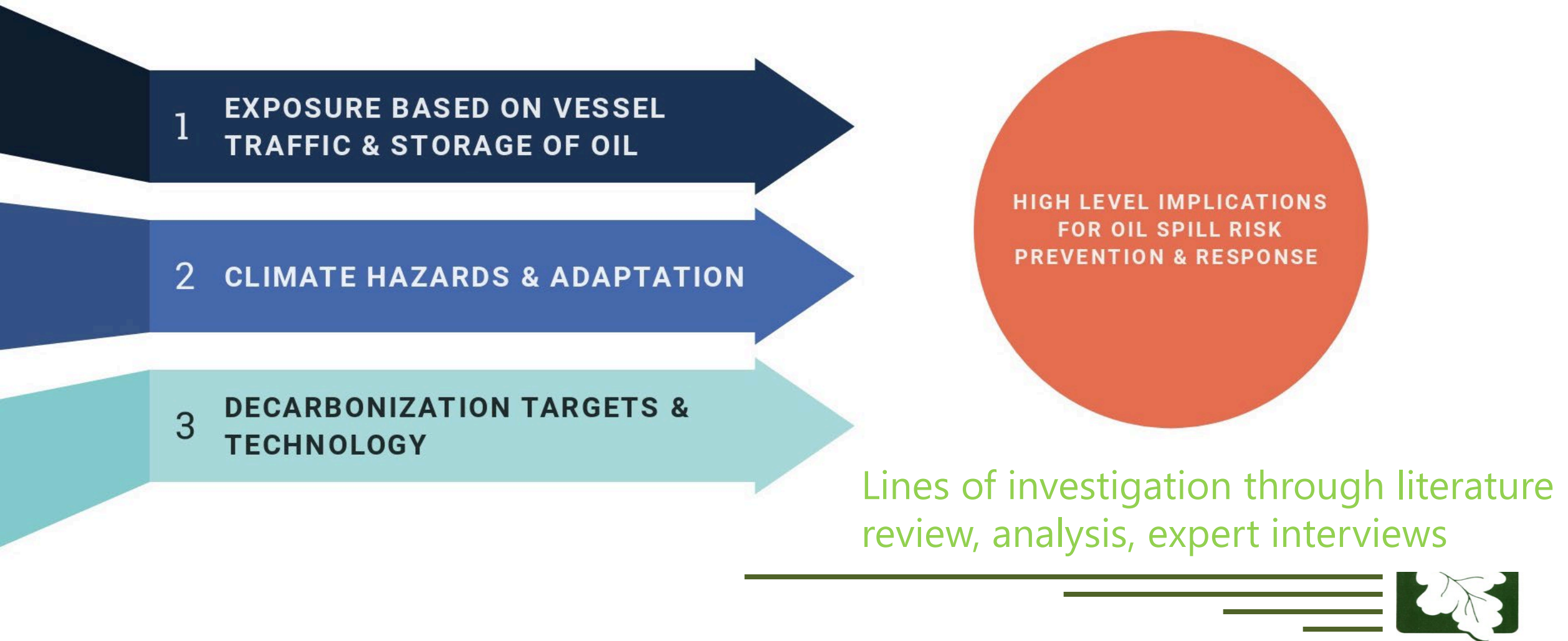


**Mapping Possible
Future Implications
of Decarbonization
to MOSPRA and
Broader Marine Oil
Spill Preparedness &
Response
Community**

MassDEP Climate-Ready Oil Spill Project



How do we envision plausible future scenarios that help us to build resilience into MOSPRA and other spill preparedness & response programs?



Climate-Ready MOSPRA Workshop

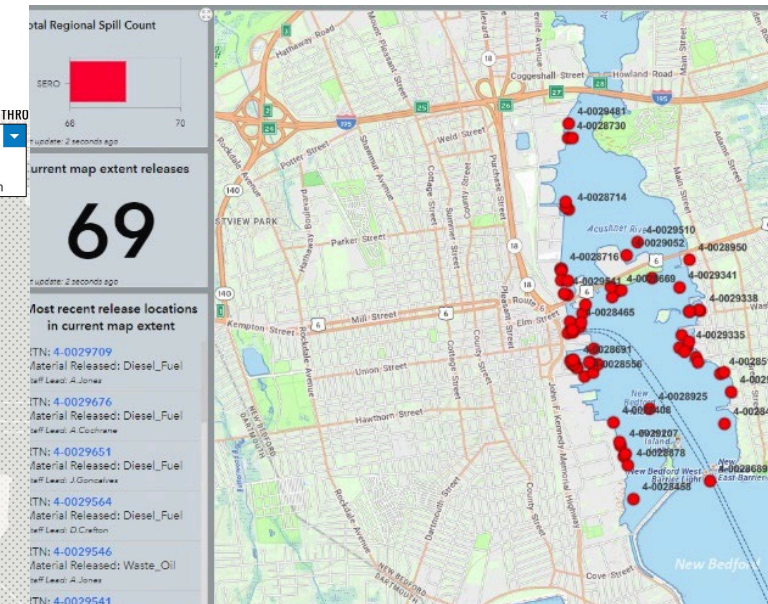
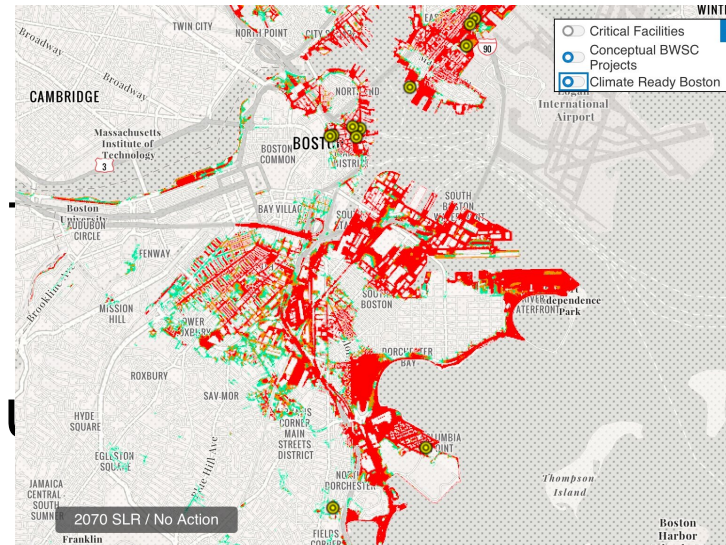
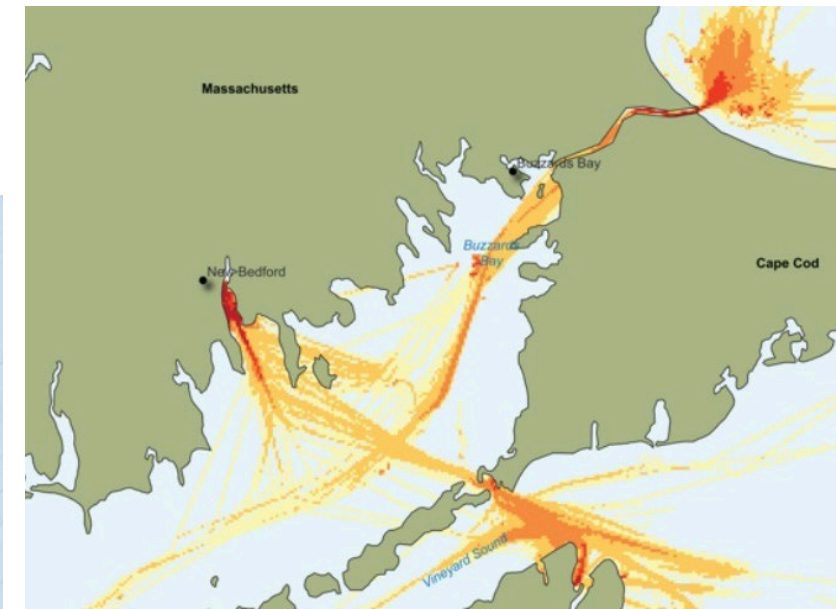
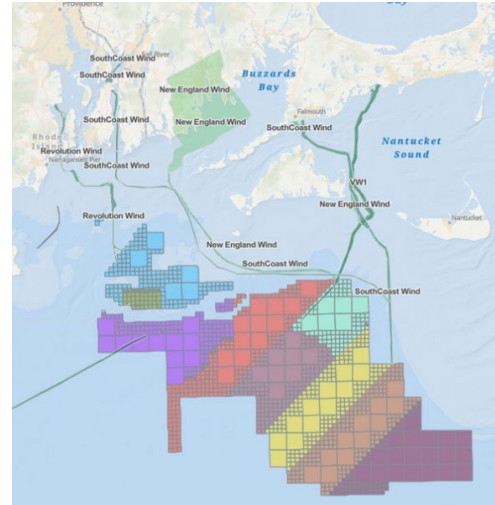
May 2023

- Geographic focus areas with high exposure:
 - Boston Harbor
 - New Bedford/Fairhaven
 - Vineyard Haven

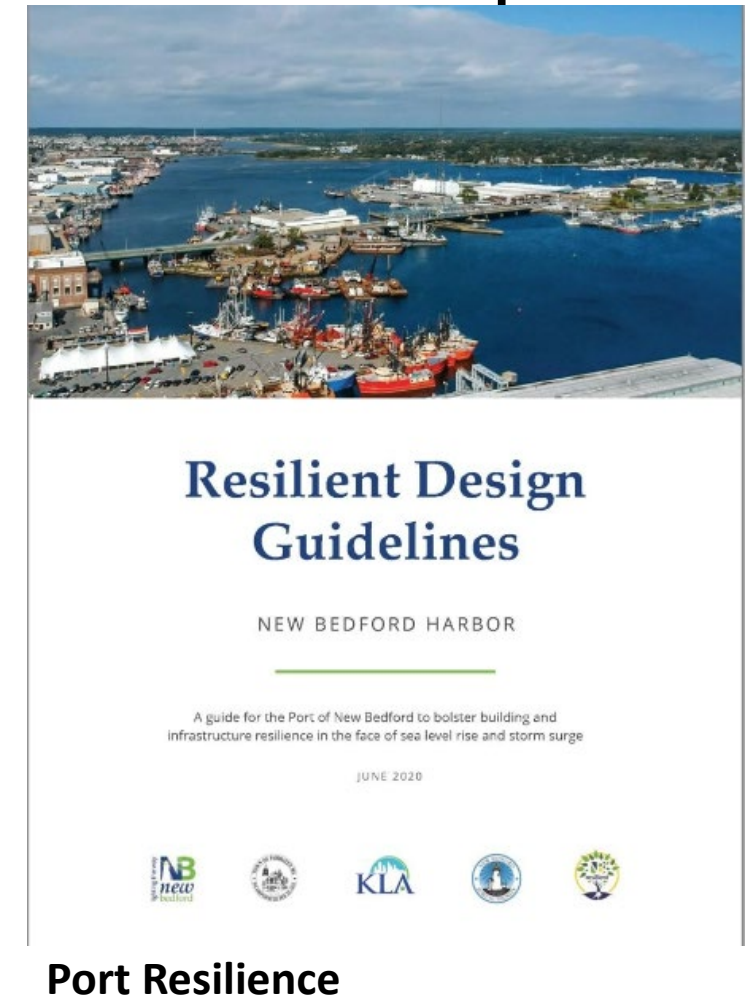
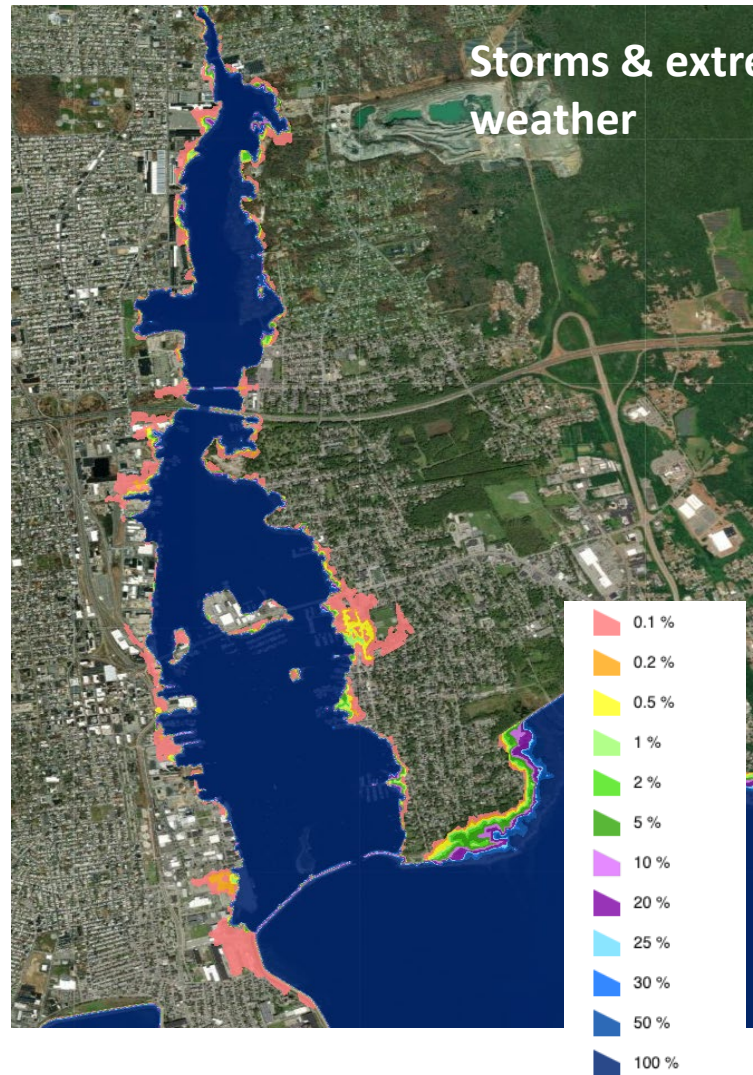
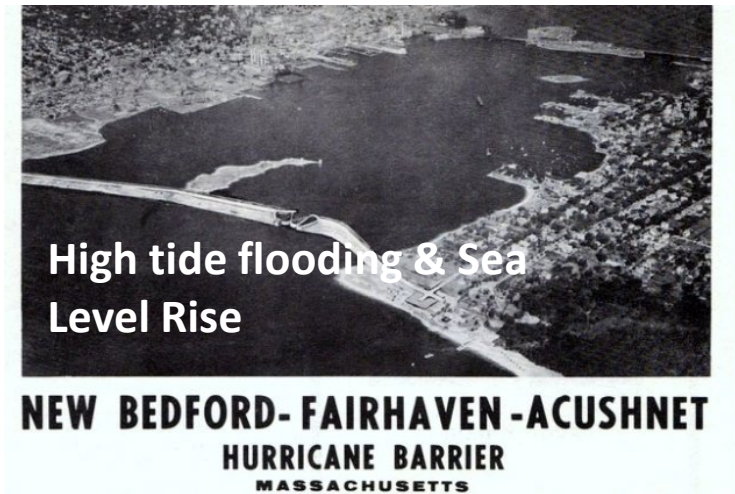


Climate-Ready Workshop

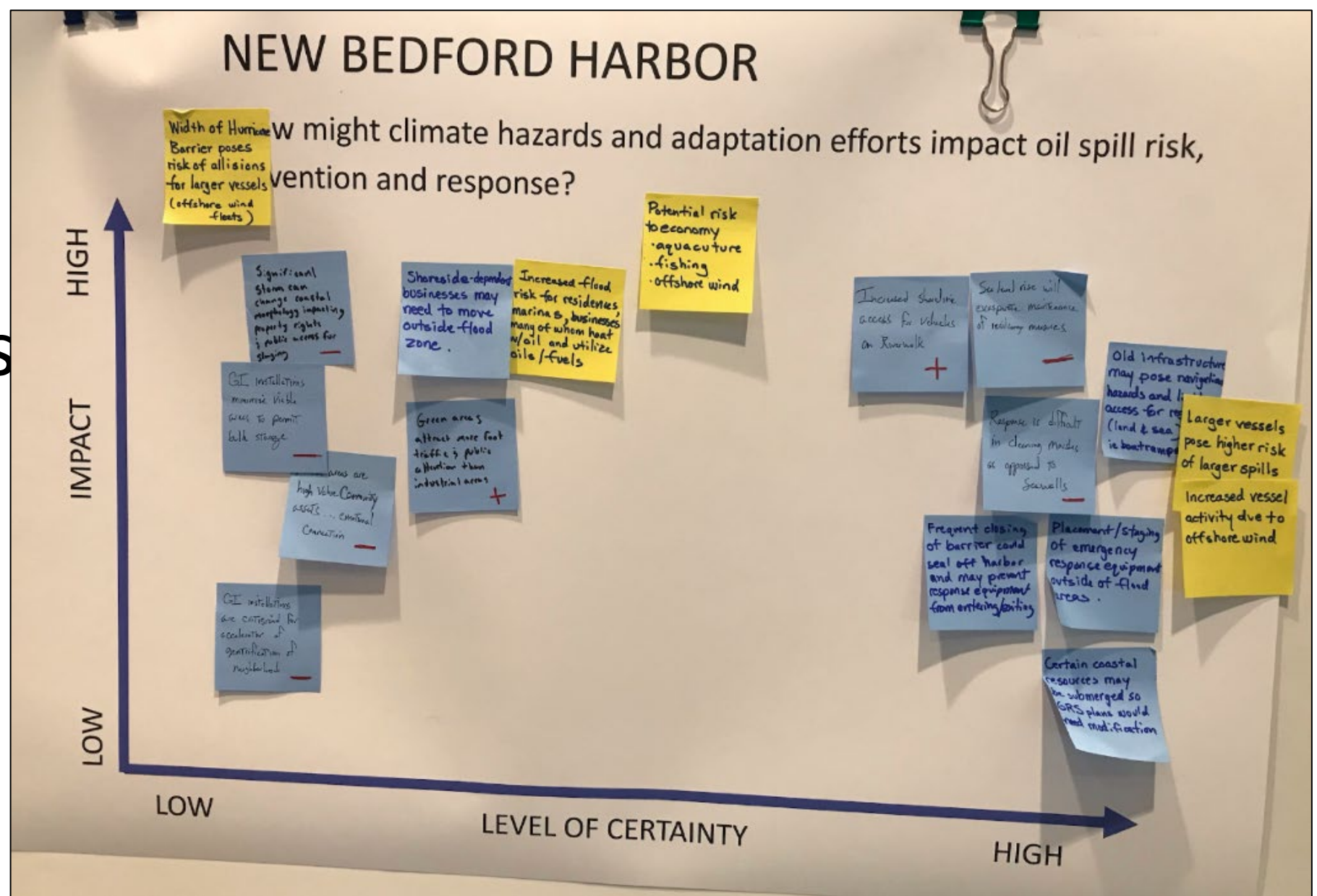
- Two tracks of scenarios:
 - Climate hazards and adaptations (2030)
 - Decarbonization (2050)
- Multiple “scenario cards” developed for each track & location
 - Small groups responded to scenario prompts
 - Report outs to larger group used to synthesize, prioritize, and identify key themes



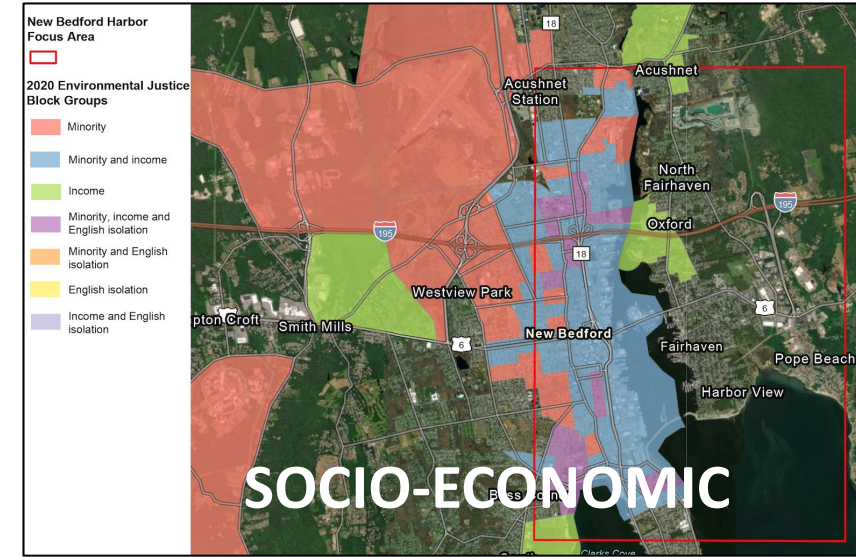
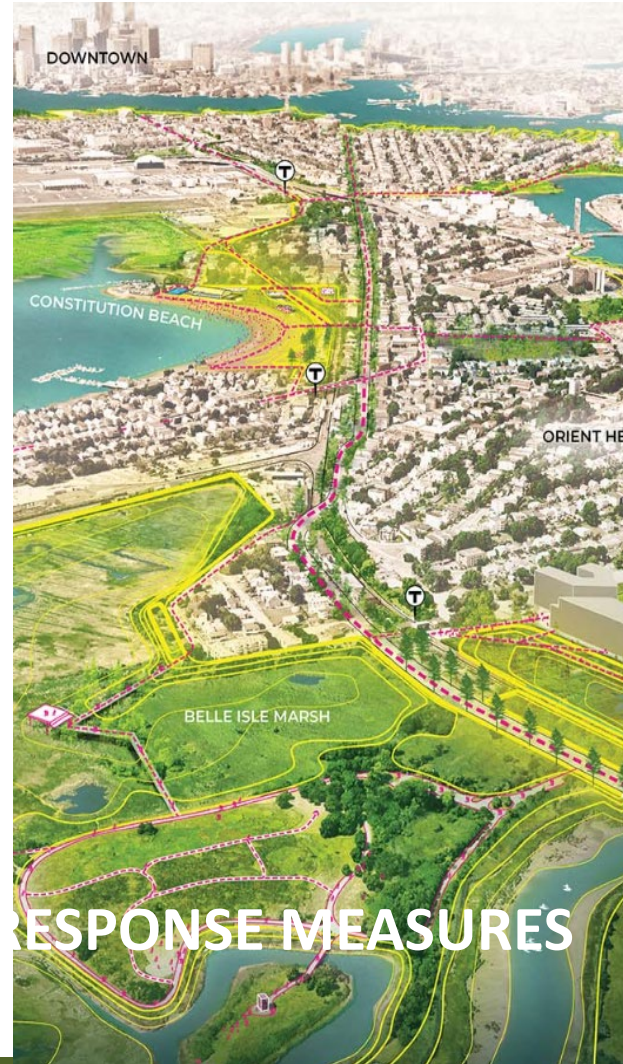
New Bedford - Climate Hazard & Adaptation Prompts



Synthesis: Risk Certainty Matrix



Common Themes: Hazards & Adaptations

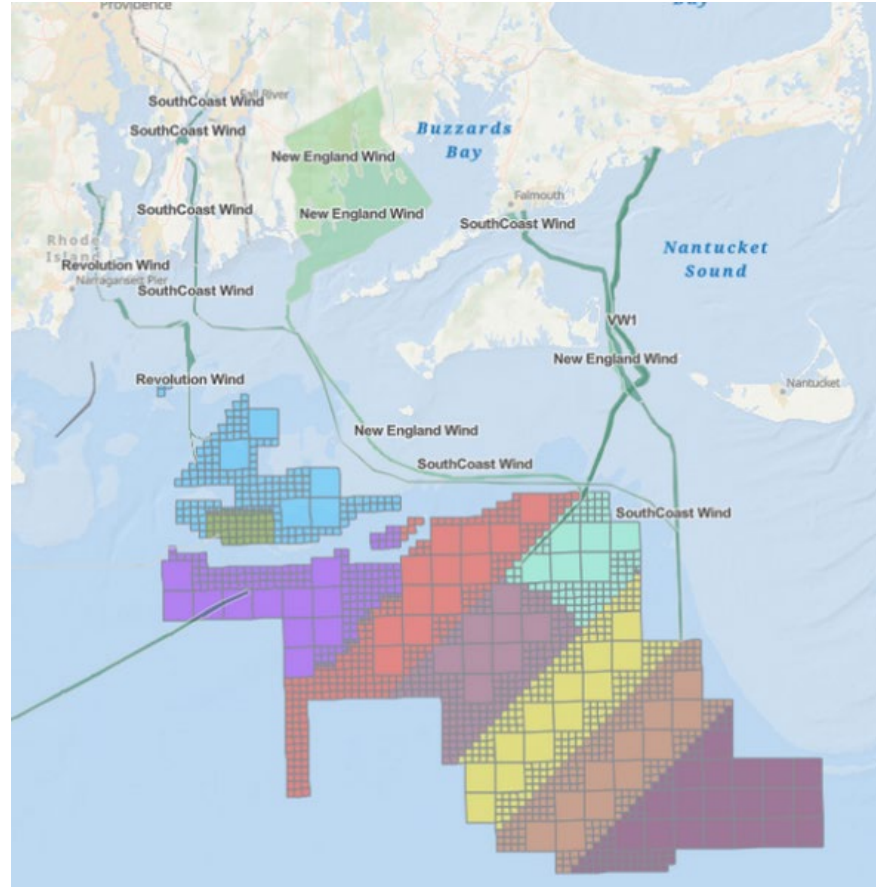


New Bedford - Decarbonization Prompts

Offshore Wind

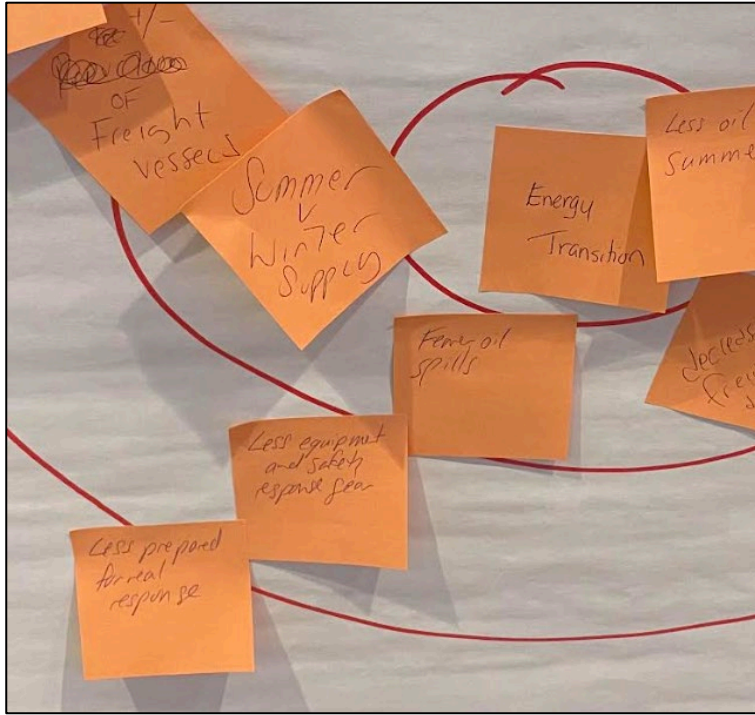


Electric Tugs & Ferries



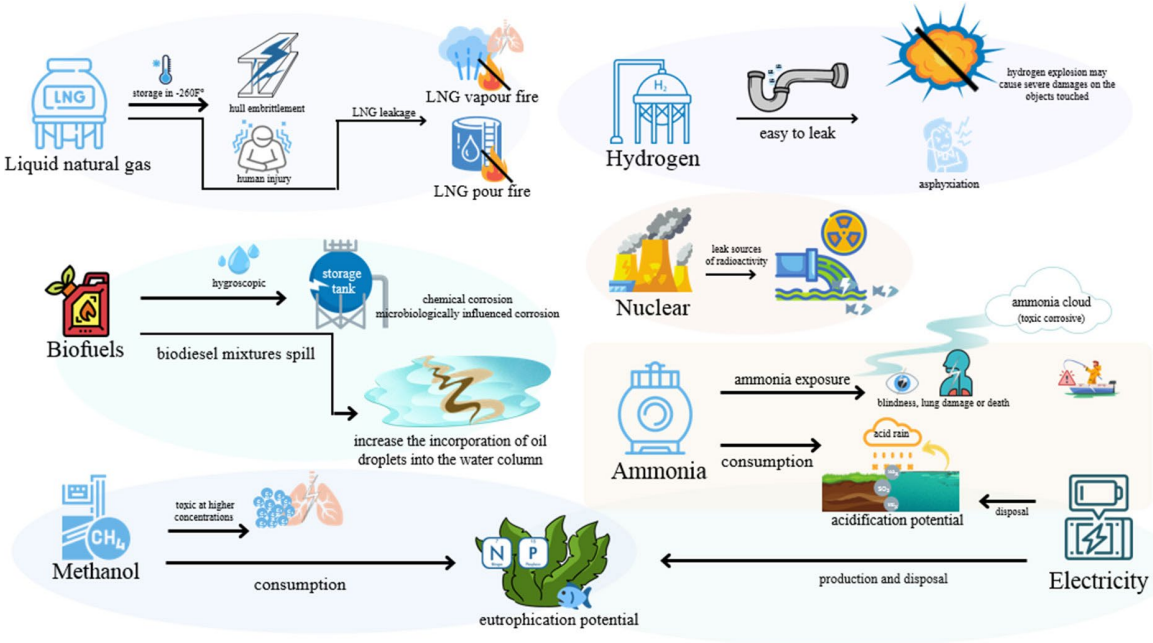
Autonomous Vessels

Synthesis: Futures Wheel



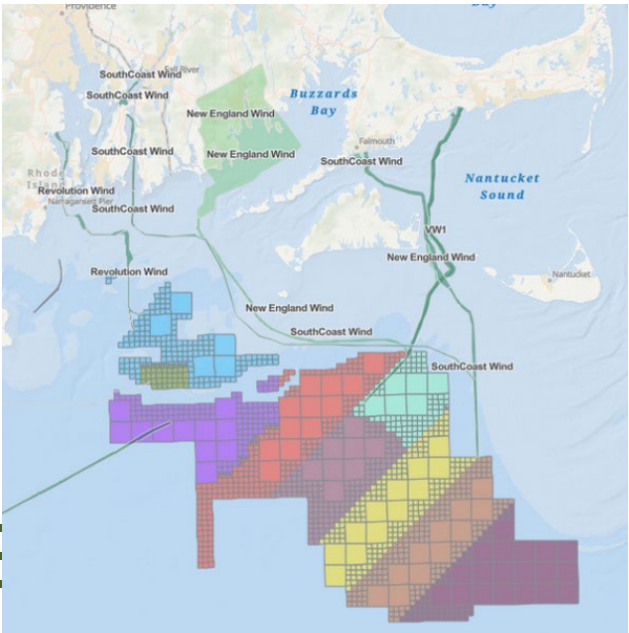
Common Themes: Decarbonization

ALTERNATIVE FUEL RISKS & RESPONSE NEEDS

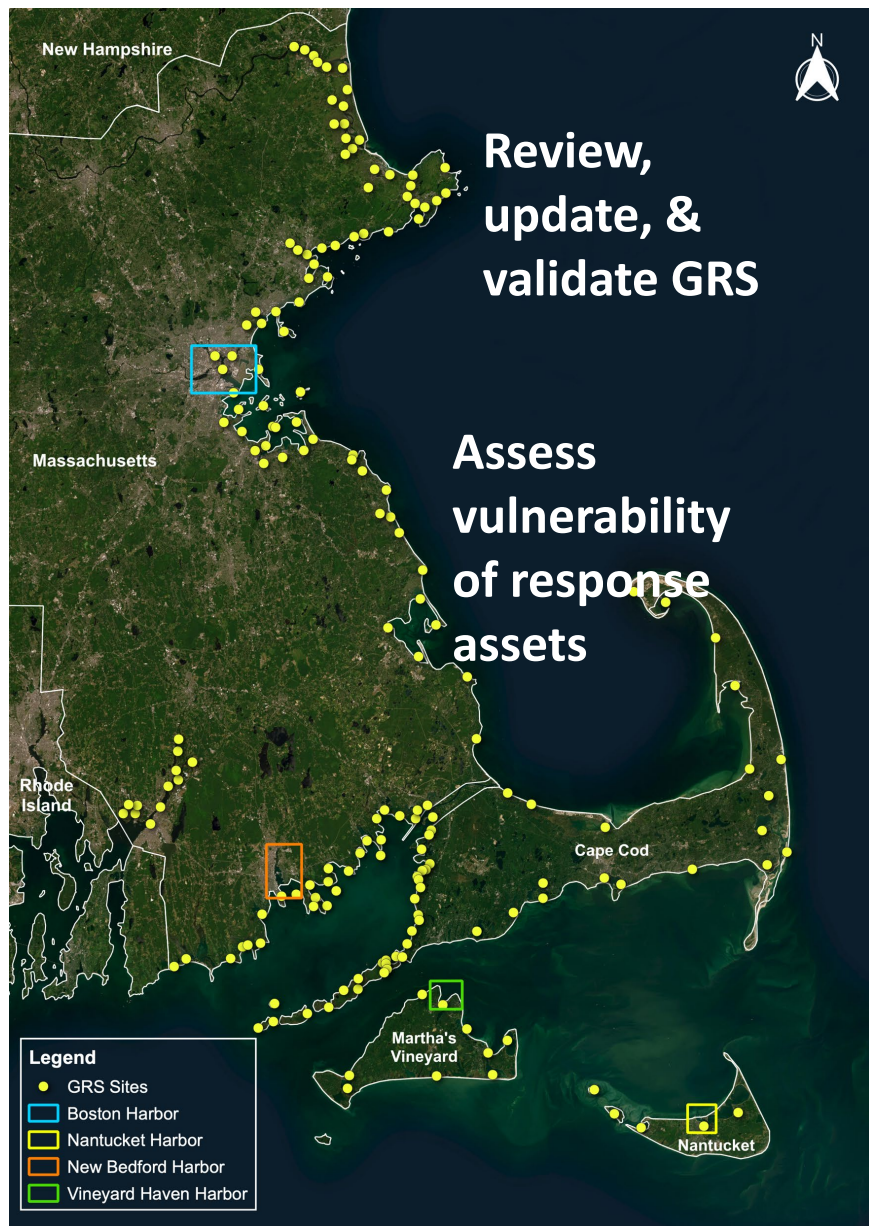


EV FIRES ON FERRIES

CHANGES TO VESSEL TRAFFIC PATTERNS & FLEET COMPOSITION OVER TIME



MOSPRA Climate Resilience: Planning, Preparedness & Risk Evaluation



Climate Resilience for MOSPRA: Stakeholder & Expert Engagement



Community-level
workshops



Create linkages through First
Responder and GRS Field
Exercise and Training Program



Look for opportunities
to promote
decarbonization

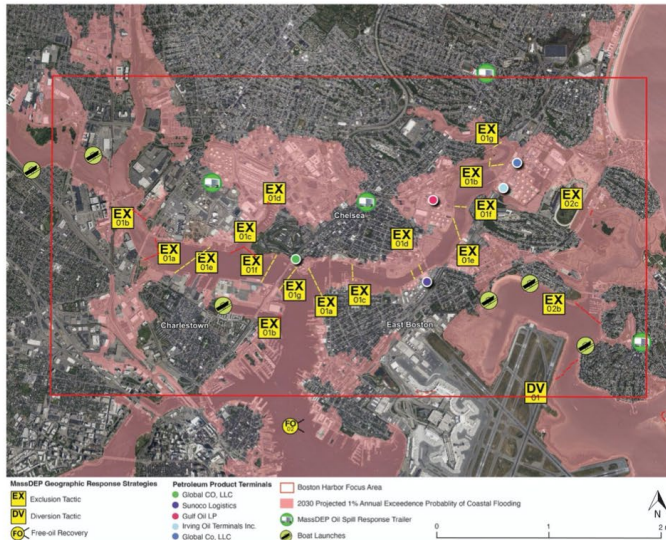


Proactively connect with
climate experts & initiatives

Questions before we transition to Foresight Discussion and In-Room* Exercise?

Marine Oil Spill Threats to Massachusetts Coastal Communities

Evaluating and Adapting Oil Spill Preparedness and Response Capabilities for a Changing Climate



Final Report to
Massachusetts Department of Environmental Protection
June 2024

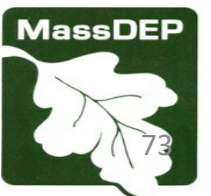
Nuka Research
10 Samoset Street Plymouth, MA 02360
www.nukaresearch.com



If you are participating online, the first 20 or so minutes will include you, but when we transition to in-room exercise you might want to drop off, or take a break and come back for the last 10-15 minutes to hear the debrief.



QR CODE FOR FINAL REPORT



Decarbonized Futures for Massachusetts

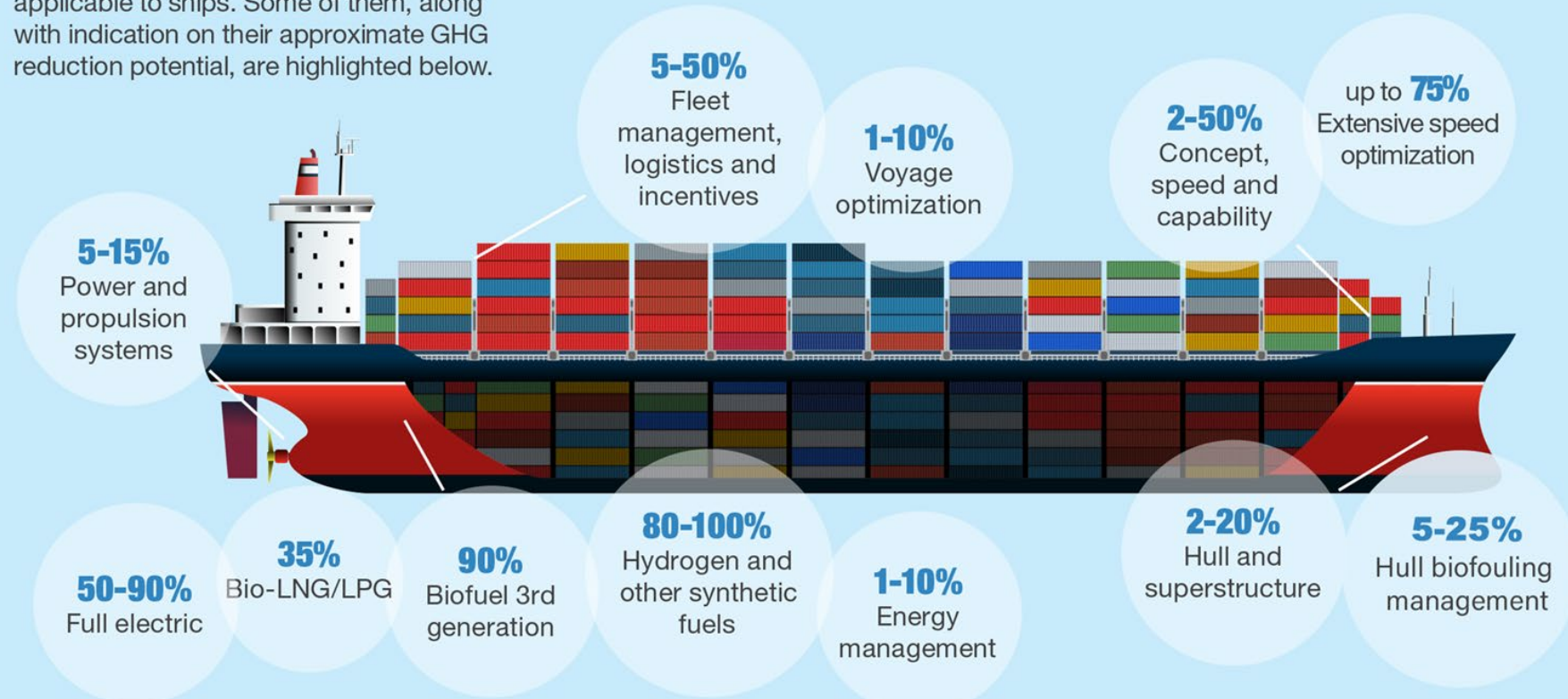


Global Drivers: IMO GHG and Emissions Targets



A wide variety of design, operational and economic solutions

Achieving the goals of the Initial IMO GHG Strategy will require a mix of technical, operational and innovative solutions applicable to ships. Some of them, along with indication on their approximate GHG reduction potential, are highlighted below.



Global Shipping Implications: Alternative Ship Fuels to Meet IMO GHG and Emissions Targets



LNG

Record number of LNG-powered vessels on order in 2023.

Credit: DNV, 2021



AMMONIA

Yara / Azane Partnership to develop an ammonia bunkering network across 15 ports.

Credit: Yara, 2022



ELECTRIC

Robert Allan Ltd, ElectRA Tugboat with back up generator option.

Credit: Robert Allan, 2023

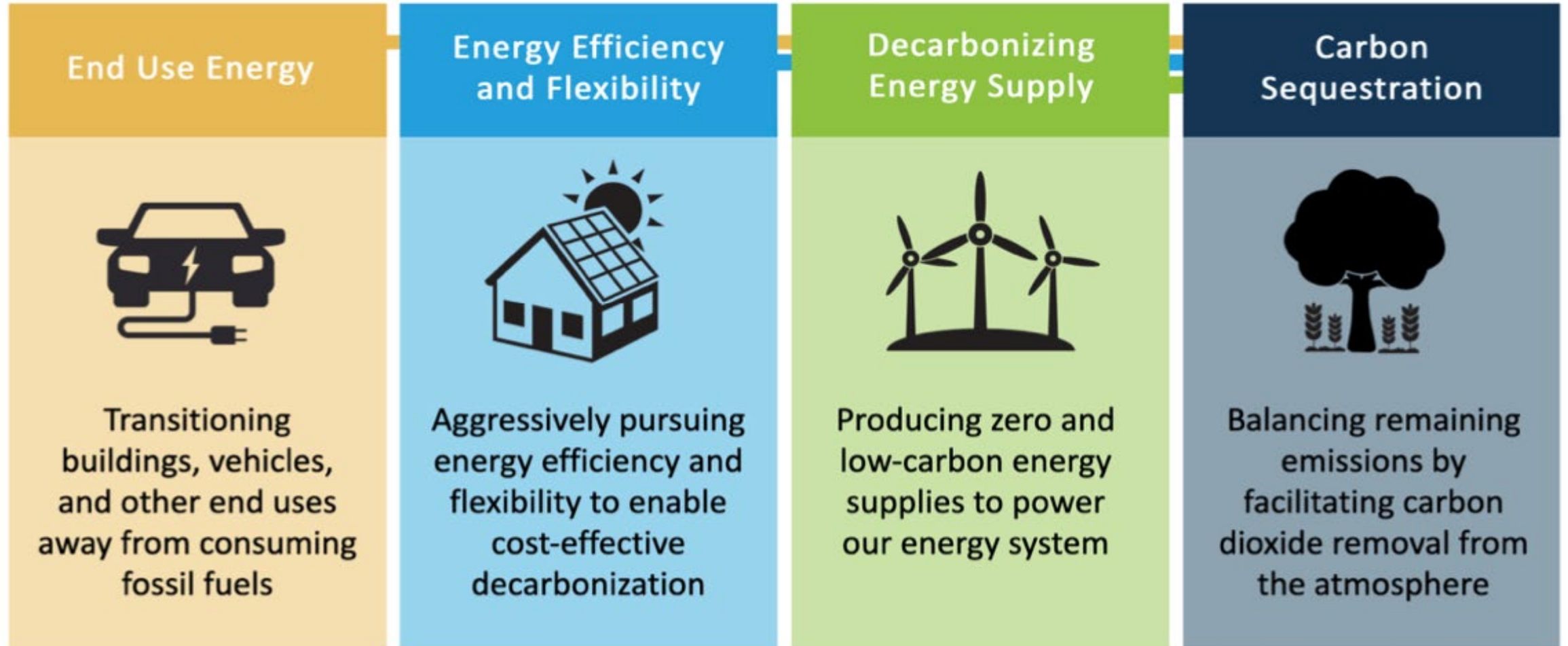


HYDROGEN

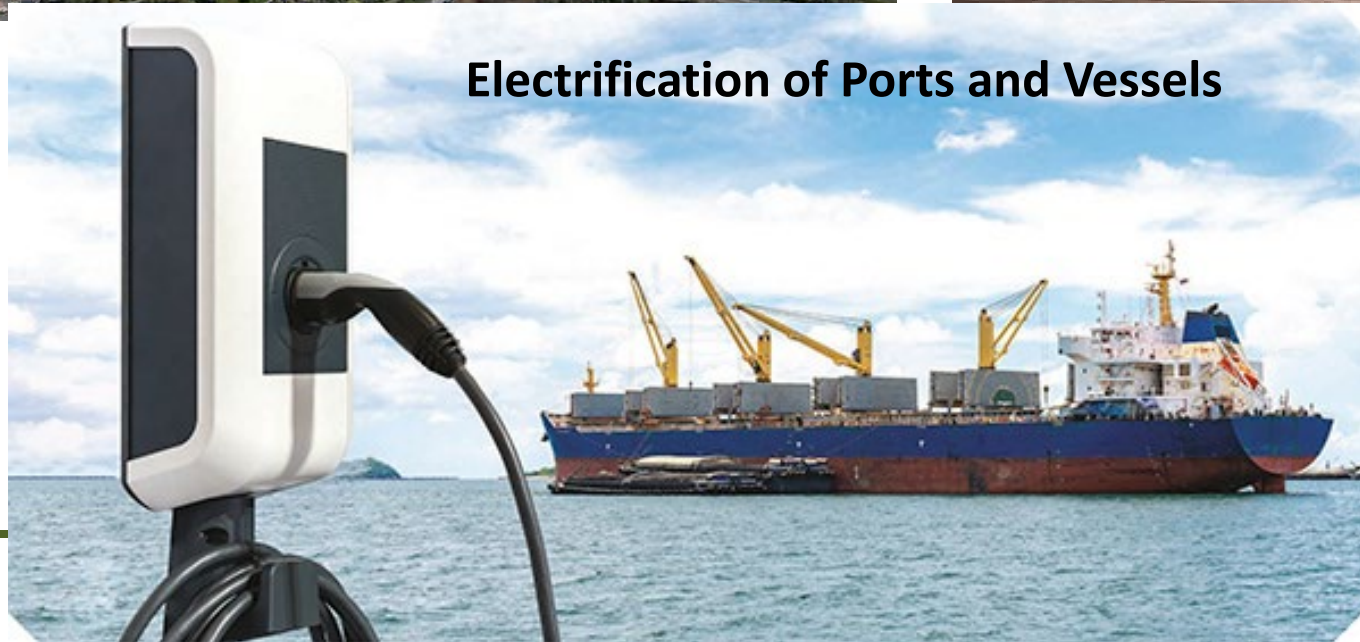
The Sea Change, San Francisco's first hydrogen powered ferry

Credit: SF Chronicle, 2023

Massachusetts Decarbonization Drivers: Net Zero by 2050



State-Level Implications



**What else is coming?
How can we anticipate
the implications to
MOSPRA and to
related programs and
industries?**



Futures Theory

Critical Futures Study

**Strategic Foresight
helps us overcome barriers to
proactive preparedness and planning
in a complex and uncertain
environment.**

Foresight Theory

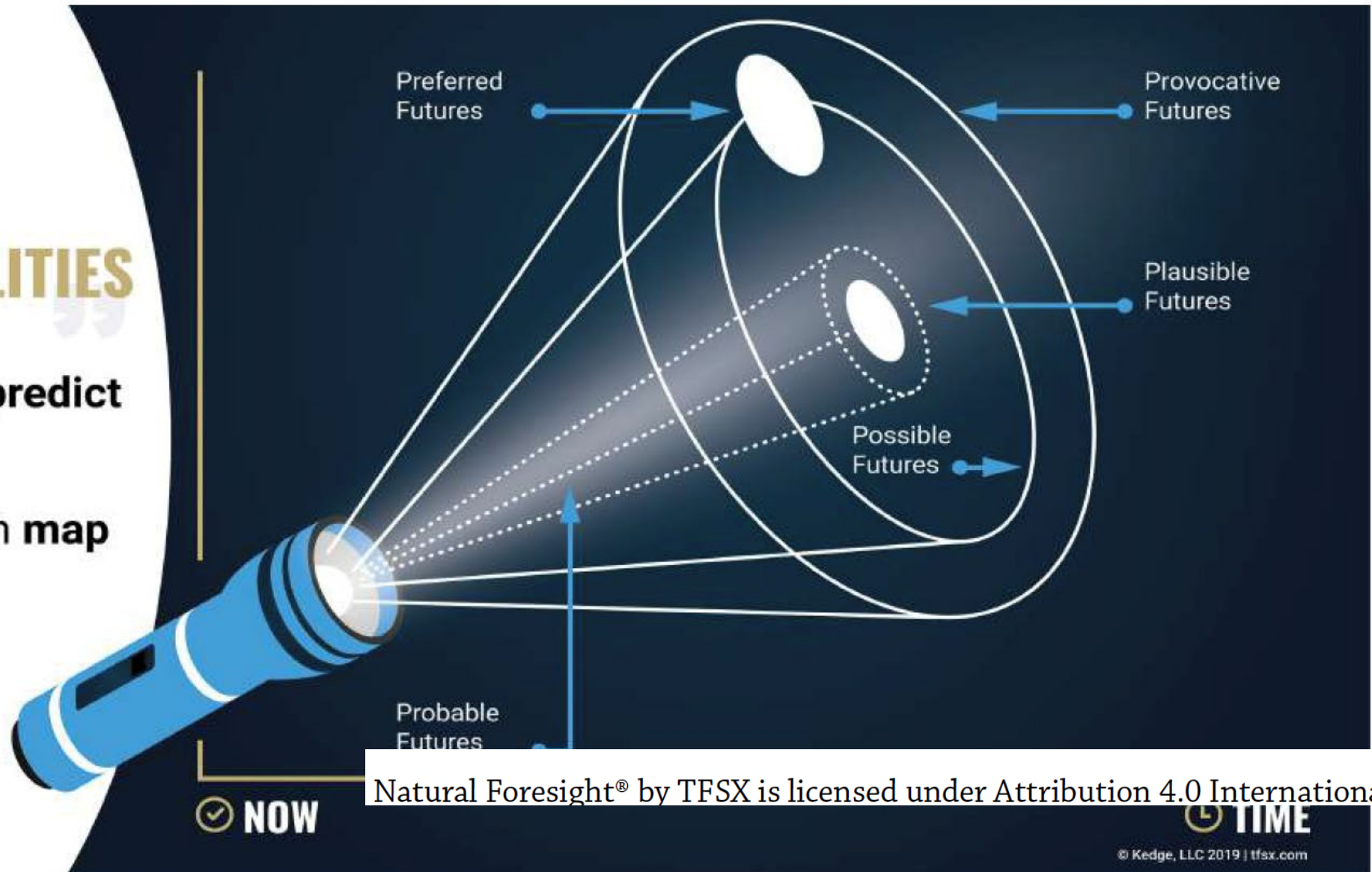
Anticipatory Intelligence

Applying Foresight: Keyhole vs. Flashlight

CONE OF POSSIBILITIES

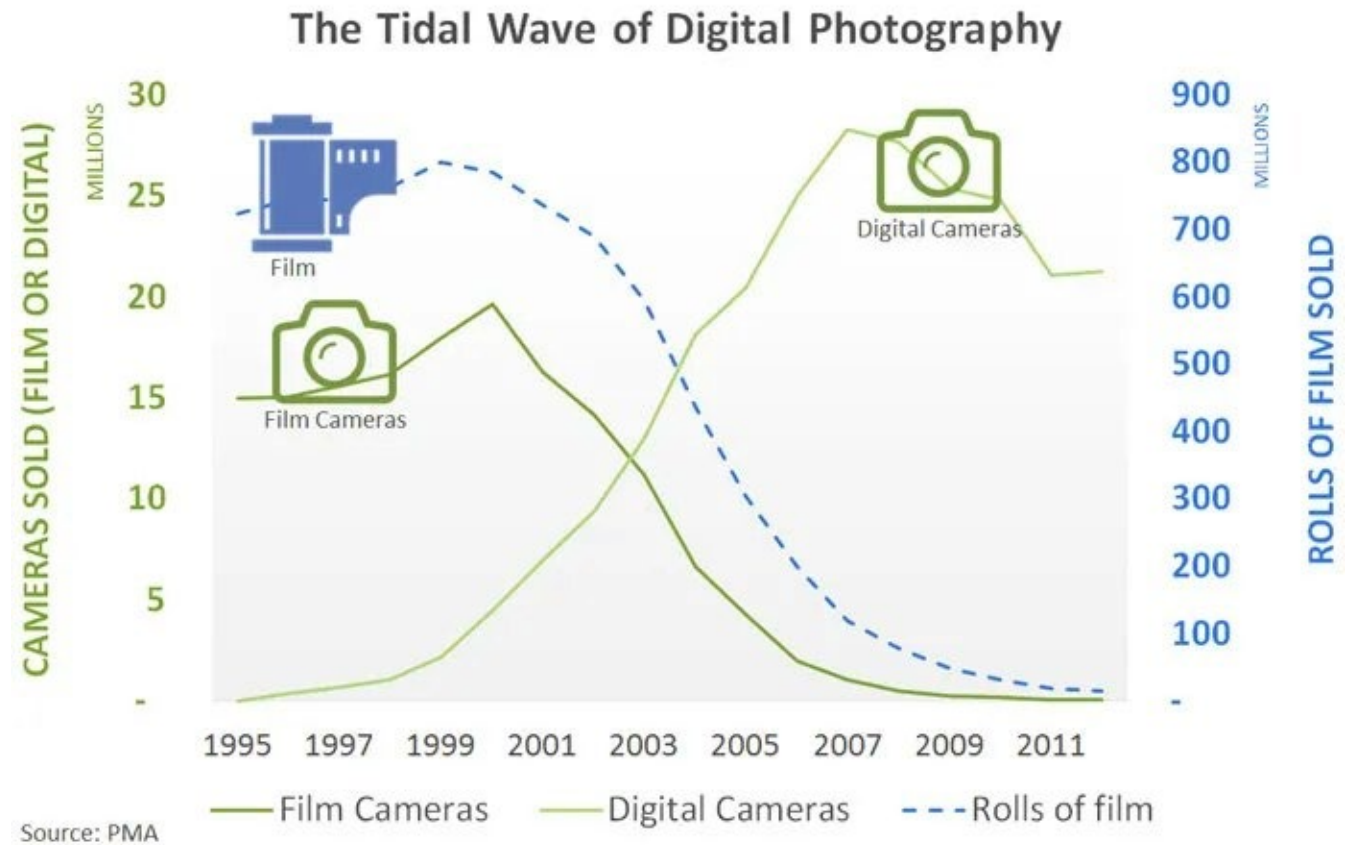
We cannot **predict**
the future...

...but we can **map**
the future.



Applying Foresight: Looking at Issues from the Outside In to Overcome "Educated Incapacity"

What is educated incapacity?





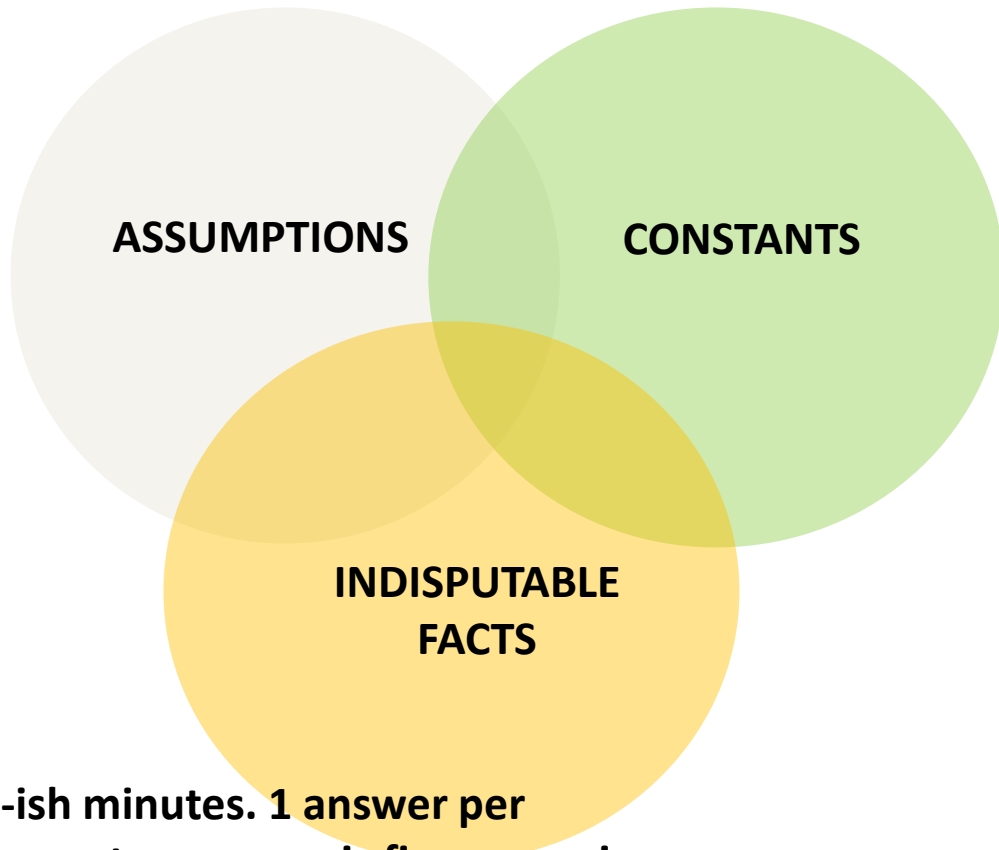
Educated Incapacity is knowing so much about
what you know that you are the last one to see
things differently

Rapid Fire Exercise: Educated Incapacity

- Pair up in twos or threes
- Sticky notes & pens
- Online participants answer in chat
- Rapid fire, don't overthink, no wrong or right responses
- Personal or organizational



Rapid Fire Exercise: Educated Incapacity



5-ish minutes. 1 answer per prompt per group is fine, more is better, zero is OK too.

What are the **ASSUMPTIONS**, **CONSTANTS**, and **INDISPUTABLE FACTS** held by your organization about *Decarbonization*?

ASSUMPTIONS: I/we believe _____ about the future of decarbonization.

CONSTANTS: No matter what happens in the future, _____ will be true.

INDESPUTABLE FACTS: _____ is an undeniable truth as it relates to a decarbonized future.

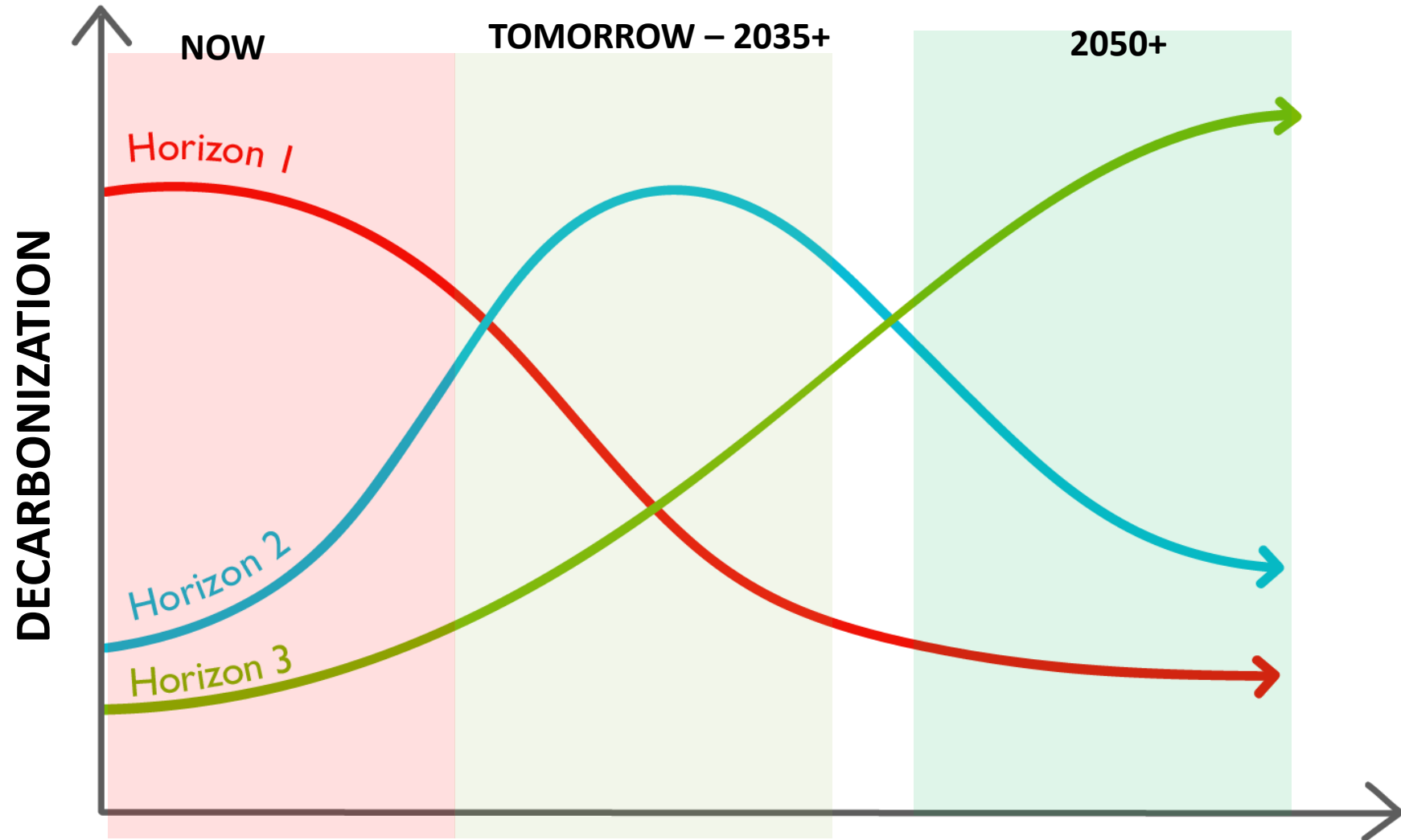
Stop: We will look at these together at the end
AFTER our next exercise



If you are online, it's your call.
You won't be able to
participate, but we will come
back together at 11:35-11:40am
to recap.

Three Horizons Concept

Pattern



Time

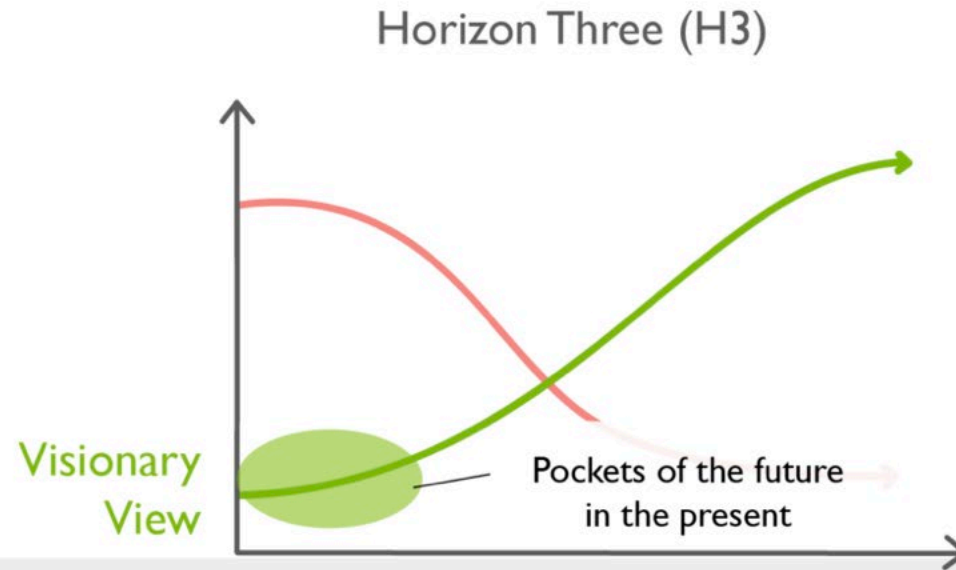
First Horizon: Today



Approach:

- * How we get things done today - 'locked in'
- * Incremental innovation framed by familiar approaches and dominant actors
- * Quantitative sense of time as limited resource

Third Horizon: Far Future (2050+)

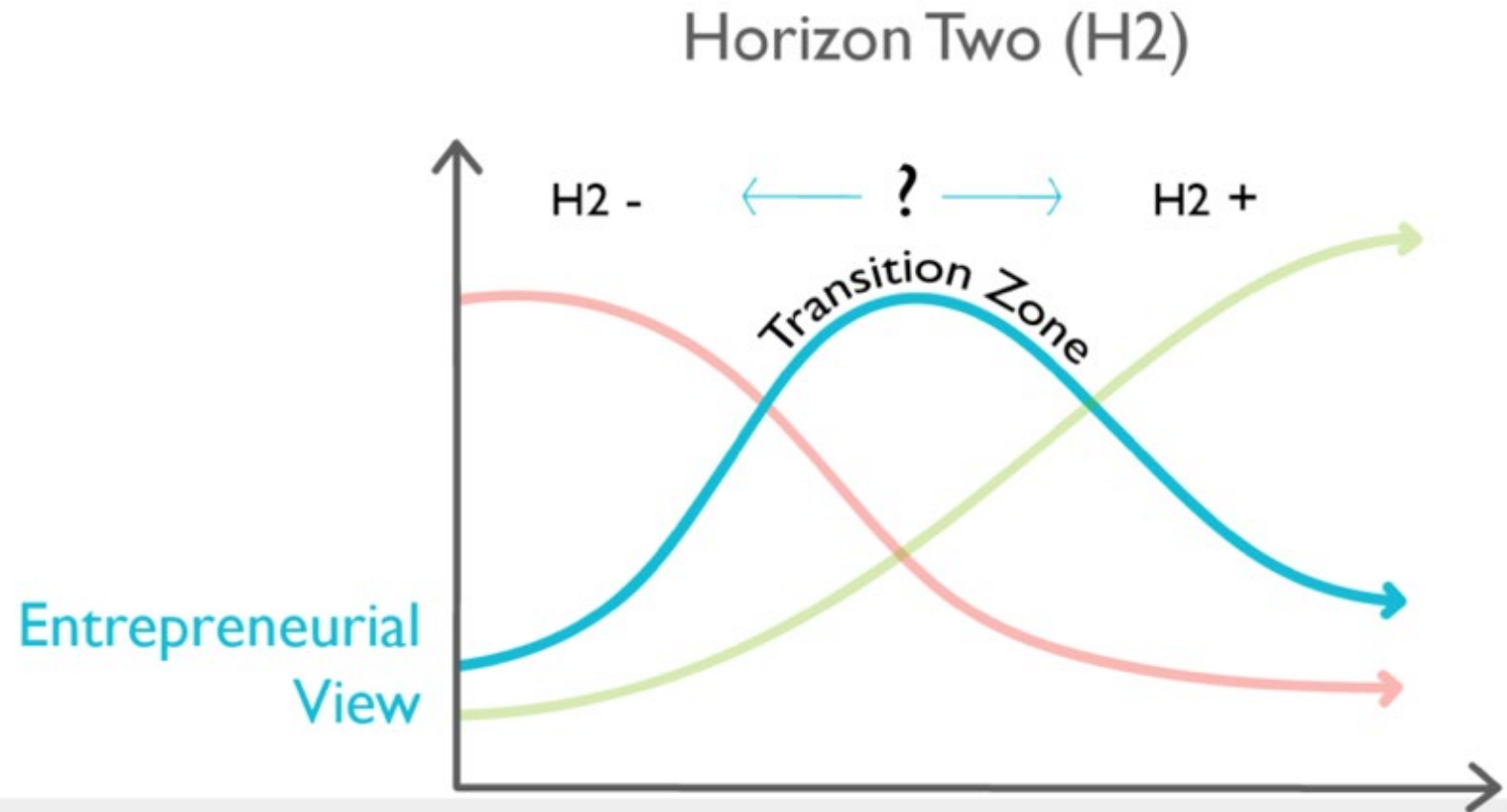


Approach:

- * Transformative shifts from the present, questioning assumptions, new actors
- * Emerging patterns of value, many alternatives
- * Quantitative sense of time as defining moment

Second
Horizon:
Transitional
Near Future

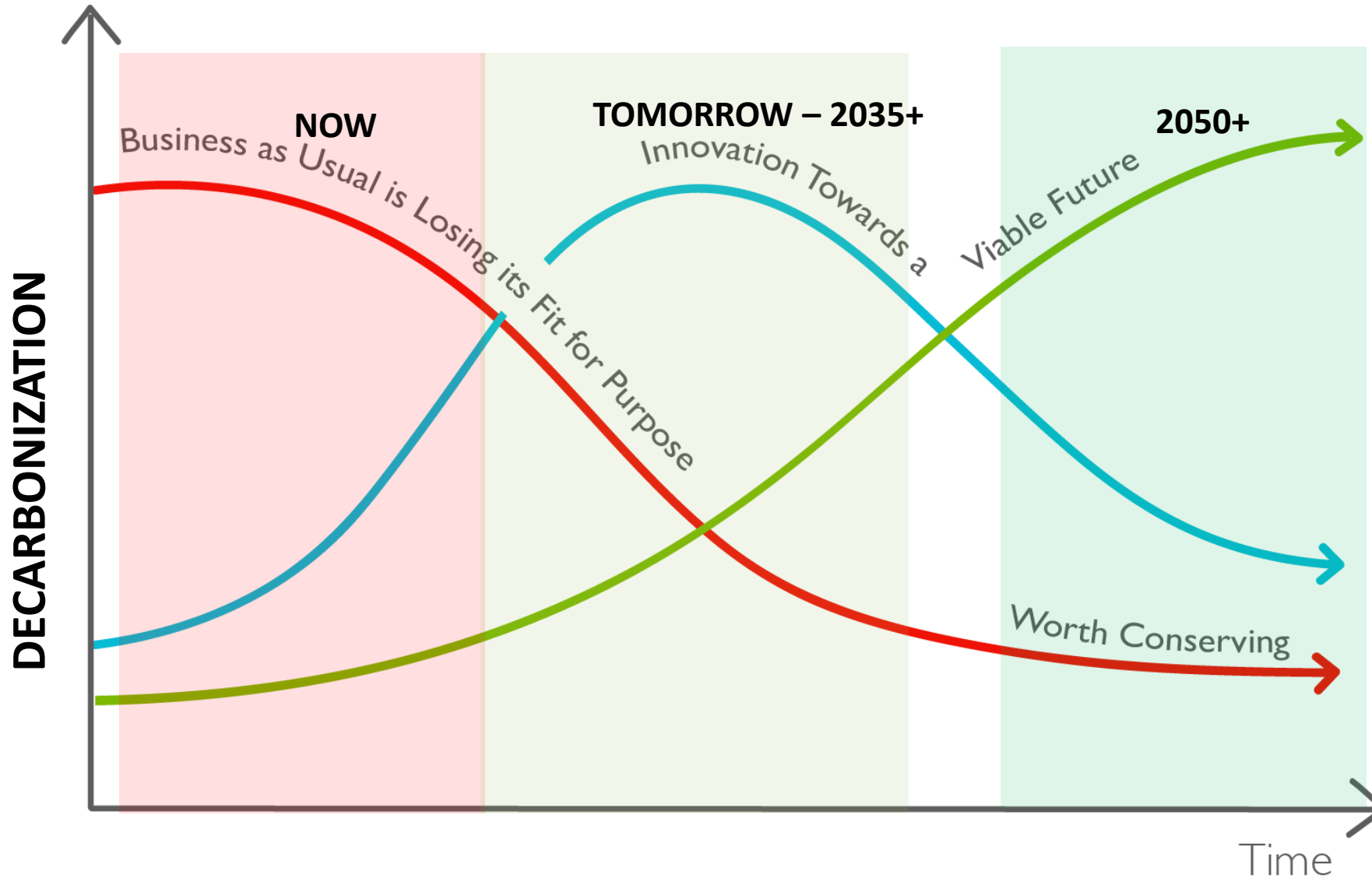
(Tomorrow
till ~2035+)



Approach:

- * Looks both ways
- * Zone of innovation and turbulence
- * Sense of time as opportunity cost - need for trade-offs

Three Horizons Exercise



Three Horizons Exercise: Horizon 1 (Today)

- Work in pairs
 - 5 minutes to brainstorm
 - 5 minutes to place on wall mural – discuss, cluster
- Think about the decarbonization trends we described earlier, and draw from your own knowledge & experience
- **Focus on Horizon 1 (~10 minutes)**
 - What are the dominant systems or assumptions within which we are currently operating?
 - What are the key factors impacting our current-day decisions and actions?



Three Horizons Exercise: Horizon 3 (2050)

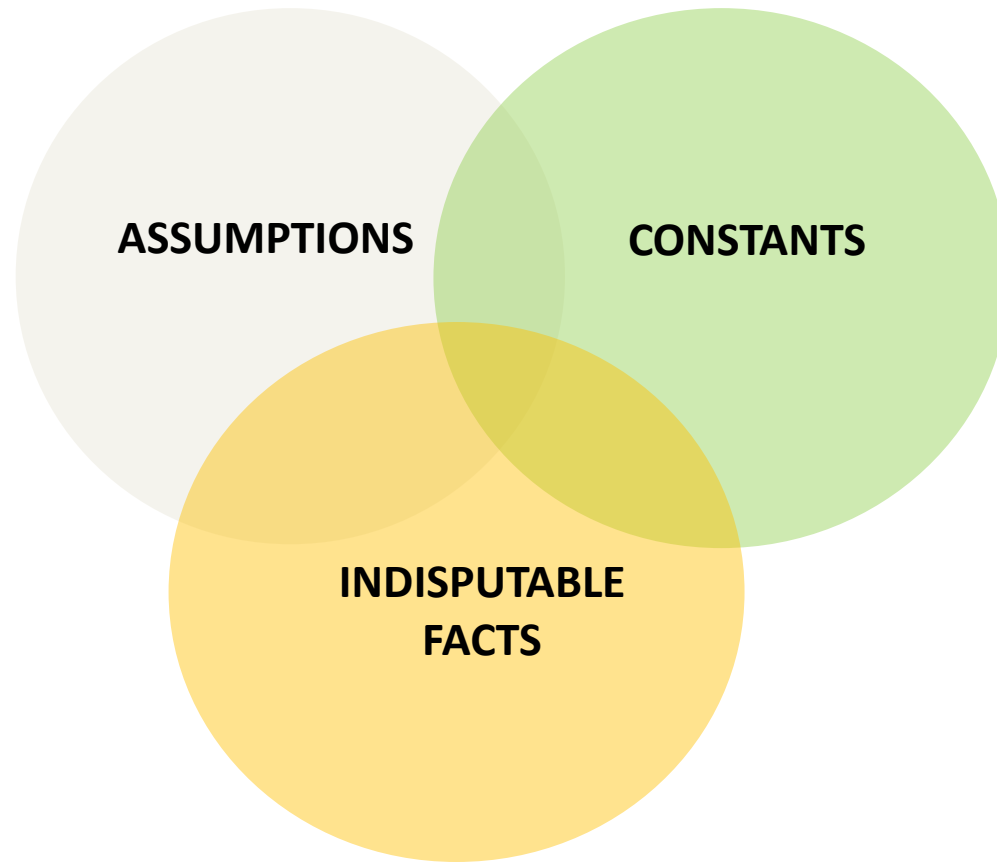
- Work in pairs
 - ~10 minutes to brainstorm
 - 5 minutes to place on wall mural – discuss, cluster
- **Jump forward to Horizon 3 - a NET ZERO 2050 in Massachusetts**
 - What new systems or assumptions have emerged to replace today's dominant narratives?
 - What new technology, trend, or invention has you excited?
 - What new technology, trend, or invention has you worried?

Three Horizons Exercise: Horizon 2 (Tomorrow – 2035+)

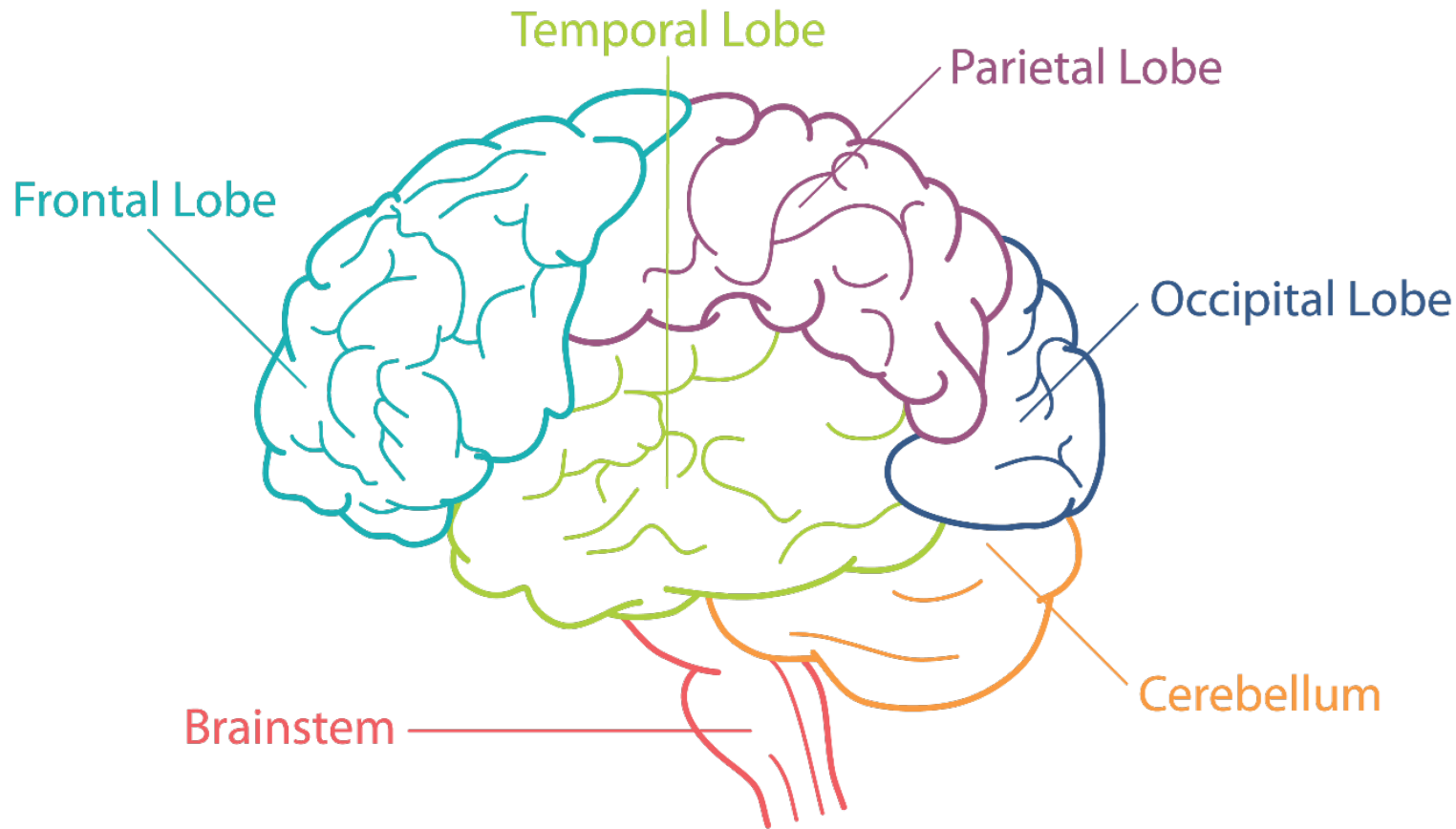
- GROUP DISCUSSION

- Which of the assumptions in Horizon 1 will be most challenged by future change?
- Which components of our current state are most vulnerable to a changed future?
 - Which are strengthened?
- Working backwards from Horizon 3, are there actions or activities in the near-future that can support the technologies, trends and innovations that are viewed positively?
 - What about actions, etc. to help avoid potentially adverse futures?

So why did we start with "Educated Incapacity"?



The human brain can process ~11 million bits of information per second



What percentage of that information can our conscious mind process?

40-50 bits per second

**As the MOSPRA
Program and the
OSAAC Progress into
your third decade,
how can we build
climate resilience into
our program?**



Closing Remarks

Julie Hutcheson

Coordinator

MOSPRA Program

MassDEP

