

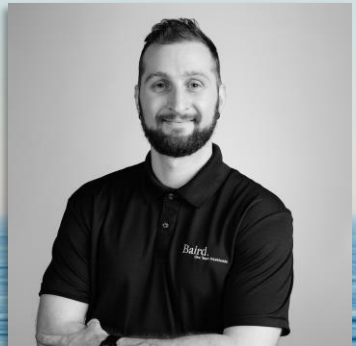
Navigation Impacts due to Offshore Wind Developments: Modelling of Collision and Allision Incident Frequencies

Marine Spatial Planning: Minimizing Impacts with Other Ocean Users

Nov 18th, 2024 – Halifax, NS

Baird.

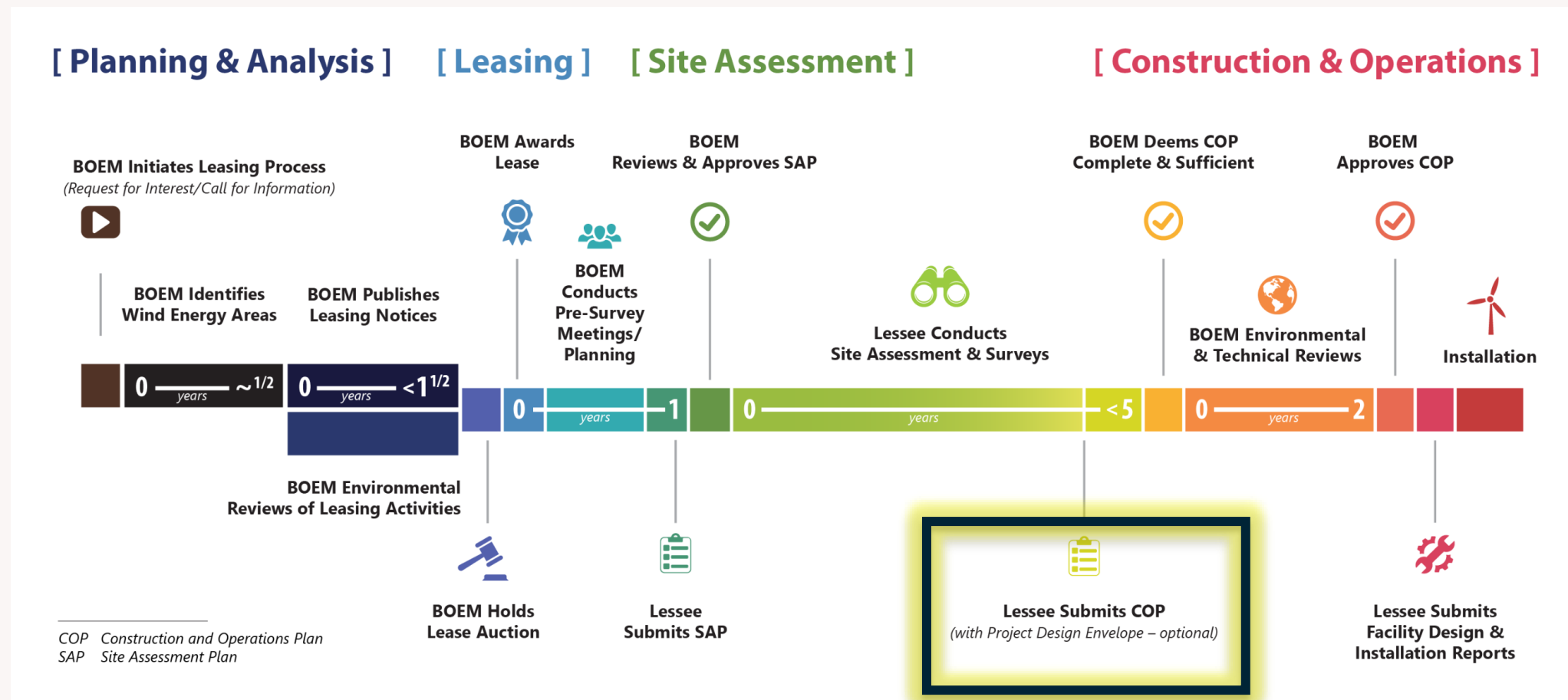
Innovation Engineered.



Karl Hanke
khanke@baird.com

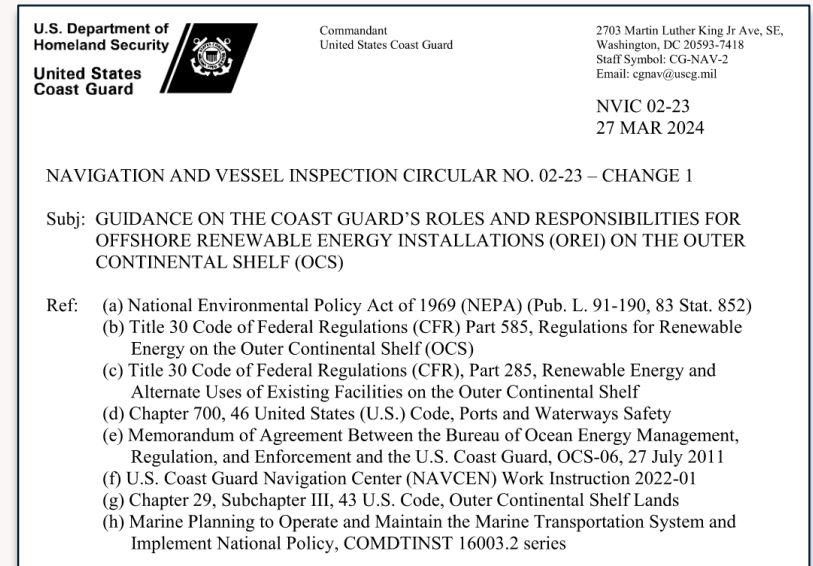
U.S. Offshore Wind Regulatory Process

- Bureau of Ocean Energy Management
- Offshore renewable energy installations (OREIs)
 - Outer Continental Shelf (OCS)
 - Construction and Operations Plan (COP)

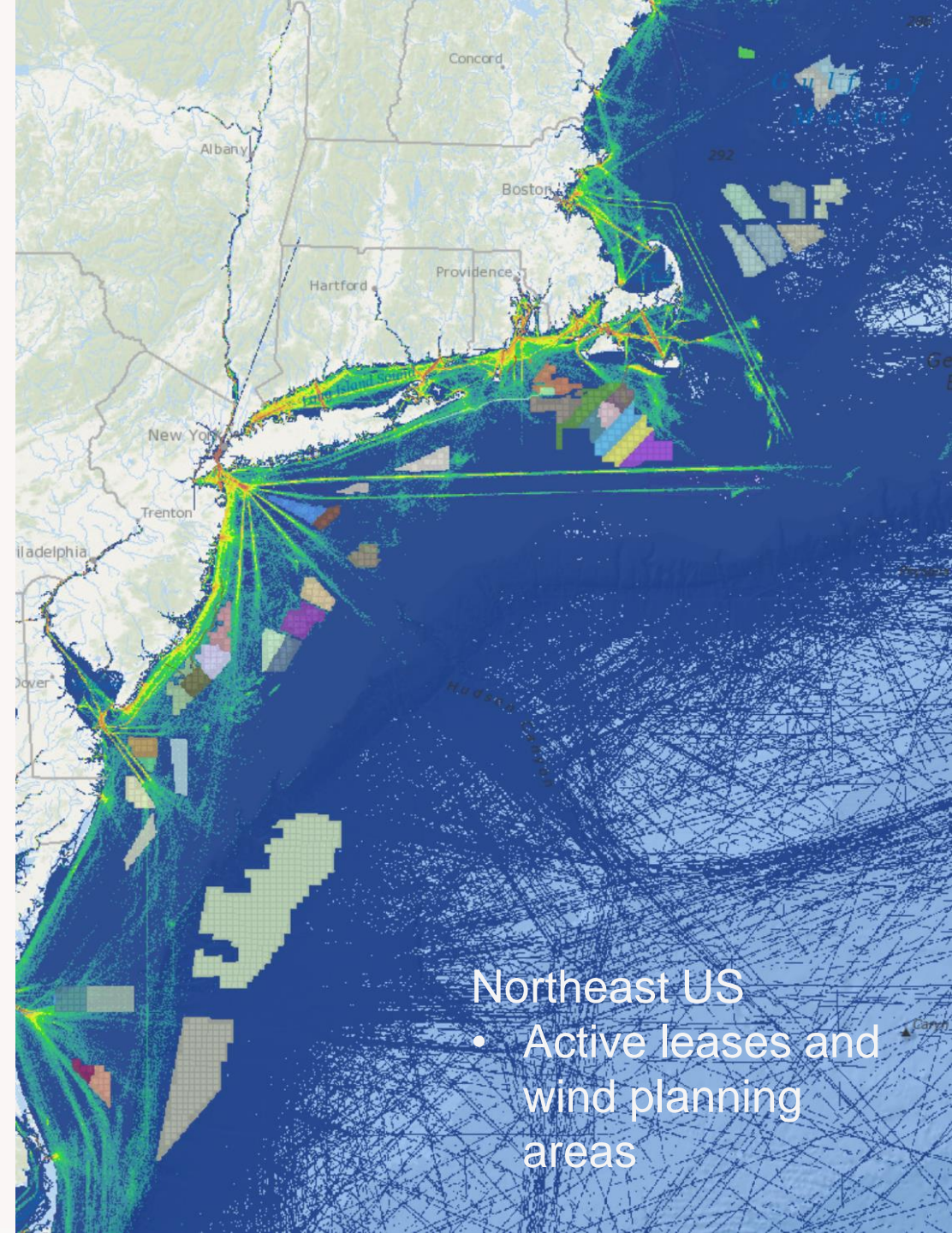
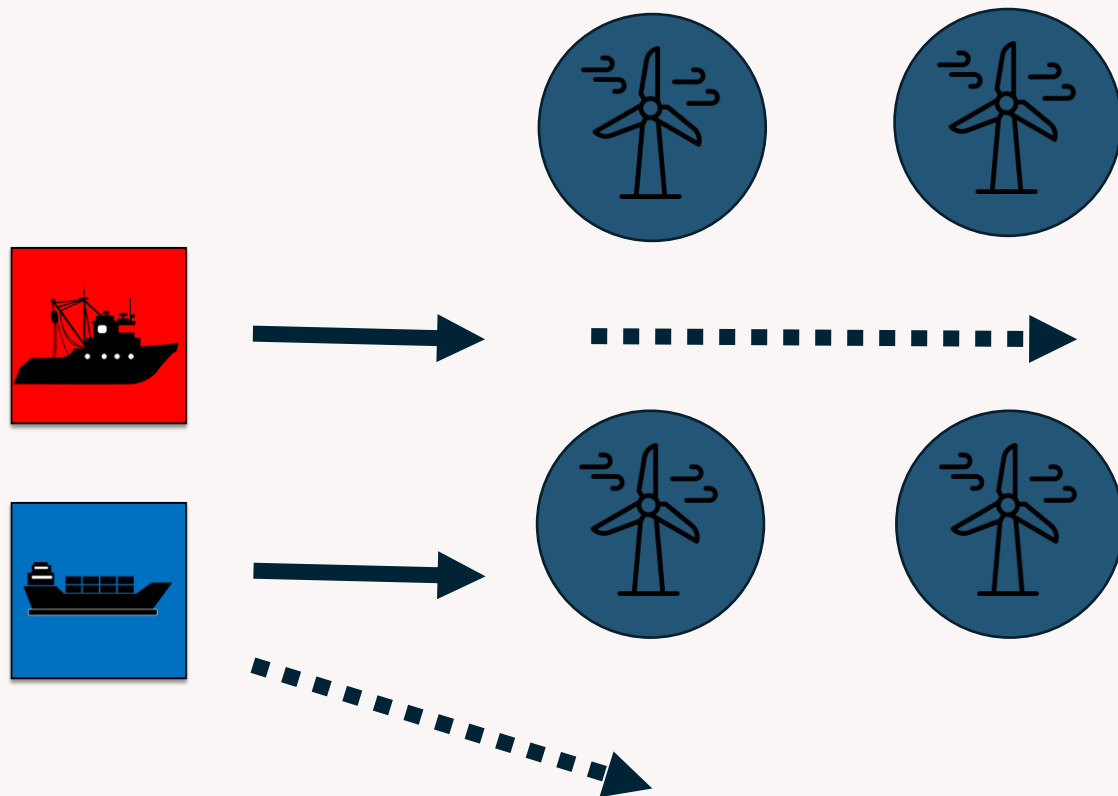


COP Permitting Requirements

- US Coast Guard (USCG) – cooperating agency
- USCG Navigation & Vessel Inspection Circular (NVIC) 02-23 Change 1
- **Navigation Safety Risk Assessment (NSRA)**
- State waters - may require additional permits or approvals



Navigation Issues

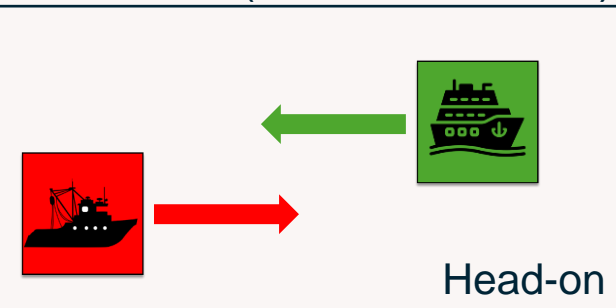


Northeast US

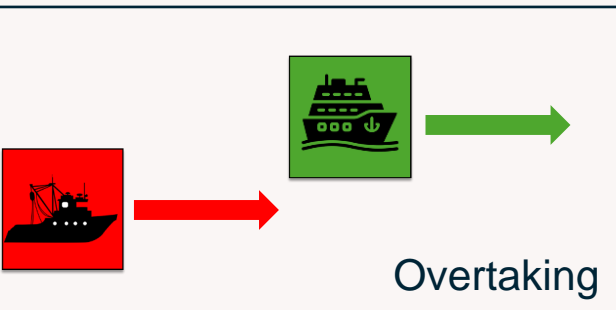
- Active leases and wind planning areas

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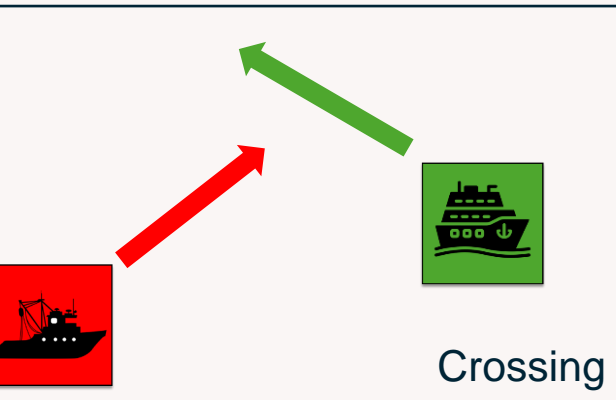
Collisions (vessel-to-vessel)



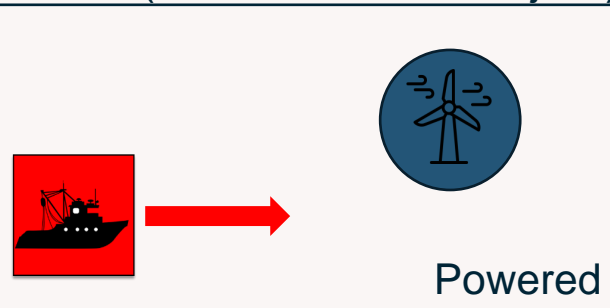
Overtaking



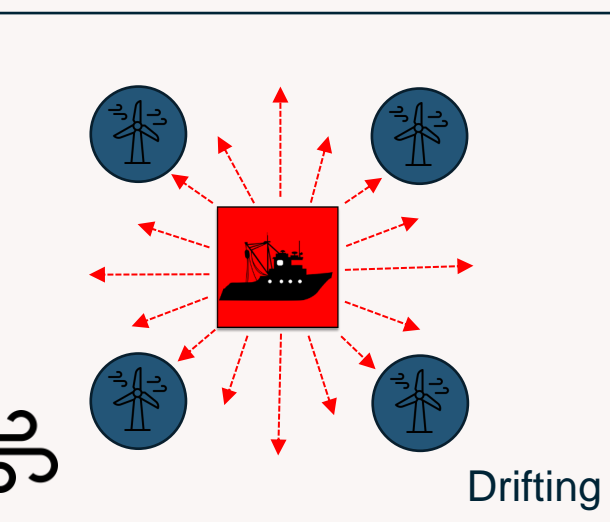
Crossing



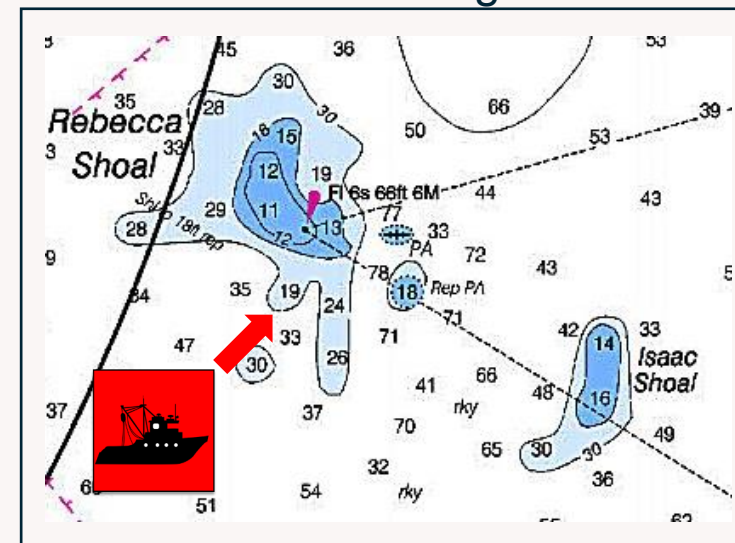
Allisions (vessel-to-fixed object)

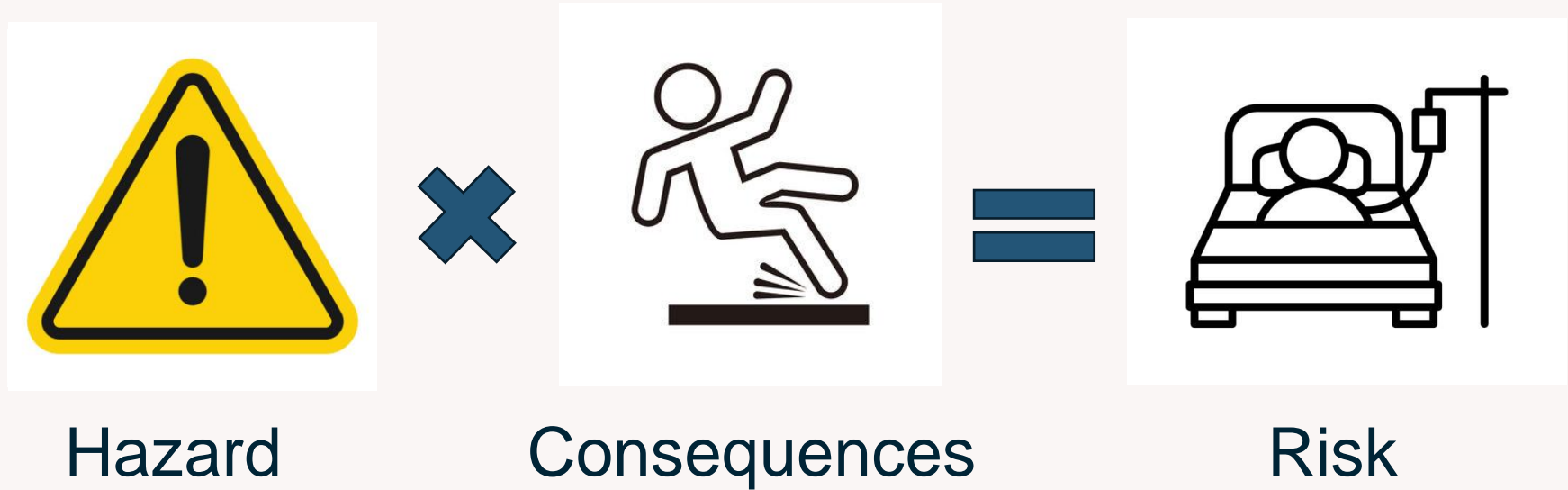


Drifting



Grounding

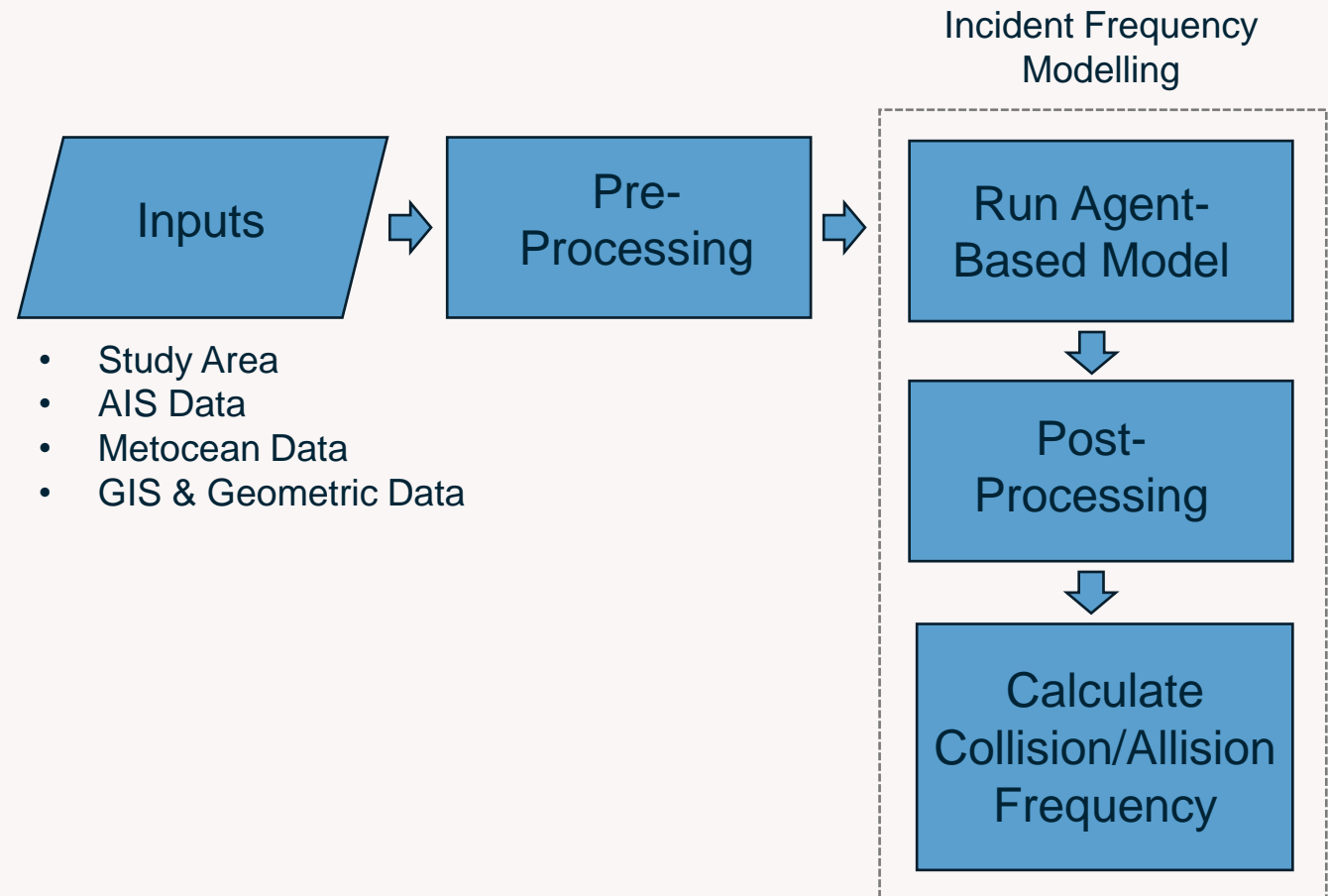




“Risk evaluation procedures are based on an estimation of the probability of the considered hazard followed by an estimate of the consequences”

Navigational and Operational Risk Model (NORM) Workflow

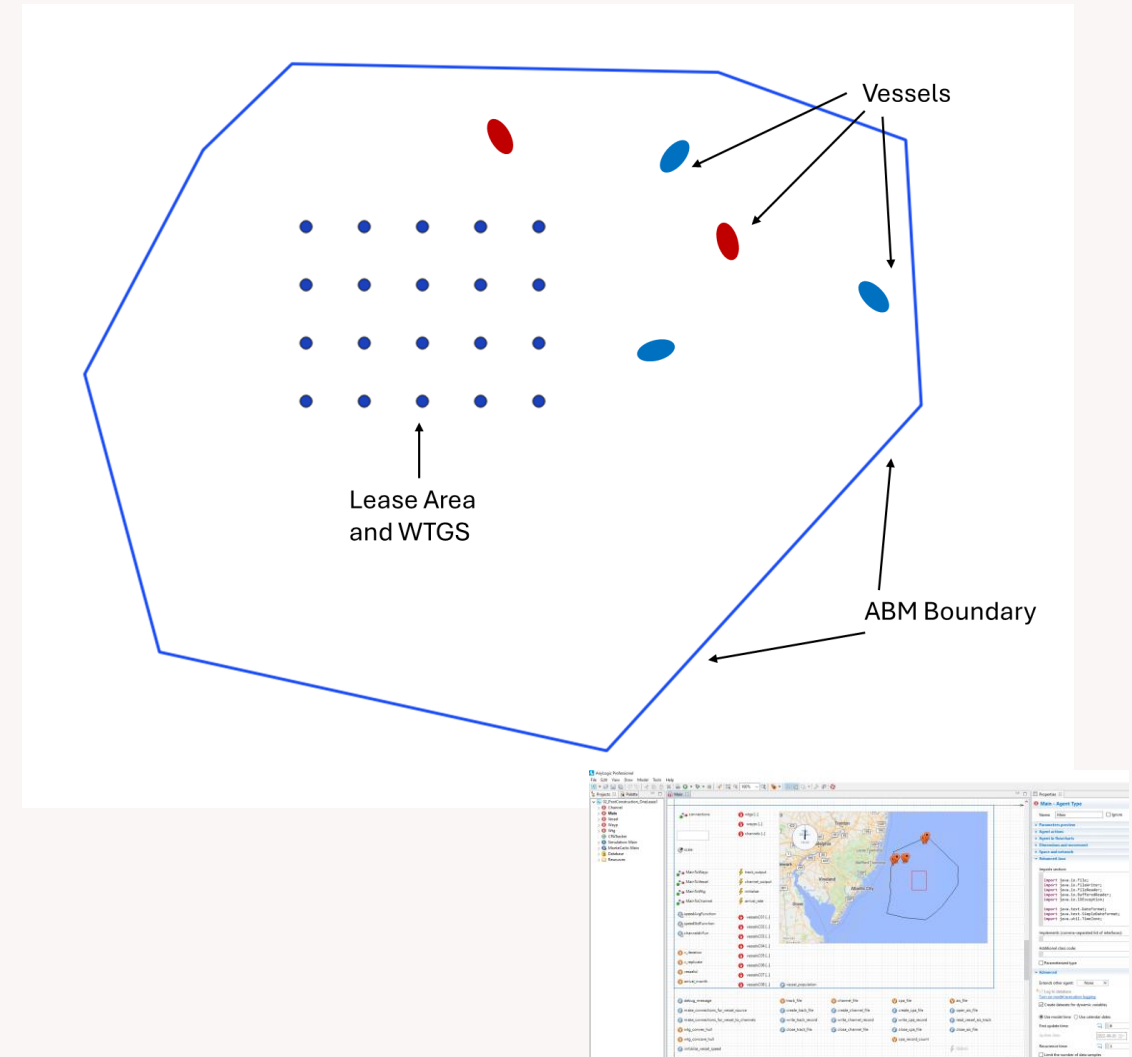
- Open-water and defined waterway conditions
- Change in risk, pre- and post-construction
- Calculations based on literature
- Validation performed

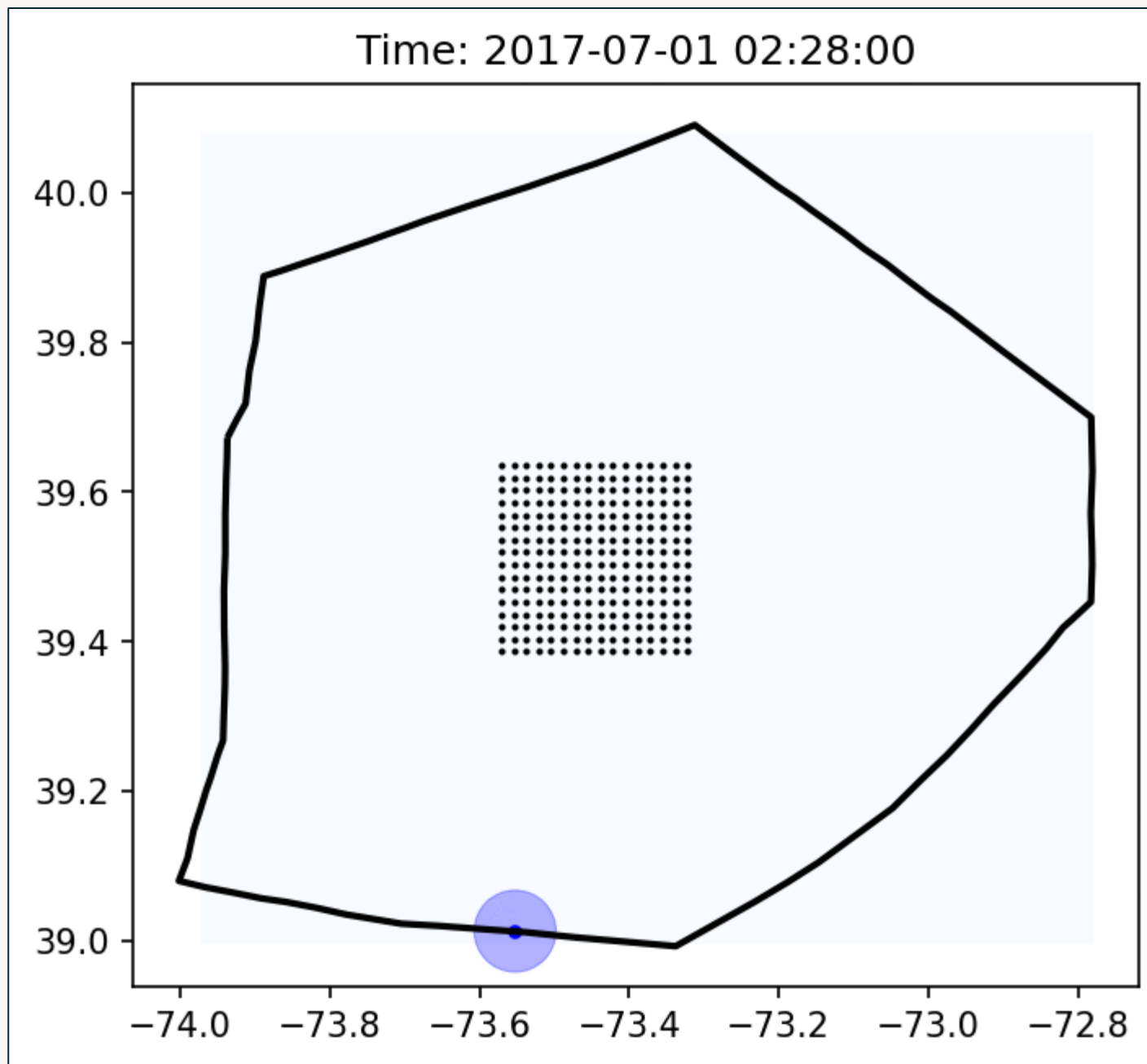
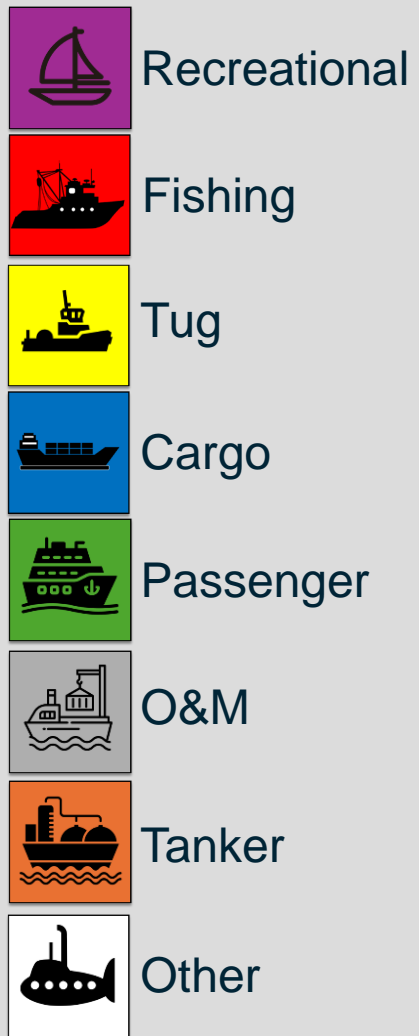


Routing of Vessels Through Turbine Field

Baird's Agent-Based model developed in AnyLogic

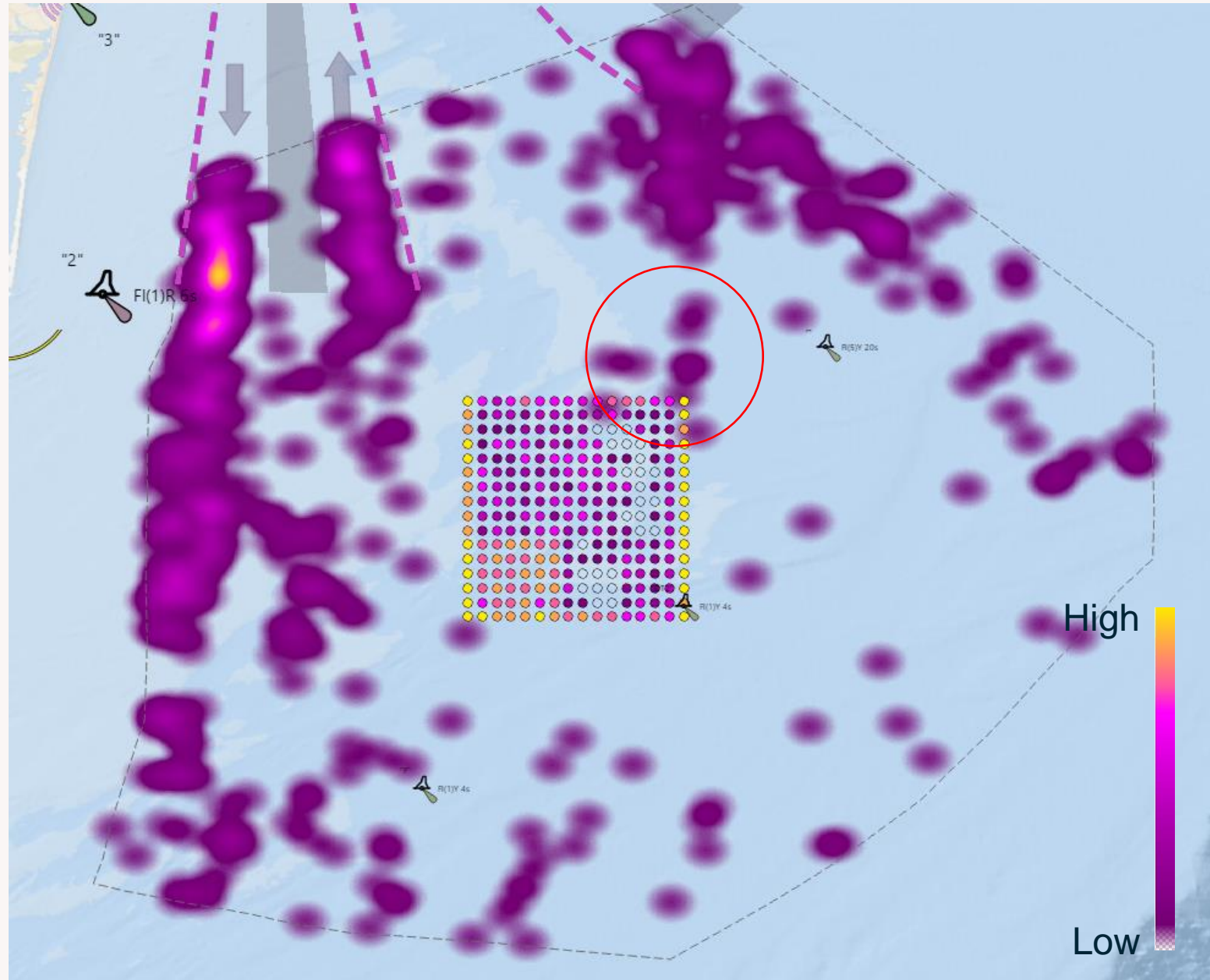
- Can account for changes in future traffic patterns due to turbines
- Recreational and fishing vessels can route through lease area
- Allows addition of multiple operation and maintenance (O&M) vessels types





Collision and Allision Outputs

- Collision candidates assuming blind navigation
- Allision is turbine centric instead of vessel centric
 - Turbine field placement and geometry is considered



NSRA Final Deliverables

| Vessel Class | Collisions | Allisions | Total |
|--------------|------------|-----------|-------|
| Tug | | | |
| Tanker | | | |
| Recreational | | | |
| Passenger | | | |
| Fishing | | | |
| Cargo | | | |
| Other | | | |
| O&M | | | |
| All | | | |

- Pre-Construction
- Post-Construction: One Lease
- Post-Construction: Cumulative



Summary

Can assess change in risk for OSW developers



Working on developing smarter agents/vessels



How can it be applied to marine spatial planning?



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