

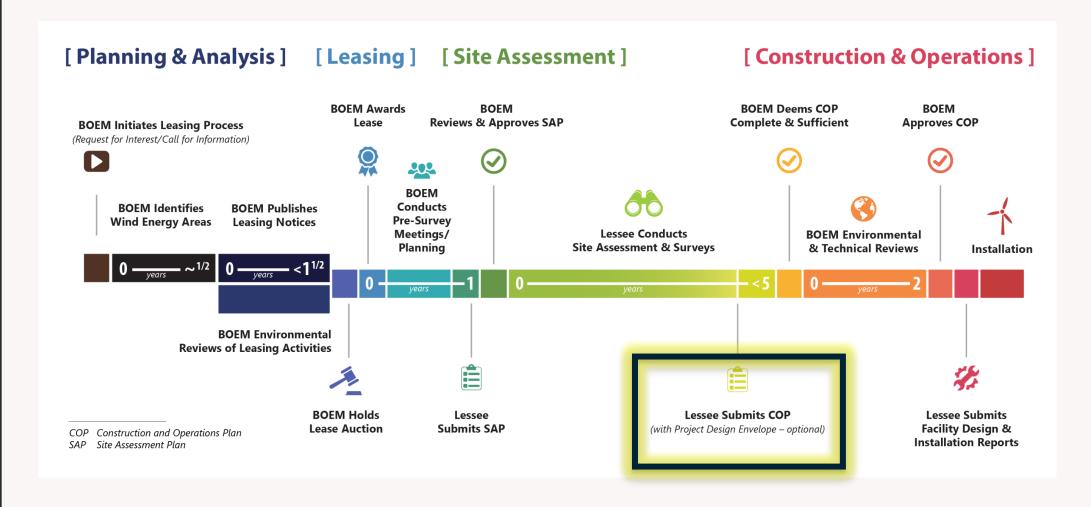


Karl Hanke khanke@baird.com

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



Commandant United States Coast Guard 2703 Martin Luther King Jr Ave, SE, Washington, DC 20593-7418 Staff Symbol: CG-NAV-2 Email: cgnav@uscg.mil

NVIC 02-23 27 MAR 2024

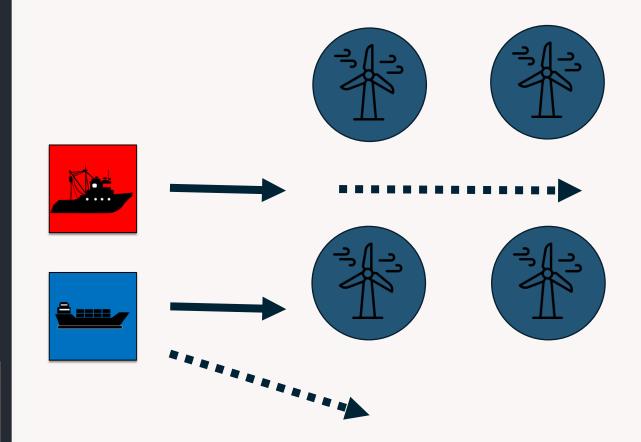
NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 02-23 - CHANGE 1

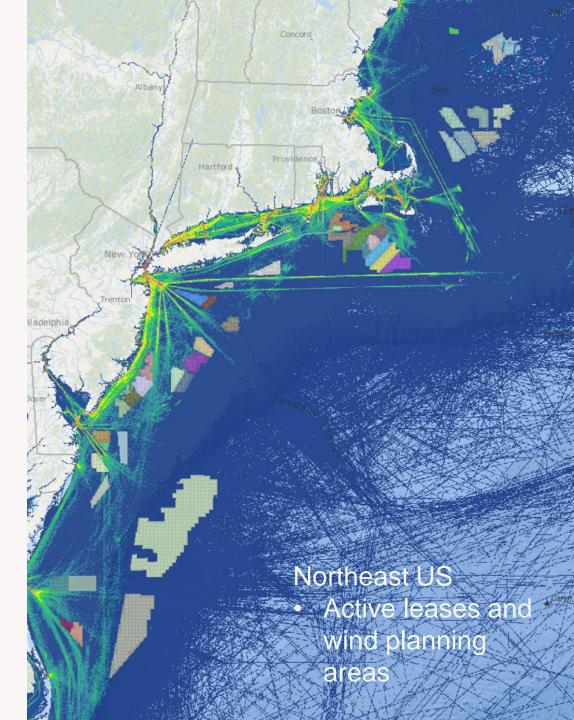
- Subj: GUIDANCE ON THE COAST GUARD'S ROLES AND RESPONSIBILITIES FOR OFFSHORE RENEWABLE ENERGY INSTALLATIONS (OREI) ON THE OUTER CONTINENTAL SHELF (OCS)
- Ref: (a) National Environmental Policy Act of 1969 (NEPA) (Pub. L. 91-190, 83 Stat. 852)
 - (b) Title 30 Code of Federal Regulations (CFR) Part 585, Regulations for Renewable Energy on the Outer Continental Shelf (OCS)
 - (c) Title 30 Code of Federal Regulations (CFR), Part 285, Renewable Energy and Alternate Uses of Existing Facilities on the Outer Continental Shelf
 - (d) Chapter 700, 46 United States (U.S.) Code, Ports and Waterways Safety
 - (e) Memorandum of Agreement Between the Bureau of Ocean Energy Management, Regulation, and Enforcement and the U.S. Coast Guard, OCS-06, 27 July 2011
 - (f) U.S. Coast Guard Navigation Center (NAVCEN) Work Instruction 2022-01
 - (g) Chapter 29, Subchapter III, 43 U.S. Code, Outer Continental Shelf Lands
 - (h) Marine Planning to Operate and Maintain the Marine Transportation System and Implement National Policy, COMDTINST 16003.2 series





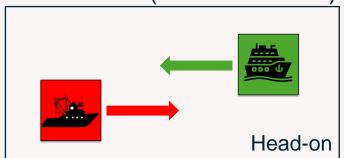
Navigation Issues

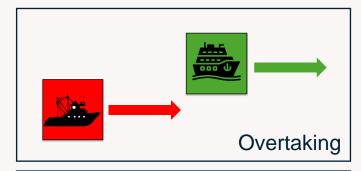


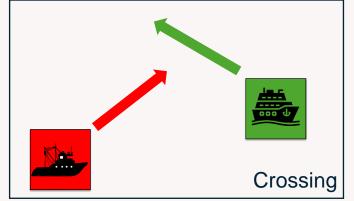


Incident Types Considered

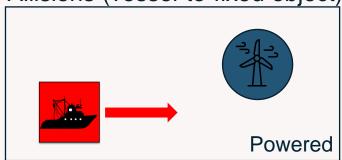
Collisions (vessel-to-vessel)

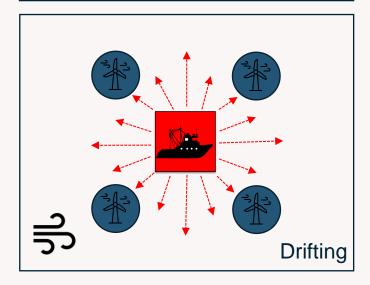




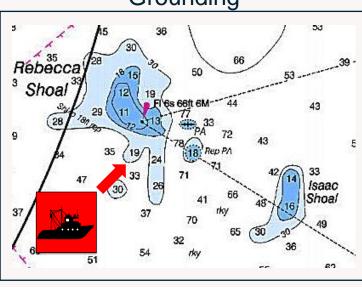


Allisions (vessel-to-fixed object)





Grounding







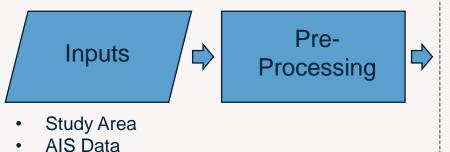
"Risk evaluation procedures are based on an estimation of the probability of the considered hazard followed by an estimate of the consequences"

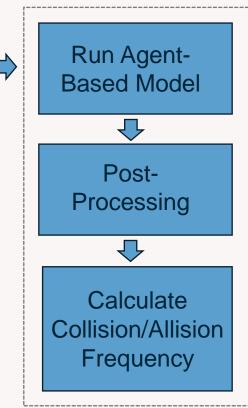
Navigational and Operational Risk Model (NORM) Workflow

Metocean Data

GIS & Geometric Data

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



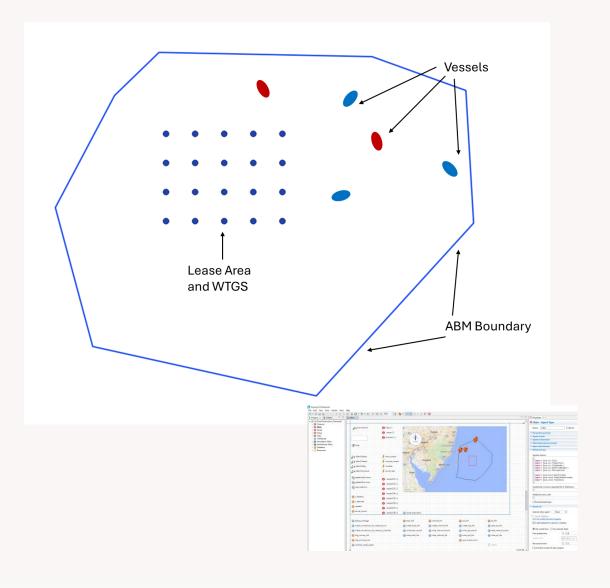


Incident Frequency
Modelling

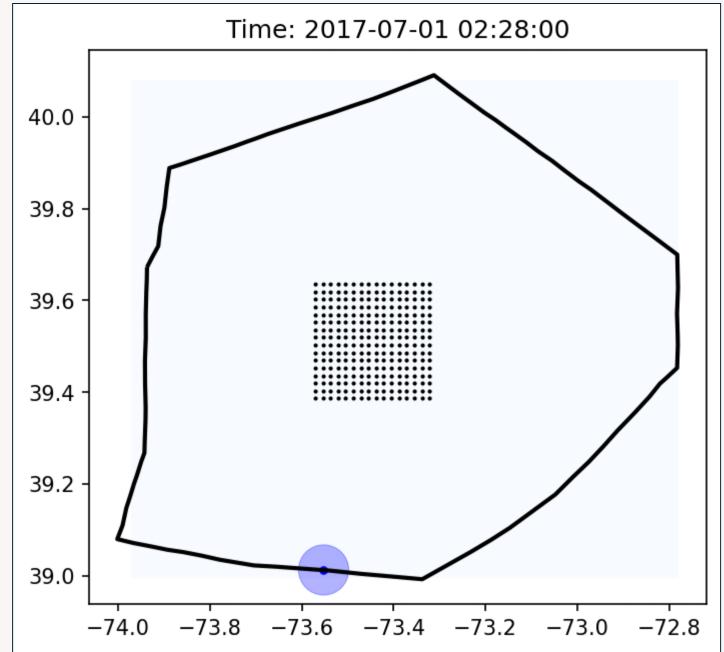
Routing of Vessels Through Turbine Field

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

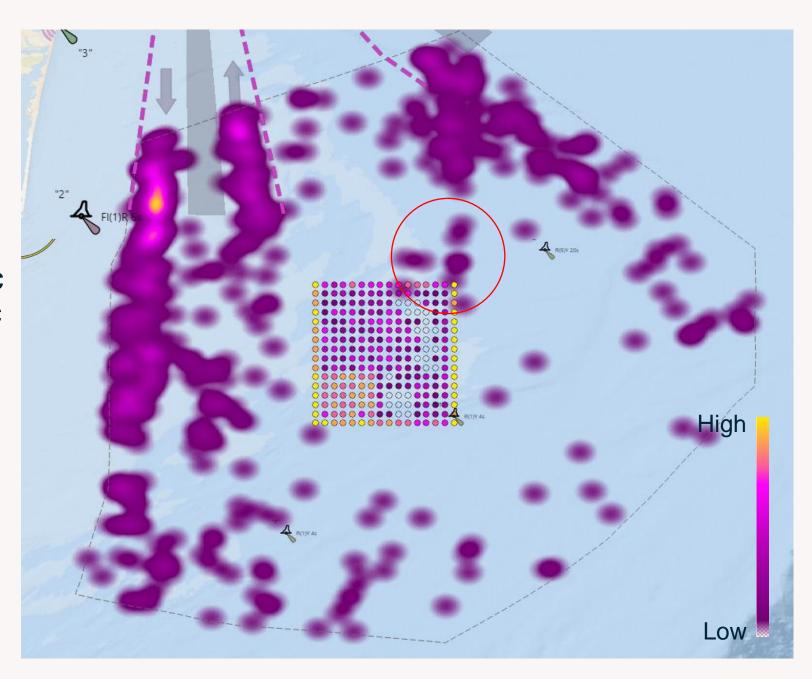






Collision and Allision Outputs

- Collison 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?



Baird.

Innovation Engineered.



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