New York State Offshore Wind
Maritime Technical Working Group (M-TWG)
Shared Research Agenda

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Overview and Purpose

The Maritime Technical Working Group (M-TWG) is an independent and non-decisional advisory entity that was established by New York State to engage interstate and regional stakeholders from the maritime transportation sector, navigation community, and offshore wind developers. The M-TWG provides guidance and advice on how to responsibly implement New York State's efforts to advance offshore wind (OSW) development. The M-TWG is led by the New York State Department of State and supported by NYSERDA. WSP has been retained as a technical consultant to the State and the Cadmus team has been retained to facilitate the M-TWG meetings. Collectively, this group has identified a variety of key topics which aims to assist developers and decision-makers in formulating valuable recommendations and policies that will ensure the construction and operation of OSW will fit the existing commercial shipping landscape. In addressing many of these topics, the industry, as well as various levels of government and academia, have made substantial progress since the M-TWG Shared Research Agenda was first developed. However, further collaborative research will be beneficial to fully address the listed questions and concerns.

The M-TWG Shared Research Agenda is a compilation of potential research topics and questions useful for shared learning that have been compiled with input from M-TWG members. This will enhance the depth of information made available to decision-makers on responsible OSW development practices, port infrastructure upgrades, and navigation safety in the region. The topics are intended to identify unaddressed gaps in, and potential impacts to, key issues in vessel traffic and navigation.

WSP staff have reviewed the previous M-TWG meeting notes, M-TWG studies, and supporting documents to compile the following list of potential future research topics, presented in no particular order. This research agenda also identifies known studies that are on-going or planned. Additionally, many topics and concerns identified by the M-TWG, while applicable to New York, are not unique to the New York/New Jersey region. A number of these topics are being addressed by various informational webinar series listed in the Appendix at the end of this document. Each potential research topic, along with key questions, existing references, previously completed and ongoing studies, and opportunities for future/additional study are presented for each research topic.

1. Active Research Topics

1.1. Acceptable Level of Risk Determination

Topic

Installation of fixed infrastructure (e.g., wind turbines, offshore substations, electrical cables) and the addition of new vessel traffic into an existing and busy waterway will introduce a new risk of allision (fixed structures) and potentially increase the risk of collision (vessels) as well as anchor strikes. Acceptance of some increase in risk is unavoidable to deploy OSW. What is the process to determine "acceptable" levels of additional risk and do different regulatory entities and stakeholders have varying thresholds for measuring acceptability of risk? M-TWG members would like to better understand how the changes in risk are calculated and what is the quantitative change in risk that will be deemed acceptable on an industry-wide basis and on a project-specific basis.

Key Questions

- What are acceptable levels of increased risk due to new OSW infrastructure on a project-specific and cumulative basis? Is a numerical standard needed?
- Who should be responsible and what is the process for estimating and evaluating cumulative change in risk due to multiple OSW installations?
- What methodology is used to calculate risk and make determinations regarding safety standards?
- How will acceptable levels of risk be communicated, such as through regulatory review or guidance documents?

Existing References, Previously Completed and Ongoing Studies

- The U.S. Department of the Interior Bureau of Ocean Energy Management (BOEM) requires developers to submit regulatory plans for development, like Construction and Operations Plans that may include Navigation Safety Risk Assessments (NSRA) in accordance with U.S. Coast Guard (USCG) guidance. **The details on BOEM's regulatory processes** can be found online at https://www.boem.gov/renewable-energy/regulatory-framework-and-guidelines
- USCG assists BOEM in the NSRA process. Specific information can be found "**Guidance on the Coast Guard's roles and responsibilities for offshore renewable energy installations (OREI) on the outer continental shelf (OCS)**", NVIC 02-23 (v2), U.S Department of Homeland Security, October 2023. https://www.dco.uscg.mil/Portals/9/OCSNCOE/References/NVICs/NVIC-02-23(v2).pdf?ver=7rc5zAZ2jvX8_q3M0kitYw%3D%3D
- **USCG Atlantic Coast Port Access Route Study Areas**, March 6, 2023.

    - Consolidated_Port_Approaches_PARS_Updated_Mar2023.pdf (uscg.gov)
    - https://www.federalregister.gov/documents/2023/08/28/2023-18444/consolidated-port-approaches-port-access-route-studies-cpapars-final-notice
- **Maritime Guidance Note (MGN-371):** Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response Issues. https://assets.publishing.service.gov.uk/media/5a8001f3ed915d74e33f7e66/371.pdf
- **USCG PARS presentation of final PARS reports and next steps, M-TWG meeting March 23, 2022**. The presentation is available on the M-TWG website: https://www.nymtwg.com/wp-content/uploads/2023/02/Presentations-03232022.pdf

Opportunities for Future / Additional Study

- Study of numerical standards and criteria for evaluating risk used in the approval process of existing OSW installations around the world.
- Interview the USCG for clarity on the criteria they use when reviewing an OSW project.
- Evaluate appetite for levels of risk for different groups including shipping community, OSW developers, and other stakeholder groups.
- Identify new technologies or modeling techniques that improve safety and reduce risk, while at the same time ensuring current and future navigational safety.

1.2. Set-Back Distance

Topic

Set-back distance refers to the minimum clear distance between a vessel traffic lane and the nearest physical structure that presents a potential for vessel allision (vessel strikes a stationary object). The topic of set-back distance has generated robust debate among members of the maritime community and offshore wind developers and is the topic of continuing conversation. Based on published literature, there is no internationally mandated numerical set-back distance. At this time, regulations and/or guidelines vary country-by-country, and proposed set-back distances are typically evaluated on a project-by-project basis. Set-back distance affects many safety related issues, including available space for vessel maneuvering, buffer zones for loss of propulsion/steerage incidents, impacts to vessel radar, and potential interference with radio-communications. A greater set-back distance offers additional safety buffer; however, it also decreases the available area to install turbines and therefore reduces potential OSW electricity generation and reduces the value of the wind energy areas.

Key Questions

- What is an appropriate set-back distance from the edge of the navigation fairway to the closest fixed infrastructure (e.g., wind turbine generator or offshore electrical substation)? How do project or location-specific factors, such as width of navigation channel, turbine layout, vessel intensity, sizes, speed, and seasonal factors inform set-back distances?
- When recommended set-back distances cannot be met, what best practices/mitigation measures can be implemented to effectively address the increased risk?

Existing References, Previously Completed and Ongoing Studies

- The literature review section of COWI's 2020 Maritime Technical Working Group Support report covers different approaches to determine the appropriate set-back distance (final report can be downloaded from link in M-TWG section of TWG website)
- **USCG Port Access Route Studies (PARS)** https://www.navcen.uscg.gov/?pageName=PARSReports, https://www.federalregister.gov/documents/2020/06/29/2020-13901/port-access-route-study-northern-new-york-bight, *and* https://www.federalregister.gov/documents/2021/09/24/2021-20797/port-access-route-study-seacoast-of-new-jersey-including-offshore-approaches-to-the-delaware-bay ; and https://www.navcen.uscg.gov/sites/default/files/pdf/PARS/Consolidated_Port_Approaches_PARS_Updated_Mar2023.pdf
- **NYSERDA Shipping and Navigation Study** (The Renewables Consulting Group, 2017)**.** This report identifies 1 nm as appropriate set-back from shipping and navigation lanes for initial planning purposes for spatial planning of windfarms, with actual set-backs determined

following full NSRA. https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/Research/Biomass-Solar-Wind/Master-Plan/17-25q-Shipping-and-Navigation.pdf

- **USCG Navigation and Vessel Inspection Circular 01-19, 2019,** provides planning guidelines for placement of structures near shipping routes, recommend port approaches and TSS navigation safe distances as 2 nm from parallel or outer seaward boundary of traffic lane, and 5 nm from the entry/exit. Additional planning guidelines are also provided in the document for coastal shipping routes, offshore deep draft routes, and more. https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/5ps/NVIC/2019/NVIC%2001-19-COMDTPUB-P16700-4-dtd-01-Aug-2019-Signed.pdf?ver=2019-08-08-160540-483
- The **USCG Navigation and Vessel Inspection Circular 03-23, 2023**, provides planning guidance on navigational safety in and around offshore renewable energy installations (OREI). Mariners planning to navigate in and around OREI are encouraged to refer to this NVIC to better understand the increased complexity and potential hazards associated within or around an OREI. https://www.dco.uscg.mil/Portals/9/OCSNCOE/References/NVICs/NVIC-03-23.pdf?ver=dTxOtZ3SrBvTV89g8wXxxw%3d%3d
- **BOEM final executed lease agreements (case-by-case), various 2009 to 2023**, provides surface structure layout and orientation stipulations in accordance with Navigation and Vessel Inspection Circular 01-19. Whereby the Lessee must endeavor to design the layout to contain two common lines of orientation between leases. Where not agreed between adjacent Lessees the layout design shall incorporate a 1 nm set-back from boundary with neighboring lease where no surface structures are permitted, and 2nm set-back between surface structures on the leases. Executed lease agreements are available on BOEM website: https://www.boem.gov/renewable-energy/lease-and-grant-information

Opportunities for Future / Additional Study

- Consider a risk based, project specific approach and methodology that links navigation risk to set-back distance where baseline recommended distances (e.g., 2NM to traffic lane or 5NM to entry to TSS) cannot be met or do not seem reasonable.
- Investigate the factors that should impact the determination of set-back distance and the ranking of these, i.e., various accident scenarios with associated likelihood, location, and project specific factors.
- Compile database of set-back distances and channel dimensions at approved/operational windfarms
- Re-examine set-back distance and “watch circles” for floating foundations. More distance may be needed.

1.3. Impacts to Navigation Radar and Radio Communication Systems [Incl. Automated Identification System (AIS)]

Topic

In some cases, wind turbine generators can cause a screening or interference effect, obscuring some vessels from the radar of vessels passing by the other side of the wind farm, as well as potential interference to very high frequency (VHF) signals. This can potentially create additional challenges with collision avoidance.

The M-TWG discussed this topic during its August 11 and 14, 2020 Wind Developer Roundtable meetings. The consensus was that radar interference is not a typical concern for operators of large vessels and most effects can be mitigated through strategies like adjusting radar settings.

Key Questions

- Do OSW farms create interference with radar and/or VHF communications, and if so, to what extent? Will increasing turbine sizes or emerging technologies such as floating OSW have an effect?
- What is the appropriate distance needed between a vessel radar and the wind farm to minimize interferences?

Existing References, Previously Completed and Ongoing Studies

- **Wind Turbine Generator Impacts to Marine Vessel Radar (2022)**, National Academies of Sciences Engineering and Medicine https://www.nationalacademies.org/en/our-work/wind-turbine-generator-impacts-to-marine-vessel-radar
- **NYSERDA's Shipping and Navigation Study**, (The Renewables Consulting Group, 2017). This study explores the possible implications of locating potential new offshore wind energy areas off the coast of New York to shipping and navigational safety, given current use of the region. This study identified and described the potential risks of using navigation aids and controls, including radar interference from wind turbines. Best practice guidelines from various references for safe distance from windfarms and main vessel traffic routes was presented. The study is available on NYSERDA website: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/Research/Biomass-Solar-Wind/Master-Plan/17-25q-Shipping-and-Navigation.pdf

Opportunities for Future / Additional Study

- Potential challenges to marine vessel radar resulting from floating wind technologies. Wave-induced movement may provide a less-consistent radar return overall and may also increase clutter and complicate Doppler return interpretation.

1.4 Submarine Cable Routing

Topic

Cables from OSW energy areas are critical infrastructure needed to connect the OSW farm to the onshore power grid. These cables will have to pass beneath traffic lanes and/or anchorage areas, traverse challenging sediment conditions that make cable burial difficult, and cross existing assets that necessitate shallower burial, heightening the risk of anchor strikes, damage to the cable, and at the worst, the safety of the vessel and crew. With the growing number of OSW projects being planned, there is broad support for careful planning and coordination to understand and minimize this risk.

Key Questions

- What are appropriate locations for submarine cables and cable corridors?
- How many cables can be sited in specific key geographic areas (e.g., through the Narrows, Long Island Sound, South Shore of Long Island)?
- How will historical/informal and federally approved anchorage areas affect cable routes?
- What are the considerations and implications of bundling multiple export cables?
- What are strategies to shorten and deconflict cables with existing known and unknown subsea infrastructure?

Existing References, Previously Completed and Ongoing Studies

- NYSERDA's Learning from the Experts webinar series presentation on Offshore Wind Transmission Systems, which took place on May 12, 2021, described the concept of planned offshore grids, which would require fewer cables to shore.
- The M-TWG facilitated the **Cabling Workshop and Workshop Summary Report**, (M-TWG, April 2023). A range of commercial mariners, offshore wind developers, and government agency staff were invited to discuss the NYSERDA Offshore Wind Cable Corridor Constraints Assessment and other offshore wind submarine cable related issues as they relate to maritime stakeholders and navigational safety. The discussion included siting in specific key geographic areas including through The Narrows, Long Island Sound, South Shore of Long Island, East River, Hudson River. While not a consensus work product, the workshop summary identifies common considerations for cable planning, siting, construction and installation, operations, needs for communication, coordination, and outreach, as well as technology, information and innovation needs, policy, and procedure. https://www.nymtwg.com/wp-content/uploads/2023/04/Workshop-Summary-Report.pdf
- **Cabling resources:** a number of cabling resources have been added to the "M-TWG Studies and Other Resources" webpage: https://www.nymtwg.com/m-twg-studies-and-other-resources/

- **NYSERDA's Cables, Pipelines, and Other Infrastructure Study**, (The Renewables Consulting Group, 2017). The study provides an overview of the submarine cables, gas pipelines, and other infrastructure located within and around the New York offshore study area, based on publicly available reference documents. The study suggests how future offshore wind farm developers could approach potential interactions with the infrastructure. It also provides an overview of the potential interactions between other users of the Study's Area of Analysis and the submarine cables and cable protection systems that may be installed as part of offshore wind projects. https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/Research/Biomass-Solar-Wind/Master-Plan/17-25f-Cables-Pipelines-and-Other-Infrastructure.pdf
- **NYSERDA's Offshore Wind Cable Corridor Constraints Assessment**, (WSP USA / VHB, 2023). This study provides the understanding of environmental, technical, and stakeholder constraints, as well as opportunities, concerns, impacts, and risks of potential undersea and overland cable corridors and associated landings; and informs potential future policy actions to maximize the benefits of OSW and minimize conflicts and impacts in a timeframe to support achieving the mandated 9 GW of offshore wind by 2035. Cable bundling, spacing, crossing, and burial depth standard practices and requirements, opportunities and limitations are discussed. Key findings include illustration of potential combination of proposed and future OSW cables through each undersea approach area, allocations include type of cable as well as recommended siting principles to be based on industry experience and support multiple cable installation (co-location) while minimizing space and impact on environmental, cultural and social resources. https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Programs/Offshore-Wind/2306-Offshore-Wind-Cable-Corridor-Constraints-Assessment--completeacc.pdf
- The Fishing Technical Working Group (F-TWG) conducted the **Offshore Wind Submarine Cabling Overview**, (Tetra Tech Inc., 2021)**.** The report provides an overview of offshore wind submarine power cable types, installation and burial methods, and operations and maintenance. The report summarizes potential impacts cables might have on the commercial fishing industry, as well as how commercial fishing practices might impact cables, and potential measures to avoid, minimize, or mitigate these impacts, including site assessment, risk assessment, project planning and design, and proper cable installation and burial methods. https://www.nyftwg.com/nyserda-publishes-offshore-wind-submarine-cabling-overview/
- The Public Service Commission (PSC) issued an Order **Addressing Public Policy Requirements for Transmission Planning Purposes** effective June 22, 2023. The PSC found that the CLCPA requirement for 9GM of OSW by 2035 constitutes a Public Policy Requirement driving the need for additional transmission facilities to deliver the OSW generating resources to NY and refers the requirement to NYISO for solicitation and evaluation of solutions. The Order can be found online at the following website: https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={A077E488-0000-C217-BAED-C4B0826480C5}
    - Additional case documents: https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?Mattercaseno=22-E-0633

- **NJ's Offshore Wind Strategic Plan 2** (Ramboll US Corporation) will include a cable constraints desktop study. The location is off the coast of New Jersey. The plan will include GIS analysis of constraints relevant to export cable routing, logistical considerations from industry regarding cable installation and routing, and sharing of results.

Opportunities for Future / Additional Study

- Lessons learned around cable construction. Focus on construction means and methods, and construction coordination within the NY region. Look to Long Island as an example.
- Supply chain challenges involving cable installation vessels.
- Best management practices for communicating construction scheduling and sequencing to mariners.

1.5. Considerations for Cable Burial Depth

Topic

To better protect submarine cables from damage and ships' gear from fouling (e.g., anchor strikes and fishing gear), submarine cables can be buried deeper. However, the risk to the cables must be balanced with technical limitations and the costs and environmental impacts of that deeper burial.

Key Questions

- How is anchor penetration depth determined?
- What are appropriate cable burial depths to reduce the risk of fouling?
- What specific advancements in cabling technology should be targeted to address the factors that limit cable burial depth (e.g., installation tools, cost, overheating, faults) and cable co-location (e.g., installation, maintenance)?
- What are best practices for verifying and maintaining cable installation (e.g., as-built surveys, routine monitoring, Distributed Temperature and Distributed Acoustic/Vibration Sensing [DAS/DVS] systems)?
- How are risks of exposure and interactions balanced with potential drawbacks of going deeper (e.g., disturbance of more substrate, increased sediment mobilization during install, increased thermal resistivity, risks of faults, increased construction duration).

Existing References, Previously Completed and Ongoing Studies

- NYSERDA's Learning from the Experts webinar series presentation on Submarine Cabling, which took place on May 26, 2021, described the cable burial risk assessment (CRBA) process and methods of protecting cables.
- **M-TWG's Anchor Strike Study,** (COWI, 2022). The study was completed in consideration of maritime industry concerns regarding ongoing and increasing need for vessels to anchor, combined with the addition of new submarine cables from OSW projects in the New York Harbor and New York Bight. The study reviews existing methods to estimate the range of anchor penetration depths for vessels that commonly operate in the New York Harbor and New York Bight. Additionally, the study researched suspected and known commercial shipping anchor strikes through a desktop study and outreach; it presents four case studies in detail. https://www.nymtwg.com/wp-content/uploads/2023/02/MTWGAnchorPenetrationandStrikes_FinalReport_2021.pdf
- **Cabling Workshop and Workshop Summary Report** (M-TWG, April 2023). See above, section 5.
- **Cables, Pipelines, and Other Infrastructure Study** (The Renewables Consulting Group, 2017). See above, section 5.
- **Offshore Wind Cable Corridor Constraints Assessment**, (WSP USA / VHB, 2023). See above, section 5.
- **Offshore Wind Submarine Cabling Overview**, (Tetra Tech Inc., 2021). See above, section 5.

Opportunities for Future / Additional Study

- Conduct anchor pull tests in the New York Bight, similar to testing performed in Germany.
- Research how anchors respond to concrete mattresses and other cable protection measures, including what happens to both the vessel and cable when anchors are fouled.
- Further research into appropriate burial depth(s) in New York State waters and the New York Bight, informed by uses and risks, and identifying how this is determined.
- Evaluate the risk between anchoring and floating structures' mooring systems.
- New technologies to reduce vessel strike risk of cables and mooring systems.

1.6. Anchor Strike Liability

Topic

Liability for damaging submarine cables is a source of concern in the maritime community. Stakeholders are concerned that if cables are inadequately buried, vessel anchors may inadvertently damage a cable and the vessel owners/operators may be liable for the cost of cable repair and/or outages, even when due to accidental damage. Greater clarity on the legal landscape may help assuage these concerns as the risk of such an incident increases, with both the number of submarine cables and vessels transiting the area increasing.

Key Questions

- In what anchor strike scenarios is the cable asset owner responsible? When is the vessel operator responsible?
- What opportunities exist to address increased costs to vessel operators in the case of accidental anchor strikes due to cables buried too shallow, becoming unburied, or shifting from their mapped locations (e.g., mitigation/contingency fund)?

Existing References, Previously Completed and Ongoing Studies

- **Anchor Strike Study,** (COWI, 2022)**.** See above section 6. Additionally, the four specific anchor strike case studies included research into ultimate liability for the event.
- **Cabling Workshop and Workshop Summary Report** (M-TWG, April 2023). See above, section 5.

Opportunities for Future / Additional Study

- Report on the current legal environment regarding liability for damage to submarine infrastructure, with case studies.
- Evaluate frameworks for establishing a mitigation fund, voluntary/mandatory insurance, or similar, to alleviate financial burdens when accidents occur.
- Evaluate mechanisms for survey/monitoring of cables over its' operational lifespan, and real-time reporting of cable condition, burial, etc.
- Other opportunities?
    - Evaluate opportunities for shared knowledge around increasing safety, minimizing risk to the industry, contingency planning, and increasing predictability/certainty around decision making?
    - Focus on economic and national security importance of submarine cables and the increasing interaction and risk that ship anchors and commercial fishing gear pose to these undersea cable projects.
    - Emergency preparedness planning, including integrated emergency/contingency planning (e.g., evaluate “Suez Canal” type incident)
    - Literature review of different liability frameworks (e.g., IMO, International Cable Protection Committee, US Coast Guard, regional standards)
    - Look at broader liability risks and what are the consequences beyond anchor strikes.
    - Opportunity to host an emergency management /securing planning / liability workshop

1.7. Jones Act-Compliant Vessel Availability

Topic

The Merchant Marine Act of 1920, more commonly referred to as the Jones Act, requires that the transportation of cargo and personnel from one U.S. port to another U.S. port must be completed by a vessel that is built, owned, and operated by U.S. citizens or permanent residents. There are currently no operating Jones Act-compliant OSW installation vessels and only a limited number of such vessels planned. While feeder barge installation strategies are possible, the U.S. has yet to develop a develop a fleet fully capable of installing and operating OSW facilities efficiently and cost effectively to support offshore wind power procurement commitments and goals.

Key Questions

- What is availability of Jones Act-compliant OSW vessels?
- How do developers determine if vessels are available?
- What does it take to build a Jones Act-compliant vessel?
- Is there new legislation that may help solve contracting issues that are preventing OSW vessel operators from making investments?

Existing References, Previously Completed and Ongoing Studies

- DNV U.S. Offshore Wind Vessels Webinar (https://brandcentral.dnvgl.com/mars/embed?o=AC32FEB06D9897DB&c=10651&a=N)
- **NYSERDA's U.S. Jones Act-Compliant Offshore Wind Turbine Installation Vessel Study**, (GustoMSC, 2017). This study created a framework for understanding what is required of a wind turbine installation vessel and/or turbine feeder vessel on the East Coast from technical and financial perspectives. The functional requirements and designs were sent to U.S. shipyards to obtain Indicative prices of $87 million (feeder barge) and $222 million (WTIV) for Jones Act compliant vessels. Operational expenses were estimated assuming the vessels were U.S. flagged. Based on the financial model created for the scenario, at least 10 years of work, or a pipeline of approximately 3,500 to 4,000 megawatts of offshore wind capacity, would be required by a WTIV owner to provide a reasonable combination of day and internal rates of return. https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/Research/Biomass-Solar-Wind/Master-Plan/US-Jones-Act-Compliant-Offshore-Wind-Study.pdf
- NYSERDA sponsored a presentation titled **Vessels for Offshore Wind**, (DNV, 2022) within its learning from the experts (LFTE) webinar series. The presentation provides a high-level overview of the vessels required for offshore wind farms from installation through to construction, and operations and maintenance. The recorded presentation is available on NYSERDA website: https://www.youtube.com/watch?v=hSts27w9jfg&list=PLNs7tyvrkK1Vv06lE5zVgJpa64X619TEL&index=22

Opportunities for Future / Additional Study

- Create a regularly updated database of Jones Act-compliant vessels potentially capable of supporting the OSW industry, organized by vessel type. Need to determine scope of database, audience, and how the database will be used.
- Evaluate past reports to determine if New York is on track or is more work needed to meet demand for Jones-Act compliant vessels?
- Evaluate the new types of vessels that floating technology will require. What steps and investments needed to build capacity and meet industry demand?
- Emerging trends in the use of automated/un-manned technologies during OSW construction
    - How will autonomous navigation/vessels become a part of offshore wind activities?
    - Case studies of autonomous vessels in Europe and potential applicability in US / New York Region
    - Will there be risks to navigational systems due to use of autonomous systems like drones?
    - Constraints with advancing automated/un-manned technologies (e.g. Jones-Act compliance, Coast Guard requirements)?
- Note: Master Plan 2.0 Track 2 studies may focus on Jones Act vessels as part of its port planning studies. NYSDOS is focusing on Vessel Analysis for Deep Water Wind Development and Operation. Opportunity for M-TWG collaboration.

1.8. Construction and Operational Safety Zones

Topic

BOEM guidance states that developers are expected to recommend construction safety zones, as was done during construction of the Block Island OSW project. European projects adopt a 500m safety zone during construction. During operations, European projects vary by country in whether or not they require a safety zone.

Key Questions

- What are appropriate and/or planned durations and dimensions for Construction and Operational Safety Zones?

Existing References, Previously Completed and Ongoing Studies

- BOEM prepared the **Supporting National Environmental Policy Act Documentation for Offshore Wind Energy Development Related to Navigation,** 2019**.** This literature review evaluates the current documentation related to navigational concerns associated with offshore wind infrastructure, focusing on existing policy and guidance, navigational risk assessments, collisions and allisions, commercial fisheries, and recreational fisheries. Key takeaways include:
    - The highest risk to navigation typically occurs during the offshore wind farm construction phase as this phase involves supply and support traffic resulting in increased vessel traffic, activity, and noise. Recommended mitigation measures for risks during this phase include establishing a temporary 1,640 ft (500 m) safety zone around specific turbines under construction.
    - The USCG's authority for instituting safety zones currently does not extend beyond 12 nm from shore; regulations found at 33 CFR § 165.

  https://www.boem.gov/sites/default/files/environmental-stewardship/Environmental-Studies/Renewable-Energy/BOEM-2019-011.pdf

Opportunities for Future / Additional Study

- Research occurrences of vessel allisions in existing OSW farms in both construction and operational phases to determine if they are more likely to occur in countries that do not require specific safety zones.
- Characterize risks and impacts with cable installation and maintenance? (e.g., navigational safety, vessel traffic)
- Other opportunities?
    - Link to opportunities in Section #5 for construction sequencing and best management practices.

1.9. Seabed Infrastructure Security

Topic

Offshore renewable energy installations are expensive infrastructure that will be valuable to the New York State and U.S. economies. Like land-based infrastructure, seabed infrastructure, including submarine cables and the OSW turbine generators, is vulnerable to sabotage and physical and/or cyber-attacks from foreign adversaries ("Grey Zone Warfare") or non-state actors.

Key Questions

- Who will be responsible for cable and seabed infrastructure security and what requirements may be imposed on mariners and on OSW farm operators?
- Will potential security measures result in any additional operational procedures or limitations for mariners and/or wind farm operators?

Existing References, Previously Completed and Ongoing Studies

- **USCG Guidelines for Addressing Cyber Risks at Maritime Transportation Security Act (MTSA) Regulated Facilities** (https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/5ps/NVIC/2020/NVIC_01-20_CyberRisk_dtd_2020-02-26.pdf?ver=2020-03-19-071814-023)

Opportunities for Future / Additional Study

- Research occurrences of intentional incidents or sabotage at existing overseas OSW installations, including the vulnerable aspects of OSW infrastructure and how those vulnerabilities and strategies to reduce such exposure compare with infrastructure like bridges and ferries?

1.10. Future Ports: Regional Shipyard Capacity, Ports Investments, Workforce Development

Topic

Offshore energy facilities require operations and maintenance activities to be performed through their construction and operational life. Vessels supporting this work will be transiting from the marine terminals, likely in the New York Harbor region, to the OSW areas. In addition to the offshore infrastructure, construction, and operations vessels themselves will require regular maintenance and repair and may have new workforce needs to operate and service. The M-TWG has identified a potential concern that existing shipyard capacity may not be sufficient to service the new vessels locally, and that there is a need to examine national ship repair opportunities. More broadly, it has been suggested to understand the types and quantities of vessels that will be added to New York waters and determine if there is sufficient capacity to support these vessels in all phases of operation.

Key Questions

- What vessel maintenance and repair support services will be necessary for the addition of OSW construction and support vessels?
- What is the timeline for these vessels entering service?
- What is the timeline for upgrades or construction of shipyard facilities?
- What are the unique maritime-related workforce development needs to support growth of the offshore wind industry?

Existing References, Previously Completed and Ongoing Studies

- The Port Authority of New York and New Jersey released the Port Master Plan 2050; however, this considers only the public terminals operated by PANYNJ. (https://www.panynj.gov/port-authority/en/press-room/press-release-archives/2019_press_releases/port_authority_unveilscomprehensive30-yearplantoaccommodatefutur.html)
- NYSERDA Offshore Wind Training Institute:
    - https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Workforce-Development-and-Training/New-York-State-Offshore-Wind-Training-Institute-Workforce-Training-and-Skills-Development
    - https://owti.org/
- SUNY Maritime Center for Excellence for Offshore Wind Energy: https://www.sunymaritime.edu/aboutcenters-excellence/center-excellence-offshore-energy
- NYCEDC offshore wind workforce development initiative, in partnership with CUNY: https://offshorewind.nyc/workforce

Opportunities for Future / Additional Study

- Create a statewide master plan for all public and private marine terminals and waterways.
- Compile a list of active shipyards in New York and the northeast region slated to support OSW, including descriptions of the limits of vessels that can be serviced at those facilities.
- Case studies on mobile shipyard facilities
- Collaboration with the Jobs & Supply Chain Technical Working Group (JSC-TWG)
- Note 1: Master Plan 2.0 Track 2 studies may focus on shipyard capacity as part of its port planning studies. Opportunity for M-TWG collaboration.
- Note 2: NYSDOS's Maritime Ports Assets Inventory and Needs Assessment is focusing on statewide port infrastructure investments, with an emphasis on investing in decarbonization of landside and waterside infrastructure. Opportunity for M-TWG collaboration. The Port Authority of New York and New Jersey's Net Zero Roadmap includes strategies and actions to support zero-emission seaport operations and is a useful reference for statewide work.

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2. Archived Research Topics

2.1. Navigation Emergencies

Topic

Navigation emergencies are an infrequent occurrence; however, they do occur, and mariners have contingency plans in place. Loss of vessel steering, or propulsion is a safety risk to the vessel, as well as a hazard to other vessels and fixed in-water or shoreline structures. If such an event were to happen while transiting a navigation corridor near an OSW area, a vessel allision with the wind turbine generators could occur if the distance between the vessel and OSW turbines is insufficient for emergency actions to stop the vessel before impact.

Key Questions

- How often do temporary/emergency loss of power/steering events occur?
- What, if anything, can be done in designing OSW installations to reduce the risk of negative outcomes from navigation emergencies?

Existing References, Previously Completed and Ongoing Studies

- Federal regulatory reviews require OSW project-specific safety protocols, coordination with US Coast Guard, and other measures like Search and Rescue Training and Exercises.
- M-TWG is finalizing the **Assessment of Loss of Propulsion and Steering Data,** (COWI, 2023)**.** This study included review of publicly available data and maritime outreach to identify instances of known or suspected loss of propulsion and loss of steerage events, within the NY & NJ harbor approaches. The study sought to determine the frequency of vessel loss of propulsion or steering events, frequency of emergency maneuvers, and identify common causation if available. Close collaboration with the USCG and attainment of MISLE data was applied in the assessment and the findings reported the number of losses of propulsion and steerage, between the years of 2001 and 2022. Coming soon to the M-TWG website: https://www.nymtwg.com/m-twg-studies-and-other-resources/

Opportunities for Future / Additional Study

- Recommend closing out.

2.2. Anchorage Areas Updates

Topic

Vessel traffic associated with OSW installations is expected to increase as OSW projects are constructed and enter service. Along with more vessels potentially in need of anchorage areas, there are likely to be large components transiting navigation corridors like the Hudson River during construction, requiring other vessel traffic to wait in anchorage areas while the construction vessels pass by.

Information regarding the location of unofficial anchorage areas is also valuable when evaluating potential cable routes for the purpose of avoiding anchorage areas in order to reduce the risk of anchor strikes.

The M-TWG has also identified formal, charted anchorage areas that are not commonly used. A byproduct of this research agenda item may be the removal of unused anchorage areas.

Key Questions

- Where are informal, common practice anchorage areas located?
- Are there any existing anchorage areas that are rarely or never used that could be "un-designated"?
- Are additional anchorage areas needed to accommodate changes in vessel traffic patterns?

Existing References, Previously Completed and Ongoing Studies

- Hudson River Safety, Navigation & Operations Committee: Report on NDAA Hudson River Anchorage Study, June 28, 2021
- 9 GW Cable Corridor, Navigation and Port Usage and Ports Cumulative Impact Studies (Ongoing), NYSERDA, HDR, COWI, WSP
- **MTWG's Anchorage Area Assessment Companion Memo**, (COWI, 2022). The study uses the methodology and data from NYSERDA's Offshore Wind Ports: Cumulative Vessel Traffic Assessment (COWI, 2022) to interpret anchorage use area patterns in New York State waters. The study assesses the usage of both Designated Anchorage Areas (DAA) as well as informal, common practice anchorage areas (CPAA). The study provided metrics regarding each anchorage area including number of vessels present, number of and average duration of anchorage events, surface area of AA, and occupancy metric. The study will soon be published to the M-TWG website: https://www.nymtwg.com/m-twg-studies-and-other-resources/

Opportunities for Future / Additional Study

- Recommend closing Out.

2.3. Vessel Traffic Modeling and Simulations

Topic

New York/New Jersey Harbor and its approaches are some of the busiest waterways in the world. The construction and operation of OSW infrastructure will introduce additional vessel traffic, including survey vessels, heavy component transport vessels, installation vessels, operations and maintenance vessels, and decommissioning vessels. While M-TWG members generally agree that additional vessel traffic can be accommodated, they have questions regarding the types, frequency, and sailing schedule of the additional vessel traffic and would like to obtain that information as soon as possible to allow for early planning.

Key Questions

- To what extent and how will OSW vessel traffic alter regional vessel traffic patterns?
- What additional vessel traffic modeling or simulations are needed to understand potential changes in vessel traffic as a result of leased and planned offshore wind energy areas? Some examples to consider may include what is the quantity of sufficient safe haven (anchorages and/or lay berths) for U.S.-flagged vessels?
- What are long-term navigation channel dredging and/or deepening needs due to OSW vessels?

Existing References, Previously Completed and Ongoing Studies

- **USCG Northern NY Bight & Seacoast of NJ Port Access Route Study** (Ongoing)
- **USCB Hudson River Anchorage Study** (Ongoing)
- **NYSERDA 9 GW Cable Corridor, Navigation and Port Usage and Ports Cumulative Impact Studies** (Ongoing), HDR, COWI, WSP
- **NYSERDA's Offshore Wind Ports: Cumulative Vessel Traffic Assessment**, (COWI, 2022). The study used a project design envelope of known and hypothetical offshore wind projects to develop a vessel traffic model which estimates future increases in vessel traffic related to offshore wind projects from 2017 to 2040 as well as the forecasted increase in vessel traffic not related to offshore wind. The study provided results of the relative increase in vessel traffic at eight passage lines at locations of high vessel traffic volumes, including variations based on vessel size and type. https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Programs/Offshore-Wind/22-11-Port-Uses-and-Navigation.pdf
- **NYSERDA's Commercial and Recreational Uses Study,** (McQuilling Renewables, coming soon). The study will provide an updated perspective on the maritime uses that addresses maritime commercial and recreational activity beyond the 60m depth contour, based on both historical data as well as projected activity related to OSW. Early findings suggest there is sufficient navigation safety planning

experience globally to draw from as well as regulatory and advisory systems, processes, and reporting. Military use, submarine transit lanes and disposal sites are present and should be considered in lease siting.

Opportunities for Future / Additional Study

- Recommend Closing Out.

Appendix A: OSW Webinar Series

I. BOEM's Offshore Wind and Maritime Industry Knowledge Exchange Series

Future and past webinars can be registered for and/or viewed at the following links:

- Summary Report, March 5-6, 2018: https://www.boem.gov/sites/default/files/renewable-energy-program/BOEM-Maritime-Meeting-Summary-FINAL-%281%29.PDF
- Webinar recordings and presentations: https://www.boem.gov/renewable-energy/stakeholder-engagement/boem-offshore-wind-and-maritime-industry-knowledge-exchange
    - Ports: Stressors, Conflicts and Offshore Wind Needs, June 24, 2021
    - Agency & Industry Coordination, July 22, 2021
    - Marine Spatial Planning for the Maritime Sector, August 19, 2021

II. NYSERDA's Learning from the Experts Webinar Series

Future and past webinars can be registered for and/or viewed at the following link:
https://www.nyserda.ny.gov/All%20Programs/Programs/Offshore%20Wind/Focus%20Areas/Connecting%20With%20New%20Yorkers/Webinar%20Series