Ports and Waterways Safety Assessment
Workshop Report

Thames River, CT

Providing Navigation Safety Information
for America's Waterways Users

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Executive Summary

The United States Coast Guard (USCG) Sector Long Island Sound sponsored a Ports and Waterways Safety Assessment (PAWSA) workshop in Mystic, CT, on 17-18 November 2021. Twenty nine participants that represented waterway users, stakeholders, environmental interest groups, and Federal, State, and local regulatory authorities joined to collaboratively assess navigation safety on the Thames River from the mouth in Long Island Sound to Norwich, CT. The USCG Navigation Center (NAVCEN) facilitated the PAWSA workshop.

The primary goal of a PAWSA workshop is to improve coordination and cooperation between government agencies and the private sector. Workshop stakeholders participate in facilitated discussion that utilizes a decision tool developed by the USCG to numerically represent relative risk and identify long-term solutions tailored to local circumstances. In 2020, the PAWSA program office [USCG Waterways Management (CG-WWM-1)] commissioned the NAVCEN to revise the original PAWSA decision tool framework to align results to modern programmatic goals. NAVCEN completed the revision in 2021, and the Thames River PAWSA is the first workshop to use the modernized framework. While the fundamentals of the PAWSA framework remain unchanged, the risk scoring system is updated and the numerical results from this report are not comparable to previous PAWSA reports.

Participants discussed and scored sixteen risk factors that are the basis for the PAWSA decision tool. In general, the risk factors rate the quality of vessels and their crews that operate on the waterway; the volume of commercial, non-commercial and recreational small craft vessel traffic using the waterway, navigational and waterway conditions that mariners encounter when transiting the assessment area, and the potential consequences that could result from a marine casualty or incident on the waterway. After a baseline assessment of the risk factors, participants identified and characterized the highest rated factors by evaluating risk tolerance for certain factors and how the risk of those factors is expected to change over time.

The priority risk factors for this PAWSA are traffic mix, volume of commercial traffic, and congestion. Participants discussed and agreed on risk mitigation strategies that involve education, coordination, policy/regulatory improvements, and physical waterway configuration enhancements. Section 4 contains the complete list of mitigation strategies.

The USCG Marine Transportation Systems Directorate (CG-5PW), the NAVCEN, and Sector Long Island Sound, extend a sincere appreciation to the workshop participants for their contributions to the Thames River PAWSA workshop. Their expertise was critical to the success of the workshop, and their recommendations will meaningfully assist the USCG as it continues to work with all Thames River stakeholders to improve safe and efficient navigation within the Thames River waterways.

Background and Purpose

The USCG Marine Transportation Systems Directorate (CG-5PW) is responsible for developing and implementing policies and procedures that facilitate commerce, improve safety and efficiency, and inspire dialogue with ports and waterway users with the goal of making waterways as safe, efficient, and commercially viable as possible.

The 1997 Coast Guard Appropriations Act directed the USCG to establish a process to identify minimum user requirements for new Vessel Traffic Service (VTS) systems in consultation with local officials, waterway users and port authorities, and to review private / public partnership opportunities in VTS operations.

The Coast Guard convened a National Dialogue Group (NDG) comprised of maritime and waterway community stakeholders to identify the needs of waterway users with respect to Vessel Traffic Management (VTM) and VTS systems. The NDG was intended to provide the foundation for the development of an approach to VTM that would meet the shared government, industry, and public objectives of ensuring the safety of vessel traffic in U.S. ports and waterways, in a technologically sound and cost effective way.

The ***Ports and Waterways Safety Assessment (PAWSA) Waterway Risk Model,*** and the ***PAWSA workshop process*** is a direct output of NDG efforts. PAWSA is a disciplined approach designed to identify major waterway safety hazards, estimate risk levels, evaluate potential mitigation measures, and set the stage for the implementation of selected risk reduction strategies.

The process involves convening a select group of waterway users and stakeholders and facilitating a structured workshop agenda to meet the risk assessment objectives. A successful workshop requires the participation of professional waterway users with local expertise in navigation, waterway conditions, and port safety. In addition, stakeholders are included in the process to ensure that important environmental, public safety, and economic consequences get appropriate attention as risk interventions are identified and evaluated.

The long-term goals of the PAWSA process are to:

1) Provide input during planning for projects that intend to improve the safety of navigation;
2) Further the Marine Transportation System (MTS) goals of improved coordination and cooperation between government and the private sector, and involving stakeholders in decisions affecting them;
3) Foster development and/or strengthen the roles of Harbor Safety Committees within each port; and,
4) Support and reinforce the role of USCG Sector Commanders and Captains of the Port (COTP) in promoting waterway and VTM activities within their geographic areas of responsibility.

PAWSA Waterway Risk Model and Workshop process

The PAWSA Waterway Risk Model includes variables associated with causes of waterway casualties and their consequences. The Waterway Risk Model measures risk as defined as a function of the probability of a casualty and its consequences. The diagram below shows the four general risk categories and their corresponding risk factors that make up the Waterway Risk Model.

Vessels	Traffic	Navigation	Waterway
Deep Draft Vessel Quality	Volume of Commercial Traffic	Winds	Dimensions
Shallow Draft Vessel Quality	Volume of Small Craft Traffic	Currents/Tides	Obstructions
Commercial Fishing Vessel Quality	Traffic Mix	Visibility Restrictions	Visibility Impediments
Recreational Vessel Quality	Congestion	Bottom Type	Configuration

- **Vessel Conditions** – The quality of vessels and their crews that operate on a waterway.
- **Traffic Conditions** – The number of vessels that use a waterway and how they interact with each other.
- **Navigational Conditions** – The environmental conditions that vessels must deal with in a waterway.
- **Waterway Conditions** – The physical properties of the waterway that affects vessel maneuverability.

In addition to the four general risk categories, the model utilizes two categories of consequences: immediate consequences and subsequent consequences. The table below shows the breakdown of the consequences in the two categories.

Immediate Consequences	Subsequent Consequences
Personnel Injury	Public Health and Safety
Petroleum Discharge	Environmental Damage
Hazardous Materials Release	Aquatic Resources
Port Mobility	Economic

Workshop Process

Workshop activities include a series of discussions about the port and waterway attributes and the vessels that use the waterway. This dialogue is followed by the completion of participant surveys to establish relative baseline risk levels, evaluate the effectiveness of existing risk mitigations, and identify additional risk intervention strategies to further reduce risk. The baseline survey is used to numerically evaluate the baseline risk levels using predefined qualitative risk descriptions for predefined risk factors. The risk characterization survey is used to evaluate trends and effectiveness of the current risk levels and mitigation efforts, and to collect preliminary comments. The results of both surveys are briefed to the participants and used to determine which factors to discuss further on the second day of the PAWSA. Participants discuss additional risk intervention strategies and then evaluate how effective those new strategies could be at reducing risks for those risk factors where the risk is deemed high or existing mitigations are ineffective. Additionally, participants were able to add georeferenced comments to a chart of the Thames River to provide further clarification for different risk factors. These comments are included in Appendix C.

Thames River PAWSA Workshop

A PAWSA workshop to assess navigation safety within the Thames River was held in Mystic, CT on 17-18 November 2021. Twenty-four participants that represented waterway users, stakeholders, environmental interest groups, and Federal, State, and local regulatory authorities attended the workshop. The purpose of the workshop was to bring waterway users, stakeholders and members of the Thames River maritime community together for collaborative discussions. The sponsor of the workshop was USCG Sector Long Island Sound.

Participants discussed the quality of vessels and their crews that operate on the waterway; the volume of commercial, non-commercial, and recreational small craft vessel traffic using the waterway, navigational and waterway conditions that mariners encounter when transiting the assessment area, and the potential environmental impacts that could result from a marine casualty or incident on the waterway.

Over the two-day workshop, the participants discussed and then numerically evaluated 16 risk factors in the PAWSA Waterways Risk Model.

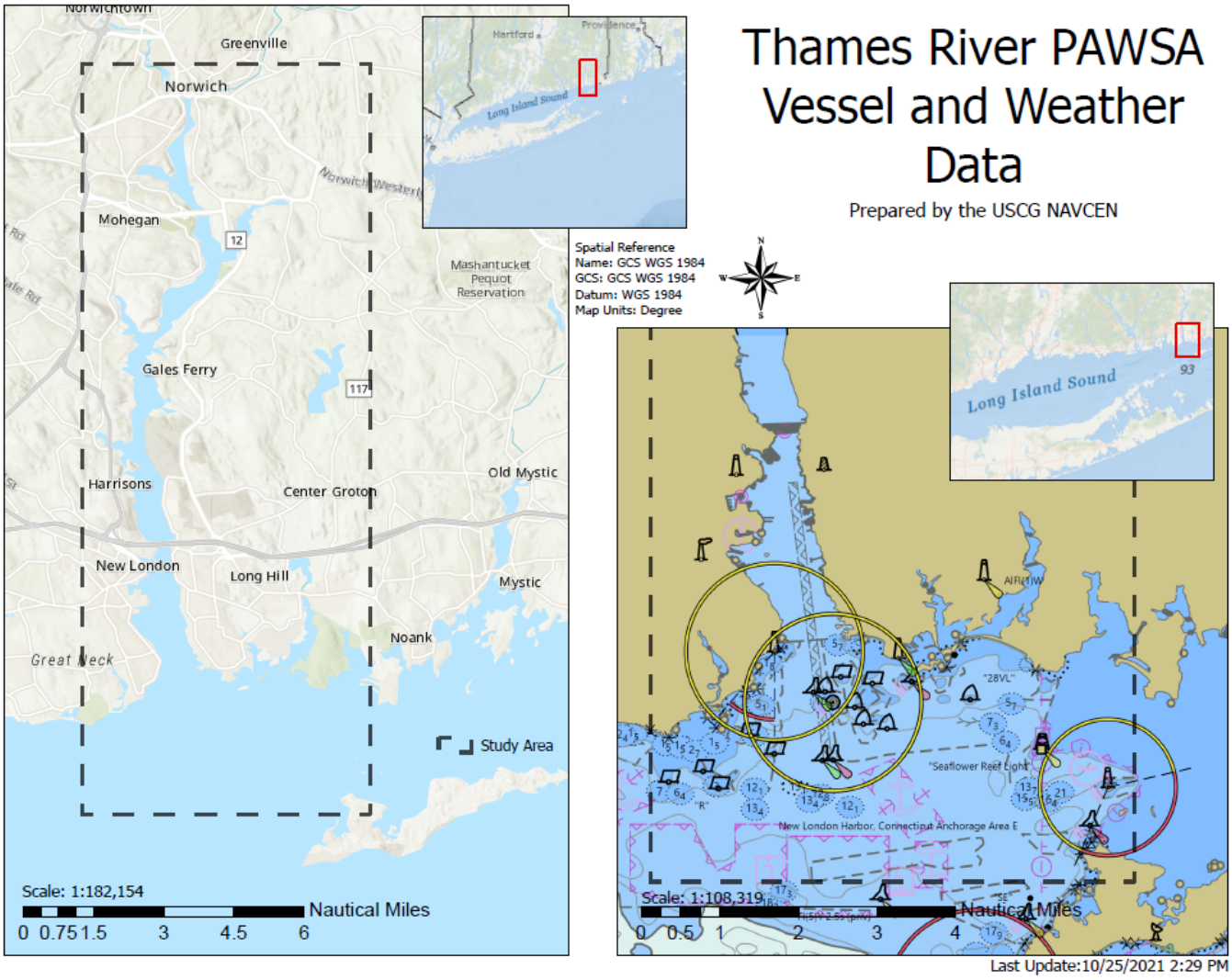
Baseline risk levels were first evaluated using pre-defined qualitative risk descriptions for each risk factor. Participants then characterized risk mitigation strategies by evaluating cost and effectiveness of existing mitigation strategies, and determining how the risks were changing over time. For the highest rated risk factors, the participants engaged in further discussion to identify additional mitigation strategies to reduce the risk. The results of the baseline-risk-level survey, risk characterization, additional risk intervention strategies, and participant comments and observations are outlined in this report.

The primary goal of a PAWSA workshop is to improve coordination and cooperation between government agencies and the private sector. A PAWSA workshop is intended to involve stakeholders in decisions affecting them, and provide the Coast Guard and members of the waterway community with an effective tool to evaluate risk and work toward long-term solutions tailored to local circumstances.

In support of these goals, this report should be viewed as a starting point for continued dialogue within the Thames River maritime community. The USCG will use this PAWSA report, together with other information, to determine whether, and to what extent, regulatory or other actions are needed to address navigation safety risk. Any rulemaking efforts will follow Coast Guard public notice and comment rulemaking procedures to allow for public participation in the process.

Section 1: Thames River PAWSA Assessment Area

The geographic area for the Thames River PAWSA extend from the mouth of the Thames River up to Norwich, CT as shown in the below graphic.



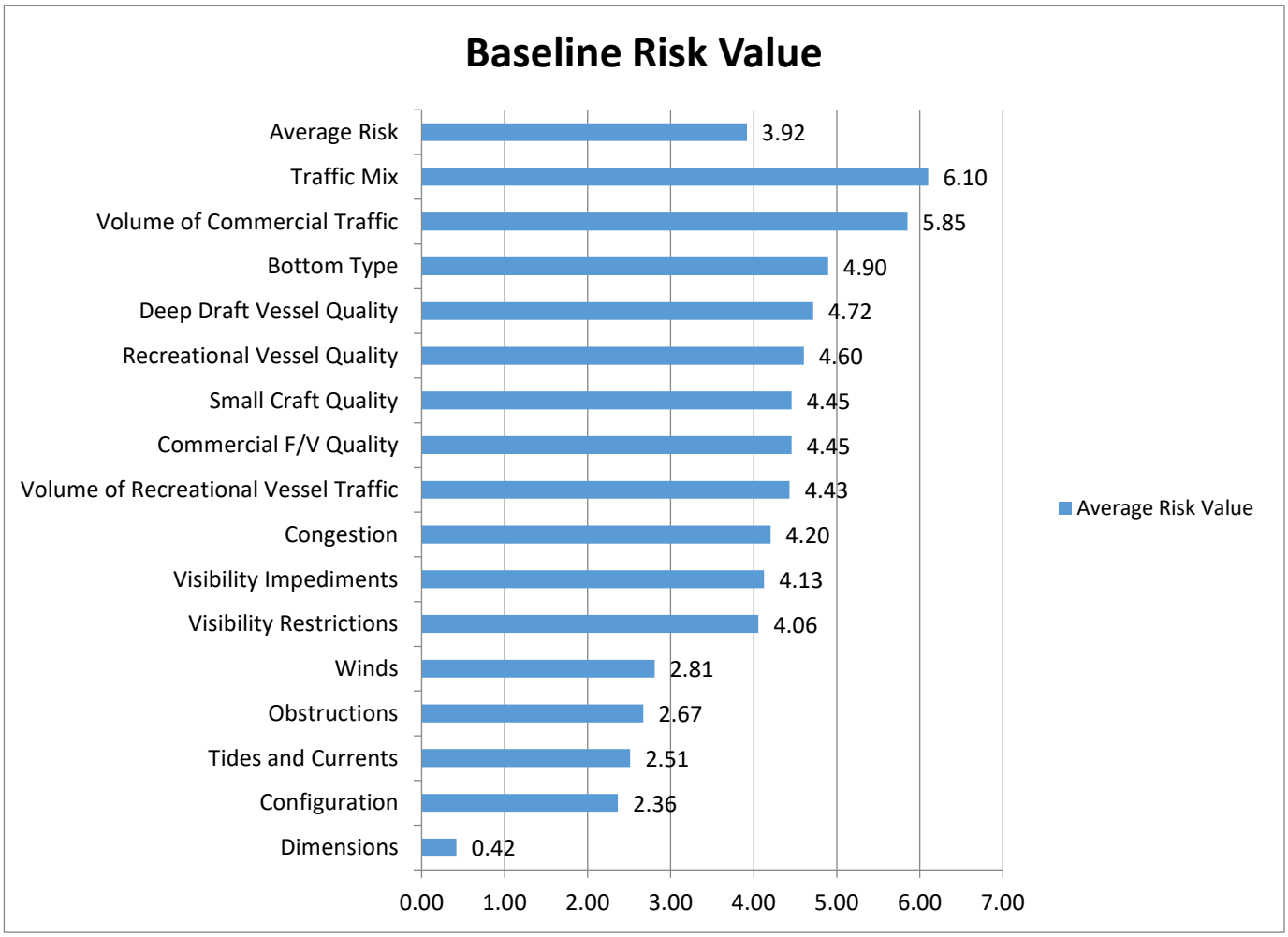
Section 2: Baseline Risk Levels

The first step in the workshop was the completion of a baseline survey to determine a baseline risk level value for each risk factor in the Waterway Risk Model. To establish the baseline risk levels, participants discussed each of the 16 applicable factors in the Waterway Risk Model and filled out the baseline survey based on quantitative descriptions of the risk level and the severity of consequences associated with those risks. These risk levels are converted to a numerical value between 1 and 4 based on the severity of the risk. The consequences are given a value of 0, 0.5, or 1 based on the level selected by the participant. For each risk factor, the baseline is determined by multiplying the risk (1-4) by the average immediate consequence plus the average subsequent consequence using the below formula.

$$Risk\ Value = (risk\ level) \times \left(\frac{\sum Immediate\ Consequences}{4} + \frac{\sum Subsequent\ Consequeunces}{4}\right)$$

The results of the risk value are on a scale between 0 and 8. On that scale, 0.0 represents low risk (best case) and 8.0 represents high risk (worst case), with 4.0 being the mid-risk value.

The graph below shows the baseline risk-level values for all risk factors evaluated by the New London PAWSA workshop participants.



Section 3: Risk Characterization

The second step in the workshop uses the risk characterization survey to determine if the current risk for each category is acceptable, the current trends in the risk level, and if current mitigations were effective. The survey also collects initial comments from the participants on the risk and mitigations for each risk factor, which are included in Appendix B. The results are generated based on what a plurality of the participants selected for each risk factor. The results were combined with the results from step 1 and briefed to the participants.

The step 2 results combined with the baseline values from the New London PAWSA conference are shown in the table below.

Risk Factor	Risk Value	Current Risk Level	The Current Risk Trend	The Current Mitigations are
Traffic Mix	6.10	The risk level is acceptable, keep the status quo	Increasing	Acceptable
Volume of Commercial Traffic	5.85	The risk level is acceptable, keep the status quo	Increasing	Acceptable
Congestion	4.20	The risk level is acceptable, keep the status quo	Increasing	Acceptable
Deep Draft Quality	4.72	The risk level is acceptable, keep the status quo	Staying the same	Acceptable
Rec Vessel Quality	4.60	The risk level is acceptable, keep the status quo	Staying the same	Acceptable
Shallow Draft Quality	4.45	The risk level is acceptable, keep the status quo	Decreasing	Acceptable
Fishing Vessel Quality	4.45	The risk level is acceptable, keep the status quo	Staying the same	Acceptable
Volume of Rec Vessel Traffic	4.43	The risk level is acceptable, keep the status quo	Staying the same	Acceptable
Visibility Impediments	4.13	The risk level is acceptable, keep the status quo	Staying the same	Acceptable
Visibility Restrictions	4.06	The risk level is acceptable, keep the status quo	Staying the same	Acceptable
Bottom Type	3.00	The risk level is acceptable, keep the status quo	Staying the same	Acceptable
Winds	2.81	The risk level is acceptable, keep the status quo	Staying the same	Acceptable
Obstructions	2.67	The risk level is acceptable, keep the status quo	Staying the same	Acceptable
Tides and Currents	2.51	The risk level is acceptable, keep the status quo	Staying the same	Acceptable
Configuration	2.36	The risk level is acceptable, keep the status quo	Staying the same	Acceptable
Dimensions	0.42	The risk level is acceptable, keep the status quo	Staying the same	Acceptable
Average Risk	3.92	The risk level is acceptable, keep the status quo	Staying the same	Acceptable

Facilitators briefed the participants on the results used to determine which risk factors to focus on during the second day of the conference. Based on the risk values determined in step 1 and the risk trends, participants could choose to focus on risk factors that were not necessarily the highest initial risk value from the baseline survey.

It was determined that the risk factors with an “increasing” trend were the highest priority. Therefore, “congestion” was reprioritized to the top of the list even though it had a lower risk value. As a result, the selected factors to focus on during step 3 were Congestion, Traffic Mix, and Volume of Commercial Traffic.

Section 4: Risk Mitigation Strategies

The last step in the workshop focused participants on specific risk factors, collected evidence for the risk levels, and brainstormed ways to mitigate the risk. The participants put their ideas on sticky notes that were grouped and consolidated by the facilitation team. The major themes/ideas were then presented to the participants to further refine into action items. Participants were encouraged to create goals that are specific, measurable, actionable, realistic, and time bound (SMART).

Workshop participants identified, discussed and evaluated additional risk intervention strategies that involve education, coordination, policy/regulatory improvements, and/or physical waterway configuration enhancements. The recommended additional risk intervention strategies recorded were agreed upon by consensus of the Thames River PAWSA workshop participants and should not be construed to represent the views of the USCG.

Congestion:

- Mitigation Strategy 1: The use of the State Pier is a potential mitigating factor to reduce vessel congestion. Form workgroup to complete a waterway study, and provide recommendations to USCG for review.

- Mitigation Strategy 2: Establish a Vessel Movement Committee (VMC) or Harbor Safety and Security Committee (HSSC). These committees will accurately reflect the mix of waterway users and stakeholders with the goal of information sharing, safety/security recommendations for USCG review, and creation of locally accepted rules/policies to mitigate congestion.

- Mitigation Strategy 3: Investigate possible mitigations with pilotage and Regulated Navigation Area (RNA) to address risk of increased vessel traffic in the future. Consider these mitigation factors in the future: expediting cargo, consolidate loads, extend port operations, and maintain clear access to South face (channel face) of State Pier.

- Mitigation Strategy 4: Submarine schedules are classified, Secret, for National Security, more than 24 hours before transit; however, information dissemination is limited. Enhance communication provided to submarine schedulers on upcoming marine events and waterways changes. Consider requesting submarine schedulers to serve as members of the VMC or HSSC.

Traffic Mix:

- Mitigation Strategy 1: Complete a study to determine the potential value and benefits of incorporating vessel traffic service capabilities throughout the port, i.e., Cooperative vessel movement traffic service (CVTS), marine exchange, etc.

- Mitigation Strategy 2: Establish a Vessel Movement Committee (VMC) or Harbor Safety and Security Committee (HSSC). Host a harbor safety forum sponsored by USCG. Proposed first meeting was targeted for Q2 of CY22, and intended to occur before the start of recreational boating season in 2022. The agendas and proposed future actions should be driven by port stakeholders with support from the local USCG Sector. Primary agenda item for the forum is to work towards formalizing a VMC or HSSC, potentially both a VMC and HSSC if deemed necessary.

- Mitigation Strategy 3: In response to increased recreational traffic concerns, propose voluntary educational waterways symposium. Meet with local adult education programs or parks and recreational services to provide practical knowledge of boating to recreational waterway users. This could include educational pamphlets on the “dos” and “don’ts” on the waterway, especially as it relates to the submarine traffic. USCG Auxiliary, Marinas, boat ramps, or points of sale/rental at national retailers could be used as distribution points.

- Mitigation Strategy 4: In response to traffic west of the channel, review potential establishment of a Regulated Navigation Area (RNA), or restricted areas.

- Mitigation Strategy 5: Consider formalizing currently accepted night restriction of operation near Railroad Bridge. Consider utilizing HSSC or VMC to formalize.

Volume of Commercial Traffic:

- Mitigation Strategy 1: Enhance channel efficiency by expanding channel width, increasing number of vessel meeting/passing locations, and improving channel marking and pier illumination.

- Mitigation Strategy 2: Establish a workgroup to provide channel and ATON improvement recommendations for USCG review. This may include discussion of formalizing the ferry route via an auxiliary channel and a Waterways Analysis and Management System (WAMS) study for the Thames River north of the bridge.

- Mitigation Strategy 3: Consider channel improvements. Correct the location of ATON: N R "18" (Next to Yale Boathouse) as it is not marking the outside of the channel. Coordinate with Army Corps of Engineers (ACOE) on potential dredging IVO G "9" next to Smith Cove.

- Mitigation Strategy 4: Encourage stakeholder participation in next scheduled WAMS process to include mitigations with Private Aids to Navigation (PATON) use.

- Mitigation Strategy 5: Establish new anchorages to manage increased vessel traffic.

- Mitigation Strategy 6: Reduce the risk of collisions by separating inland traffic from deepwater traffic via traffic lanes.

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Appendix A

Workshop Participants

Participant	Organization
Martha Klimas	Bridgeport Port Authority
Steven Fields	City of New London
Yolanda Cooley	CT Deep
Chris Anglin	Cross Sound Ferry Block Island Express
Lyndsey Pyrke-Fairchild	Empire Scallop
Joseph Gilbert	Empire Scallop
Jon Haney	Fishers Island Ferry District
Mark Augur	Gateway Terminal New London
Peter Olsen	ILA Local 1411
Donald Toby	Interport Pilot
Chris Clark	McAllister Towing
Dave Sigler	MSRON 8 HVU
Colleen Roche	NOAA Office of Coast Surveys
Rich Astles	Northeast Marine Pilots
Edward Leblanc	Orsted
Kevin Schneider	SUBASE Harbor Security
Steven Sadlowski	AICP, Community Planning and Liaison Officer
Jonathon Battle	SUBASE Port Services Officer
Richard Willette	SUBase Ship Pilot
Kevin Blacker	97 Farm
Robert Garris	USCG Station New London
John Murphy	USCG Cutter BOLLARD
Joshua Reeve	USCG Aids to Navigation Team Long Island Sound
Andrew Bichlmeier	USCG Cutter COHO

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Appendix B

Participant Observations- Trends in the Port and Existing Risk Mitigations

The workshop participants are local subject matter experts and these comments capture their opinions and analysis, providing a general sense of the ideas discussed during the workshop. These comments provide various perspectives representing widely different interests and should not be construed to represent the views of or statements by the United States Coast Guard.

Deep Draft Vessel Quality

(Vessels 1600 Gross Tons and higher engaged in commercial trade)

Trends/Observations:

- The general consensus among workshop participants is that deep draft vessel quality is good overall. This is mostly driven by existing mitigation.
- Most deep draft vessels are relatively new, with more advanced technology onboard.
- Communication challenges between personnel can pose a safety risk. However, these concerns are low and current existing mitigation is effective.
- Military and commercial vessels present different risks to the waterway (i.e. submarines).
- One participant noted that the water depth at the pier should inform deep draft restrictions of deep draft vessels coming into port, not just river depth. Near Allyn's Point most vessels are 600ft vessels in good working condition.

Existing Mitigations:

- There are established Standards of Care.
- There are tools to rate a company's safety on an international level.
- Cargo companies have their own marine assurance departments. They thoroughly vet vessels before they are hired. Terminals complete their own inspections, based on the Ship Inspection Report Program (SIRE) system. SIRE is a tank vessel risk assessment tool that is used by industry to track and document a tank vessels compliance with safety and inspection requirements. Companies mandate SIRE inspections.
- Oil Company International Marine Forum (OCIMF) and International Marine Contracting Association (IMCA) Standards are followed for large passenger vessels.
- There are maintenance standards and policies. Most vessels use class-certified maintenance schedules. OCIMF sets international recommendations. Tankers typically must meet these recommendations to stay employed. International Tanker Owners Pollution Federation (ITOPF) also develops standards.
- On the chemical side, there are chemical distribution inspections. Crews are educated and certified. They have specific endorsements.
- Shipping companies develop Key Performance Indicators (KPI). They regulate internally to meet KPIs.
- Shipping companies pressure vessel captains to report deficiencies.

- Crew training is completed and standardized as required by the International Convention of Standards of Training, Certification and Watch keeping (STCW).
- Pilots practice bridge resource management (BRM). Every time pilots board a vessel, they ask a series of questions regarding vessel conditions. If the answers are unsatisfactory, they are passed to the applicable government authorities.

Additional Mitigations:

- No additional mitigation identified as being needed.

Shallow Draft Vessel Quality

(Vessels less than 1600 Gross Tons engaged in commercial trade)

Trends/Observations:

- This category includes ferries and small inspected vessels. Tugs/barges and ATBs are in a separate category. Shallow draft vessel quality is different than deep draft vessel quality because the regulations and inspections are different.
- Overall, shallow draft quality is good. Vessels are inspected and operators are experienced/knowledgeable.
- There is a consensus among participants that there has been a vast improvement in shallow draft vessel quality over the past few years. There is a recent trend of newer equipment onboard these vessels.
- Language barriers are minimal for shallow draft vessels. In this aspect, the quality is better than deep draft vessels.

Existing Mitigations:

- State Ferry System: Crews are required to take a detailed familiarization training and Crew Resource Management training. No one works longer than 12 hours in a 24-hour period. They have their own maintenance facility, and average ship age is 30 years old. Mechanics know their ferries extremely well.
- Navigation technology and general machinery has advanced significantly.

Additional Mitigations:

- No additional mitigation identified as being needed.

Small Craft and Commercial Fishing Vessel Quality

Trends/Observations:

- Commercial fishing vessel inspection requirements are different than other commercial vessels. Therefore, commercial fishing vessels are combined with small craft. Both types of vessels are relatively high risk. Some participants disagree with this rationale because fishing vessel operators are generally more knowledgeable/experienced than small craft operators.
- The fishing fleet is diverse. It includes all types of hulls, construction, and equipment. Risk usually depends on the type of fishery.

- There is a perception among participants that fishing vessels are responsible for a large percentage of pollution incidents.
- Small craft/recreational boaters generally lack experience and onboard equipment (radios, radar, Global Positioning System (GPS), and electronic charts).
- Small craft/recreational boaters generally lack an understanding of the Rules of the Road.
- Point of emphasis: limited to no education is required for small craft/recreational boaters. This is a major reason for their elevated safety risk. Outreach efforts need to drastically improve.

Existing Mitigations:

- Vessel safety checks, dockside exams and safety classes provided by the by the CG Auxiliary and US Power squadron for small craft operators.
- Subchapter C equipment carriage requirements for uninspected commercial fishing vessels.

Additional Mitigations:

- No additional mitigation identified as being needed.

Volume of Commercial Traffic

Trends/Observations:

- This category includes assessing traffic volume in the river and anchorages.
- General consensus among the group is that (current) volume of commercial traffic in the river is not a concern.
- The majority of small craft vessels can navigate easily to avoid deep draft vessels.
- The concern and need for additional mitigation is due to future increase in volume of commercial traffic in the river.
- River width alone cannot describe the risk associated with traffic volume. For example, over the past few years there has been an increase of 200+ vessels annually.
- Potential for wind turbine construction and the future vessel activity it would bring is a concern.
- Future of Electric Boat construction along with the construction of Class boats and the increased traffic this could bring is a concern.
- Major consensus is that the volume of vessel activity in the river is going to increase and that future increase is a concern.

Existing Mitigations:

- Traffic operating protocol for the Thames River Waterway
- Vessel Traffic Online schedule sharing
- Communication and cooperation among pilots

Additional Mitigations:

- See appendix C

Volume of Small Craft Traffic

Trends/Observations:

- During the summer small craft vessel and fishing vessel traffic increases.
- The summer also brings heavy paddle craft traffic.
- There is a consensus that this is a larger harbor. However, good communication between the harbor pilots and others, and small craft vessel maneuverability (to avoid deep draft vessels in harbor), decrease the concern of small craft traffic volume.

Existing Mitigations:

- Internal Communication

Additional Mitigations:

- No additional mitigation identified as being needed.

Traffic Mix

Trends/Observations:

- The traffic mix is wide-ranging with various types of vessels including general cargo ships, military submarines, commercial fishing vessels, and sea planes.
- Submarines raise a unique challenge to the channel due to their width and security zone requirements.
- Multiple proposed projects pose a major concern of the future traffic mix.
- Traffic mix changes seasonally. The summer boating season has less prepared vessels and inexperienced operators.
- Based on total number of vessel movements and mixture of vessel traffic, there is a low number of incidents on the waterway. However, the future of vessel traffic mix is the real concern.

Existing Mitigations:

- Internal Communication

Additional Mitigations:

- See Appendix C

Congestion

Trends/Observations:

- The general consensus is that submarine movement creates an all stop situation for remaining vessel traffic in the channel, until the submarine gets underway and clears the channel.
- Traffic congestion north of the bridge with tug and barges transiting to Montville Dock.
- Concerns with congestion at several narrow points in the channel. Two vessels cannot approach the bridge at the same time.

- A consensus from the group is that the current state of congestion is manageable; however the concern is more about future congestion for the waterway.
- Future concern is for the potential of major congestion due to added vessel traffic at the state pier.

Existing Mitigations:

- Pilots
- Tugboats
- Transparency and Communication Sharing

Additional Mitigations:

- See Appendix C

Winds

Trends/Observations:

- Winds are well forecasted for the area. Wind prediction has significantly improved over the past 10-20 years.
- Wintertime, the State Pier faces the northwest with a northwestern wind unless it's a gale.
- The harbor in general is protected.
- When wind restrictions are met for the Amtrak Bridge, the bridge will remain in the closed position, causing an obstruction to navigation.
- Because every ship has different levels of susceptibility to winds, the port is not restrictive when it comes to wind limits.
- Instead of automatically canceling movements due to high winds, the on-scene decision to move forward is made with the master onboard the vessel.

Existing Mitigations:

- Weather Forecasting
- Physical Oceanographic Real-Time System (PORTS)
- Tugs

Additional Mitigations:

- No additional mitigation identified as being needed.

Water Movement

Trends/Observations:

- Over the course of a year, the currents are moderate; however, the consensus is there are tide and current concerns near the railroad bridge.
- There are several areas of localized hazardous conditions; however, these locations are predictable. They are areas where currents collide, coupled with a consistent eddy in the channel.

- Near piers 15 and 17, there is a slight bend and within this bend there is extreme caution taken by the pilots due to the swift change in current.
- Currents play a significant role in operations, especially submarine transit. Sometimes the submarine pilots will recommend a different day due to the currents in the channel.
- North of the bridge you can find a 1 ½ to 2 kts current change, significantly effecting transit operations.
- Northside piers are difficult to maneuver due to changes in tides and currents. Based on the effects of either tides or currents, the piers themselves become a pinch point while maneuvering between tugs and submarines.
- Of note, it was identified that there are concerns with calibration of sensors at piers 2, 6, and at the sub base. An acknowledgement was made that more frequent calibration checks will be made.

Existing Mitigations:

- PORTS system

Additional Mitigations:

- No additional mitigation identified as being needed.

Visibility Restrictions

Trends/Observations:

- Fog is year around, with morning fog being a daily occurrence.
- It is common to be fogged in until 10 a.m. and sometimes noon. On rare occasions fog can last more than 24 hours.
- Fog can get dramatically worse in a short period of time. Conditions change while underway.
- Though fog is a regular occurrence, it is usually predictable and forecasted. Once or twice a month fog will cause 30 minute delays.
- Rain is not a major problem, but it can obstruct the line of site to small objects/vessels.
- Recreational boating during foggy and rainy days is increasing now that GPS and navigation technology are more common/available. This provides a false sense of security for amateur boaters.

Existing Mitigations:

- NOAA Forecasts
- National Weather Service

Additional Mitigations:

- No additional mitigation identified as being needed.

Obstructions

Trends/Observations:

- For this workshop, obstructions are fixed and floating objects. This definition may confuse mariners as obstructions are typically fixed objects.
- The general concern and common observation was the down position of the Thames River Railroad Bridge due to bridge casualty, inclement weather conditions, or normal operation. When the bridge is in the down position it halts all deep draft vessel traffic north of the bridge (most notably submarines).
- Deadheads are an occasional risk. The U.S. Army Corps of Engineers recovers deadheads. High tides and major storms increase risk of deadheads.
- Areas with fishing gear may pose risk of a fouled propeller due to light line.

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Existing Mitigations:

- Coordination Team
- Salvage Response
- ACOE

Additional Mitigations:

- No additional mitigation identified as being needed.

Visibility Impediments

Trends/Observations:

- The group has identified that the Thames River Bridge is a visual impediment. The location/area of the bridge and visual guides around the bridge are a continued topic of discussion.
- New facilities tend to use new LED lighting. It has been noted that this can pose a challenge in certain places due to the color rendering index.
- Fix lighting terminals are causing a visibility impediment at night due to lighting.
- Many facilities are going through expansion and construction. The lighting for the work areas are blinding vessel operators in the channel.
- Replacing physical ATON with electronic aids may increase navigational risk. There are no plans to implement this change. Electronic aids to navigation will only augment the physical ATON constellation.
- There is a proposal to build a Coast Guard Museum out of glass on the waterfront at City Pier. Note for consideration, consider the construction material to be used, as there could be a potential for solar glare off of the building.

Existing Mitigations:

- USCG will fix ATON discrepancies in 48 hours or less because of sensitivity

Additional Mitigations:

- No additional mitigation identified as being needed.

Dimensions

Trends/Observations:

- Although the river has stopped growing, vessels continue to increase in size.
- A participant brought a point that considering dimensions of the waterway would be worth noting. In the participant's opinion, there are potentially two proposals, if accepted, that would decrease the width of the river because of the Mohawk Project.

Additional Mitigations:

- No additional mitigation identified as being needed.

Bottom Type

Trends/Observations:

- Likelihood of grounding on underwater dikes near the Mohegan Sun is high. Boats find themselves running aground frequently in this area.
- The bottom type north of the Thames River Bridge is made up of multiple mix substrates of shallow ground and sand, with some shell mix, which decrease the severity of groundings.
- South of the bridge near Greens Harbor is fairly rocky, which increases the severity of groundings.
- Vessel damage from groundings will be influenced by vessel speed.
- Accurately charted bottom types are important because mariners will look for soft areas to mitigate damages after an engineering casualty.

Additional Mitigations:

- No additional mitigation identified as being needed.

Configuration

Trends/Observations:

- General consensus on the river's configuration is that it is too narrow and too shallow.
- Ferries typically depart the channel from buoys 5 and 6. This often brings the potential for vessels continuing up the channel to meet or potentially allide with other buoys.
- Multiple docks are in close proximity to the federal waterway. Due to this configuration, these docks pose challenges to widening and deepening the waterway. Although the general consensus favors widening the channel, there are several locations on the waterway that make this difficult, no growth potential in those particular areas.

Additional Mitigations:

- No additional mitigation identified as being needed.

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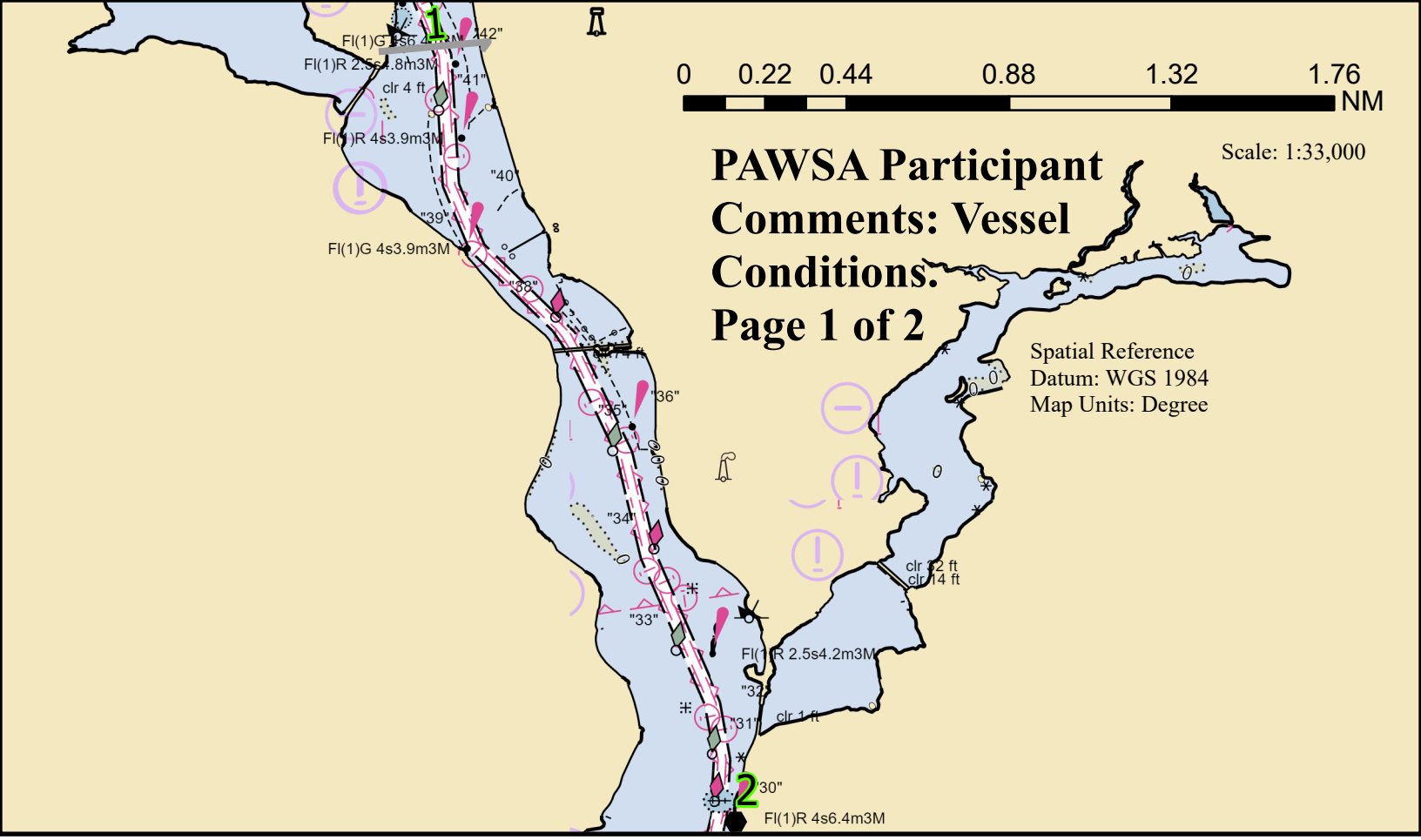
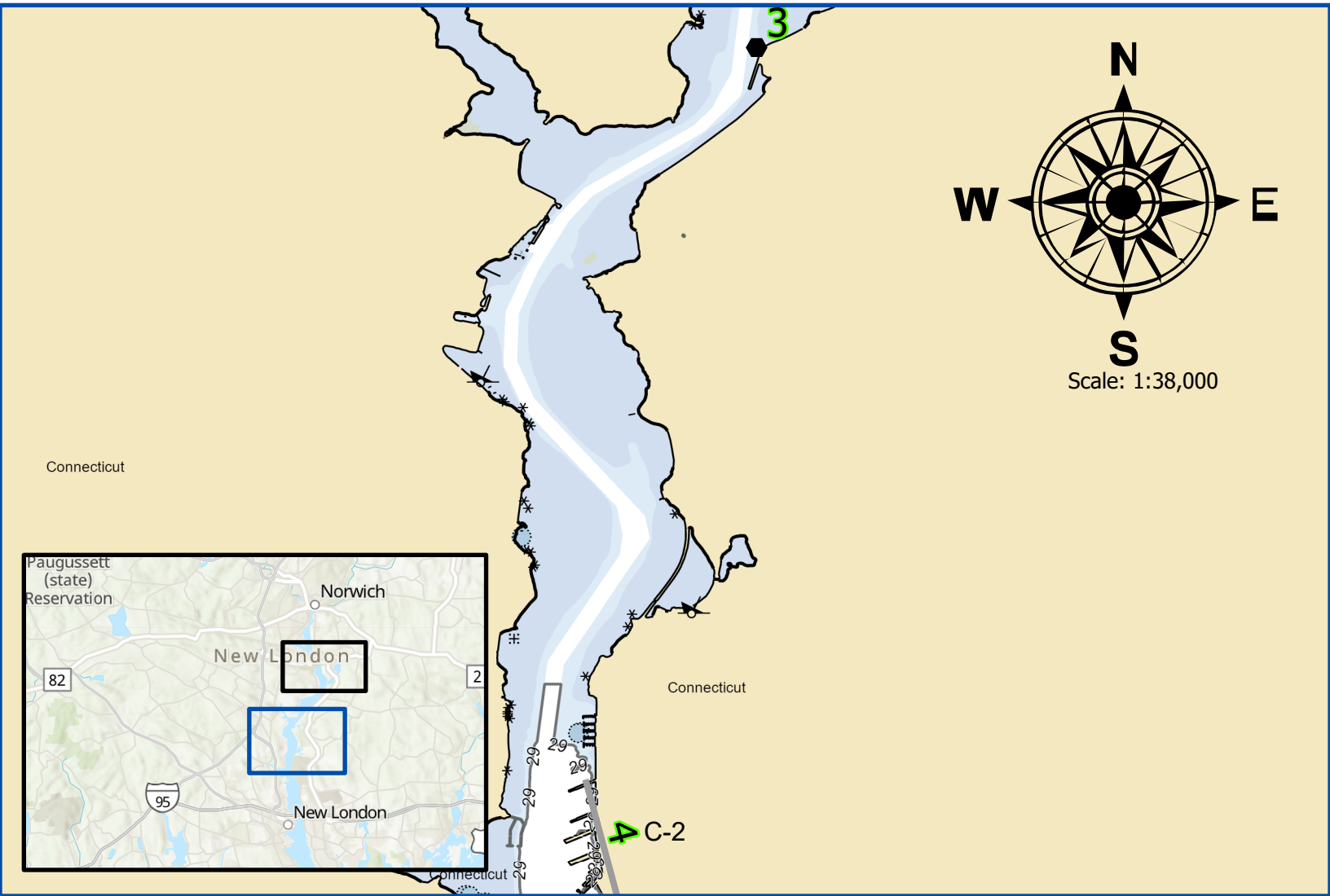
Appendix C

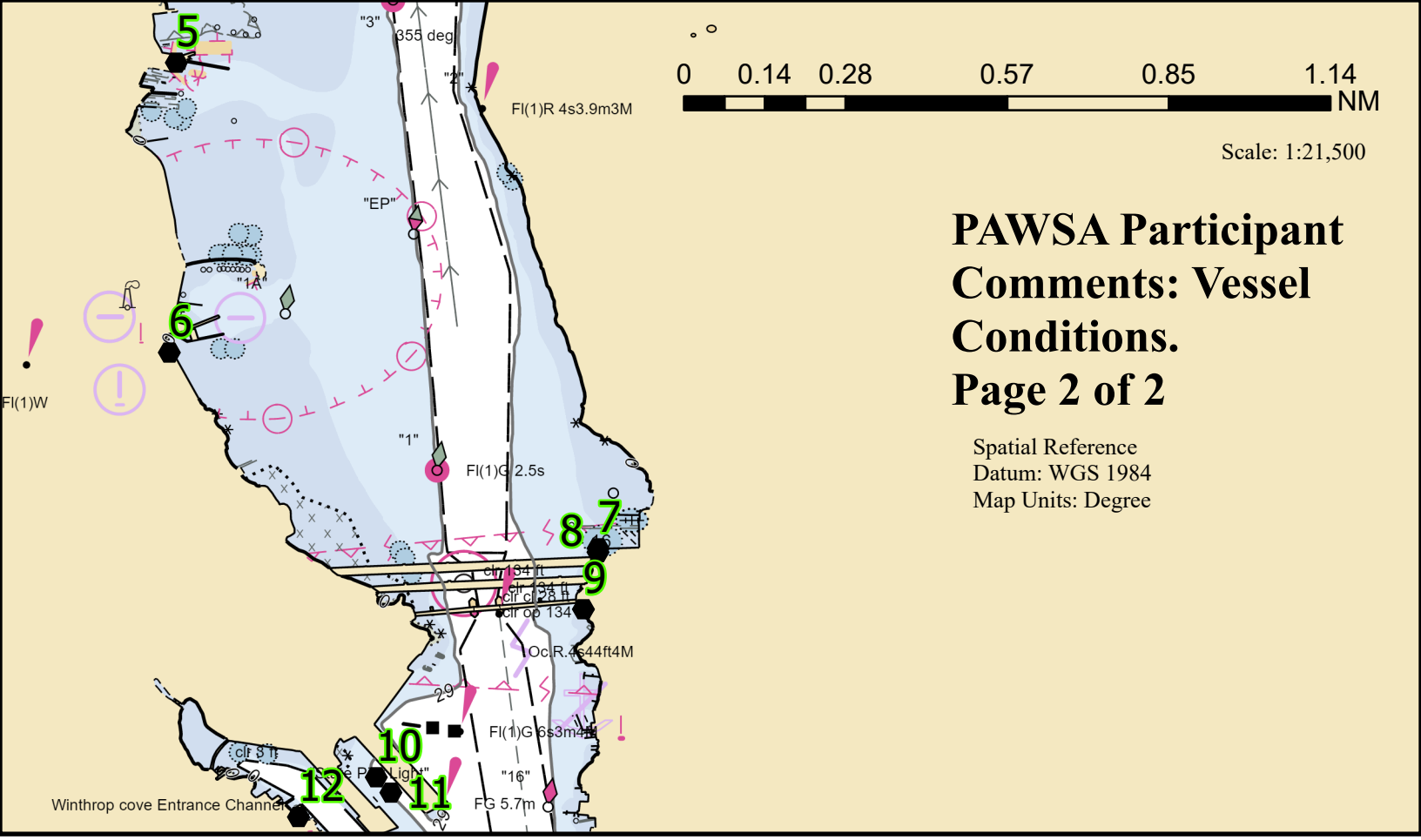
Geospatial Participant Observations

During the workshop participants recorded the location of significant observations on an ArcGIS online web-application. Those comments are tabulated in this appendix following maps of the locations for each risk category. For GIS layers contact the navigation center at TIS-DG-NAVCEN-Waterways@uscg.mil.



Labeled points correspond with table on page C-4.





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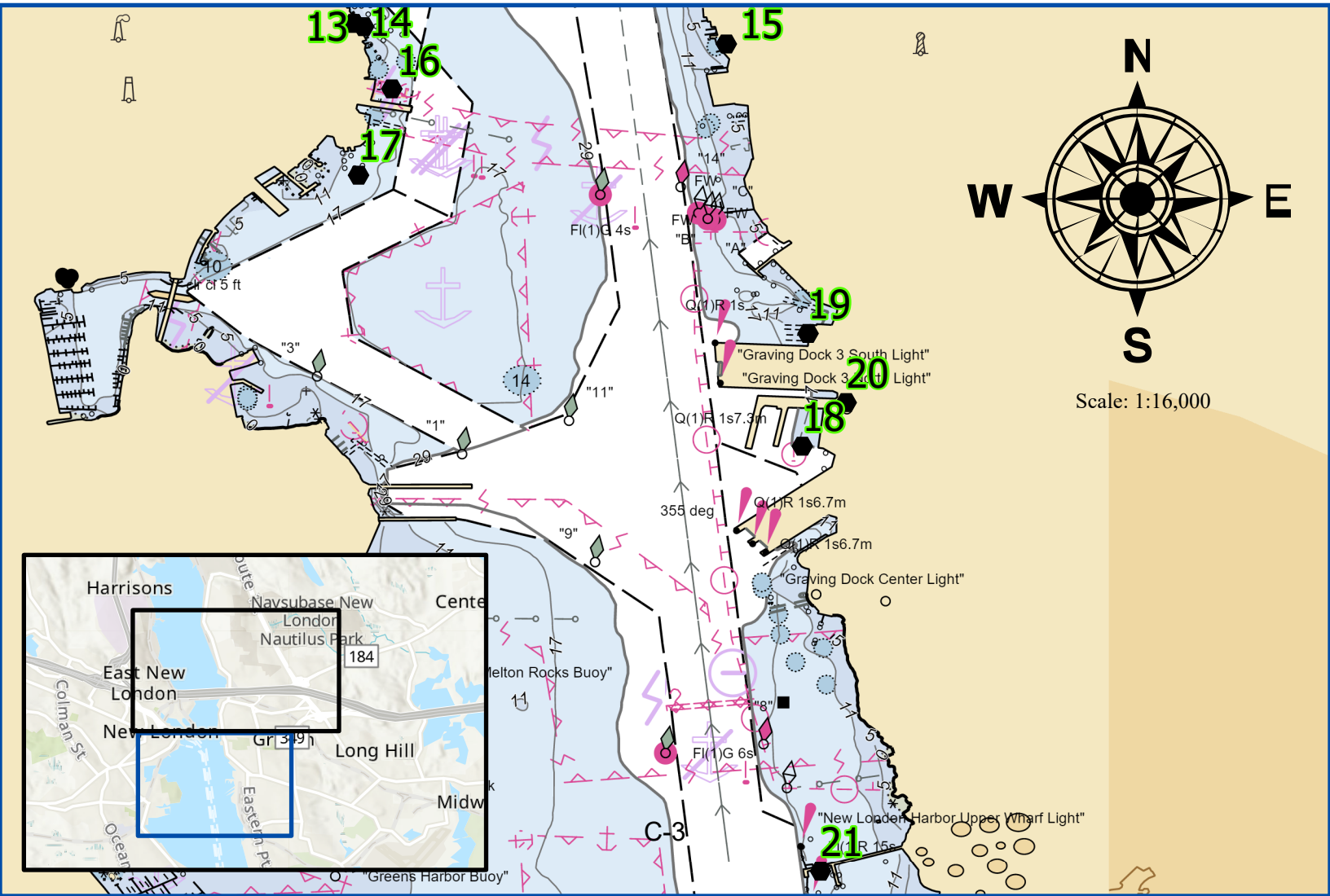
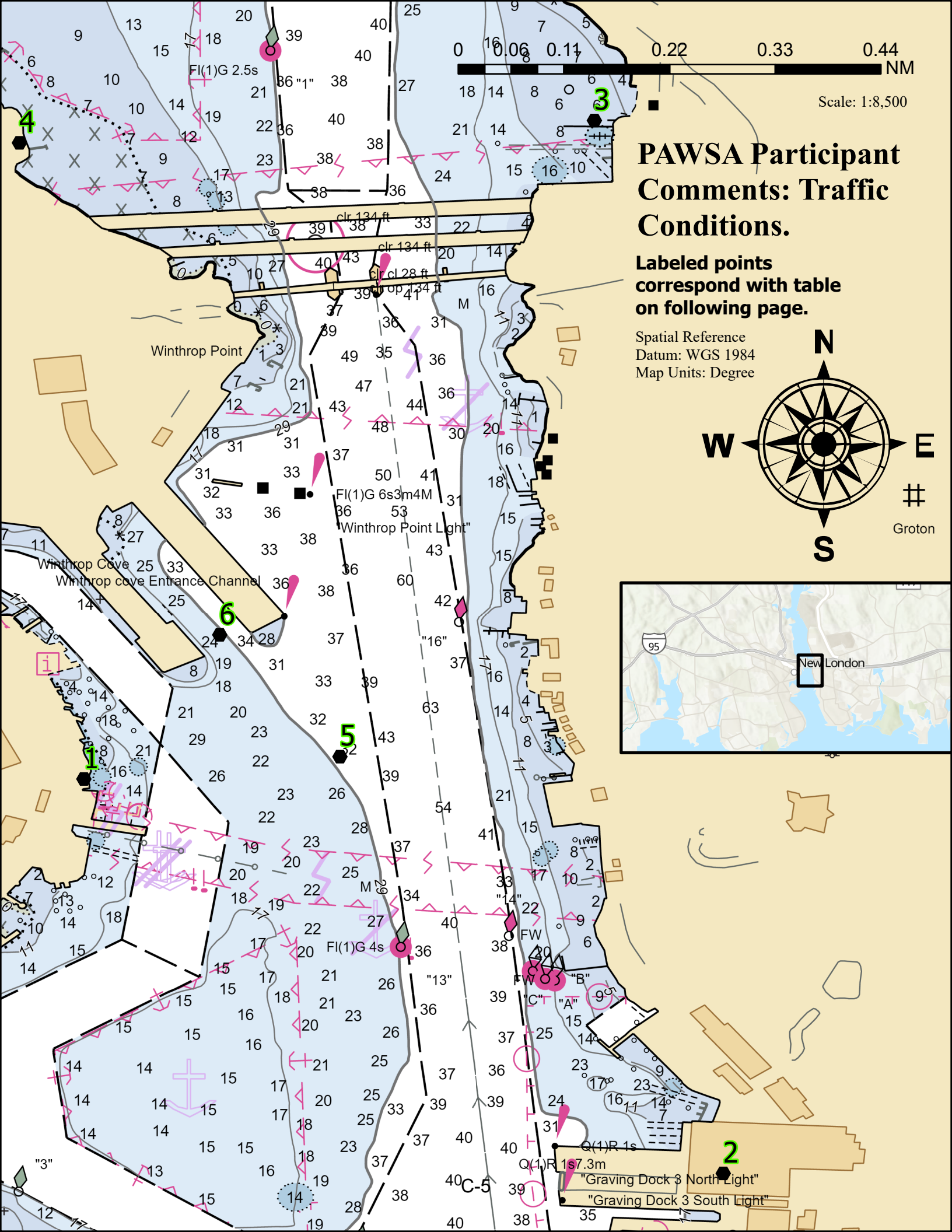


Vessel Condition Comments

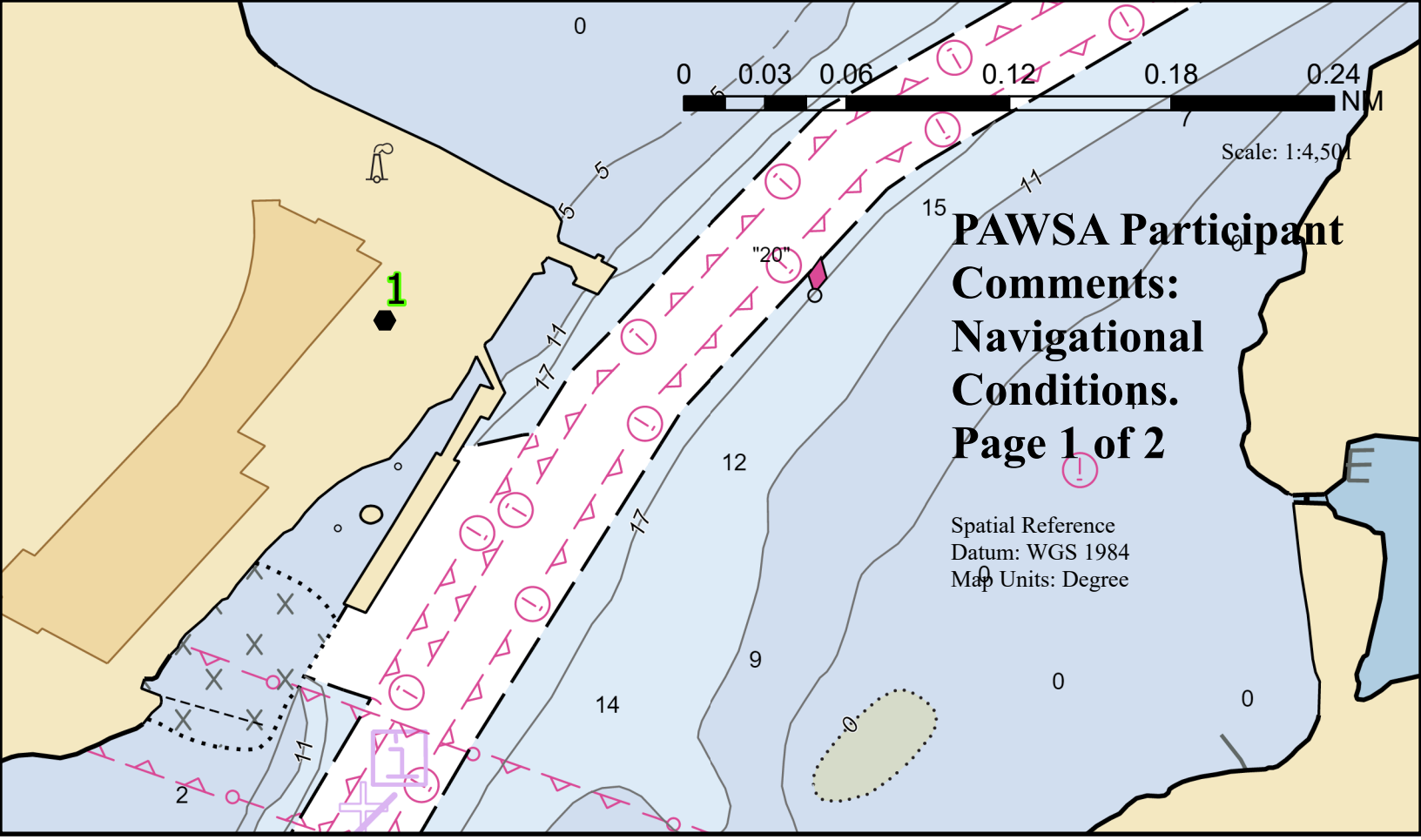
Point	Comment
1	Underwater rock structures have caused groundings in the past
2	Boat launch
3	Dowe Chemical Allens Point, deep draft commercial vessel traffic observed here.
4	Sub base operations are high quality, subs will not operate out of this area without being in good condition
5	Service facility, tugs for Thames Shipyard operate in and out of here
6	Coast Guard Academy training boats""
7	Marine contractor with fleet of tugs and barges here (hauling rock, aggregates, piling)
8	Boat launch
9	Fueling for commercial fishing vessels
10	Deep draft commercial vessel traffic observed near this area is high quality (25-30ft draft).
11	Inspection requirements have increased, standards are high for equipment checks.
12	Thames towboat operations
13	Fishermen use this to offload product
14	Block Island Express, Cross Island Ferry, Cross Sound Cruises
15	Helcat fishing vessel
16	Trips to Fort Griswald and Nautalis
17	fishers island ferry district operations
18	Tug operating around a dozen times per year""
19	Tug arriving at EB
20	Electric Boat, subs built here
21	Commercial traffic (tanker, bunker) observed here


0 0.06 0.11 0.22 0.33 0.44 NM
Scale: 1:8,500
PAWSA Participant Comments: Traffic Conditions.
Labeled points correspond with table on following page.
Spatial Reference
Datum: WGS 1984
Map Units: Degree
N
W
E
S
Groton
New London
95
Winthrop Point
Fl(1)G 2.5s
Fl(1)G 6s3m4M
"Winthrop Point Light"
Winthrop Cove
Winthrop cove Entrance Channel
Fl(1)G 4s
clr 134 ft
clr cl 28 ft
clr op 134 ft
Q(1)R 1s
Q(1)R 1s7.3m
"Graving Dock 3 North Light"
"Graving Dock 3 South Light"
C-5
1
2
3
4
5
6

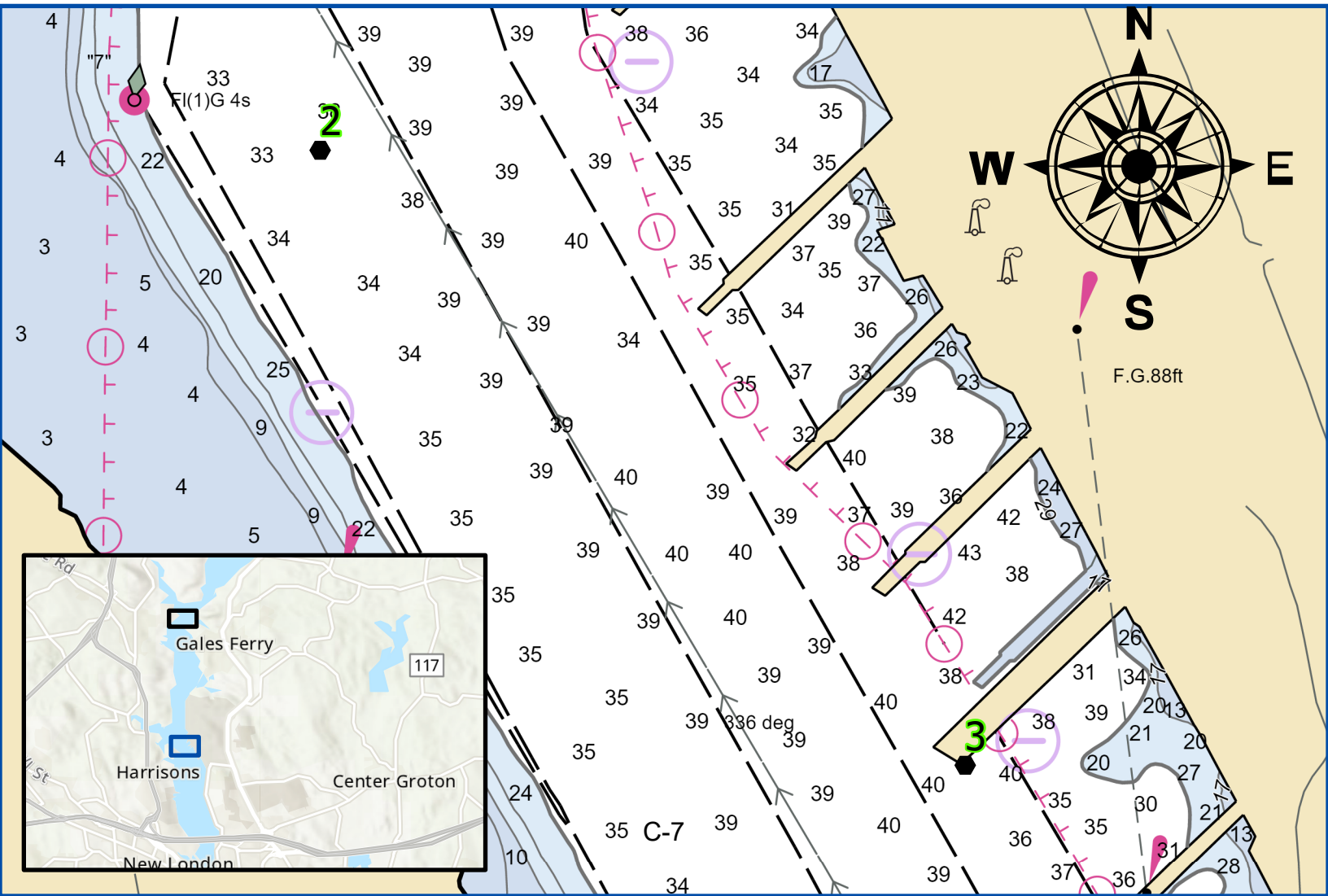
Traffic Condition Comments

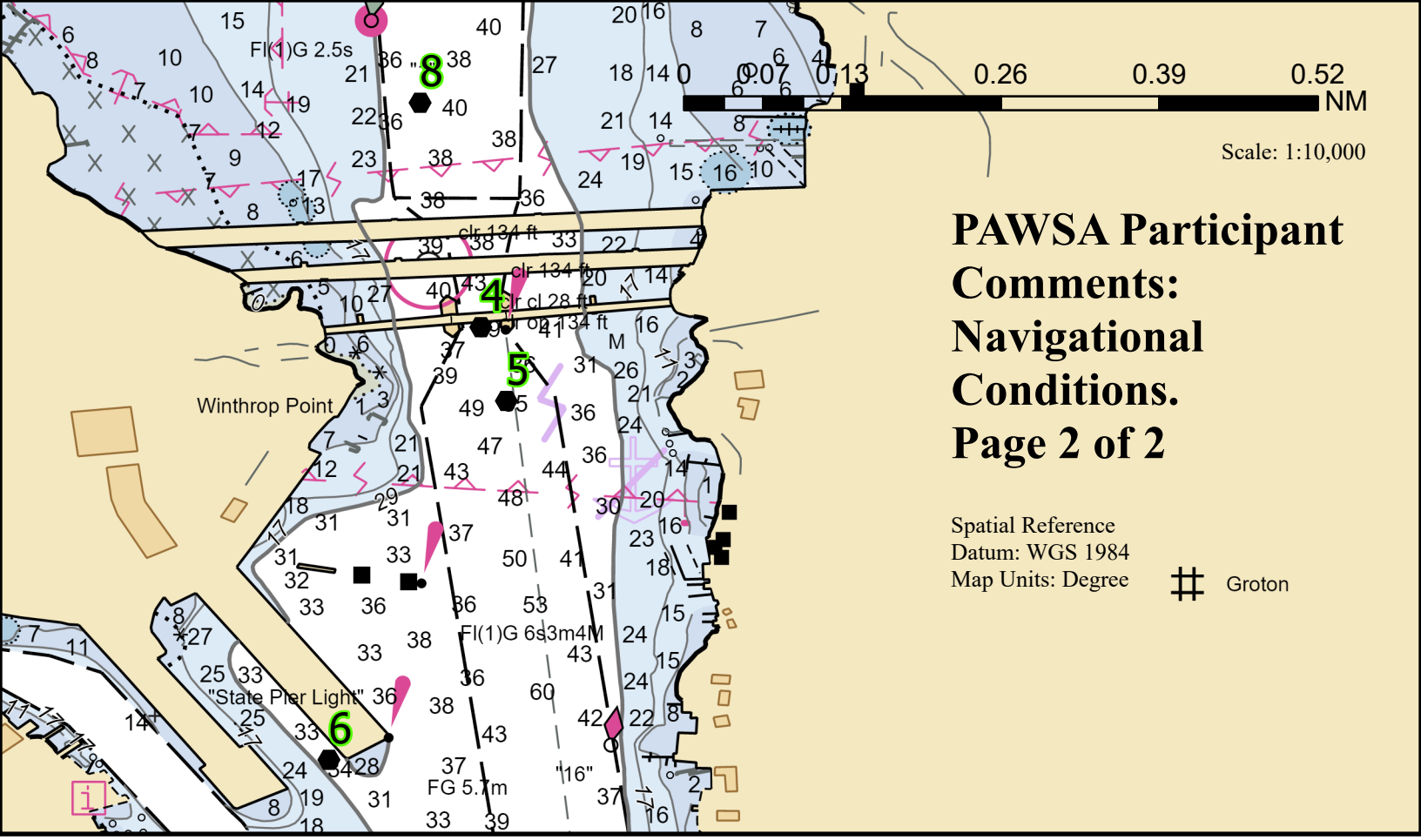
Point	Comment
1	Ferries do upwards of 70 transits per day
2	Anticipated increase in vessel building operations here due to the wind development
3	Mohawk (marine contractor) here, expected pier build, expected increase in vessel construction
4	Mohawk (marine contractor) here, expected pier build, expected increase in vessel construction
5	Current traffic mix is manageable, especially for the ferries that operate just to the west of the channel, plenty of open water
6	Traffic mix at State Pier is varied but manageable

*****Pilots give subs priority, otherwise following rules of the road without issues with the traffic mix/congestion*****



Labeled points correspond with table on page C-9.





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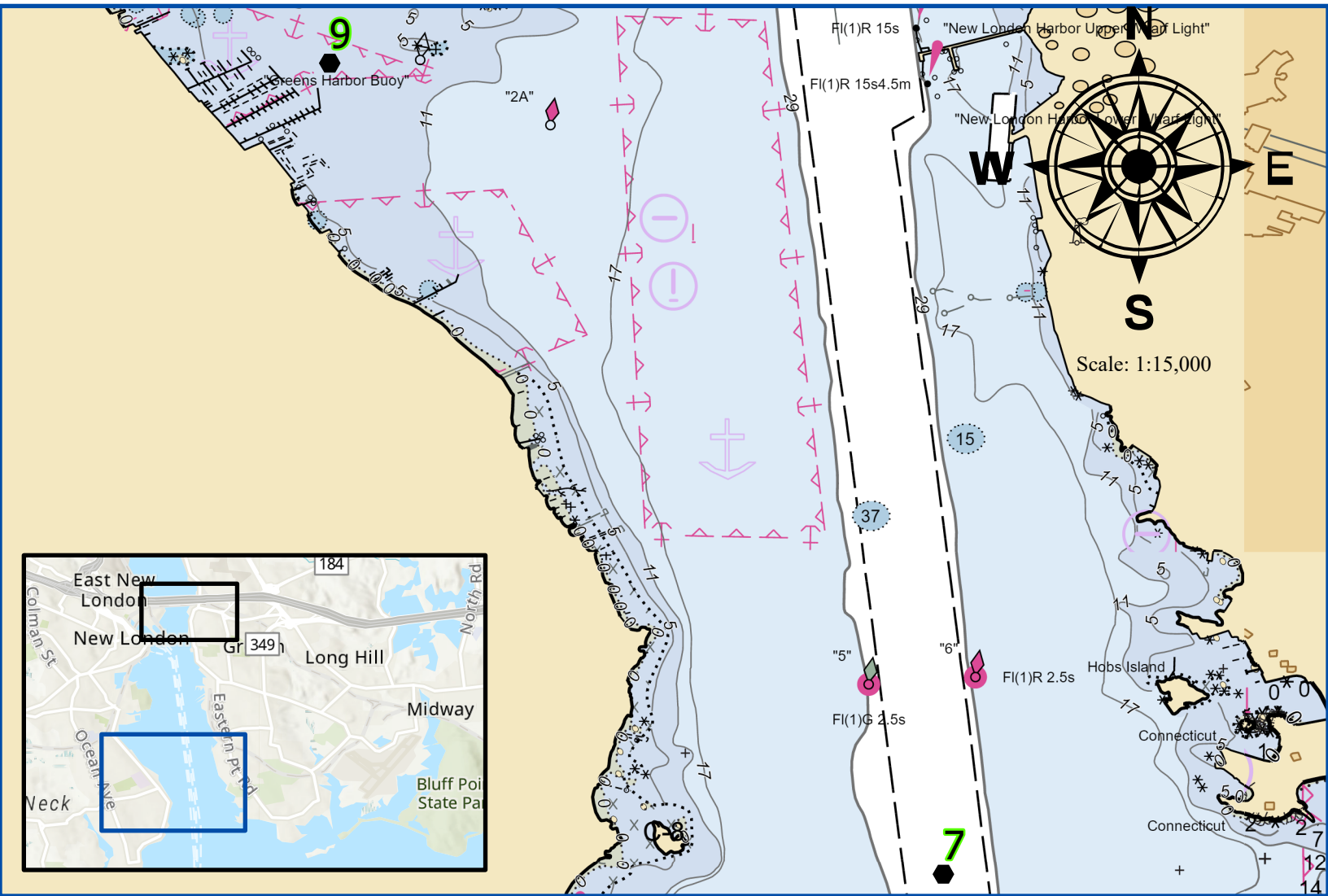
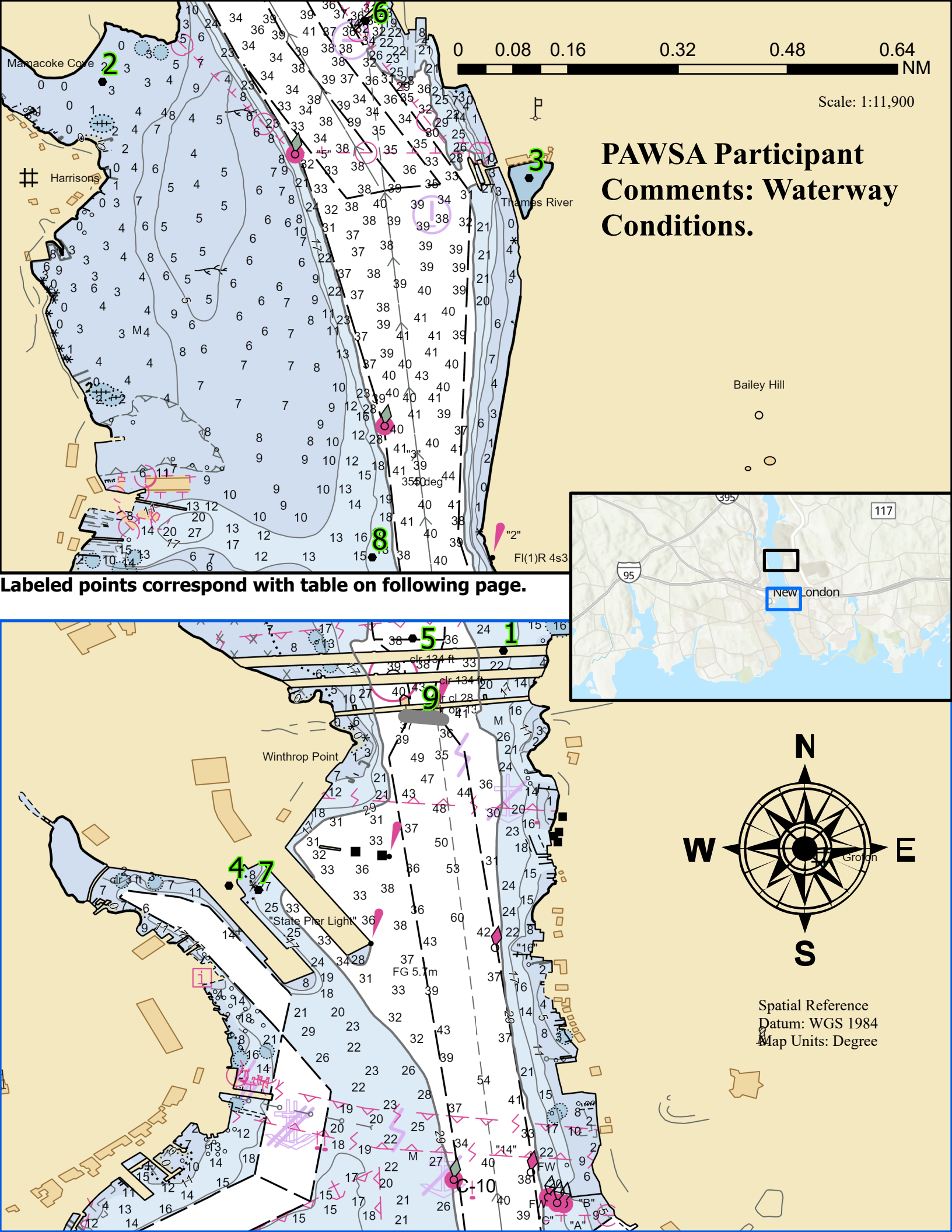


Navigational Condition Comments

Point	Comment
1	Looking to develop a terminal (AES Thames Power plant)
2	Strong tides\currents. Sometimes causes scheduling issues with the subs. Usually ebbing, difficult to moor to north side piers. Navy worked with NOAA to install real time current sensors.
3	Real time current meter
4	Around 40-45 knots the bridge won't open anymore, also below specific temps
5	Eddy current no matter what stage of the tide they are in. Bridge funnels the tide
6	Extreme high tides cause issues with ferries operation
7	Springtime fog in the morning if there is low wind, usually around the mouth of the river
8	Visibility conditions different on either side of the bridge causing occasional issues for navy
9	Most of the river is soft bottom except around this area. Anything of significance is well marked

PAWSA Participant Comments: Waterway Conditions.



Labeled points correspond with table on following page.

Waterway Condition Comments

Point	Comment
1	Train bridge can cause delays for subs transmitting in and out, not always clear if the train or sub has priority
2	safe area outside the channel
3	Safe water outside the channel
4	The construction of the Coast Guard museum out of glass may cause visibility issues due to glare
5	The construction of the Coast Guard museum out of glass may cause visibility issues due to glare
6	Range lights difficult to see due to the bridge
7	Filling in approximately 7.4 acres between the two piers
8	Not much room east of the channel, much more room west
9	Bridge has a max width and height restriction

*****Ferries often leave the channel around 5 & 6*****

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Appendix D

References

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http://www.americancanoe.org/

The American Waterways Operators
http://www.americanwaterways.com/

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https://www.epa.gov/regulations-emissions-vehicles-and-engines/domestic-regulations-emissions-marine-compression

International Convention of Standards of Training, Certification and Watchkeeping (STCW)
http://www.imo.org/en/About/conventions/listofconventions/pages/international-convention-on-standards-of-training,-certification-and-watchkeeping-for-seafarers-(stcw).aspx

International Marine Contracting Association (IMCA) Standards
https://www.imca-int.com/

International Tanker Owners Pollution Federation (ITOP)
http://www.itopf.com/

Life Lines Brochure - Safety Tips That Could Save Your Life
http://www.americanwaterways.com/commitment_safety/lifelines.pdf

National Oceanic and Atmospheric Administration, National Ocean Service
https://oceanservice.noaa.gov/

Offshore Vessel Inspection Database (OVID)
https://www.ocimf-ovid.org/

PORTS
https://tidesandcurrents.noaa.gov/ports.html

Recreational Boating Safety - Accident Statistics
http://www.uscgboating.org/statistics/accident_statistics.php
Ship Inspection Report Program (SIRE)
https://www.ocimf.org/sire/

SIRE
https://www.ocimf.org/media/84968/SIRE-Factsheet-May-2018.pdf

State Specific Boating Safety Requirements
http://www.americasboatingcourse.com/lawsbystate.cfm

Texas General Land Office
https://www.glo.texas.gov/ost/index.html

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http://www.usace.army.mil/Missions/

U.S. Army Corps of Engineers - Vessel Transit Statics
http://www.navigationdatacenter.us/

U.S. Coast Guard - Navigation Rules and Regulations
http://www.navcen.uscg.gov/?pageName=navRuleChanges

USCG PSC regulations
https://www.dco.uscg.mil/Our-Organization/Assistant-Commandant-for-Prevention-Policy-CG-5P/Inspections-Compliance-CG-5PC-/Commercial-Vessel-Compliance/Foreign-Offshore-Compliance-Division

U.S. Coast Guard - Vessel Inspection Regulations
http://www.ecfr.gov/cgi-bin/ECFR?page=browse

U.S. Coast Guard - Vessel Traffic Services
https://www.navcen.uscg.gov/?pageName=vtsLocations

U.S. Coast Guard Auxiliary Requirements for Recreational Boats
http://www.cgaux.org/boatinged/classes/2011/bss.php

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Appendix E

Abbreviations and Acronyms

ACP	Area Contingency Plan
AIS	Automated Identification System
ANPRM	Advance Notice of Proposed Rulemaking
ATON	Aids to Navigation
BWI	Boating While Intoxicated
BTM	Broadcast Notice to Mariners
COTP	Captain of the Port
EPA	Environmental Protection Agency
MARAD	Maritime Administration
MTS	Marine Transportation System
MTSRU	Marine Transportation System Recovery Unit
NDG	National Dialogue Group
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic Atmospheric Administration
OSRO	Oil Spill Response Organization
PAWSA	Ports and Waterways Safety Assessment
PDF	Personal Flotation Device
PSC	Port State Control
PORTS	Physical Oceanographic Real-Time System
RNA	Regulated Navigation Areas
STCW	Standards of Training Certification of Watchkeeping
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
VHF	Very High Frequency
VMRS	Vessel Movement Reporting System
VTM	Vessel Traffic Management
VTS	Vessel Traffic Service

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