Ports and Waterways Safety Assessment Workshop Report

Boston, Massachusetts

Providing Navigation Safety Information for America's Waterways Users

Released By:

CAPT Scott Calhoun

Commanding Officer

U.S. Coast Guard Navigation Center

Table of Contents

Executive Summary

The United States Coast Guard (USCG) Sector Boston sponsored a Ports and Waterways Safety Assessment (PAWSA) workshop in Boston, MA, on 31 Jan & 01 Feb 2023. Thirty participants represented the range of waterway users, stakeholders, joined together with Federal, State, and local safety authorities to collaboratively assess navigation safety within the harbor waters of Boston and proximate offshore regions to include Salem. Ahead of the formal workshop, the USCG Navigation Center (NAVCEN) facilitated an executive-level stakeholder engagement meeting on 08 Dec 2022 to enhance community outreach and prepare stakeholders for the formal 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 a facilitated discussion framed by a USCG developed decision tool that numerically represents the participants understanding of relative risks among a standard set of waterway design and use factors subsequently referred herein as "Waterway Risk Factors". These outputs focus the collective discussions and consensus towards the identification of potential long-term solutions tailored to local circumstances. PAWSA workshops have been held by the Coast Guard since 1999 but the goals of the program have changed significantly in that time. Commissioned by the PAWSA program office, Waterways Management (CG-WWM-1), in 2020 to evaluate the original decision tool's results against modern programmatic goals, NAVCEN implemented substantive revisions by 2021. While the fundamentals of the PAWSA construct remain unchanged, the risk scoring system and numerical results from this report are not comparable to pre-2021 PAWSA reports.

On the first day of the workshop, participants discussed and scored sixteen risk factors that form the basis of the PAWSA decision tool. Generally, these 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. Potential consequences as a result of a casualty or incident on the waterway are evaluated with each factor to develop a baseline risk value for each of the sixteen waterway risk factors. In parallel to this baseline assessment, participants assessed risk trends over time, risk tolerances, and the effectiveness of any existing mitigation measures.

On the second day, participants reviewed the survey results and prioritized the risk factors most in need of more effective mitigation measures. The following Waterway Risk Factors were agreed upon as the highest priorities: all four traffic conditions, recreational vessel quality, obstructions, and deep draft vessel quality. 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), NAVCEN, and Sector Boston, extend a sincere appreciation to the workshop participants, undeterred by a one week snowstorm delay, for their contributions to the Boston PAWSA workshop. Their expertise was critical to the success of the workshop and recommendations will meaningfully assist the USCG as it continues to work with all Boston stakeholders to improve safe and efficient navigation within these 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. Regional stakeholders are also included in the process to ensure that important environmental, public safety, and economic consequences get appropriate attention in the identification and evaluation of risk interventions.

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

- Provide input during planning for projects that intend to improve the safety of navigation;
- 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;
- Foster development and/or strengthen the roles of Harbor Safety Committees within each port; and,
- 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

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.

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

- **Navigational Conditions** – The environmental conditions that vessels must deal with in a waterway.
- **Vessel Quality and Operation 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.
- **Waterway Conditions** – The physical properties of the waterway that affect 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. Following dialogue with each risk factor, the participants are surveyed to establish a relative risk baseline. Using predefined qualitative risk descriptions for predefined risk factors, the baseline survey establishes a numerical value. The risk characterization survey segment then evaluates risk tolerance, current risk level trends, effectiveness of existing mitigation efforts, and collects preliminary comments in conversation and survey free-text entry. Additionally, participants were able to add geo-referenced comments to a gridded nautical chart around Boston (Appendix C). On the second day, participants review the aggregated survey results as the basis for determining which factors to discuss for additional risk mitigation strategies. With consensus on those priorities, generally where the assessed risk is high or existing mitigations are ineffective, the facilitated dialogue then aims to identify impactful mitigation strategies.

Boston PAWSA Workshop

A PAWSA workshop to assess navigation safety within Boston Harbor and contiguous waters was held in Boston, MA on 31 Jan & 1 Feb 2023. Thirty participants represented the range of waterway users, stakeholders, offshore renewable energy developers, and Federal, State, and local regulatory authorities to collaboratively assess navigational safety in the Boston assessment area. The USCG Navigation Center (NAVCEN) facilitated the PAWSA workshop.

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 Model.

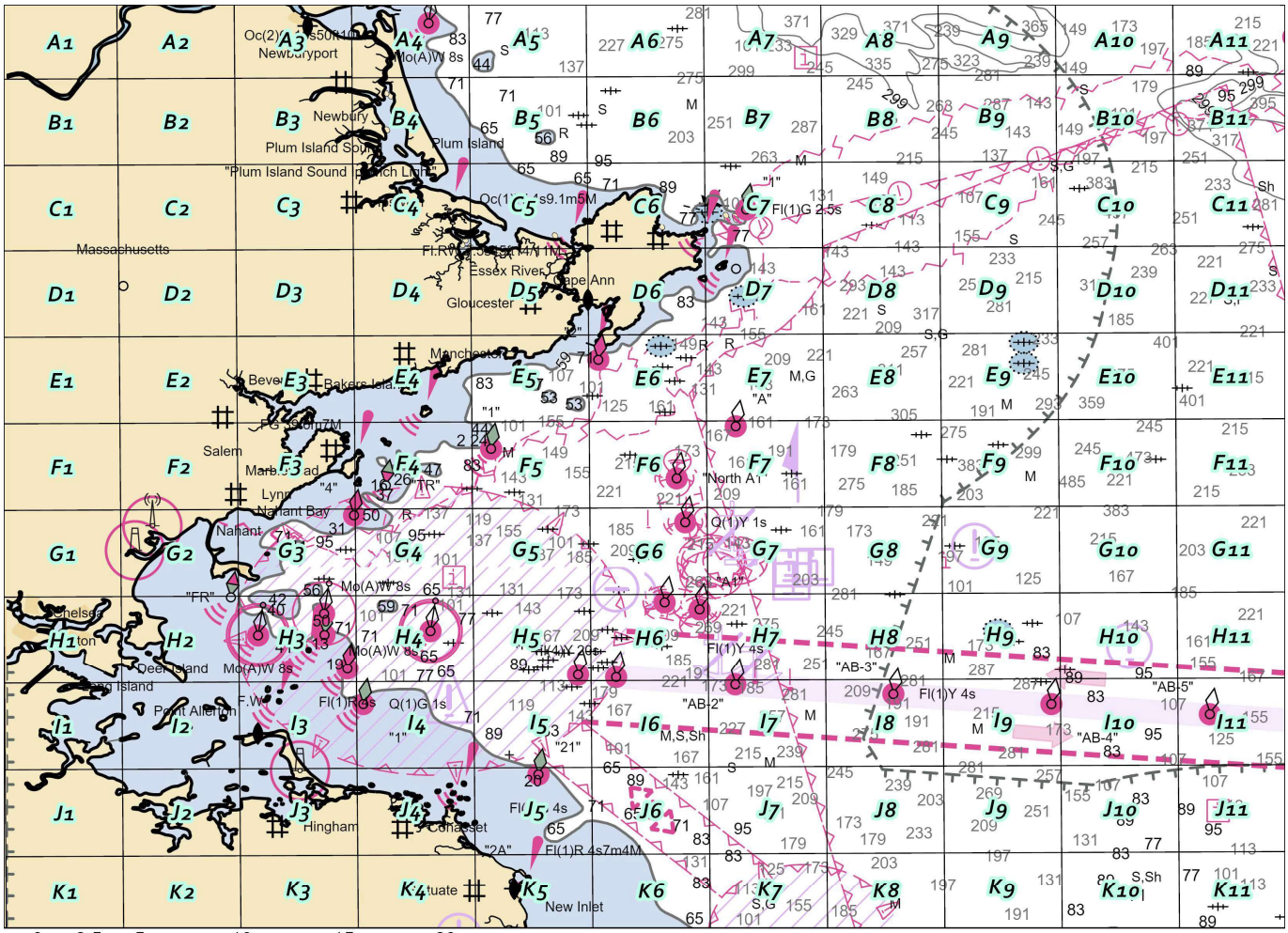
Baseline risk levels were first evaluated using pre-defined qualitative risk descriptions for each risk factor. Participants then characterized risk mitigation strategies by evaluating cost and effectiveness of existing mitigation strategies followed by an assessment of risk trends over time. For the 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 engages stakeholders in decisions affecting them and provides the Coast Guard and members of the waterway community with an effective tool to evaluate risk and work towards long-term solutions tailored to local circumstances.

In support of these goals, this report is a starting point for continued dialogue within the Boston maritime community. The USCG may use this PAWSA report, together with other information, to determine whether, and to what extent, regulatory or other actions are necessary 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: Boston PAWSA Assessment Area

The geographic area for the Boston PAWSA includes the harbor and near coastal region as depicted.



Scale: 1:362,000

Boston Harbor PAWSA Large Grid for Public Comment Cards

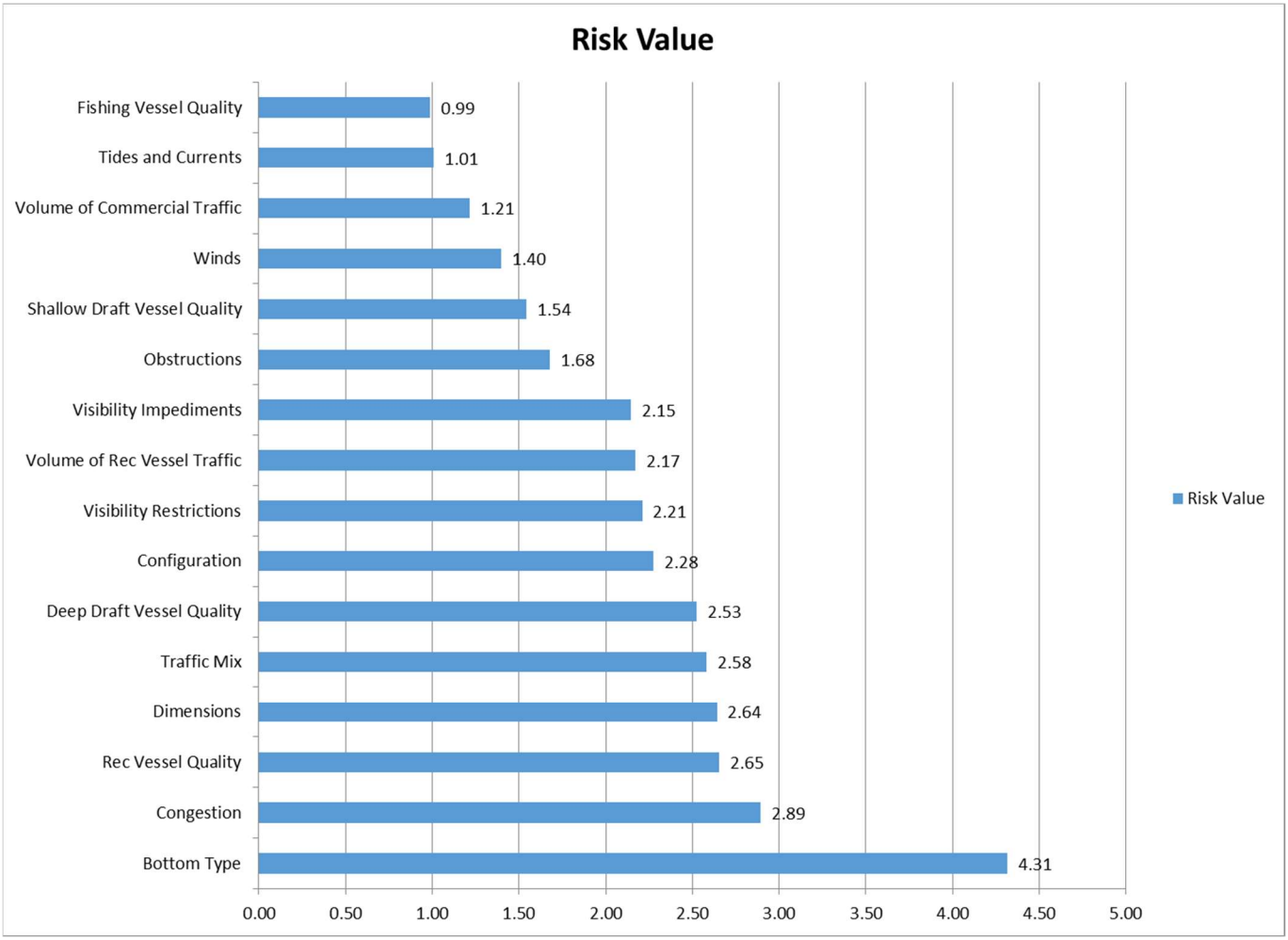
Section 2: Baseline Risk Levels

The first step in the workshop was the completion of a baseline survey to determine a baseline risk level value and trend characterization 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 Boston PAWSA workshop participants.



Section 3: Risk Characterization

Concurrently within the survey, risk characterization questions 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 (Appendix B). The results are generated based on what a plurality of the participants selected for each risk factor. The baseline risk value and risk characterization results were combined and reviewed with the participants to begin the second day.

The resulting baseline values and risk characterizations from the Boston PAWSA workshop surveys were assessed on the second day. Facilitators reviewed these results with the participants to determine which risk factors to focus on in developing potential mitigation measures. Based on the risk values and risk characterization trends, participants could discuss, reorder, and/or choose to focus on risk factors that were not necessarily the highest initial risk value from the baseline survey. Mitigation strategies or interventions were developed for the highlighted categories.

Participants generally assessed that the risk factors with an "increasing" trend were the highest priority. According to participants, Bottom Type is the most significant factor contributing to potential incidents. In addition, participants validated that after Bottom Type, the following risk factors, ranked in order by priority, were secondary contributing factors to potential incidents: Dimensions, Congestion, Recreational Vessel Quality and Operation, Volume of Recreational Vessel Traffic, Traffic Mix, Configuration and Obstructions.

Risk Factor	Risk Value	Survey Valu	Current Risk Level	The Current Risk Trend	The Current Mitigations are
Bottom Type	4.31	1	The level of risk is acceptable, keep the status quo	Staying The Same	Acceptable but Tenuous
Dimensions	2.64	2	The level of risk is acceptable, keep the status quo	Increasing	Acceptable but Tenuous
Congestion	2.89	1	The level of risk is acceptable, keep the status quo	Increasing	Unacceptable, we need more/better mitigations
Rec Vessel Quality	2.65	8	unacceptably high risk	Increasing	Unacceptable, we need more/better mitigations
Volume of Rec Vessel Traffic	2.17	4	The level of risk is acceptable, keep the status quo	Increasing	Unacceptable, we need more/better mitigations
Traffic Mix	2.58	4	unacceptably high risk	Increasing	Acceptable but Tenuous
Deep Draft Vessel Quality	2.53	3	The level of risk is acceptable, keep the status quo	Staying The Same	Acceptable
Configuration	2.28	0	The level of risk is acceptable, keep the status quo	Staying The Same	Acceptable but Tenuous
Obstructions	1.68	0	The level of risk is acceptable, keep the status quo	Staying The Same	Acceptable
Visibility Restrictions	2.21	2	The level of risk is acceptable, keep the status quo	Increasing	Unacceptable, we need more/better mitigations
Visibility Impediments	2.15	1	The level of risk is acceptable, keep the status quo	Staying The Same	Acceptable but Tenuous
Shallow Draft Vessel Quality	1.54	2	The level of risk is acceptable, keep the status quo	Increasing	Unacceptable, we need more/better mitigations
Winds	1.40	4	The level of risk is acceptable, keep the status quo	Staying The Same	Acceptable
Volume of Commercial Traffic	1.21	4	The level of risk is acceptable, keep the status quo	Increasing	Acceptable
Tides and Currents	1.01	3	The level of risk is acceptable, keep the status quo	Staying The Same	Acceptable
Fishing Vessel Quality	0.99	1	The level of risk is acceptable, keep the status quo	Staying The Same	Acceptable

Section 4: Risk Mitigation Strategies

The workshop's final step focused participant efforts on specific risk factors, risk level evidence collection, and identifying potential mitigation measures. Using a team facilitated discussion format, participants employed handwritten sticky notes to then group and consolidate ideas. Resulting major themes/ideas were then presented to the participants to further distill action items. From this bank of action items, participants were encouraged to create specific, measurable, actionable, realistic, and timebound (SMART) goals.

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

Bottom Type/Dimensions:

Mitigation Strategy 1: Initiate marine spatial planning discussions with cognizant U.S. Congressional members, Harbor Safety Committee (HSC), US Coast Guard (USCG), US Army Corp (USACE), Offshore Renewable Energy Installation industry, (OREI), pilots associations, Massachusetts Coastal Zone Management, Massachusetts Clean Energy Center, and MassPort for the following areas within the Boston AOR:

- Spectacle Island through Castle Deer Island. Need to achieve 50-foot project depth throughout whole width of channel. Deep draft vessels currently restricted to half-channel width on flood tidal current, which is further constrained by wind/steerage leeway. Mariners are currently using natural ranges to navigate the deep side of channel. Recommend placing temporary Aids to Navigation (AToN) ranges for deep draft side of channel until project depth of entire channel can be achieved.

- Salem Sound requires deeper and wider waterways to support forecasted commercial traffic and floating OREI support projects.

- Hull Gut and Fore River requires permanently placed AToN. Currently no AToN exists in these areas. Recommend conducting local Waterway Analyses (WAMS), most recent study is dated from 2007.

Congestion/Recreational Vessel Quality &Operation/Volume of Recreational Traffic:

Mitigation Strategy 1: Multi-pronged boater training, education, and awareness to address unsafe operations and poor seamanship practices in congested waterways:

- Recommend federal and/or state requirements:
  - National boating safety CFR.
  - Completion of state course.
  - Federal requirement for higher insurance premiums for recreational mariners that do not have competed boater safety course.

  - Mandatory boating safety education at point of sale/registration of vessels.

- Community outreach and engagement with Coast Guard Auxiliary, port stakeholders, sailing clubs/associations, and boat rental companies. Hold annual pilot association meetings/visits with sailing clubs and kayak rental companies.

- Invest in federal, state, and local enforcement activity capacity to promptly address hazardous boating operations, inspect existing safety equipment requirements, and conduct boater education (e.g., International & Inland U.S. Inland Navigation Rules, monitor VHF CH-16 and CH-12 to understand harbor operations).

Mitigation Strategy 2: Employ commercial picket boats to escort deep draft vessels in and out of ports during high recreational traffic months (e.g., Memorial Day through Labor Day).

Mitigation Strategy 3: Expanding AIS requirements for vessels less than 65 feet:

- Federally regulate with appropriate CFR.

- Leverage community outreach opportunities and engagements to increase voluntary carriage.
- Consider insurance incentives for recreational vessels to carry and utilize AIS.

Mitigation Strategy 4: Implement a new CFR requiring dayshapes for kayaks and paddleboards to increase visibility.

Traffic Mix:

Mitigation Strategy 1: Engage with local USCG to mark perimeter of existing seaplane landing zone with AToN to better visually identify area. Engage with NOAA to add chart symbols identifying seaplane landing zones. Create additional seaplane landing zone on Governor's Island side of harbor to prevent congestion when vessel traffic is high.

Mitigation Strategy 2: Engage with NOAA to add nautical chart symbols for ferry route in Salem to provide additional mariner awareness for daily routes.

Mitigation Strategy 3: Include developers of autonomous vessels in Port Operations Group for information exchange and planning. With autonomous vessel testing, establish and maintain voluntary operational testing areas. Establish an HSC autonomous vessel activity focused sub-committee with recurring updates, include core members of HSC, and autonomous vessel contractors/builders (Bluefin, General Dynamics, etc.).

Configuration/Obstructions:

Mitigation Strategy 1: Establish comprehensive waterfront facility cooperative strategy to address removal of old marine piers creating hazards to navigation (sunken and floating). Include waterfront facility owners in dialogue with Boston Police Department and Harbormaster.

Mitigation Strategy 2: Marine mammal protection mitigation measures (Right Whale Zones) cause ordered effects on navigational safety by reducing vessels to or below effective steerageway in confined waterways and during pilot maneuvering operations.

- Enhance marine mammal (Right Whale) monitoring capabilities to implement small and dynamic vessel speed restrictions (technical capabilities and ecotourism operator reports) more effectively.

- Note navigational concerns and provide PAWSA report to NOAA (National Marine Fishies Service).

- Evaluate 33 CFR § 164.25(a)(1) & (5), the tests of steering gear and machinery propulsion astern prior to entering navigable waters of the United States, in the context of modern Z-drive propulsion systems.

Mitigation Strategy 3: Current dimensions of Chelsea Creak pose a significant hazard to larger vessels.

- Engage with local USCG to add additional AToN to safely enable nighttime transits. Currently no ranges or lights and traffic is reduced to daytime only.

- Replace McArdle Bride and dredge to authorized channel width with sufficient channel slope. Develop a HSC Working Group to include City of Boston, USACE, USCG and any additional state and local stakeholder for constructive/active dialogue.

Mitigation Strategy 4: Recommend Long Island Bridge built to former height and not permitted height. Current permitted height will present vessel height restriction with added tidal height.

Mitigation Strategy 5: Conduct climate resiliency in regard to sea-level rise sea gates research, development and planning. (USACE).

Visibility Restrictions/Winds

Mitigation Strategy 1: Improve environmental observations and predications with additional sensors in high return on investment locations to feed NOAA's PORTS.

This Page Intentionally Left Blank

Appendix A

Workshop Participants

Participant	Organization
Shea Fumagalli	Avangrid Renewables Marine Operations
Jeff Smith	Boston Docking Pilots
Eric Brown	Boston Harbor Sailing Club
Chris Bailey	Boston Police Marine Division/Harbor Master
Richard Stover	Boston State Pilots
Ken Lussier	Charlestown Marina/East Boston Shipyard
Allen Morris	Citgo Braintree Terminal Operations
John Berry	Crowley Terminal Operations
Marcus Von Spiegelfeld	Crowley Terminal Operations
Robert Gorman	Dion's Boat Yard
Bob Blair	Eastern Point Pilots
Sean Dattoli	Everett Fire Marine Division
Jeff Taylor	Hornblower & Boston Harbor Cruises Operations
Peter Gilson	Massachusetts Bay Harbor Safety Committee
Mario Ferragamo	Massachusetts Department of Transportation Bridges
Robert Aiken	Massachusetts Environmental Police
Steve Holler	Massachusetts Commercial Lobster/Fishing Representative
Sean Barry	Massachusetts State Police Marine Division
LT Michael Barker	Massport Fire Marine Division
Max Wigglesworth	Massport Terminal Director
Colleen Roche	NOAA
Robert Gillan	Quincy Police/Harbor Master South Shore Rep
Tony Carli	Red Top Boats Ferry Service
Mike McDonough	Resolve Marine/Northeast Response Coordinator
Matt Murphy	Sea Tow Boston Operations Manager
LCDR Ben Lyons	USCG
CDR Myles Greenway	USCG
CAPT Kaile Benson	USCG
Time Chase	USCG
Jack McLaughlin	USCG

This Page Intentionally Left Blank

Appendix B

Participant Observations - Trends in the Port and Existing Risk Mitigations

Workshop participants are local subject matter experts, waterway users, and regional stakeholders. These comments capture their observations, opinions, and analyses to provide a general sense of the ideas discussed during the workshop. Participants were asked to identify risks, trends, and any existing or potential mitigation strategies. References to existing regulations and standards may be included for additional context. Participant comments provide various perspectives representative of varying interests and do not reflect the views of or statements by the United States Coast Guard.

The following participant comments are structured by risk condition/factor as follows:

1. Participant observations of risks, issues, and/or trends
    - Existing mitigations
        - Potential mitigation strategies

Risk Condition: Navigation

Risk Factor: Winds

1. Environmental observation data from port adjacent land-based stations (i.e., Logan International Airport) are not reflective of and undervalues conditions experienced at-sea at surface level or deep draft vessel mast height. Large deep draft vessels are significantly affected by high wind conditions given their exposed hull and superstructure or "sail area." During this conditions these vessels must crab through narrow channels with the effect of a greater "virtual beam" (e.g., increase from 150ft to 220ft).
    - Current practice in Boston Harbor, is that bridges will not operate with winds about 35 knots. Commercial traffic operations that require pilotage depends on the vessel inbound/outbound and the amount of sail area it has.
        - Improve environmental observations and predications with additional sensors in locations that matter and are of greatest priority to stakeholders and meteorological personnel. (Bridges, additional weather buoys). See Appendix C for exact locations of requested sensors.

Risk Factor: Tides/Currents

1. Charles River dammed in the navigable portion, which is managed by the USACE and Department of Conservation. Very little current is experienced in the harbor, unless sluicing occurs. Sluicing only occurs during outgoing or low tides in the inner harbor; however, a release will happen if it is needed due to extreme water levels. Sluicing has been seen to increase currents in the harbor up to 4-6 knots.
    - Pilots call, either by phone or radio, and ask if they have any plans to sluice the day they are underway to anticipate changes in current.

Risk Factor: Visibility Restrictions

1. Fog is a perennial challenge throughout the study area. It can set in during the morning and burn off in an hour and set right back in during the late afternoon. It could be clear in Gloucester and no visibility whatsoever in Boston. A vessel could also have a clear transit out of the harbor and a wall of fog is waiting for the same vessel at the sea buoy.
        - Need sensors throughout the study area and have it publicly available in real time.

Risk Factor: Bottom Type

1. Majority of bottom type outside channel is rock/hard bottom. If a vessel had to go outside channel to avoid recreational traffic, chances of running aground are significantly high.
    - See mitigations for Bottom Type is Section 4.

Risk Condition: Vessel Quality & Operation

Risk Factor: Deep Draft Vessels

1. Contingent of aging vessels, particularly bulk ships from Canada. Majority of commercial ships are in good working order and material conditions are exemplary.
    - Vessels comply with company safety management requirements, inspections, and increased maintenance regimes.
2. A significant decrease in English proficiency has been observed on ships, which makes communication extremely difficult. Maybe two or three personnel on the entire crew speak English and not good English.
    - Pilots have made concerted efforts to emphasize IMO Standard Marine Communication Phrases for effective bridge resource management and minimize incorrect or hazardous crew actions.
3. MARPOL Annex VI Regulations for the Prevention of Air Pollution from Ships compliant vessels and other "green ships" often exhibit suboptimal maneuvering ability due to propulsions restrictions or powerplant limitations. Some vessels can overcome these challenges with additional interventions or engineer overrides to increase available torque and decrease command/feedback delay. However, this is case-by-case and vessels masters, or chief engineers are often unwilling or unable to overrider such controls.
4. During summertime with the amount of recreation vessels in the water, it makes the in/outbound transits almost nonexistent.
    - Need to utilize picket boats during peak recreational vessel seasons. Engage with local USCG, Boston Police and State Police.

Risk Factor: Shallow Draft Vessels

1. Number of towing vessels have significantly increased since the last PAWSA. Companies are getting new equipment and they are maintained better. However, seeing more and more inexperienced ship handlers with no regards to Rules of the Road.
    - Gather members of the shallow draft commercial industry and have a meeting with pilots, commercial boat operators, fisherman and local law enforcement, to discuss challenges each community has on the water and how we can improve as a whole.
2. A lot of the captains of the smaller commercial boats are not required to obtain the same amount of training with their captain's license.
    - Have mariners that captain smaller vessels (100GT) take training that will benefit them and other mariners (radar training). Need to increase awareness of their responsibility and liability. Encourage mariners to take recurrent, advanced, and/or proficiency enhancing training (i.e., radar training).

Risk Factor: Commercial Fishing Vessels

1. Significant upgrade in the material quality of commercial fishing vessels. Used to be able fish off anything that can float. USCG and insurance companies getting involved in the quality of the vessels that leave and fish in US waters.
2. As older fisherman retire, younger ones are more reliant on electronics than knowing the water. Lack of experience on the radio and communicating with other mariners.
3. Fishing boats equipped with light bars for working at night on deck, but mariners are using them as headlights and blinding the other mariners.
    - Regulations implementing that they are illegal to use unless dead in the water, anchored or moored.

Risk Factor: Recreational Vessels

1. Lack of education within the recreational boating community and an attitude that rec vessels can do what they want, and no one will stop them.
    - Develop regulated navigation areas and limited access areas to ensure safe passage of commercial vessels in/outbound.
    - Mitigation enhancements include local boater safety course supplement with insurance provider incentives, boat operator pamphlet handout events.

Risk Condition: Traffic

Risk Factor: Volume of Commercial Traffic

1. The size of cruise ships keeps getting larger. As larger ones are built and placed in Miami, the ones currently in Miami make their way up the eastern coast.
2. The anticipated loss of port facilities in the Boston area and the increase in commercial and recreational traffic is a concern. With the size of commercial cargo vessels increasing and the available space to expand current port facilities decreasing, jeopardizes the future of the Boston port.

Risk Factor: Volume of Small Craft Traffic

1. Volume of recreational traffic to increase because more and more DPAs are going away and condos will replace them on the water. Which translates to more smaller vessel traffic on the water and no one on the water to regulate and ensure safe passage for commercial shipping vessels.
2. The increase of boat clubs in the area poses a major concern, due to the possibility of unskilled and negligent mariners renting boats. Although you have one registered vessel, that one vessel has a different inexperienced operator each day of the month.

Risk Factor: Traffic Mix

1. Significant amount of deep draft traffic, to include cargo, passenger, and some military vessel traffic.
    - USCG Captain of the Port implements Security Zones for military vessel transits and berth shifts for USS CONSTITUTION.
2. Complex waterway usage given passenger cruise, autonomous vessel, supply vessels for offshore wind farms, fishing community, recreational vessels and human powered craft, and other activities.
3. The testing of sea gliders in Narragansett Bay poses a concern that, vessels are traveling upwards of 170 knots 20 feet off of the surface.

4. Increase in human powered vessel traffic. They have no idea about Rules of the Road and feel they are free to do what they want. No concern for the large container ship barreling down.
5. Not recommended to transit the port while seaplanes are landing, but current company is very good about wave off procedures if recreation vessels are in the way. Company does employ the use of a picket boat to clear landing zones of recreational vessels but does take time depending on the season.
    - Would like to see a dedicated take-off and landing zone charted on a chart and made public.

Risk Factor: Congestion

1. Congestion is seasonal. Picks up around Memorial Day and will day off early October.
2. With the introduction of windfarms, an increase of offshore supply ships will be calling on the Salem/Boston ports 130 to 180 times a year.

Risk Condition: Waterway

Risk Factor: Dimensions

1. Chelsea Creek poses a hazard to large vessels as vessels continue to get bigger. Currently only available for one way traffic and day time only traffic.
    - Increase AToN to safely enable night transits
    - Dredge to authorized channel width with sufficient channel slope to allow two way traffic.

Risk Factor: Obstructions

1. Participants broadly expressed concerns with respect to blanket vessel speed restrictions imposed by offshore marine mammal protection measures. 10 knot speed restrictions can affect the maneuverability of deep draft vessels, particularly in narrow channels during high wind conditions as they “crab” through a waterway. This effectively limits available channel width increases risk of collision and/or hard grounding. Common industry propulsion engine order telegraph input of 'dead slow ahead' can yield insufficient steerageway, especially in high wind conditions and sea states. Whereas 'slow ahead' can often exceed a given speed restriction. Further, speed restrictions reduce available maneuvering techniques (i.e., stern-sweep) to safely transfer pilots at-sea.
2. The reconstruction of the Long Island Bridge being built to its former height, which will impede vessel traffic.
3. When the Chelsea Creek lift bridge breaks in Chelsea Creek, ships are waiting upwards of two hours waiting for the repair person to come in from New Hampshire. Most oil comes in through the Chelsea Creek terminal, and when a 600 foot tanker has to wait in between two bridges and already constrained by the shallow depths. Poses a significant environmental risk if vessel were to run aground.
4. Many derelict piers and debris floating in the water after a really high tide or a king tide. No money or resources to cleanup with the exception of volunteers.

Risk Factor: Visibility Impediments

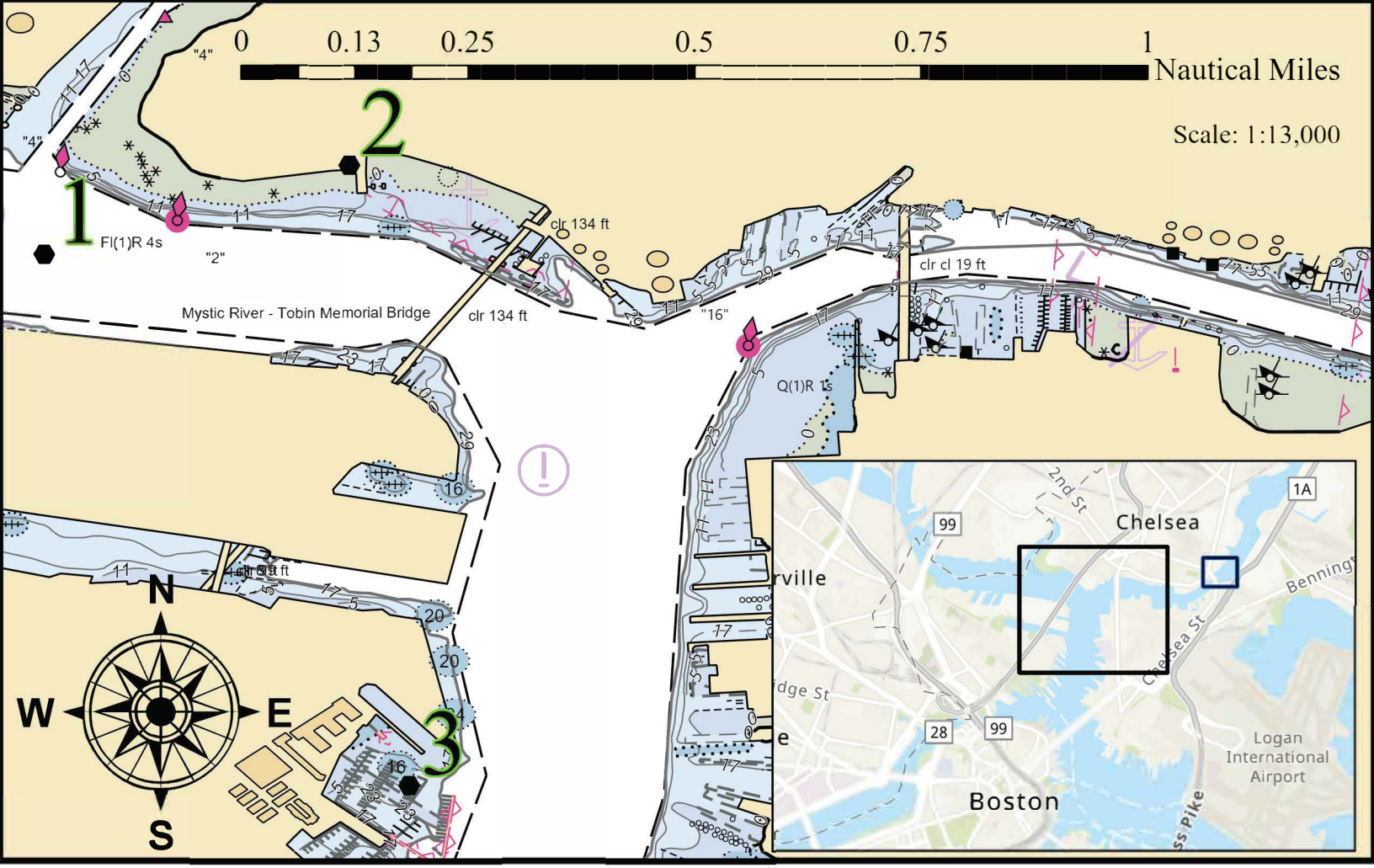
1. Airport lighting causes an issue with nighttime navigation. Not so much for the experienced mariner, but more so for a person who has not been in the Boston Harbor before.

2. All the buildings in Boston are outdoing each other with getting brighter and brighter LED lights. Makes it hard to decide which light is on the building and which light is on the AToN.
    - Increase the luminosity/visible range and radar reflectivity of AToN in Boston Harbor would enhance navigational safety.

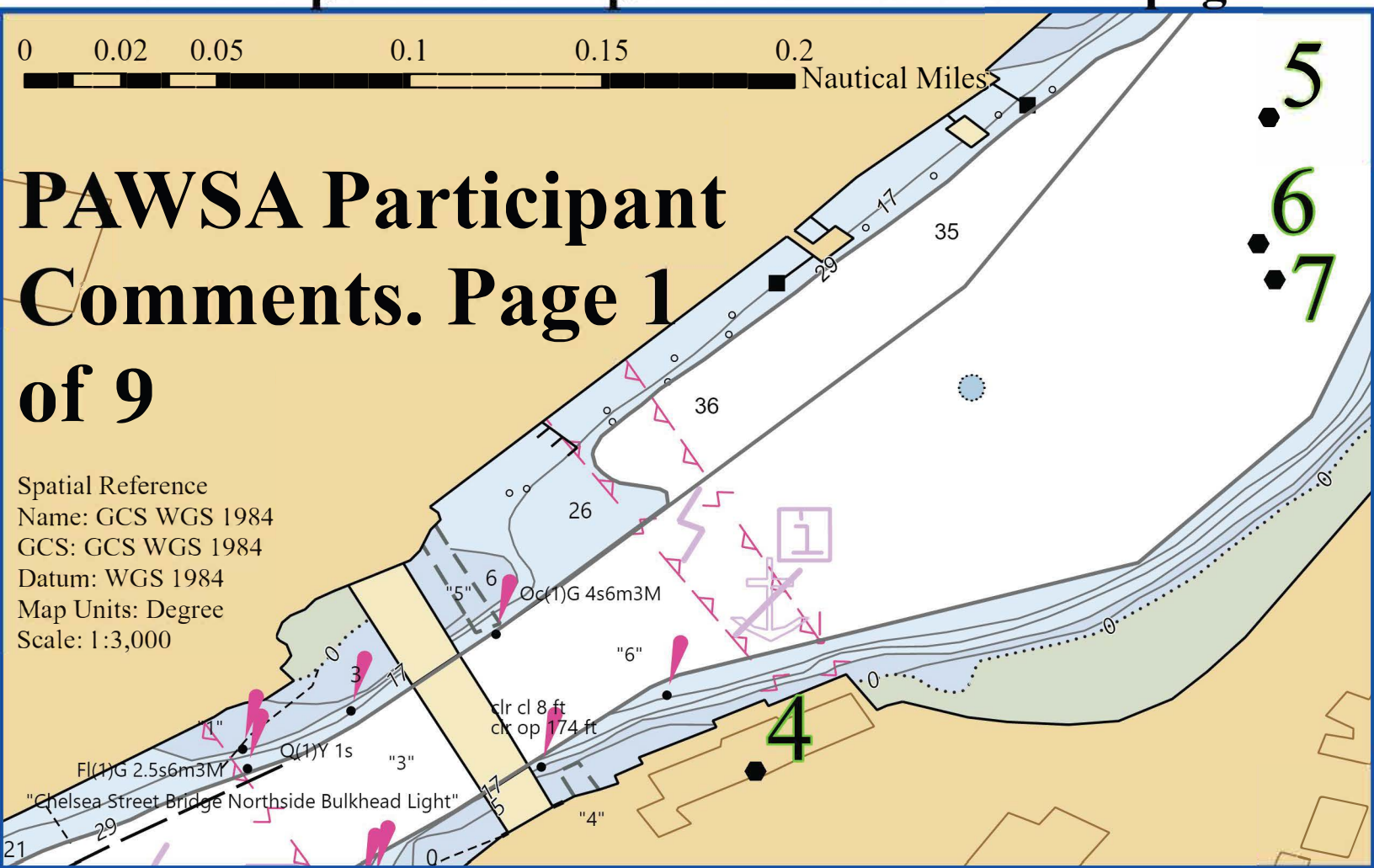
Risk Factor: Configuration

1. No significant observations or trends noted through discussion.

This Page Intentionally Left Blank



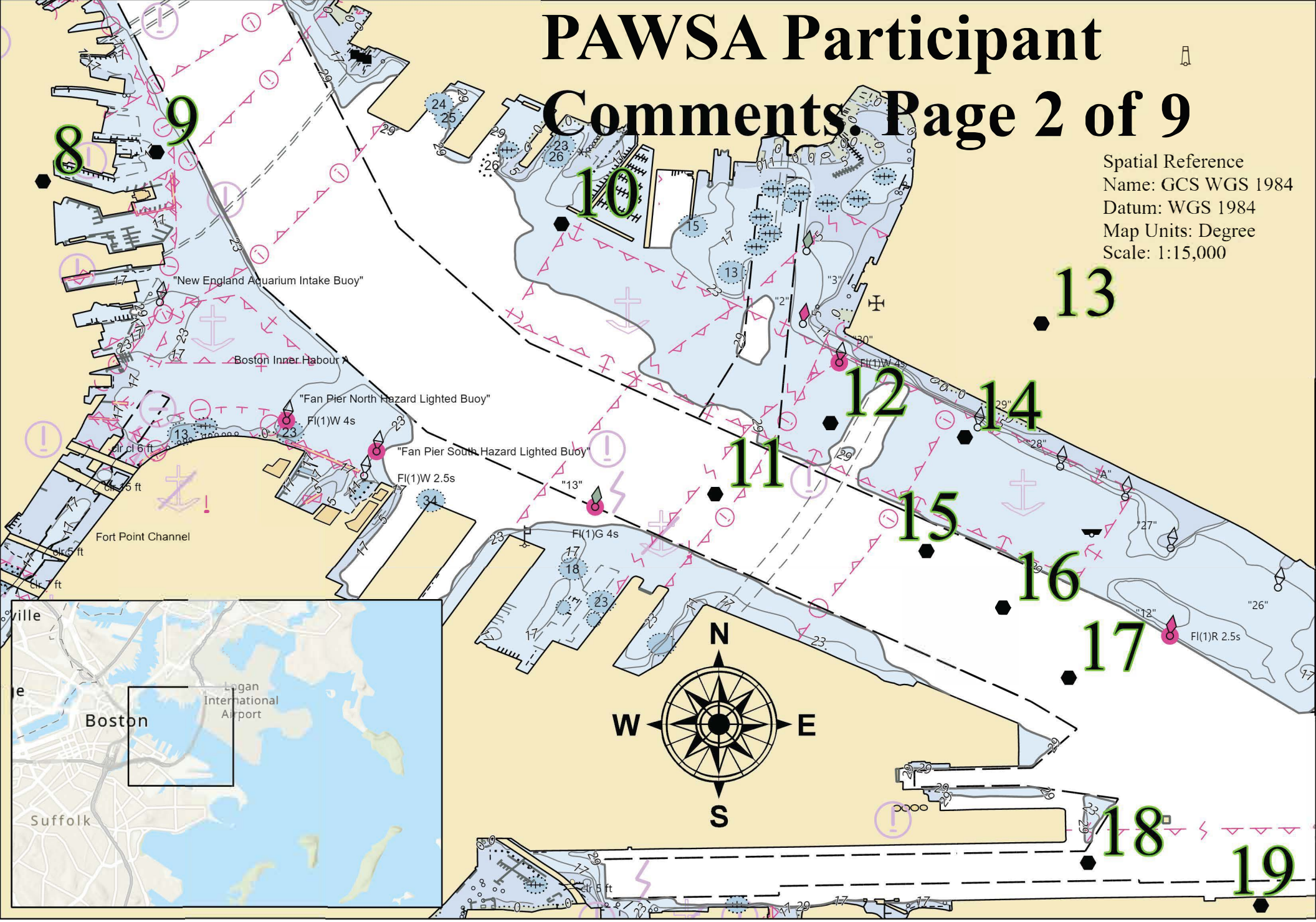
Labeled points correspond with table on last page.



PAWSA Participant Comments. Page 1 of 9

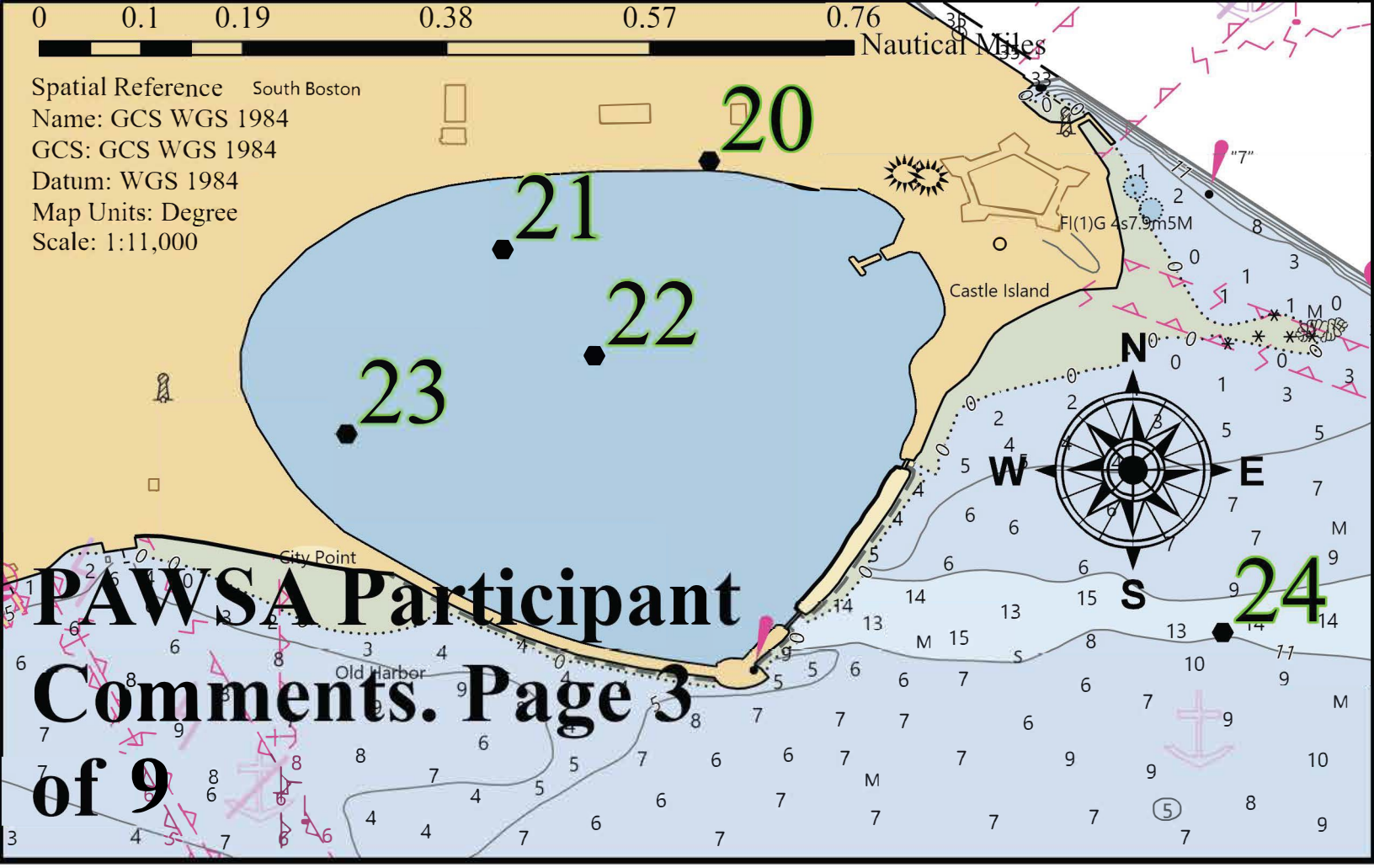
Spatial Reference
Name: GCS WGS 1984
GCS: GCS WGS 1984
Datum: WGS 1984
Map Units: Degree
Scale: 1:3,000

PAWSA Participant Comments. Page 2 of 9



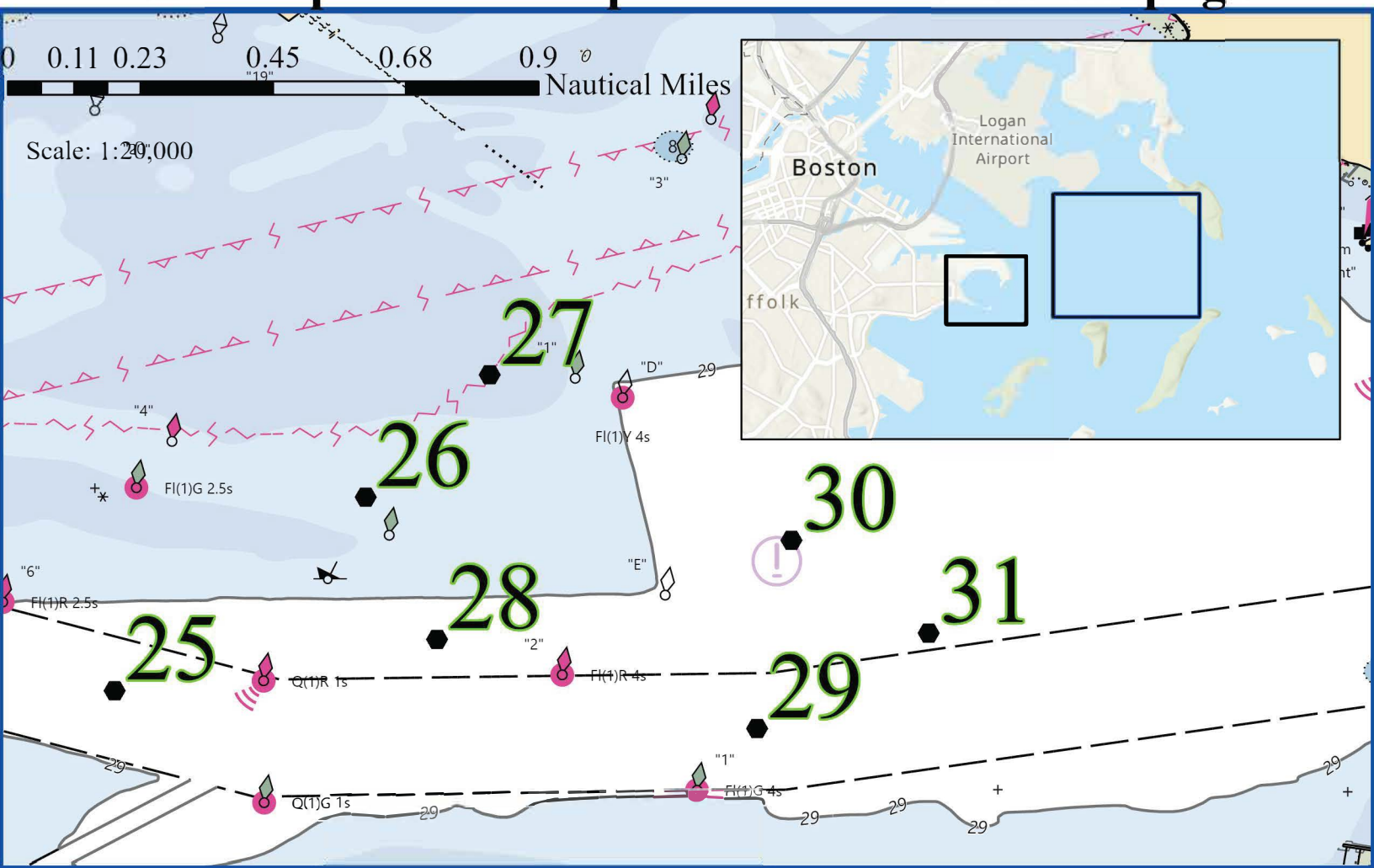
Labeled points correspond with table on last page.

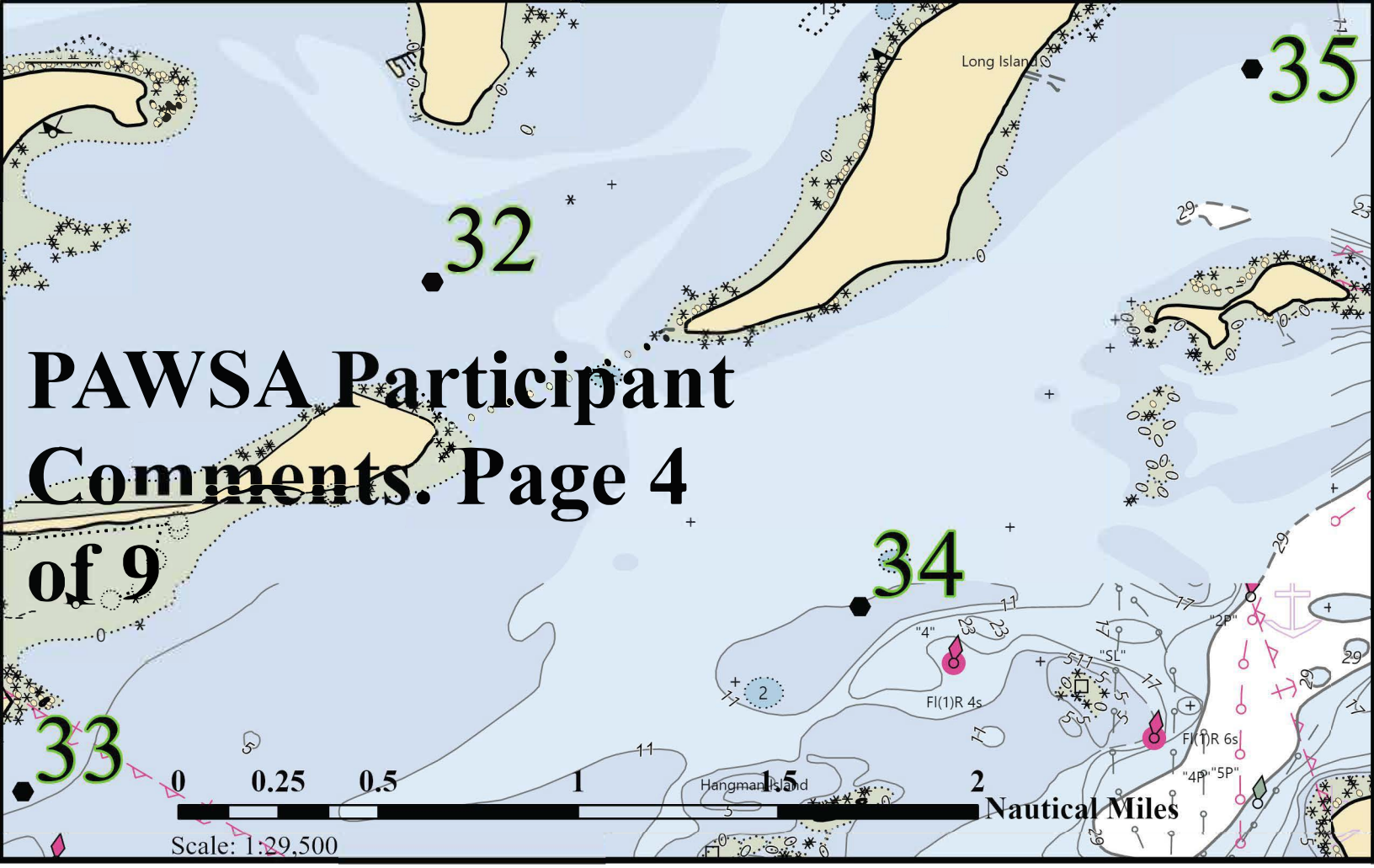
0 0.13 0.25 0.5 0.75 1 Nautical Miles



PAWSA Participant Comments. Page 3 of 9

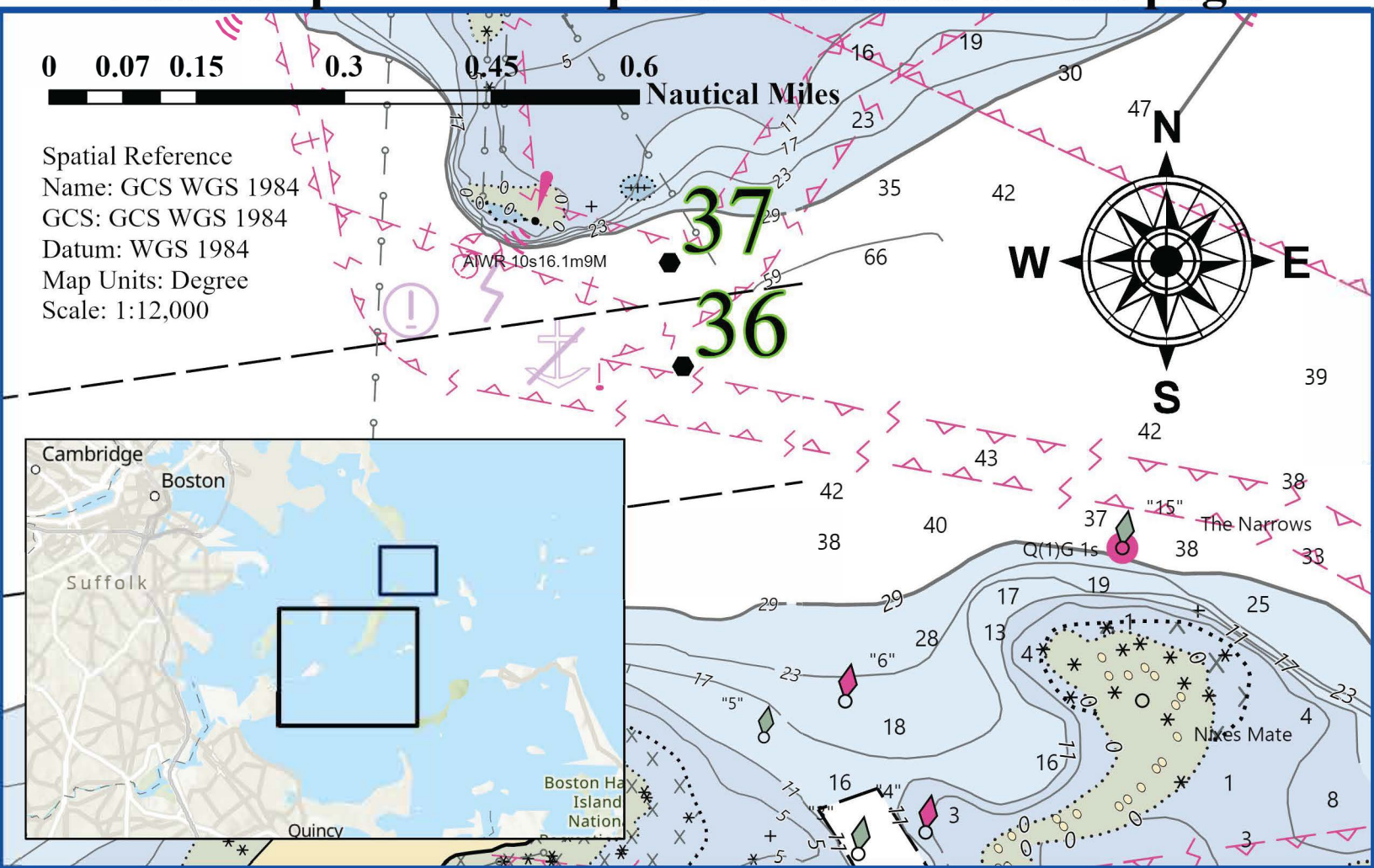
Labeled points correspond with table on last page.

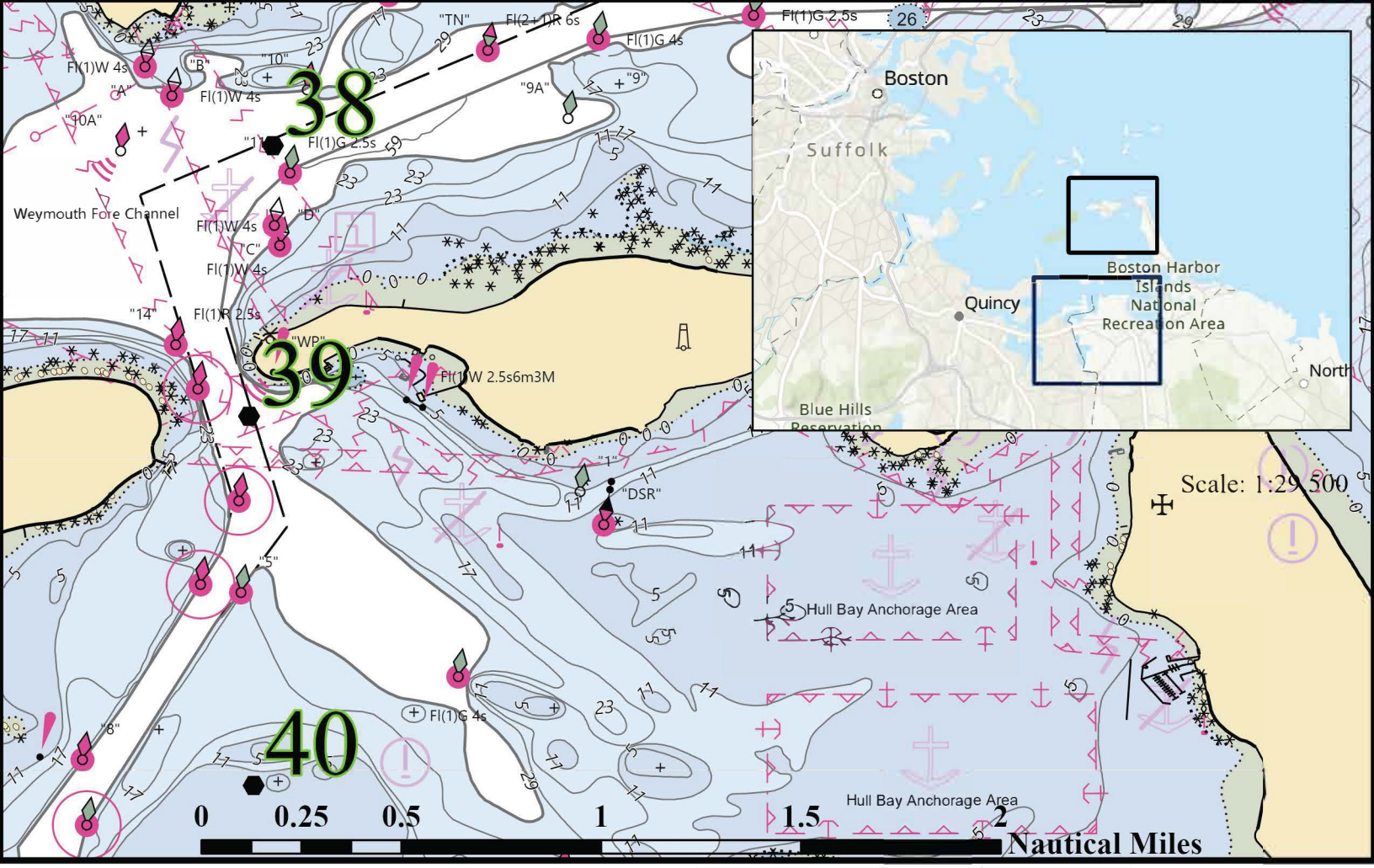




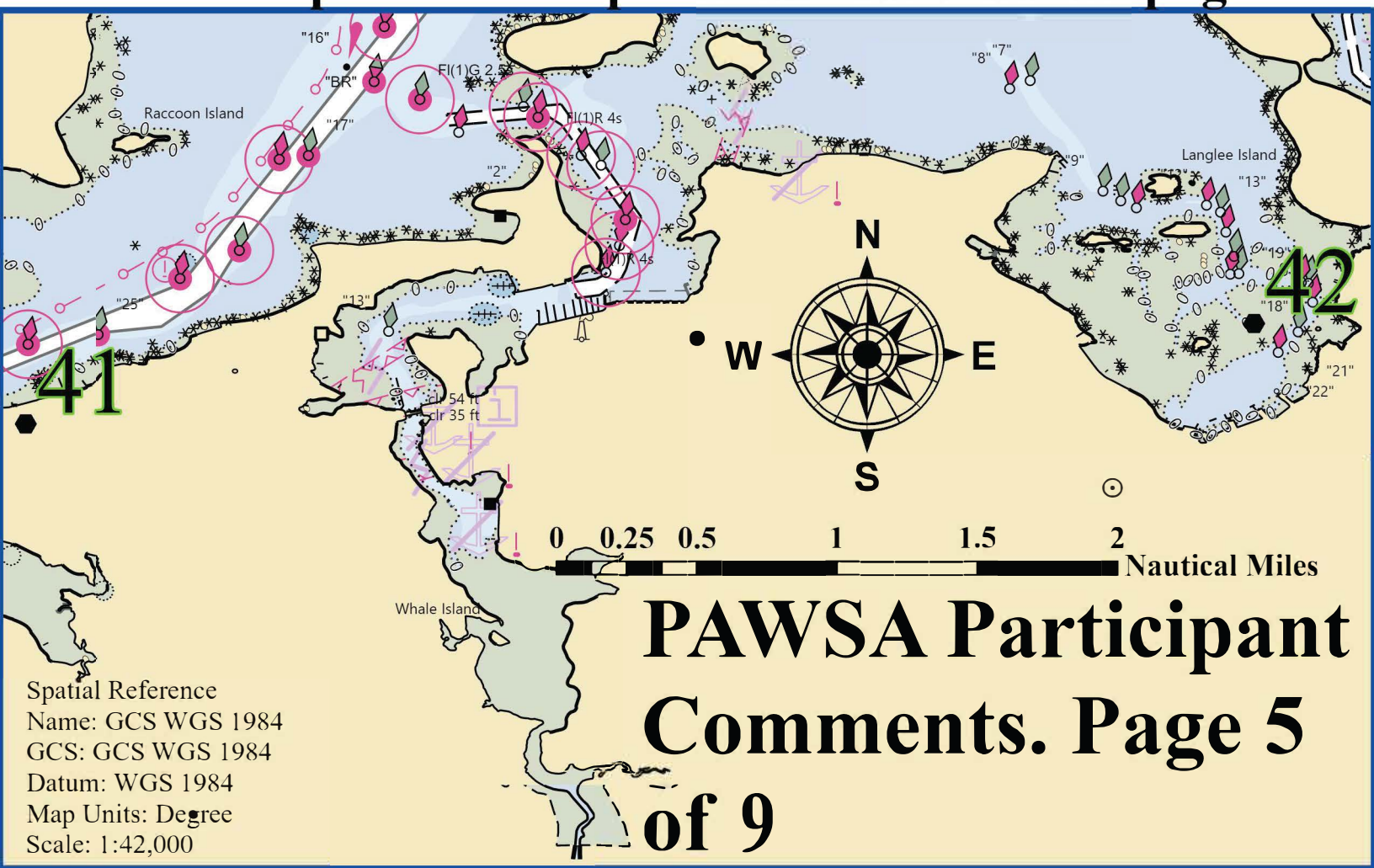
PAWSA Participant Comments. Page 4 of 9

Labeled points correspond with table on last page.





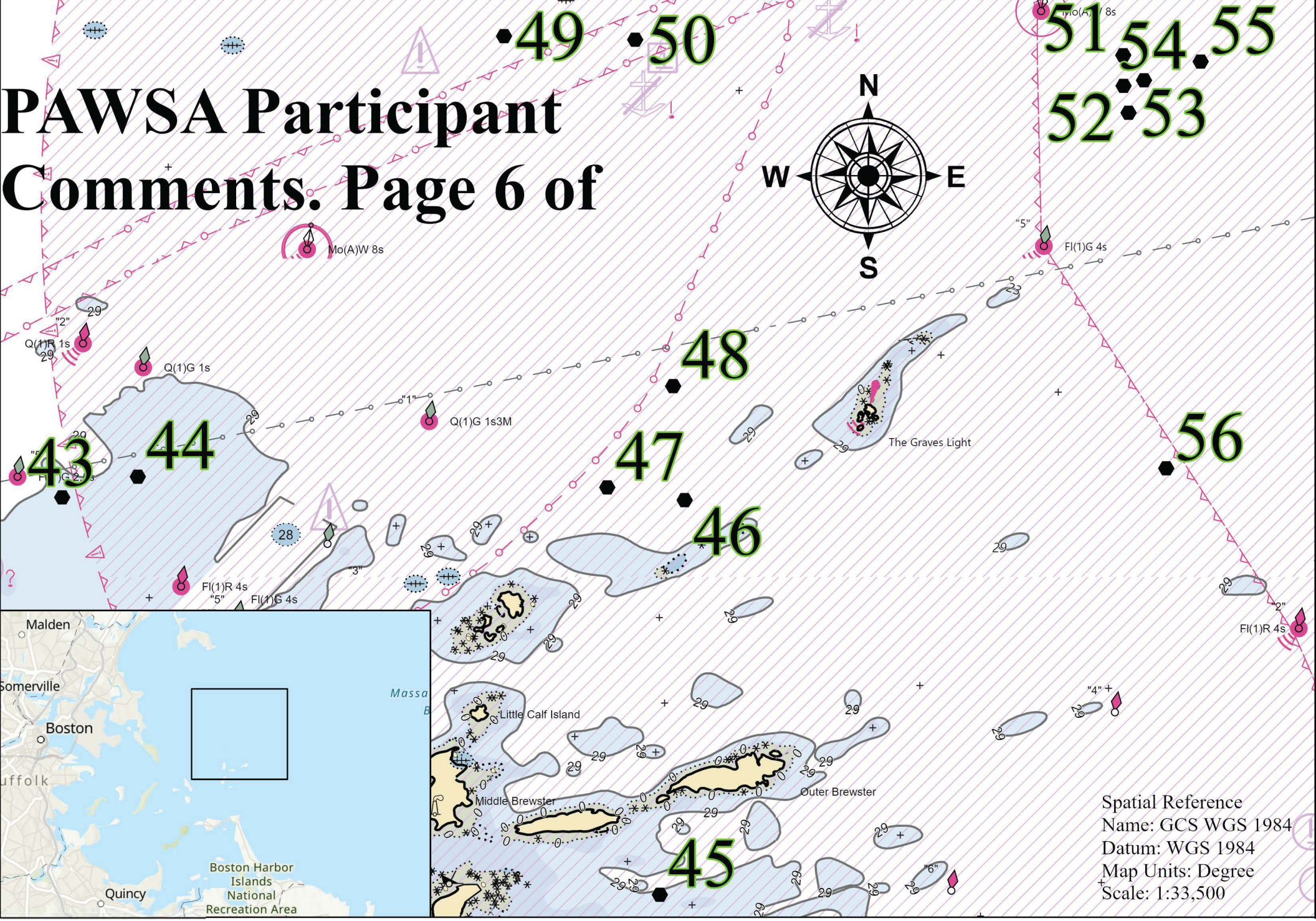
Labeled points correspond with table on last page.



Spatial Reference
Name: GCS WGS 1984
GCS: GCS WGS 1984
Datum: WGS 1984
Map Units: Degree
Scale: 1:42,000

PAWSA Participant Comments. Page 5 of 9

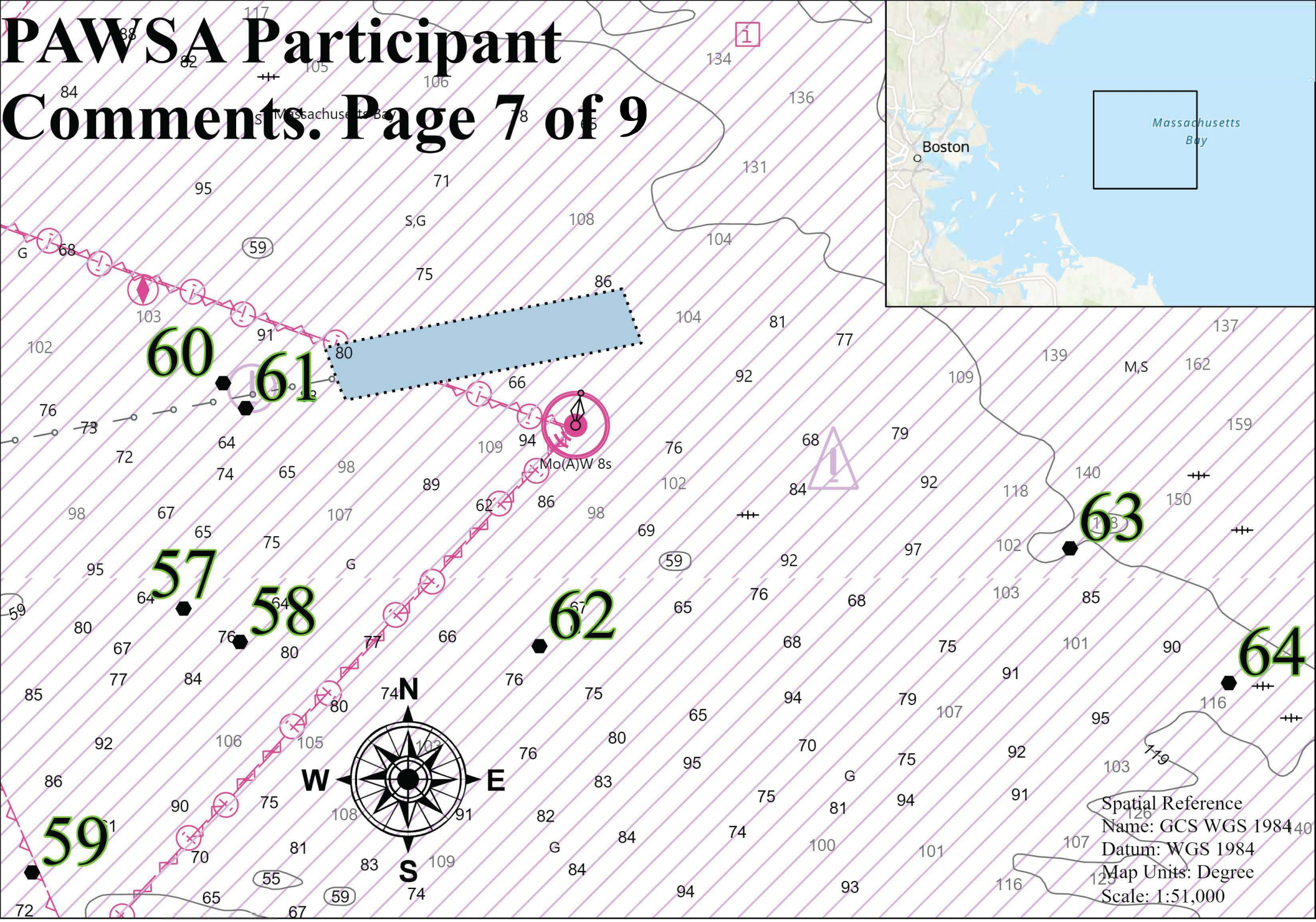
PAWSA Participant Comments. Page 6 of



Labeled points correspond with table on last page.

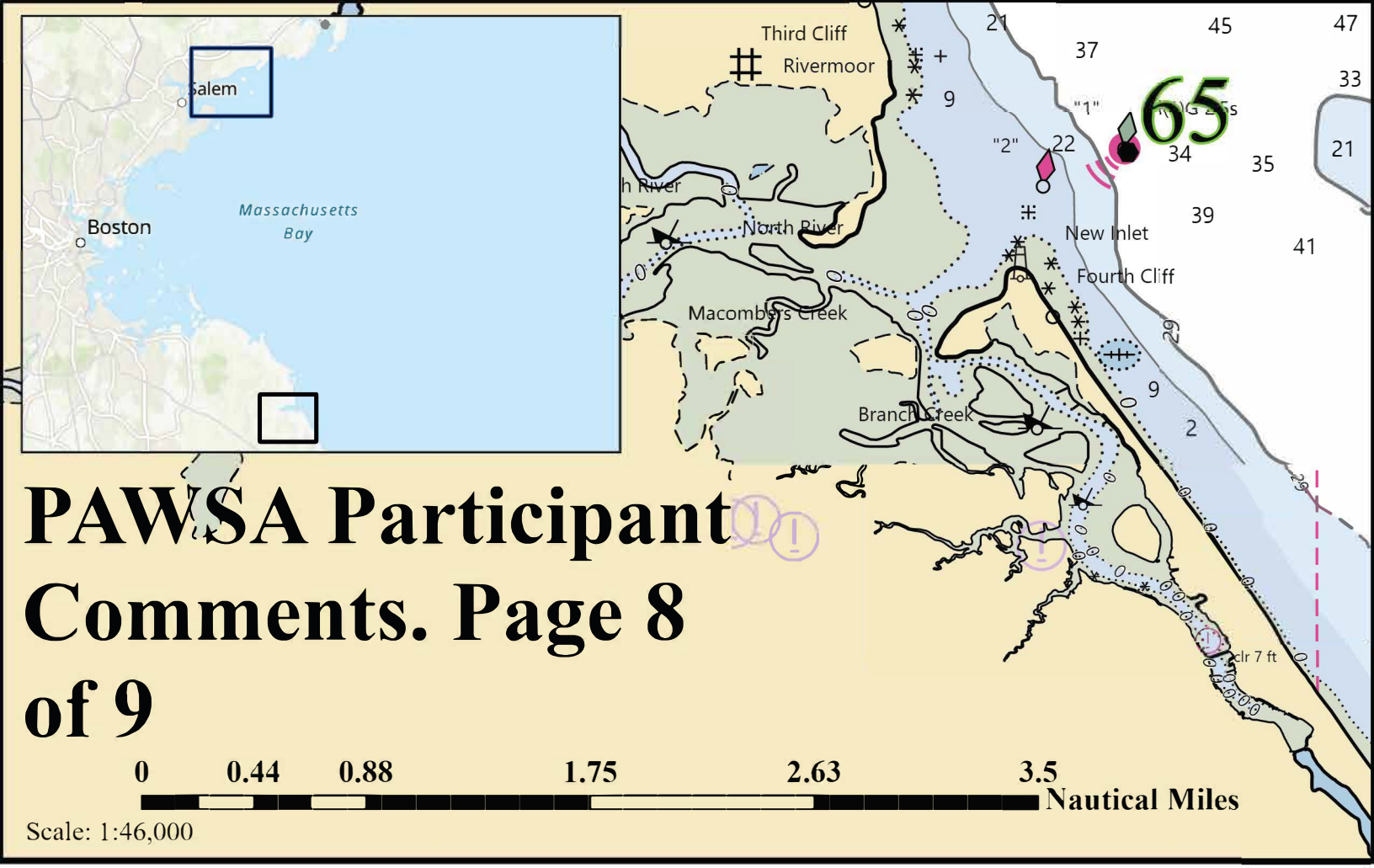
0 0.31 0.63 1.25 1.88 2.5 Nautical Miles

PAWSA Participant Comments. Page 7 of 9



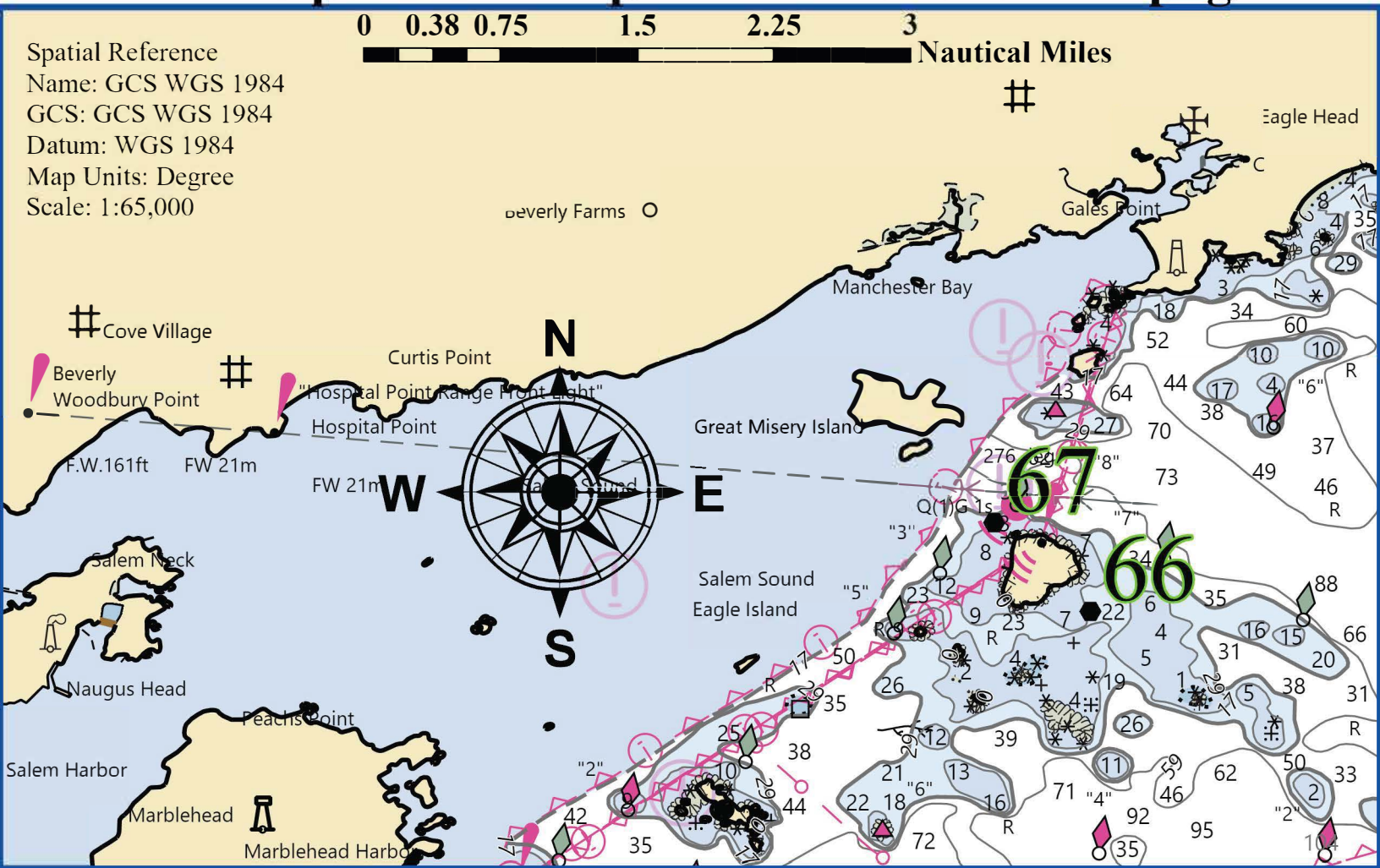
Labeled points correspond with table on last page.

0 0.5 1 2 3 4 Nautical Miles

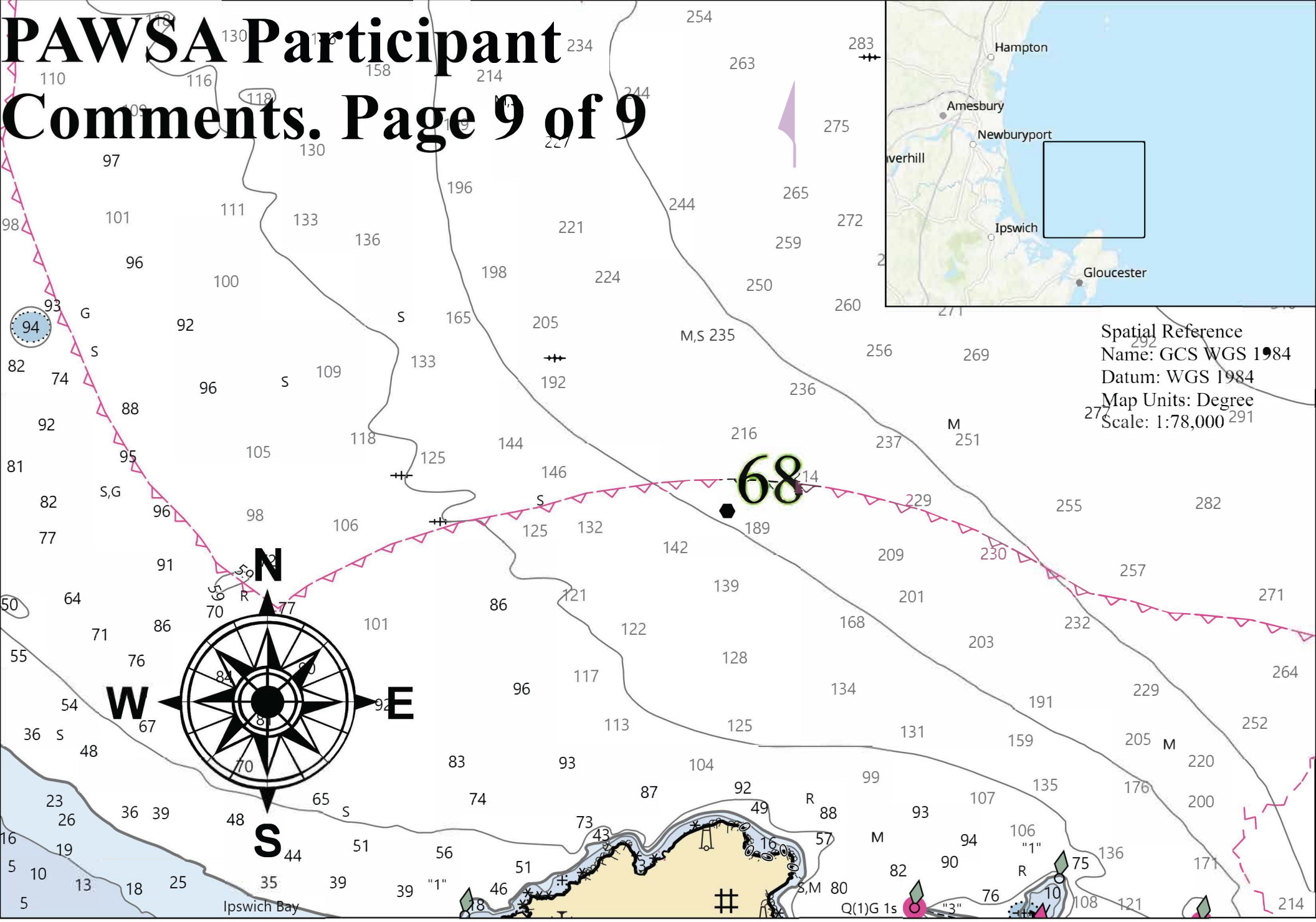


PAWSA Participant Comments. Page 8 of 9

Labeled points correspond with table on last page.



PAWSA Participant Comments. Page 9 of 9



Labeled points correspond with table on last page.

PAWSA Particpant Comments

Point	Comment	Condition
1	We need a consistent and reliable weather data point for Boston Harbor. Pilots/Operators/COTP make all decisions regarding sustained weather for the port.	Waterways
2	Tobin Bridge needs a tide and wind sensor.	Navigation
3	When dams open there is no notification to vessel traffic. It increases the current in the inner harbor.	Waterways
4	Chelsea Street Bridge: This bridge has a history of breaking down. Normally its an electrical issue and most times it happens after normal working hours. The on call electrician is usually 1 hour away. Much to long to wait in restricted waters.	Waterways
5	Paddle boards and kayaks are a major problem to commercial vessels moving in the very narrow Chelsea River.	Vessel
6	Chelsea Street bridge should be fendered and widened. The area off the Gulf dock should be widened and straightened out.	Waterways
7	Air draft is an issue with the Tobin Bridge. Vessels are getting larger and do not fit underneath at high tide, have to wait for low tide.	Vessel
8	Charles River Locks: Pilots call the lock tenders when moving the USS Constitution and docking/undocking naval vessels in Charlestown.	Navigation
9	Small passenger ferries not deviating to other traffic due to time schedule. (Commentor discussed that these smaller vessels are very driven by their schedules, even though they should be giving way to other traffic in the waterway).	Vessel
10	Designated port areas (DPA) are under attack by real estate developers. Terminals and berths are disappearing. Simultaneous increase in traffic with offshore wind development.	Waterways
11	Autonomus vessel increase in activity. Currently small vessel operating but anticipate larger capacity vessel development. Currently operate with chase boats with some companies however offshore autonomus operating for months at a time conducting survey and research work with no chase boats.	Vessel
12	Increase in sea plane activity to include new sea glider operations. Operating at 180 knots under 500 feet no FAA rules apply. Concern is conjested harbor already, adding high speed operating WIG/gliders will be dangerous.	Vessel
13	Lack of oversight with rental fleet boats. Racing, sailing, rentals cause extra congestion.	Traffic
14	There is no schedule of releasing notice to mariners at chales river dam after heavy periods of rain affect currents.	Navigation

PAWSA Particpant Comments

Point	Comment	Condition
15	Boston is a hub for new ideas of water use and testing. Lack of policy and guidance creates safety concerns.	Traffic
16	Chart sea plane takeoff and landing area.	Traffic
17	What is impact of recreational boat clubs, specifically in the urban areas? Does this quantity of members get counted in the number of boaters vs registrations?	Waterways
18	Increased residential development in South Boston and seaport may add recreational boats to the area of cruise ships and container vessels.	Traffic
19	Increased size and vessel visits in the reserve channel. This will require more tugs and more pilots.	Vessel
20	Seasonal recreational fisherman traffic from (Jun-Oct).	Traffic
21	FAA critical airspace limits infrastructure heights.	Waterways
22	Weymouth Fore River Bridge needs tide, current, and height sensors.	Navigation
23	Wind sensors also needed at the reserved channel, Chelsea Street Bridge.	Navigation
24	Seasonal E-Foil creative craft (Jun-Oct).	Traffic
25	Need more recreational boater education, particularly for reduced visibility operations.	Navigation
26	Seasonal recreational sailing schools/club traffic from (Jun-Oct).	Traffic
27	Seasonal sailing schools/clubs traffic from (Jun-Oct).	Traffic
28	Recreational vessels: means for communication to the bridge. Horns, radios, phones and access to information to contact the bridge.	Vessel
29	Passenger vessels refuse to deviate course.	Vessel
30	Add light to red #4 lower middle channel.	Traffic
31	Blinding LED light bars on some commercial fishing vessels and recreational vessels.	Vessel
32	Long Island Bridge reconstruction, will it create a new hazard, what height will it be? Bridge/Craigie Bridge (sic) Lack of proper training with new boaters. Mouthing	Waterways
33	off/entitlement/violent verbal behavior. Disrespect to the bridge operators. Also opening a bridge because you can. Not because you must. Ex, lowering antenna.	Vessel
34	Lack of required safe boating classes	Vessel
35	Area wide debris removal throughout the harbor. Lack of removal.	Traffic
36	The North Channel should be dredged to a uniform depth for the full width of the channel. This will allow 2 way traffic and large vessels ability to move in heavier winds.	Waterways
37	New charts have no soundings. Channel is blank!	Vessel

PAWSA Particpant Comments

Point	Comment	Condition
38	Tide and current sensor needed at Hull Gut (12) turning basin off the airport, Chelsea St Bridge and Weymouth Fore River Bridge.	Navigation
39	Strong currents in Hull Gut and Fore River and West Gut	Navigation
40	Harry's Rock day mark with flashing white light structure is rusting away and about to fall over.	Waterways
41	Fore River Fl R 28ft 4M ""16"" day mark: light package is about to fall through the deck. Poor comms with ships' crews after pilots have left ship while at anchorage. (Commentor	Waterways
42	mentioned but did not write that perhaps they are turning off equipment once they are anchored/moored).	Vessel
43	Pilot boat transit time will almost double impacting work/rest hours.	Traffic
44	The North Channel should be dredged to a uniform depth for the full width of the channel. This will allow 2 way traffic and large vessels ability to move in heavier winds.	Waterways
45	Seasonal recreational kayak traffic (Jun-Oct).	Traffic
46	During Covid the crews were extremely tired and many stayed much longer than normal. Also many Russian and Ukranian crews had hard times focusing because of the war.	Vessel
47	New emision effect engines have reduced the manuverability of deep draft vessels	Vessel
48	Animometers and cameras on Deer Island Light, Gnomes Light, Long Island Head and Boston Light.	Waterways
49	Nahant lobsterman playing chicken with inbound ships at NC Buoy. Communication on channel 13. FWD lightbars being used as headlights are blinding	Vessel
50	This right whale expansion also puts the pilots life in jeopardy during embarkation and disembarkation.	Traffic
51	Scrubber- Ships now have exhaust scrubbers some new and older ships have been modified. They are huge and can drastically effect the handling of the ship. They work like giant wind vanes.	Vessel
52	Right Whale reduced speed zone: At times especially during rough weather the pilot boat may need speeds in excess of 10kts to safely board and disembark the pilot.	Waterways
53	10 KT right whale zone expansion puts safe navigation of vessels in North Channel at risk	Traffic
54	Full weather instruments needed at four locations: Long Island Light, Deer Island Light, Graves Light, Boston Light.	Navigation
55	As offshore wind moves towrds floating structure towers, what new channel and basin design will be required to safely transit Salem.	Waterways
55	More classes of vessels, not enough regulations	Vessel

PAWSA Particpant Comments

Point	Comment	Condition
56	Losing VSL Service yards supplies to maintain commercial shallow draft fleet to commercial high rises and condos.	Vessel
57	All areas of the harbor construction barges being moved by unregulated vessels under 26' LOA. No communication, they don't monitor 13/16 VHF if they even have a radio. No common sense or knowledge of the rules of the road.	Vessel
58	Gear Conflict- Lobster gear set inside channel bounds and approaches. Should we set 'gear free' navigation zones?	Vessel
59	Lack of experience of PV operators, they don't seem to understand the lack of mobility of deep draft vessels. Communication can be a problem at times. Training is needed.	Vessel
60	Smaller fishing/lobster vessels has better hulls/less casualties. Larger fishing fleet still needs compliance/standards. Fishing vessels need to be inspected/licensed/regulated.	Vessel
61	DPA Loss of infastructure. Seaplanes safety loss of waterways. Boston Harbor congestion rec vs commercial. Future Salem to Gloucester traffic congestion due to future wind project.	Traffic
62	Visibility- Perhaps live camera feed in numerous local spots covering real time visibility.	Navigation
63	Pilot ladder conditioni and rigging need emphasis.	Vessel
64	Add more E-ATON throughout AOR	Waterways
65	Check buoy location in New Inlet and signage for dangerous currents	Navigation
66	Gales Ledge Buoy - add annamometer and camera	Waterways
67	Approach to Salem Channel - annamometer and camera	Waterways
68	Strong currents impact nav under Salem-Beverly draw bridge.	Navigation

Appendix D

References

Environmental Protection Agency
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/

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

U.S. Army Corps of Engineers - Regulatory Policies
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
Amalgamated International & U.S. Inland Navigation Rules | Navigation Center (uscg.gov)

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

This Page Intentionally Left Blank

Appendix E

Abbreviations and Acronyms

ACP	Area Contingency Plan
AIS	Automatic Identification System
ANPRM	Advance Notice of Proposed Rulemaking
ATON	Aids to Navigation
BWI	Boating While Intoxicated
BNM	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
PFD	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

This Page Intentionally Left Blank