Ports and Waterways Safety Assessment Workshop Report

Chicago, Illinois
15 – 16 March 2023

Providing Navigation Safety Information for America's Waterways Users

Released By:
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CHAPTER 1. GENERAL

A. Executive Summary

1. Coast Guard Marine Safety Unit Chicago sponsored a Ports and Waterways Safety Assessment (PAWSA) workshop in Chicago, IL, from March 15, 2023 to March 16, 2023. Thirty participants representing a range of waterway users, stakeholders, federal, state, local regulatory and public safety authorities met and collaboratively assessed navigational safety on the waterways adjoining the Port of Chicago and proximate areas. Prior to the workshop, the Coast Guard Navigation Center (CG NAVCEN) facilitated a stakeholder engagement meeting on January 18, 2023, to enhance community outreach and prepare stakeholders for the formal workshop. Chapter 2.A of this report provides a visual depiction of the study area and Appendix A contains the full list of workshop participants and their associated organizations.

2. During the first day of workshop, activities included a series of discussions about port and waterway attributes and vessel traffic in relation to the sixteen Waterway Risk Factors (WRFs) in the PAWSA Waterway Risk Model. Chapter 1.C of this report contains more information regarding the methodology of the PAWSA Waterway Risk Model. Following individual topic discussions, participants were surveyed to establish the Baseline Risk Value (BRV) and Risk Characterization for each WRF. BRV quantifies the overall risk, whereas Risk Characterization assesses the potential consequence, risk trend, risk tolerance, and effectiveness of existing mitigation strategies for a specific WRF. Figure 3 and Table 4 in Chapter 2.B respectively documented the BRV and Risk Characterization for the Chicago PAWSA workshop. The metrics from the BRV and Risk Characterization were combined to quantitatively prioritize WRFs for purposes of informing discussions during the next phase of the workshop. During the second day, participants reviewed and validated the aggregated survey ranking of the WRFs and conducted follow-on discussions to identify and develop risk mitigation strategies as documented in Chapter 2.D. The five straight highest WRFs as numerically ranked by participants are documented in Table 1 with their associated Waterway Risk Condition. Table 4 in Chapter 2.B of this report contains a full list of prioritized WRFs.

Waterway Risk Condition	WRF
Vessel Quality & Operation	Recreational Vessels
Traffic	Waterway Use
Traffic	Congestion
Traffic	Volume of Commercial Traffic
Traffic	Volume of Recreational Traffic

Table 1-Highest Priority WRFs for the Chicago PAWSA. Participants opted to combine discussion of mitigations for Waterway Use and Congestion.

3. The recommended mitigation strategies and participant observations documented in this report will meaningfully facilitate continued collaboration between the Coast Guard and waterway stakeholders to improve safe and efficient navigation within the Chicago Marine Transportation System (MTS). The Director of Marine Transportation Systems (CG-5PW), CG NAVCEN, Coast Guard Sector Lake Michigan, and Coast Guard Marine

Safety Unit Chicago extend their sincere appreciation to participants for their contributions to the Chicago PAWSA workshop.

B. Background and Purpose

1. The Director of Marine Transportation Systems (CG-5PW) is responsible for developing and implementing policies and procedures that facilitate commerce, improve safety and efficiency, and maximize the commercial viability of the MTS. In the late 1990s, the Coast Guard convened a national dialogue group (NDG) comprised of maritime stakeholders to identify the needs of waterway users with respect to Vessel Traffic Management (VTM) and Vessel Traffic Service (VTS) systems. A major outcome of the NDG was the development of the PAWSA process, which the Coast Guard established as the formal model for facilitating stakeholder discussion to identify VTM improvements and determine candidate VTS waterways. In 2020, CG NAVCEN modernized the PAWSA process to create a more flexible tool available to Sector Commanders to engage the maritime community for purposes of monitoring and improving the health of the MTS within their area of responsibility.

2. The current PAWSA process involves convening a select group of waterway users and stakeholders to facilitate a structured workshop agenda to meet pre-identified risk assessment objectives. A successful workshop involved the participation of professional waterway users with local expertise in navigation, waterway conditions, and port safety. Stakeholder involvement is central to ensuring that important environmental, public safety, and economic consequences received appropriate attention as risk interventions were identified and evaluated. The workshop culminated in a written report that included proposed risk mitigations developed by participants, which was made publicly available on the CG NAVCEN's website, https://www.navcen.uscg.gov/ports-and-waterways-safety-assessment-final-reports.

3. The PAWSA process strived to achieve the following objectives:

   a. Gather stakeholder input to identify major waterway trends, safety hazards, and potential mitigation strategies.

   b. Bolster public-private partnership and enhance cooperation across the MTS.

   c. Generate a stakeholder driven report that captures data gathered from the PAWSA to prioritize future projects impacting the MTS.

C. Methodology

1. Waterway Risk Conditions and WRFs. The PAWSA process was designed to convert qualitative experience, observations, and opinions of participants into quantitative assessments. This method utilized numerical comparison among sixteen WRFs for purposes of facilitating consensus among participants to better inform conversations regarding risk mitigation strategies within the study area. The Waterway Risk Condition categories and associated WRFs are outlined in Table 2 below and further defined in

Appendix B.

Waterway Risk Conditions	Navigation	Vessel Quality & Operation	Traffic	Waterway
WRFs	Winds	Large Commercial Vessels	Volume of Commercial Traffic	Dimensions
	Currents and Tides	Small Commercial Vessels	Volume of Recreational Traffic	Obstructions
	Visibility Restrictions	Commercial Fishing Vessels	Waterway Use	Visibility Impediments
	Bottom Type	Recreational Vessels	Congestion	Configuration

Table 2-The four Waterway Risk Condition categories and sixteen WRFs.

2. Waterway Risk Model. The PAWSA Waterway Risk Model defines risk as the product of the probability of an unwanted event and the consequences resulting from that event. Figure 1 provides a visualization of the relationship between the probability of an unwanted event for each Waterway Risk Condition and the impact of the risk in terms of Immediate and Subsequent Consequences. Appendix B provides an explanation of Immediate and Subsequent Consequences as defined by the PAWSA Waterway Risk Model.

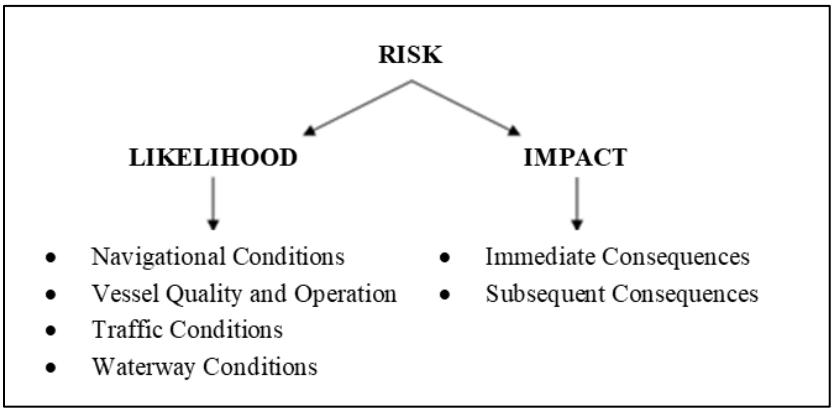

Figure 1- Relationship between risk, likelihood, and impact.

3. WRF Survey. During day one of the workshop participants were led through individual discussions for each WRF identified in Table 2. Each discussion concluded with the completion of a three-part participant survey that established the BRV and Risk Characterization for each risk factor. Following completion of all surveys, the WRFs were numerically prioritized by BRV and Risk Characterization from greatest to least. At the beginning of the second day of the workshop, the order of the risk factors were presented to participants for validation and consensus to prioritize mitigation strategy discussions and development. A description of the methodology to calculate the BRV and Risk Characterization is provided in the following sub-sections.

   a. BRV. This value was calculated using numerical values attained from Part One and Part Two of the survey that were then input into the formula outlined in Figure 2.

      (1) Part One. The first section of the survey asked participants to evaluate the Risk

Level of a specific risk factor based on four options specific to each individual WRF. Risk Levels were presented as written options to participants. Each written option had an associated numerical value between one and four based on their likelihood. Appendix B contains a list of the WRFs and the associated Risk Level options with their attributed numerical value.

(2) Part Two. The second section of the survey asked participants to assign the Impact Level for Immediate and Subsequent Consequences associated with each risk factor. Appendix B contains the list and definition of Immediate and Subsequent Consequences.

(a) The Impact Level of Immediate and Subsequent Consequence were presented as three choices for each WRF. The choices correlated to the numerical values shown in Table 3.

Impact Level of Consequence	Numerical Value
None or hardly any impacts	0
Moderate impact	0.5
Impacts are likely severe	1

Table 3- Impact level of consequences with associated numerical value.

(b) The numerical values for Risk Level from Part One and Impact Level from Part Two of the survey were used in the formula outlined in Figure 2 to calculate the associated BRV for each WRF. The BRV numerically ranged between zero and eight, with zero representing low BRV and eight representing high BRV.

$$\text{BRV} = (\text{Risk level}) \times \left(\frac{\sum \text{Immediate Consequences}}{4} + \frac{\sum \text{Subsequent Consequences}}{4} \right)$$

Figure 2- Risk Value formula.

b. Risk Characterization. Risk Characterization was ascertained from Part Three of the survey. It provided additional context to the BRV generated from Part One and Part Two of the survey and was mainly used by facilitators to better guide participant discussion.

(1) Part Three. The third section of the survey asked participants to evaluate Risk Characterization in terms of the Current Risk Level, Risk Trend, and Current Mitigations. Table 4 provides the associated available selections for each Risk Characterization Category. Questions to ascertain Risk Characterization were standard for all WRFs. The answers to these questions were calculated by plurality, wherein the option that was most frequently selected by participants served as the prevalent group consensus for each question. In the event a plurality could not be determined, PAWSA facilitators examined the raw data and

determined the most appropriate selection.

Risk Characterization Category	Available Selections
Current Risk Level	We could benefit by accepting more risk
	The level of risk is acceptable, keep the status quo
	Unacceptably high risk
Risk Trend	Increasing
	Decreasing
	Staying the same
Current Mitigations	Acceptable
	Acceptable, but tenuous
	Unacceptable, we need more or better mitigations

Table 4- WRF Survey Part Three, Risk Characterization categories.

CHAPTER 2. CHICAGO PAWSA WORKSHOP

A. PAWSA Study Area

1. The geographical area for the Chicago PAWSA included the Chicago River and near coastal regions as depicted in Figure 3. The coordinates bounding the Chicago study area were: 41.911N, 87.659W and 41.843N, 87.549W. Graphic representations of this study area were used to facilitate discussion with participants. Additionally, geographically referenced comments were collected during the workshop and are documented as chartlets in Appendix D.

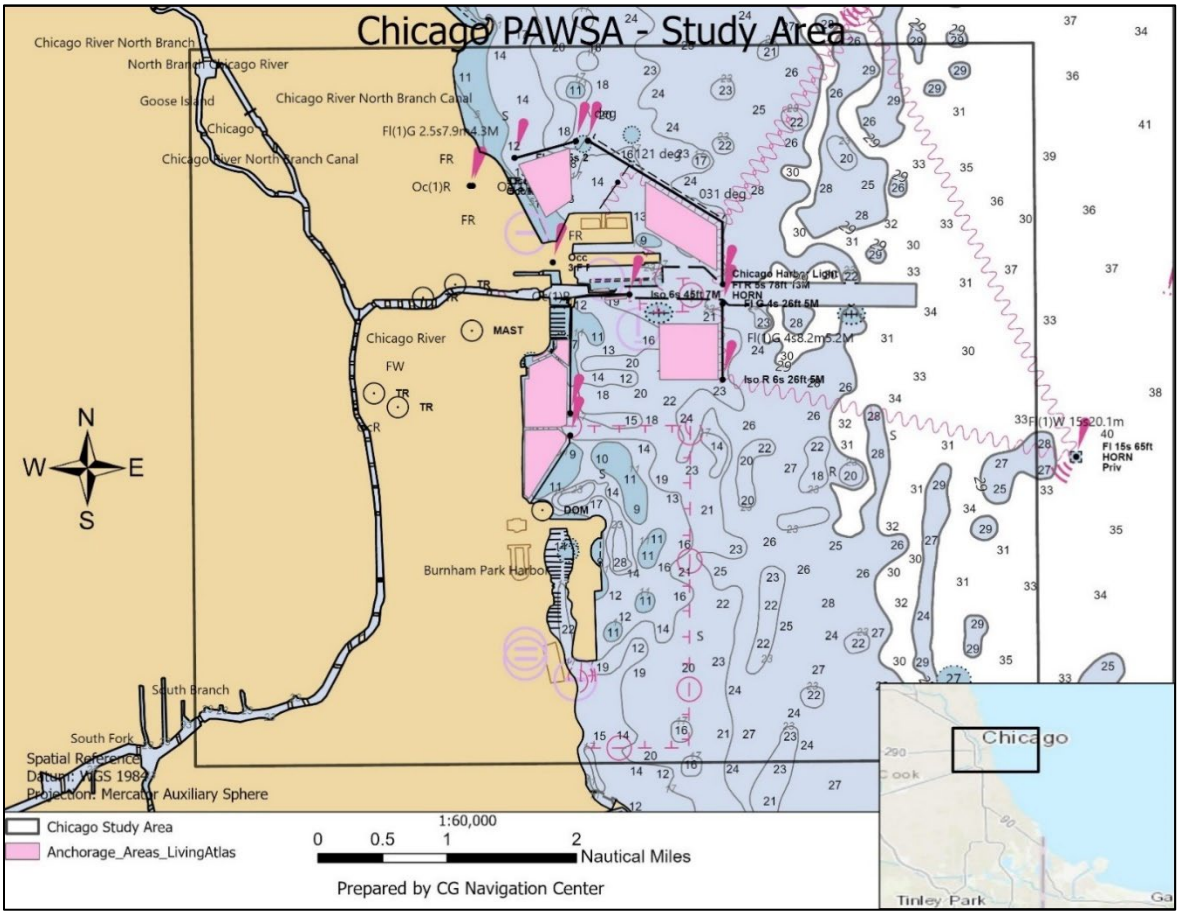

Figure 3- Chicago PAWSA workshop study area.

B. BRV

1. The BRV utilizing the methodology described in Chapter 1.C for the Chicago PAWSA workshop is depicted in Figure 4.

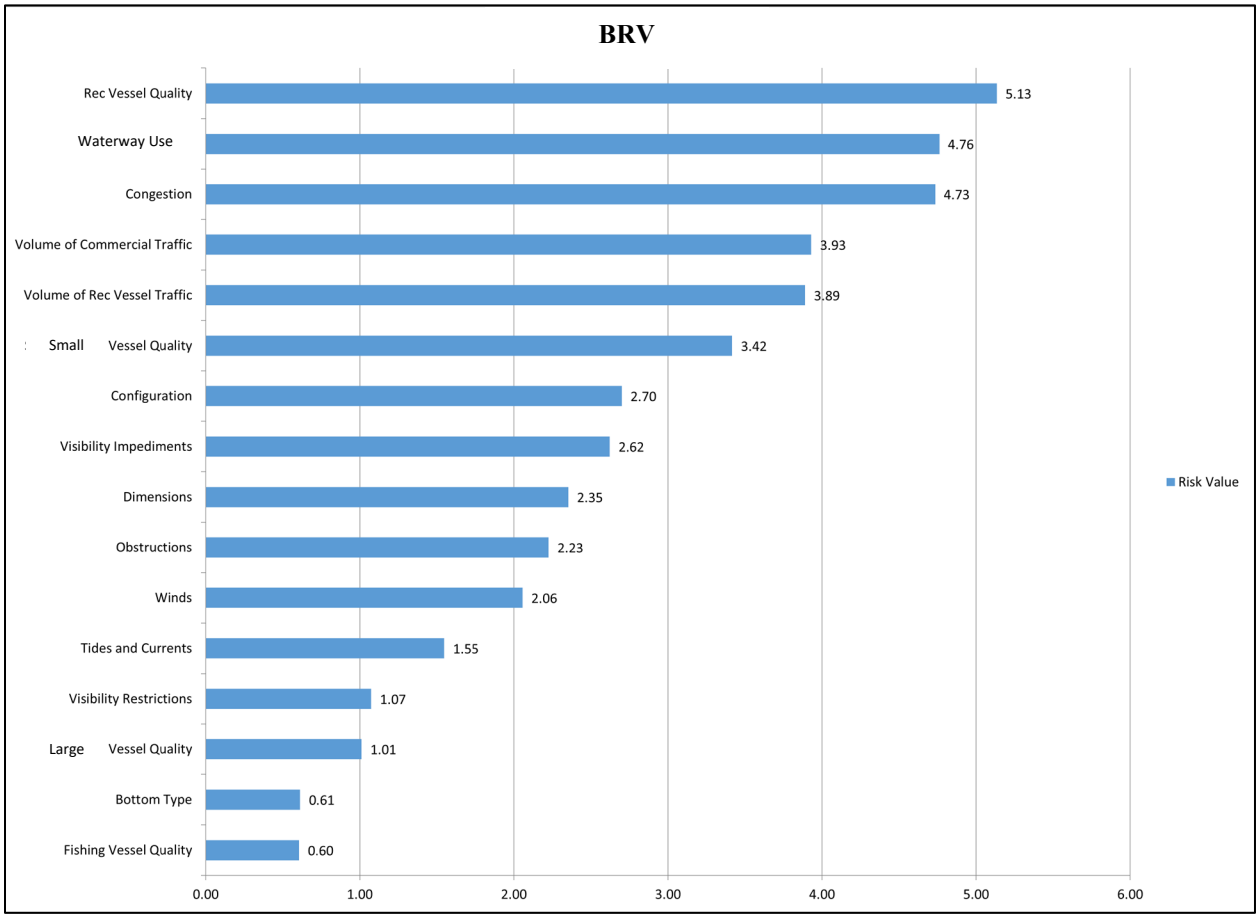

Figure 4- Chicago PAWSA workshop WRF BRV.

2. The five highest priority WRFs and their associated Waterway Risk Condition for the Chicago PAWSA prior to combining the BRV with the Risk Characterization results were documented in Table 5.

Waterway Risk Condition	WRF
Vessel Quality & Operation	Recreational Vessels
Traffic	Waterway Use
Traffic	Congestion
Traffic	Volume of Commercial Traffic
Traffic	Volume of Recreational Traffic

Table 5- Five highest priority WRF based on BRV.

C. Risk Characterization

1. The Risk Characterization for each WRF utilizing the methodology described in Chapter 1.C for the Chicago PAWSA Workshop was presented in Table 6.

WRF Risk Characterization			
WRF	**Current Risk Level**	**Current Risk Trend**	**Current Mitigations**
Recreational Vessels	Unacceptably high risk	Increasing	Unacceptable, we need more and better mitigations
Waterway Use	Unacceptably high risk	Increasing	Unacceptable, we need more and better mitigations
Congestion	Unacceptably high risk	Increasing	Unacceptable, we need more and better mitigations
Volume of Commercial Traffic	Unacceptably high risk	Increasing	Acceptable but tenuous
Volume of Recreational Traffic	Unacceptably high risk	Increasing	Unacceptable, we need more and better mitigations
Small Commercial Vessels	Unacceptably high risk	Increasing	Acceptable but tenuous
Configuration	The level of risk is acceptable, keep the status quo.	Increasing	Acceptable but tenuous
Visibility Impediments	The level of risk is acceptable, keep the status quo.	Increasing	Acceptable but tenuous
Dimensions	The level of risk is acceptable, keep the status quo.	Increasing	Acceptable but tenuous
Obstructions	The level of risk is acceptable, keep the status quo.	Increasing	Acceptable
Winds	The level of risk is acceptable, keep the status quo.	Increasing	Acceptable but tenuous
Tides and Currents	The level of risk is acceptable, keep the status quo.	Staying the same	Acceptable but tenuous
Visibility Restrictions	The level of risk is acceptable, keep the status quo.	Staying the same	Acceptable
Large Commercial Vessels	The level of risk is acceptable, keep the status quo.	Staying the same	Acceptable
Bottom Type	The level of risk is acceptable, keep the status quo.	Staying the same	Acceptable
Commercial Fishing Vessels	The level of risk is acceptable, keep the status quo.	Staying the same	Acceptable

Table 6- Chicago PAWSA workshop WRF Risk Characterization.

D. Validation WRF Prioritization.

1. The combined WRF BRV and Risk Characterization results depicted in Table 7 were presented to participants to validate the prioritization of WRFs for mitigation strategy development and dialogue. The rows highlighted in green in Table 7 represent the highest priority WRFs for Chicago PAWSA workshop participants.

			Risk Characterization		
Waterway Risk Condition	**WRF**	**Baseline Risk Value**	**Current Risk Level**	**Current Risk Trend**	**The Current Mitigations Are**
Vessel Quality and Operations	Recreational Vessels	5.13	Unacceptably high risk	Increasing	Unacceptable, we need more and better mitigations
Traffic	Waterway Use	4.76	Unacceptably high risk	Increasing	Unacceptable, we need more and better mitigations
Traffic	Congestion	4.73	Unacceptably high risk	Increasing	Unacceptable, we need more and better mitigations
Traffic	Volume of Commercial Traffic	3.93	Unacceptably high risk	Increasing	Acceptable but Tenuous
Traffic	Volume of Recreational Traffic	3.89	Unacceptably high risk	Increasing	Unacceptable, we need more and better mitigations
Vessel Quality and Operations	Small Commercial Vessels	3.42	Unacceptably high risk	Increasing	Acceptable but Tenuous
Waterway Conditions	Configuration	2.70	The level of risk is acceptable, keep the status quo.	Increasing	Acceptable but Tenuous
Waterway Conditions	Visibility Impediments	2.62	The level of risk is acceptable, keep the status quo.	Increasing	Acceptable but Tenuous
Waterway Conditions	Dimensions	2.35	The level of risk is acceptable, keep the status quo.	Increasing	Acceptable but Tenuous
Waterway Conditions	Obstructions	2.23	The level of risk is acceptable, keep the status quo.	Increasing	Acceptable
Navigational Conditions	Winds	2.06	The level of risk is acceptable, keep the status quo.	Increasing	Acceptable but Tenuous
Navigational Conditions	Tides and Currents	1.55	The level of risk is acceptable, keep the status quo.	Staying The Same	Acceptable but Tenuous
Navigational Conditions	Visibility Restrictions	1.07	The level of risk is acceptable, keep the status quo.	Staying The Same	Acceptable
Vessel Quality and Operations	Large Commercial Vessels	1.01	The level of risk is acceptable, keep the status quo.	Staying The Same	Acceptable
Navigational Conditions	Bottom Type	0.61	The level of risk is acceptable, keep the status quo.	Staying The Same	Acceptable
Vessel Quality and Operations	Commercial Fishing Vessels	0.60	The level of risk is acceptable, keep the status quo.	Staying The Same	Acceptable

Table 7- Combined BRV and Risk Characterization results for all WRFs.

2. Following subjective evaluation, participants selected Recreational Vessels, Waterway Use, Congestion, Volume of Recreational Traffic, and Obstructions as the most significant WRFs that contributed to potential incidents in the Chicago PAWSA study area. These WRFs are shown highlighted in green in Table 7. Participants prioritized these WRFs listed in Table 8 from top to bottom as the critical areas to develop and

discuss mitigation strategies. Although Waterway Use and Congestion were separate WRFs, consensus among participants was to combine discussion because many of the concerns and mitigation strategies were interrelated.

Waterway Risk Condition	WRF
Vessel Quality & Operation	Recreational Vessels
Traffic	Waterway Use
Traffic	Congestion
Traffic	Volume of Recreational Traffic
Waterway Conditions	Obstructions

Table 8- Validated and prioritized WRFs listed from top to bottom.

E. Risk Mitigation Strategies

The validated list of WRFs was used to prioritize discussion and development of risk mitigation strategies. Facilitators directed participants to capture potential mitigation strategies on sticky notes, which were then consolidated and grouped to identify major themes. From this bank of action items, participants were encouraged to create specific, measurable, actionable, realistic, and timebound (SMART) goals as well as general goals. Both kinds of mitigation strategies developed by participants are represented in this report. Recommended mitigation strategies documented in this section received consensus among workshop participants. Mitigation strategies were documented in order of significance to participants.

1. <u>WRF - Recreational Vessels.</u>

   a. While the presence of human powered crafts (HPCs) in the Chicago River and Chicago Harbor anecdotally increased, participants observed that boater safety education had not kept pace with the increased volume of recreational vessels on the waterway. As a result, unsafe boating practices increased and posed the greatest safety risk to commercial traffic and to other recreational boaters. Section C.2 of Appendix C contains additional comments made by participants describing concerns associated with Recreational Vessels.

      (1) The minimum age for issuance of a recreational boating license in Illinois is 12 years old. A proposed mitigation was to utilize the Chicago Harbor Safety Committee to petition state lawmakers to raise the minimum boating age.

      (2) It was recommended to expand Illinois boater safety requirements by developing mandatory recurring certification programs for operators of recreational vessels. The purpose of this requirement was to ensure knowledge of recreational vessel operators, with a targeted goal of covering seasonal boaters. Participants noted that an annual re-certification program should provide a blend of general boater safety information and regional knowledge of local waterway practices and

procedures to include the following:

(a) Inland Navigational Rules;

(b) Local, state, and federal rules and regulations pertaining to safe operation of recreational vessels in Illinois;

(c) Handheld very high frequency (VHF) radio operations and communication; and,

(d) Chicago Harbor Lock transit procedures.

b. In addition to enhanced boater safety education requirements, participants proposed increasing the availability and presence of maritime public safety and enforcement infrastructure in the Chicago River and Chicago Harbor to police unsafe boating practices. It was additionally determined that current response times and coverage for waterborne enforcement assets were inadequate in relation to the volume of recreational traffic present within the Chicago PAWSA study area.

(1) It was recommended as a mitigation that authorities consider strategically positioning law enforcement assets in areas of high visibility to promote an atmosphere of compliance by recreational vessel operators. The vicinity of Dime Pier was recommended as a high visibility staging area for public safety assets.

(2) As a mitigation to improve response times for marine enforcement efforts, participants recommended the Chicago Harbor Safety Committee facilitate cooperation between local, state, and federal agencies to determine the feasibility of committing additional assets with low organizational impact and high safety returns on the waterway. Specific recommendations included:

(a) A jet ski patrol dedicated to monitoring and responding to operators of HPCs in distress;

(b) The introduction of a pace boat dedicated to controlling the flow of recreational traffic; or,

(c) Obtaining authorization for the U.S. Army Corps of Engineers (USACE) to dedicate a waterborne asset to supervise the Chicago Harbor Lock vessel queue.

2. <u>WRF - Waterway Use and Congestion.</u> Participants opted to combine discussion of mitigation strategies for Waterway Use and Congestion.

a. A broad range of vessel traffic, including sailing vessels, electric boats, and HPCs operate in the Chicago River and Chicago Harbor. Participants noted that the limited navigable width of the Chicago River made it prone to vessel congestion during peak boating season and was further exacerbated by permitted marine events and fireworks displays. Drawbridges and the Chicago Harbor Lock were specifically identified as

locations where interactions between different vessel types contributed to waterway congestion, e.g., sailing vessels circling in the center of the river to hold position. Section D.3 and Section D.4 of Appendix C contain additional comments made by participants describing concerns associated with Waterway Use and Congestion.

(1) Participants recommended increasing safety and efficiency of the Chicago Harbor Lock by facilitating engagement between the Chicago Habor Safety Committee and USACE to discuss enhancing the lock with additional signage, lights, and sound signals. Visual and audible indicators would be used to clearly signal the status of the lock to mariners, specifically whether it is open or closed and presence of any oncoming traffic.

(2) Participants recommended facilitating engagement between the Chicago Harbor Safety Committee, local agencies, and USACE to assess the viability of seeking increased funding to build a dual chamber lock to improve efficiency and reduce congestion.

(3) To limit the impact of waterfront construction to the navigable waterway as it pertained to vessel congestion, participants recommended leveraging the Chicago Harbor Safety Committee to work with local, state, and federal agencies to draft a policy letter or city ordinance that restricted business expansion into the Chicago River. It was additionally recommended to encourage pre-approved engagement with the Chicago Metropolitan Planning Council, Chicago Department of Planning, or other planning agencies regarding projects which impacted the characteristics of the navigable channel on the Chicago River.

3. WRF - Volume of Recreational Traffic.

a. Participants noted that commercial vessels were frequently required to maneuver to avoid collision with recreational vessels in the Chicago River. Large HPC tour groups, such as kayaks, were noted as contributing to increased congestion and limiting maneuverable space in the river for commercial vessels to pass. Section D.2 of Appendix C contains additional comments made by participants describing concerns associated with the Volume of Recreational Traffic.

(1) As a mitigation to deconflict the volume of recreational vessels and safe navigation of commercial vessels, it was proposed to implement a river transit scheme that would require recreational vessels to operate along a specific side or area of the river, leaving the center channel available for larger commercial vessels to operate. It was suggested that HPC routes might be identified by visual ranges to demarcate dedicated recreational vessel transit routes.

(2) Participants recommended that the Chicago Harbor Safety Committee establish a working group to include HPC tour operators and operators of commercial vessels to compare operating schedules to deconflict times and locations in the Chicago River most impacted by congestion.

(3) It was additionally recommended as a mitigation to reduce HPC tour group sizes,

thereby limiting the number of HPCs that may be traveling together in a small group, or "pod," to improve oversight by tour leaders. This might be accomplished by introducing regulation that limited or defined kayak group sizes in city or state business license requirements.

4. WRF - Obstructions.

   a. Participants noted that several locations, including Dime Pier, Chicago & Northwestern Railway Bridge, and Chicago Harbor seawall are degraded, creating debris which poses hazards to navigation. Derelict vessels were also identified as posing hazards to navigation in the Chicago River. Section E.2 of Appendix C contains additional comments made by participants describing concerns associated with Obstructions.

      (1) It was recommended as a mitigation by participants to improve coordination between federal, state, and local authorities to remove derelict vessels on the Chicago River.

      (2) Participants proposed developing an improved process for identifying the owners of derelict vessels to hold them accountable for their impact to the waterway.

Appendix A. Workshop Participants

Participant	Organization
Community Planning	
1. Dave Brezina	Chicago Harbor Safety Committee
2. Warren Marwedel	Chicago Harbor Safety Committee
3. Mike McElroy	Chicago Harbor Safety Committee
4. John Quail	Friends of the Chicago River
Cruises, Tours, and Charters	
5. Gabe Argumedo	First Lady Cruises
6. Tom Blakely	City Experiences
7. Grace Fuller	City Experiences
8. Tim Roche	City Experiences
9. Daneil Russel	City Experiences
10. Mike Borgstrom	Wendella Boats
11. Larry Van Der Bosch	Shoreline Sightseeing
12. Pat Driscoll	Shoreline Sightseeing
13. Todd Fabley	Northern Marine
14. Eric Gierzynski	Shoreline Sightseeing
15. Jessica Herum	Wendella Boats
16. Kelli Kovach	Chicago Electric Boats
17. James Morrow	Urban Kayaks
18. Marc Mozga	Shoreline Sightseeing
19. Ryan Shulz	Anita Dee Yacht Charters
Commercial Barge and Shipping	
20. Dan Wolf	Illinois & Michigan Oil LLC - Northern Marine
Physical Infrastructure	
21. John Graber	Navy Pier
22. Christine Rivero	Chicago Harbors
23. Tyronne Valley	U.S. Army Corps of Engineers
24. Mike Walsh	U.S. Army Corps of Engineers
Public Safety and Emergency Management	
25. Jason Lach	Chicago Fire Department
26. Matthew Ladniak	Chicago Office of Emergency Management and Communications
27. Chris Pettino	Office of Emergency Management and Communications
28. Tony Mendez	Chicago Police Department Marine Unit
29. Frederic Miller	U.S. Coast Guard Auxiliary
Recreational Boating	
30. John McDermott	Greater Chicago Dragon Boat Club

Appendix B. Waterway Risk Model Terms and Definitions

A. Waterway Risk Conditions and WRF Definitions. The Ports and Waterway Safety Assessment (PAWSA) Waterway Risk Model utilizes sixteen WRFs categorized under four Waterway Risk Conditions. Definitions for each Waterway Risk Condition and their associated WRF are defined in this section.

1. Waterway Risk Condition - Navigation. The environmental conditions that affect vessel navigation, such as wind, currents, and weather.

    a. WRF -Winds. The difficulty in maneuvering vessels resulting from increased and unpredictable winds, particularly if the wind is from abeam.

    b. WRF - Tides and Currents. The difficulty in maneuvering vessels caused by water movement flow and speed, often affected by seasonal variations and sustained winds. Tide rips and whirlpools can be created by strong currents and affect the maneuverability of smaller vessels. The frequency of occurrence and the location of the strongest currents in the waterway are critical considerations (e.g., if current speed can exceed vessel speed, timing is critical when transiting the area).

    c. WRF - Visibility Restrictions. The natural conditions that may prevent a mariner from seeing other vessels, aids to navigation, or landmarks, such as fog, severe rain squalls, etc.

    d. WRF - Bottom Type. The material on the waterway bottom or just outside the channel, such as hard rock, mud, coral, etc.

2. Waterway Risk Condition - Vessel Quality and Operations. The quality of vessels and their crews that operate on a waterway. Each waterway has what are considered to be high risk vessels, such as old vessels, vessels with poor safety records, vessels registered in certain foreign countries, vessels belonging to financially strapped owners, vessels with inexperienced crews and operators, etc. When assessing risk, the following items should be considered (as appropriate) for each risk factor: maintenance, age, flag, class society, ownership, inspection record, casualty history, language barriers, fatigue related issues, and local area knowledge.

    a. WRF - Large Commercial Vessels. The quality of the large commercial vessel itself and the proficiency and quality of the crew. Large vessels are those ocean-going vessels, often in international trade, that usually are constrained by their draft to use dredged channels where such channels exist. Large vessels include such things as: oil tankers, container ships, break bulk cargo ships, and cruise liners.

    b. WRF - Small Commercial Vessels. The quality of the small commercial vessel itself and the proficiency and quality of the crew. Small vessels include all other commercial craft EXCEPT commercial fishing vessels. Examples include tugs and towboats, offshore supply vessels, charter fishing boats, and small passenger vessels (inspected under 46 CFR Subchapters T and K), such as dinner cruises and ferries.

    c. WRF - Commercial Fishing Vessels. The quality of the commercial fishing vessel itself and the proficiency and quality of the crew. These vessels are included because they are not required to undergo annual vessel inspections nor are the crewmembers

required to hold USCG licenses; therefore, there may be a greater potential for increased incidents involving commercial fishing vessels.

d. WRF - Recreational Vessels. The quality of the recreational vessel itself and the proficiency and operating knowledge of the individuals who operate them. Recreational vessels include all boats used for noncommercial purposes (e.g., pleasure craft or craft used by indigenous people for transportation or subsistence fishing). They can be powered by an engine, the wind, or human exertion. Examples include yachts, personal watercraft (a.k.a., jet skis), and kayaks. Besides local knowledge, understanding of the rules of the road and inebriation also should be considered for this risk factor.

3. Waterway Risk Condition - Traffic Conditions. The number of vessels that use a waterway and their interactions.

   a. WRF - Volume of Commercial Traffic. The amount of commercial vessel traffic using the waterway (i.e., the more vessels there are on the water, the more likely that there will be a marine casualty). Deep draft and shallow draft commercial vessels as well as commercial fishing vessels are included in this risk factor. Shoreside infrastructure is also addressed in this risk factor (i.e., can it handle the volume of commercial traffic within the waterway).

   b. WRF - Volume of Recreational Traffic. The amount of non-commercial vessel traffic using the waterway. The volume may vary depending on the time of day, the day of the week, the season of the year, or during a major marine event.

   c. WRF - Waterway Use. The interaction between vessels or boats of different sizes using the same waterway and their maneuvering characteristics. Conflicts occur as risk increases with each type of vessel's maneuvering characteristics and actions that are often different and unpredictable (e.g. commercial mariners and recreational mariners using deep draft vessels and shallow draft vessels within the same waterway).

   d. WRF - Congestion. The ability of the waterway to handle the volume and density of traffic. Risk increases when a large number of vessels uses a small geographic area for an extended period of time. Risk also increases substantially when you get a larger than normal number of vessels together for a short time (e.g., fishing tournament or short season commercial fishery).

4. Waterway Risk Condition - Waterway Conditions. The physical properties of the waterway that affect vessel maneuverability.

   a. WRF - Visibility Impediments. The man-made objects (e.g., moored ships, condominiums, background lighting, etc.) or geographic formations (e.g., headlands, islands, etc.) that prevent a mariner from seeing aids to navigation or other vessels.

   b. WRF - Dimensions. The room available for two vessels to pass each other within the waterway.

   c. WRF - Obstructions. Floating objects in the water that impede safe navigation and could damage a vessel, such as ice, debris, fishing nets, etc.

d. WRF - Configuration. The arrangement of a waterway, including elements such as waterway bends, multiple and converging channels, and perpendicular traffic flow.

B. WRF Survey. During the first day of the PAWSA workshop, facilitators guide participants through a discussion about each WRF. Following each dialogue, participants take a three-part survey that is used to prioritize the development and discussion of mitigation strategies during the second day of the PAWSA. The following sections provide the associated numerical values, selection options, and definitions for Part One and Part Two of the WRF Surveys that are utilized to calculate the BRV of each WRF.

1. Part One. This first section of the survey asks participants to evaluate the likelihood of a specific WRF based on four available selections. Likelihoods are presented as written options to participants. Each written option has an associated numerical value between one and four based on the likelihood of the condition. Tables 1- 4 in this appendix provide the four written options and associated point value for each WRF.

Waterway Risk Condition - Navigation	
WRF - Winds	
Selection Option	**Point Value**
Strong winds affect maneuverability less than twice a month and are well forecasted.	1
Strong winds affect maneuverability more than twice a month but are well forecasted.	2
Strong winds affect maneuverability less than twice a month but without warning.	3
Strong winds affect maneuverability more than twice a month and without warning.	4
WRF – Tides and Currents	
Selection Option	**Point Value**
Fast tidal and seasonal currents are weak.	1
Fastest tidal and seasonal currents are moderate.	2
Fastest tidal and seasonal currents are strong but do not affect maneuverability.	3
Fastest tidal and seasonal currents are strong and affect maneuverability.	4
WRF – Visibility Restrictions	
Selection Option	**Point Value**
Restricted visibility occurs less than 24 days a year.	1
Restricted visibility occurs more than 24 days a year but usually persists less than 6 hours.	2
Restricted visibility occurs more than 24 days a year but usually persists less than 24 hours.	3
Restricted visibility occurs more than 24 days a year and usually persists more than 24 hours.	4
WRF – Bottom Type	
Selection Option	**Point Value**
Deep water throughout the waterway; no channel is needed, vessel breakdown unlikely to result in grounding or allision.	1
Soft bottom with no hard obstructions.	2
Soft bottom with some hard obstructions.	3
Hard or rocky bottom.	4

Table 1- Selection options and point values for WRFs categorized under the Waterway Risk Condition – Navigation.

Waterway Risk Condition - Vessel Quality and Operation	
WRF – Large Commercial Vessel Quality and Operation	
Selection Option	**Point Value**
All of the large commercial vessels using the waterway are materially sound and are operated proficiently.	1
Most of the large commercial vessels using the waterway are materially sound and are operated proficiently.	2
Many of the large commercial vessels using the waterway are materially sound and are operated proficiently.	3
Some of the large commercial vessels using the waterway are materially sound and are operated proficiently.	4
WRF – Small Commercial Vessel Quality and Operation	
Selection Option	**Point Value**
All of the small commercial vessels using the waterway are materially sound and are operated proficiently.	1
Most of the small commercial vessels using the waterway are materially sound and are operated proficiently.	2
Many of the small commercial vessels using the waterway are materially sound and are operated proficiently.	3
Some of the small commercial vessels using the waterway are materially sound and are operated proficiently.	4
WRF – Commercial Fishing Vessel Quality and Operation	
Selection Option	**Point Value**
All of the commercial fishing vessels using the waterway are materially sound and are operated proficiently.	1
Most of the commercial fishing vessels using the waterway are materially sound and are operated proficiently.	2
Many of the commercial fishing vessels using the waterway are materially sound and are operated proficiently.	3
Some of the commercial fishing vessels using the waterway are materially sound and are operated proficiently.	4
WRF – Recreational Vessel Quality and Operation	
Selection Option	**Point Value**
All of the recreational vessels using the waterway are materially sound and operated proficiently.	1
Most of the recreational vessels using the waterway are materially sound and operated proficiently.	2
Many of the recreational vessels using the waterway are materially sound and operated proficiently.	3
Some of the recreational vessels using the waterway are materially sound and operated proficiently.	4

Table 2- Selection options and point values for WRFs categorized under the Waterway Risk Condition – Vessel Quality and Operation.

Waterway Risk Condition - Traffic	
WRF – Volume of Commercial Traffic	
Selection Option	**Point Value**
Light commercial traffic.	1
Moderate Commercial Traffic.	2
Heavy commercial traffic but waterway infrastructure handles load easily.	3
Heavy commercial traffic and vessels regularly have to wait for berths.	4
WRF – Volume of Recreational Vessel Traffic	
Selection Option	**Point Value**
Light recreational use of the waterway.	1
Moderate recreational use of the waterway.	2
Heavy recreational use of the waterway but seasonal.	3
Heavy recreational use of the waterway year round.	4
WRF – Waterway Use	
Selection Option	**Point Value**
Predominately a single use waterway serving one interest.	1
Multiple use waterway but no conflicts occurring.	2
Multiple use waterway and some minor conflict occurring.	3
Multiple use waterway and major conflicts occurring.	4
WRF – Congestion	
Selection Option	**Point Value**
No congestion ever occurs in the waterway.	1
Congestion only occurs in small areas for limited times.	2
Congestion occurs regularly but flow of vessel traffic is not impeded.	3
Congestion occurs regularly and flow of vessel traffic is impeded.	4

Table 3- Selection options and point values for WRFs categorized under the Waterway Risk Condition – Traffic.

Waterway Risk Condition – Waterway Condition	
WRF – Visibility Impediments	
Selection Option	**Point Value**
No visual impediments on the waterway.	1
Visibility impediments that do not impact navigation.	2
Visibility impediments that sometimes impact navigation.	3
Visibility impediments that often impact navigation.	4
WRF – Dimensions	
Selection Option	**Point Value**
No waterway constrictions.	1
Waterway constrictions (width and depth) exist but never impact navigation.	2
Waterway constrictions (width and depth) exist and sometimes impact navigation.	3
Severe waterway constrictions often impact navigation.	4
WRF – Obstructions	
Selection Option	**Point Value**
No obstructions.	1
Some obstructions not affecting navigation.	2
Obstructions sometimes affect navigation.	3
Obstructions often affect navigation.	4
WRF – Configuration	
Selection Option	**Point Value**
Current waterway configuration is adequate for navigation.	1
Current configuration is inadequate but does not pose a safety concern.	2
Current configuration poses a safety concern.	3
Current configuration poses a significant safety concern.	4

Table 4-Selection options and point values for WRFs categorized under the Waterway Risk Condition – Waterway Condition.

2. Part Two. This portion of the survey asks participants to assign an Impact Level for Immediate and Subsequent Consequences for each WRF. Definitions for terms associated with Part Two of the Survey are provided in this section.

    a. Immediate Consequences. The instantaneous impacts of a vessel casualty (i.e., what happens right after a collision, allision, or grounding). These include the following events or categories –

        i. Personnel Injuries. The maximum number of expected casualties. People can be injured, killed, or need to be rescued.

        ii. Petroleum Discharge. The largest petroleum spill in the most probabe worst-case scenario.

        iii. Hazardous Materials Release. The largest chemical or hazardous material spill in the most probable worst-case scenario.

        iv. Mobility. The infrastructure that is critical to the Marine Transportation System within the waterway (i.e., the significant structures upon which moving people and cargo through the marine transportation system depend). The waterway can be blocked and the shoreside Marine Transportation System can be disrupted, ultimately causing greater problems moving cargo through a port—both on the water and ashore.

b. Subsequent Consequences. The longer-term effects of a marine casualty that are felt hours, days, months, and even years afterwards, such as shoreside facility shut-downs, loss of employment, destruction of fishing areas, decrease or extinction of species, degradation of subsistence living uses, and contamination of drinking or cooling water supplies. These include the following events:

    i. Health and Safety. The potential consequences to the community that lives or works on or near the waterway. Risk is increased when more people live or work in close proximity to a waterway.

    ii. Environmental. The risks to wetlands and endangered species and how sensitive people are to the quality of their environment. The more sensitive, the more people will expect in terms of both preparedness and response effectiveness for any marine accident that threatens environmental quality.

    iii. Aquatic Resources. Water dwelling life forms harvested for commercial or recreational reasons. Timing of a marine casualty could affect the seriousness of the consequences (i.e., some species are only in the waterway at certain times of the year).

    iv. Economic. The extent of the impact if a particular waterway is closed for some period.

Appendix C. Participant Comments

A. Background.

1. This appendix documents participant observations and recommendations expressed during the workshop with respect to specific issues of concern within the study area. Discussion during the first day of the workshop was recorded and subsequently transcribed using professional services. Comments were compiled and categorized by most applicable Waterway Risk Condition and WRF.

B. Waterway Risk Condition - Navigation.

1. WRF – Winds.

a. Wind velocity was a considerable environmental factor that effected the safe transit of vessels on the Chicago River and the harbor. Pockets and gusts of wind on the Chicago River made certain sections windier than others. For example, proximity of building infrastructure to the Chicago River created dangerous downdrafts, amplifying wind gusts from 30 knots to 75 knots. Additionally, the dimensions of the Chicago River created a wind tunnel that contributed to gusty waterway conditions.

b. Participants noted, due to waterway configuration, pockets, and gust of wind near the southern tip of Goose Island, where commercial barge and tour boats encountered recreational traffic was an area of concern. Additionally, the Jackson Street area on the South Branch around the Willis Tower, the Chicago Harbor Lock area, and the basin near the Navy Pier were areas affected by sudden changes in wind velocity.

c. Significant differences in wind conditions were observed near Chicago O'Hare Airport in comparison to conditions observed in the Chicago Harbor. As noted in the Coast Pilot, the windspeed near Chicago O'Hare Airport averaged 9 knots. However, observed windspeed was typically faster on the waterways.

d. Weather radio broadcasts and wind condition updates helped to mitigate wind risk. Human powered craft (HPC) operators leveraged training and practiced good judgment when operating in windy conditions. Tour boat captains routinely communicated the status of incoming barges, kayak pods, and alerted other commercial operators if wind conditions were particularly strong.

2. WRF - Tides and Currents.

a. Tides and currents uniquely affect the Chicago River and the Chicago harbor. Currents in the Chicago River were generally affected by human-induced factors. These included vessel movements, opening and closing of the Chicago Harbor Locks to release pressure post Chicago River swells due to heavy rainfall, and water discharge from buildings. The tides and currents for the harbor were also severely impacted by

wind conditions.

b. Outflows from the dams also impacted light watercraft including kayaks, jet skis, and dragon boats by pushing them into commercial lanes. Currents generated by outflows and propwash also created hazards to HPC and small vessels on the Chicago River.

c. Weather forecast and communication via radio were existing mitigation factors to reduce risk for recreational traffic. In addition to monitoring weather forecasting, commercial vessels communicated with Chicago Lock to determine Chicago River height in real-time and utilized data to determine changes in water levels.

d. Participants recommend posting additional signage along the Chicago River warning vessels of fluctuations in river height.

3. WRF – Visibility Restrictions.

a. Usually between the months of March through May and September through November, fog and rain visibility limitations were identified as improving vessel traffic management.

b. Weather forecasts and Chicago Harbor Locks closures were current mitigations to reduce risk.

C. Waterway Risk Condition - Vessel Quality and Operation.

1. WRF - Small Commercial Vessels.

a. Small commercial vessels for the area were determined to include charter fishing vessels, passenger vessels, barges, and towing vessels.

b. Participants arrived at the consensus that the passenger vessel fleet primarily consisted of newer vessels (less than 10 years of age) that varied in size and capacity. Regarding shallow vessel operation, it was identified that there was a significant shortage of credentialed mariners and crew to operate these vessels. As a result, participants perceived that operator credential testing requirements were less stringent. Participants expressed concern that less stringent testing requirements and general lack of experience (e.g., hiring practices recruiting less experienced crew) have resulted in reduced credentialed mariner seamanship proficiency and an increase in vessel near misses.

c. Recent implementation of 46 CFR Chapter I Subchapter M for towing vessels to obtain a Certificate of Inspection (COI) improved the material quality, maintenance regimens, and overall safety.

d. Both Coast Guard inspections and company training programs for towing and passenger vessels for credentialed mariners and deckhands were existing mitigations

that reduce risk.

2. WRF - Recreational Vessels.

   a. Recreational vessel operations were a significant safety concern identified by workshop participants. Specific concerns included an observed increase in number of HPC in the Chicago waterway, an absence of state regulatory requirements for boater safety education to operate a non-motorized vessels, and a lack of seasoned mariner experience and local knowledge of waterways.

   b. The Chicago waterways were a hub for a wide range of waterborne recreation activities including power and sail cruisers, personal watercraft rentals, yachting, sailing, paddling, and rowing vessels. During the COVID-19 pandemic, boater outreach and education metrics were anecdotally reduced while boat sales increased.

   c. The Chicago Yachting Association hosted voluntary boating training for motorized vessel operations ages 18 and older.

D. Waterway Risk Condition - Traffic.

1. WRF - Volume of Commercial Traffic.

   a. Areas of concern included one-way traffic chokepoints near Kenzie Street, Jackson Avenue, and Goose Island.

   b. Barges located under or near bridges were noted to reduce the width of the Chicago River by half.

   c. Participants discussed the temporary planned closure of the TGO Brian Lock prior to summer of 2026 or 2027 for major construction. As a result, all commercial barge traffic that transits to Keil will be required to transit through the Chicago River and Chicago Lock. On average, the TGO Brian Lock scheduled between 5 to 10 towboats per day.

   d. Strong communication between operators was a major mitigation to reduce risk. To reduce the impact of commercial traffic in the Chicago waterways, vessels followed each other in a line. Tour boats traveled at a slow rate of speed and had flexibility in the length of planned routes. Passenger vessel schedules were repetitive and predictable. Tour boats also spread out along the Chicago River and avoided being close in proximity to prevent marine casualties. Most commercial vessels in the area had longevity in the area waterways, worked well with each other, and regularly communicated to reduce risk with other vessels.

2. WRF - Volume of Recreational Traffic.

   a. Recreational vessel traffic in the Chicago area was primarily comprised of owners with a general working knowledge of boating safety best practices, individuals who rented recreational vessels with limited knowledge of boating safety best practices,

and kayakers and paddle boarders that transited as either part of a tour group or individually.

b. Peak boating season generally spanned from mid-April to mid-November. During this period, of the 70,000 vessels recorded transiting through the Chicago River Locks, approximately 60,000 were recreational vessels. In addition to seasonality, permitted events and fireworks displays significantly increased the volume of recreational traffic on the waterway.

c. Sailboats sometimes stopped all Chicago River traffic during drawbridge lift season. To effectively hold position, sailboats conducted circling maneuvers, disregarding the Chicago River traffic scheme.

d. Participants noted that recreational vessels consistently violated no-wake zones.

e. The Chicago Harbor Safety Committee actively supported educational and training events for recreational vessel operators.

f. There was a successful effort to provide public awareness of the commercial vessel traffic schedule for the Chicago waterways.

3. WRF - Waterway Use.

a. Recreational traffic continued to evolve with the introduction of electric boating to the Chicago River. Participants heavily emphasized safety concerns within this risk factor as influenced by types of recreational vessel traffic on the Chicago River and in the Chicago Harbor.

b. Participants noted that the number of vessel operators with limited waterway experience and local knowledge was increasing and presented a growing concern for collision among large commercial vessel operators on the Chicago River and in the Chicago Harbor.

c. Most of the Chicago River was a no-wake zone. However, recreational operators of larger vessels and electric vessels often violated speed restrictions and were not accountable due to an absence of sufficient enforcement presence on the waterway.

4. WRF – Congestion.

a. Participants expressed a need for enhanced coordination between marine and landside event planners for events that affect the waterway.

b. During firework events, recreational vessel and kayaks rafted together and blocked commercial traffic. Federal agencies and city of Chicago need to address rafting vessels and kayaks during landside or waterway events.

c. Wolf Point was identified as an area of concern and congestion due to three sections of the Chicago River meeting at a specific point. Most commercial vessels use this as

a turnaround area and often encounter significant recreational traffic.

d. Commercial vessel scheduling outside of peak recreational traffic times was an existing mitigation to avoid congestion.

e. The marine permitting process prior to a permitted marine event was an additional existing mitigation to congestion.

E. Waterway Risk Condition - Waterway.

1. WRF – Dimensions.

a. Bridge infrastructure, operations and construction projects posed significant constraints on the Chicago River. The Van Buren and Jackson bridges have slopped bottom framings; if two double-decker passenger vessels and a tug and barge were attempting to pass each other, one was required to wait for the other to pass. Overhead bridge construction occurred frequently and at times the construction crew would leave the barges and work flats in the water after the work was completed or the workday had ended.

b. Bridges' vertical clearances or openings restricted larger vessels to the channel center, limiting maneuvering room to a small portion of the entire navigable channel. Towing vessel operators must lower their pilot houses to navigate the numerous bridges that cross the Chicago River system. By lowering the pilot house, visibility was reduced, and operators were unable to see ahead of the barge or barges they were pushing.

c. Areas with tight bends long the Chicago River made it difficult for two vessels to pass. One such location was in the North Branch of the Chicago River at "Old Man's Railroad," and another was near the southern tip of Goose Island.

d. Frequent communication via radio between commercial vessel operators reduced risk caused by the waterway dimensions. Passing arrangements are agreed upon between operators. At Congress Parkway, bridge construction crews blew a horn to alert construction personnel to stop work while a vessel transited under the bridge. Kayakers carried whistles on their jackets and pod guides carried radios to communicate with other vessel operators.

2. WRF – Obstructions.

a. Participants noted that Dime Pier, north of the locks, was in disrepair. After rainfall or weather, degradation of the pier created debris which posed a hazard to navigation.

b. The former Chicago Tribune building, Old Rail Bridge was degraded and narrowed navigable waters. Participants recommended its removal to widen the Chicago River.

c. Significant seawall degradation and debris from the seawall was reported on the north

branch of the Chicago River and required repair.

d. The Metropolitan Water Reclamation Department, Chicago Department of Transportation, and Department of Street and Sanitation were responsible for removing debris on the Chicago River. These organizations patrolled the waterways looking for obstructions and responded to local requests for debris removal.

e. Participants identified a need for a better process to hold derelict vessel owners accountable.

f. Participants additionally identified a need for improved coordination between federal, state, and local authorities for removal of derelict vessels.

3. WRF - Visibility Impediments.

a. Participants noted that Wolf Point presented a visibility impediment due to three sections of Chicago River meeting at this location. A blind corner south of Halstead also posed a visibility impediment, compounded by most commercial vessels using this area as a turnaround point. Background light often made entrance to the Chicago Lock difficult. Additionally, there was no lighting at the break wall, and the lights in harbor made the entrance to the Chicago Harbor Lock difficult to locate.

b. Participants additionally noted significant vegetation and tree growth above Kinzie. The Northeast branch of the Chicago River needed immediate growth removal and additional resources dedicated to the prevention re-growth.

c. Kayak companies operated according to the philosophy, “Operate as if no one sees you.” This kept kayak operators on high alert for oncoming vessels and nearby structures.

d. Towing vessel operators provided individuals to act as bow lookouts to give the pilot a 200’ vantage point, especially around bridges.

e. Commercial vessel operators communicated the locations of kayaks or HPC to each other in low visibility areas on the waterway.

4. WRF – Configuation.

a. Converging waterways in the Chicago River, Wolf Point near Main Branch, North Branch, and South Branch, were noted as imposing a significant safety risk to HPC.

b. The area between State Street and Michigan Avenue, the bend by Congress Parkway, and West Chicago Avenue were noted as areas of risk due to waterway configuration. A turning basin was located at Damon Street on the South Branch of the Chicago River.

c. City construction projects on the Chicago River were noted as a potential impediment of waterway use and search and rescue response efforts.

Appendix D. Geospatial Participant Comments

Facilitators captured participant observations that made specific geographic references. Those observations were then transferred to an ArcGIS online web-application to generate the chartlets reflecting the location and specific context of each comment. This appendix contains chartlets grouped by Waterway Risk Condition as annotated. There were no geospatially referenced participant comments documented during the Chicago PAWSA workshop for the Vessel Quality and Operation Waterway Risk Condition. A copy of these comments is available for distribution and can be requested from the CG Navigation Center at TIS-DG-NAVCEN-Waterways@uscg.mil.

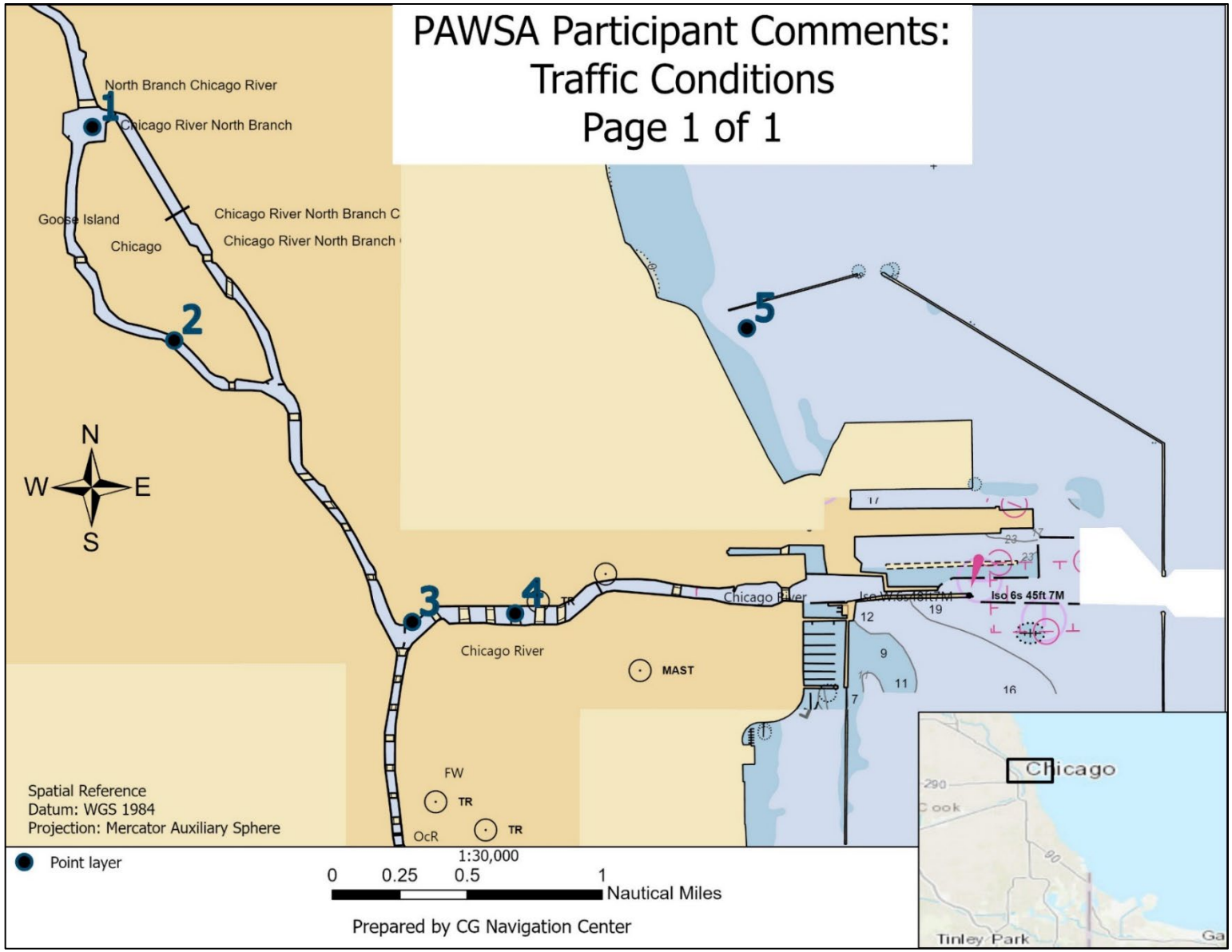

Figure 1- Mapped location of geospatial comments for the Traffic Waterway Risk Condition.

Waterway Risk Condition - Traffic	
Point	**Comment**
1	Near North Avenue Turning Basin, large vessels created strong current outflows that pushed smaller vessels out of the channel.
2	Large commercial vessels docked near Goose Island South obscured visibility and create a blind turn for passing traffic.
3	Recreational vessels transited in the vicinity of Wolf Point without adhering to navigation rules of the road. Participants reported repeated near-miss events occurred between operators of recreational vessels and commercial vessels.
4	Recreational vessels were perceived to display uncontrolled docking and maneuvering while coming about between Clark Street Bridge and Dearborn Street Bridge and also in the vicinity of State Street Bridge.
5	The “Playpen” is a no-wake zone area between Ohio Street Beach and Oak Street Beach on Lake Michigan in the Chicago Harbor. This area encompasses Anchorage A within the Chicago Harbor. On a nice day, the “Playpen” is busy with recreational boaters rafted together. Participants recommended increased law enforcement presence to enforce no-wake zones and deter hazardous vessel operation in this area.

Table 1- Geospatial Comments for the Traffic Waterway Risk Condition.

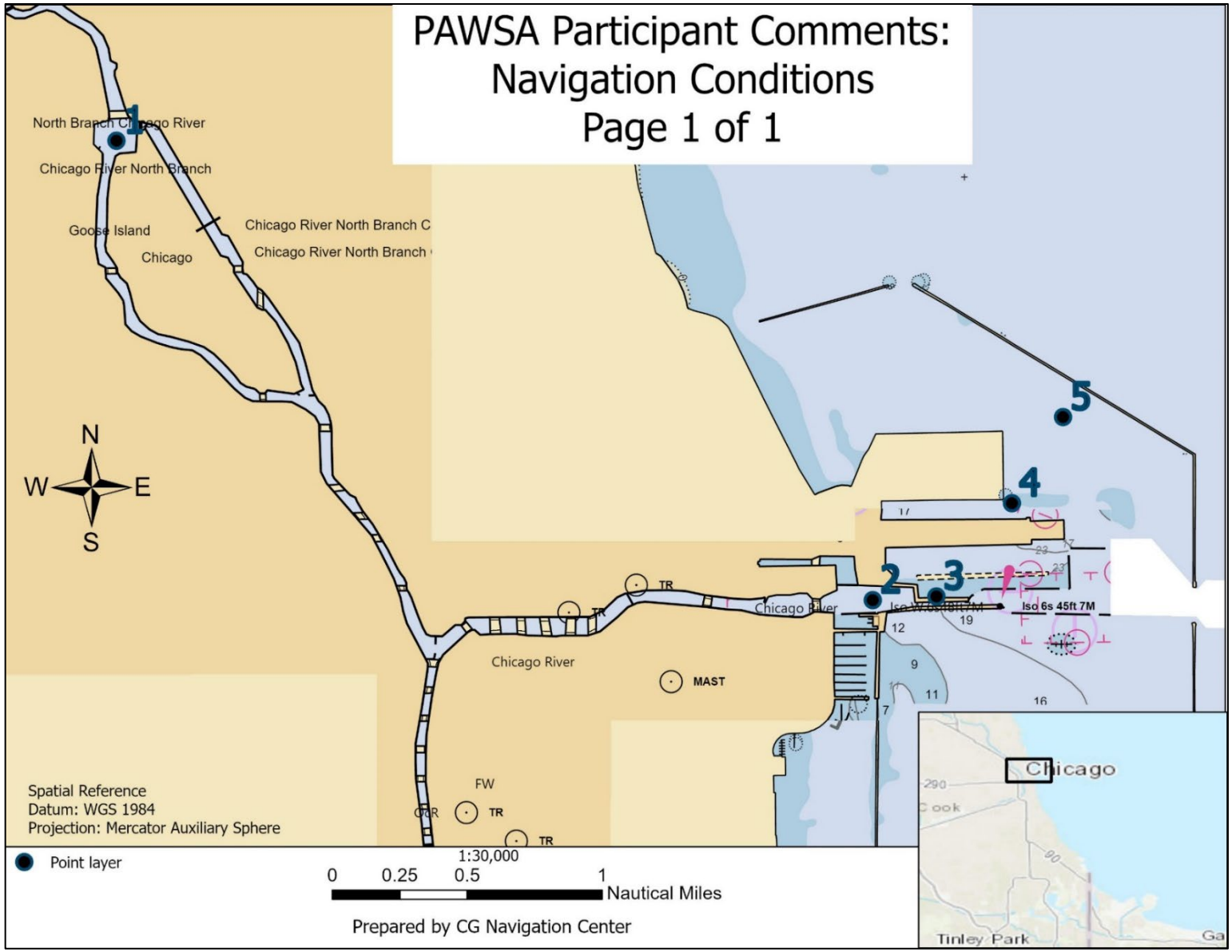

Figure 2- Mapped location of geospatial comments for the Navigation Waterway Risk Condition.

Waterway Risk Condition - Navigation	
Point	**Comment**
1	Wind downdrafts negatively impact safe navigation south of Goose Island Terminal and often exceeds 20 knots. Commercial barges, commercial tour boats, human powered craft, and dragon boats used this area as a turnaround point and were affected by wind downdrafts.
2	On nights where firework displays were scheduled, the Chicago Harbor Lock approach is entirely blocked by recreational boaters.
3	During restricted visibility, participants recommended closing the Chicago Harbor Lock if Lock operators are unable to see a vessel navigation lights.
4	Rapid and severe changes in wind conditions occur at Navy Pier, which significantly impacts the operation of shallow draft and recreational vessels.
5	The seawall is unclearly identified and needs additional signage or markers to become more visible to boaters.

Table 2- Geospatial Comments for the Navigation Waterway Risk Condition.

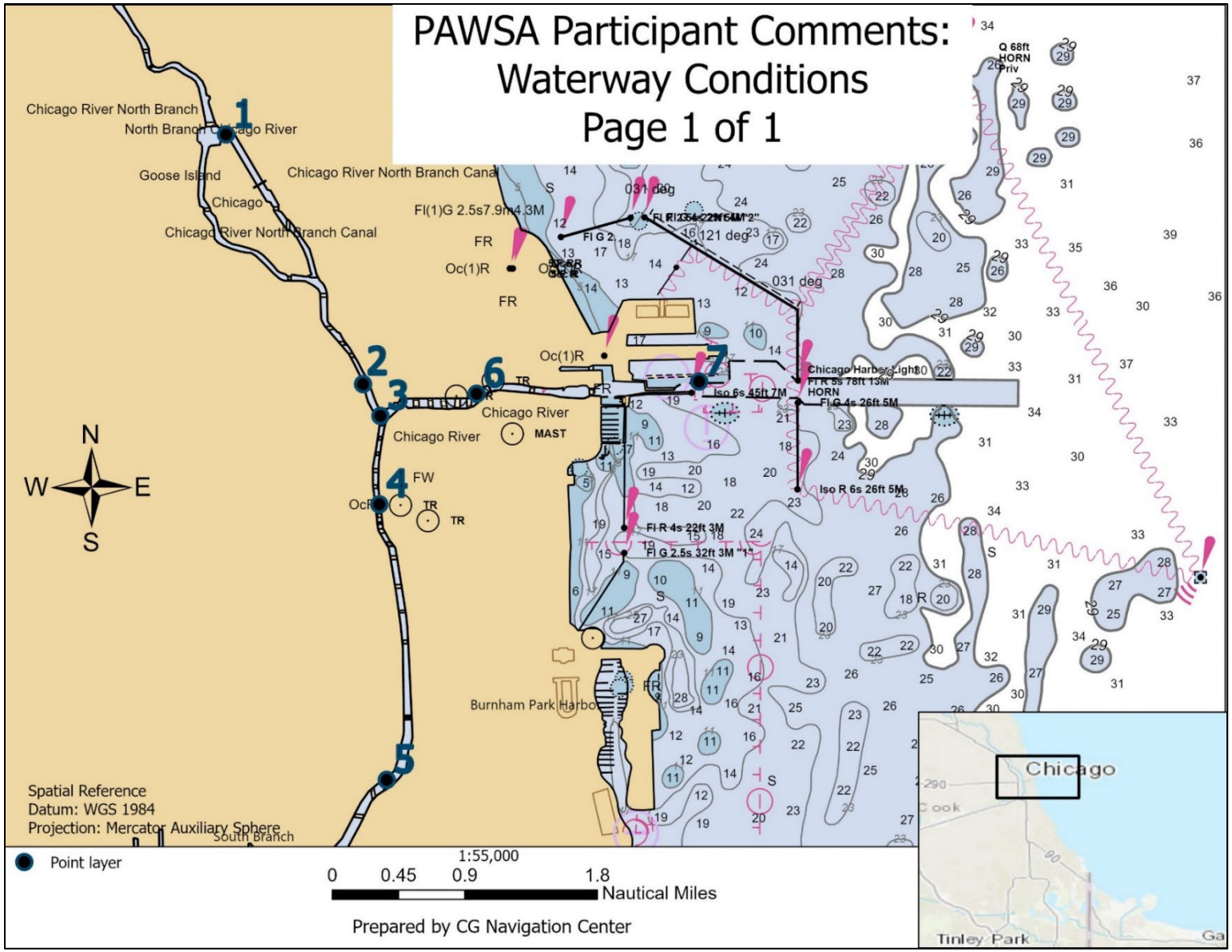

Figure 3- Mapped location of geospatial comments for the Waterway - Waterway Risk Condition.

Waterway Risk Condition - Waterway	
Point	**Comment**
1	There is an increased need for tree maintenance on the East Canal.
3	A blind turn exists near Wolf Point, causing commercial vessels transiting downbound the Chicago River to round the point without full awareness of traffic conditions on the other side. This area needs a vessel transit scheme for HPCs and commercial boats transiting in the vicinity of Wolf Point.
2	Kinzie Street Railroad Bridge is a physical property of the waterway that narrowed the navigable channel and reduced availability for vessels to maneuver. As a result, larger vessels are limited to one-way traffic when passing this point.
4	Hazardous wind shear caused by Willis Tower and Jackson Boulevard occurs when wind encountered low-arched bridges. This condition causes larger vessels to transit center of channel or increase transit speed to overcome the risk of wind shear.
5	The Amtrak South Branch Bridge near Ping Tom Memorial Park is the only bridge that opens on demand in the Chicago River.
6	A new casino located near North Wabash Avenue and East Riverwalk, near the Tribune Tower, creates new traffic concerns that resulted in vessel congestion and docking.
7	Dime Pier, (also known as City Pier #1,) north of the Chicago Harbor Lock, is in disrepair and poses a navigational hazard.

Table 3- Geospatial Comments for the Waterway - Waterway Risk Condition.