Port of Portland, Maine
PAWSA Workshop Report

Introduction

A Ports and Waterways Safety Assessment (PAWSA) workshop was conducted for the Port of Portland, Maine on 1 – 2 May, 2001. This workshop report provides the following information:

- Brief description of the process used for the assessment;
- List of participants;
- Numerical results from the Analytic Hierarchy Process (AHP) [1];
- Summary of risks and mitigations discussions; and
- Port of Portland Attributes Summaries.

Strategies for reducing unmitigated risks will be the subject of a separate report.

Assessment Process

The PAWSA process is a structured approach for obtaining expert judgments on the level of risk in a port area. The process also addresses the relative merits of specific types of Vessel Traffic Management (VTM) improvements for reducing risk in the port. Based on the Analytic Hierarchy Process, the port risk assessment process uses a select group of experts/stakeholders in each port to evaluate waterway risk factors and the effectiveness of various VTM improvements. The process requires the participation of local Coast Guard officials before and throughout the workshops. Thus the process is a joint effort involving waterway user experts, stakeholders, and the agencies/entities responsible for implementing selected risk mitigation measures.

This methodology employs a generic model of port risk that was conceptually developed by a National Dialog Group on Port Risk and then translated into computer algorithms by the Volpe National Transportation Systems Center. In that model, risk is defined as the sum of the probability of a casualty and its consequences. Consequently, the model includes variables associated with both the causes and the effects of vessel casualties. Because the risk factors in the model do NOT contribute equally to overall port risk, the first session of each PAWSA workshop is devoted to obtaining expert opinion about how to weight the relative contribution of each variable to overall port risk. The workshop participants then are asked to establish scales to measure each variable. Once the parameters have been established for each risk-inducing factor, port-specific risk is estimated by putting into the computer model specific values for that port for each variable. The computer model allows comparison of relative risk and the potential efficacy of various VTM improvements between different ports.

- [1] Developed by Dr. Thomas L. Saaty, et al, to structure complex decision making, to provide scaled measurements, and to synthesize many factors having different dimensions.

Participants

The following is a list of waterway users and stakeholders who participated in the process:

Participant	Organization	Phone	Email
Tom Bergh	Maine Island Kayak Co.	(207) 766-2373	info@maineislandkayak.com
Dan Brown	USCG GRU Portland	(207) 767-0312	dbrown@uscg.mil
Kenneth Campbell	Portland Pilots	(207) 774-5623	N/A
Rob Elder	Maine Dept. of Transportation	(207) 287-2841	robert.elder@state.me.us
Bill Flynn	South Portland Fire Dept.	(207) 799-3313	N/A
Arthur Fournier	Portland Tugboat & Ship Docking	(207) 774-2902	porttug@aol.com
Jay Frye	N/A	N/A	N/A
Mark Gandolfo	Casco Bay Ferries	(207) 774-7871	nickm@cascobaylines.com (Nick Mavadones)
William Gribbin	Portland Docking Masters	(207) 846-5620	wgribbi1@maine.rr.com
Tom Hardison	Portland Pipeline	(207) 767-0440	tom.hardison@pmpl.com
Judy Harris	City of Portland	(207) 775-3522	jh@ci.portland.me.us
Paul Jensen	Spring Point Marina	(207) 767-3254	pcjensen@portharbormarine.com
John Kenney	ME Dept. of Inland Fish & Wildlife	(207) 941-4448	john.kenney@state.me.us
Steve Lowe	USCG MSO Portland	(207) 780-3069	slowe@msoportme.uscg.mil
John Mauro	First Coast Guard District (oan)	(617) 223-8355	jmauro@d1.uscg.mil
Joe McCarthy	National Response Corporation	(207) 767-7112	resolute@nrcc.com
Jeff Monroe	City of Portland	(207) 773-1613	jwm@ci.portland.me.us
Kelly Moran	Moran Shipping Agencies Inc	(207) 772-6515	kmoran@moranshipping.com
Coley Mulkern	Lionel Plante Association	(207) 766-2508	mulkern@maine.rr.com
Tom Meyers	City of South Portland	(207) 767-5556	tmeyers@spsd.org
Roy Nash	USCG MSO Portland	(207) 780-3703	rnash@msoportme.uscg.mil
Paul Nevins	Irving & Piscataqua River Loop	(603) 436-5747	paul.nevins@irvingoil.com
David Sait	Maine Dept. of Environ. Protection	(207) 287-2651	david.c.sait@state.me.us
Ben Snow	City of Portland	(207) 773-1613	ben@ci.portland.me.us
Brad Thompson	USCG Auxiliary	(207) 883-6426	N/A
Rolf Westphal	Sprague	(207) 799-4899	rwestphal@spragueenergy.com

Facilitation Team	Organization	Phone	Email
Dave Murk	USCG Commandant (G-MWV)	(202) 267-0352	dmurk@comdt.uscg.mil
Doug Perkins	Potomac Management Group, Inc.	(703) 836-1037	dperkins@potomacmgmt.com
Rich Musto	Potomac Management Group, Inc.	(703) 836-1037	rmusto@potomacmgmt.com
Leanne Rebuck	Potomac Management Group, Inc.	(703) 836-1037	lrebuck@potomacmgmt.com

Numerical Results

Book 1 – Risk Categories *(Generic Weights Sum to 100)*

Fleet Composition	Traffic Conditions	Navigational Conditions	Waterway Configuration	Immediate Consequences	Subsequent Consequences
29.0	10.1	8.6	9.8	17.0	25.5

Analysis:

Book 1 begins the process of weighting the national port risk model. The participant teams use their knowledge and the AHP process to provide weights for the six major risk categories. The contribution to the national model by the Port of Portland participants is as listed above. These participants felt that Fleet Composition was the largest driver of risk. Navigational Conditions was a significantly lower influence.

Book 2 - Risk Factors *(Generic Weights)*

Fleet Composition	Traffic Conditions	Navigational Conditions	Waterway Configuration	Immediate Consequences	Subsequent Consequences
29.0	10.1	8.6	9.8	17.0	25.5

% High Risk Deep Draft	Volume Deep Draft	Wind Conditions	Visibility Obstructions	# of People on Waterway	Economic Impacts
19.3	1.4	1.7	3.9	8.1	5.6
% High Risk Shallow Draft	Volume Shallow Draft	Visibility Conditions	Channel Width	Volume of Petroleum	Environmental Impacts
9.7	2.3	4.7	2.3	4.2	5.4
	Vol. of Fish & Pleasure	Tide & River Currents	Bottom Type	Volume of Chemicals	Health & Safety Impacts
	1.2	1.3	1.7	4.7	14.5
	Traffic Density	Ice Conditions	Waterway Complexity		
	5.2	0.9	2.1		

Analysis:

Book 2 further refines the weighting for the national port risk model. The participants examined the importance of the 20 risk factors to port safety and provided the above results to the national model. For each of the six major categories, they determined that the following factors contribute the most to overall risk:

- Fleet Composition: High-Risk Deep Draft Vessels contribute the highest amount of risk and High-Risk Shallow Draft Vessels contribute the third highest amount of risk.
- Traffic Conditions: Traffic Density contributes the seventh highest amount of risk.
- Navigational Conditions: Visibility Conditions contribute the eighth highest amount of risk.
- Waterway Configuration: Visibility Obstruction contributes the tenth highest amount of risk.
- Immediate Consequences: The Number of People on Waterway contributes the fourth highest amount of risk, the Volume of Chemicals contributes the eighth highest amount of risk, and the Volume of Petroleum contributes the ninth highest amount of risk.
- Subsequent Consequences: Health and Safety Impacts contribute the second highest amount of risk, the Economic Impacts contribute the fifth highest amount of risk, and the Environmental Impacts contribute the sixth highest amount of risk.

Book 3 Factor Scales - Condition List *(Generic)*

	Scale Value
Wind Conditions	
a. Severe winds < 2 days / month	1.0
b. Severe winds occur in brief periods	2.1
c. Severe winds are frequent & anticipated	4.5
d. Severe winds occur without warning	9.0
Visibility Conditions	
a. Poor visibility < 2 days/month	1.0
b. Poor visibility occurs in brief periods	2.0
c. Poor visibility is frequent & anticipated	4.4
d. Poor visibility occurs without warning	9.0
Tide and River Currents	
a. Tides & currents are negligible	1.0
b. Currents run parallel to the channel	2.4
c. Transits are timed closely with tide	5.4
d. Currents cross channel/turns difficult	9.0
Ice Conditions	
a. Ice never forms	1.0
b. Some ice forms-icebreaking is rare	1.5
c. Icebreakers keep channel open	4.6
d. Vessels need icebreaker escorts	9.0

Visibility Obstructions

a. No blind turns or intersections	1.0
b. Good geographic visibility-intersections	1.9
c. Visibility obscured, good communications	4.5
d. Distances & communications limited	9.0

Channel Width

a. Meetings & overtakings are easy	1.0
b. Passing arrangements needed-ample room	2.0
c. Meetings & overtakings in specific areas	6.0
d. Movements restricted to one-way traffic	9.0

Bottom Type

a. Deep water or no channel necessary	1.0
b. Soft bottom, no obstructions	1.1
c. Mud, sand and rock outside channel	3.8
d. Hard or rocky bottom at channel edges	9.0

Waterway Complexity

a. Straight run with NO crossing traffic	1.0
b. Multiple turns > 15 degrees-NO crossing	2.0
c. Converging - NO crossing traffic	4.5
d. Converging WITH crossing traffic	9.0

Number of People on Waterway

a. Industrial, little recreational boating	1.0
b. Recreational boating and fishing	2.6
c. Cruise & excursion vessels-ferries	5.4
d. Extensive network of ferries, excursions	9.0

Petroleum Volume

a. Little or no petroleum cargoes	1.0
b. Petroleum for local heating & use	2.2
c. Petroleum for transshipment inland	4.5
d. High volume petroleum & LNG/LPG	9.0

Chemical Volume

a. Little or no hazardous chemicals	1.0
b. Some hazardous chemical cargo	2.1
c. Hazardous chemicals arrive daily	5.1
d. High volume of hazardous chemicals	9.0

Economic Impacts

a. Vulnerable population is small	1.0
b. Vulnerable population is large	3.2
c. Vulnerable, dependent & small	5.4
d. Vulnerable, dependent & large	9.0

Environmental Impacts

a. Minimal environmental sensitivity	1.0
b. Sensitive, wetlands, VULNERABLE	2.9
c. Sensitive, wetlands, ENDANGERED	5.7
d. ENDANGERED species, fisheries	9.0

Health and Safety Impacts

a. Small population around port	1.0
b. Medium - large population around port	2.4
c. Large population, bridges	5.4
d. Large DEPENDENT population	9.0

Analysis:

The purpose of Book 3 is for the participants to calibrate a risk assessment scale for each risk factor. For each risk factor there is a low (Port Heaven) and a high (Port Hell) severity limit, which are assigned values of 1.0 and 9.0 respectively. The participants determined numerical values for two intermediate qualitative descriptions between those two extreme limits. Participants from this port evaluated the average difference in risk between the lower limit (Port Heaven) and the first intermediate scale point as being equal to 1.2; the average difference in risk between the first and second intermediate scale points was equal to 2.8; and the average difference in risk between the second intermediate scale point and the upper risk limit (Port Hell) was 4.1.

Book 4 - Risk Factor Ratings *(Port of Portland)*

Fleet Composition	Traffic Conditions	Navigational Conditions	Waterway Configuration	Immediate Consequences	Subsequent Consequences
% High Risk Deep Draft 5.0	Volume Deep Draft 5.6	Wind Conditions 2.0	Visibility Obstructions 2.3	# of People on Waterway 6.7	Economic Impacts 8.4
% High Risk Shallow Draft 5.3	Volume Shallow Draft 5.3	Visibility Conditions 3.2	Channel Width 5.5	Volume of Petroleum 8.2	Environmental Impacts 5.8
	Vol. Fishing & Pleasure Craft 5.7	Tide & River Currents 4.1	Bottom Type 3.8	Volume of Chemicals 1.0	Health & Safety Impacts 3.8
	Traffic Density 5.5	Ice Conditions 1.7	Waterway Complexity 6.9		

Analysis:

Book 4 is the point in the workshop when the process begins to address local port risks. The participants use the scales developed in Book 3 to assess the absolute level of risk in their port for each of the 20 risk factors. The values shown in the preceding table do NOT add up to 100. Based on the input from the participants, the following are the top risks to port safety in the Port of Portland (in order of importance). Note that the highest possible value is 9.0 (Port Hell).

1. Economic Impacts (8.4)
2. Volume of Petroleum (8.2)
3. Waterway Complexity (6.9)
4. Number of People on Waterway (6.7)
5. Environmental Impacts (5.8)
6. Volume of Fishing & Pleasure Craft (5.7)
7. Volume of Deep Draft (5.6)
8. Channel Width (5.5)
8. Traffic Density (5.5)

Book 5 - VTM Tools *(Port of Portland)*

Fleet Composition	Traffic Conditions	Navigation Conditions	Waterway Configuration	Immediate Consequences	Subsequent Consequences

% High Risk Deep Draft		Volume Deep Draft		Wind Conditions		Visibility Obstructions		# of People on Waterway		Economic Impacts	
10	0.7	**12**	0.6	**14**	0.2	**18**	–0.2	**9**	0.9	**1**	2.3
RA		RA		RA		RA		RA		OTH	ALERT
% High Risk Shallow Draft		**Volume Shallow Draft**		**Visibility Conditions**		**Channel Width**		**Volume of Petroleum**		**Environmental Impacts**	
5	1.5	**7**	1.0	**11**	0.6	**18**	–0.2	**3**	2.0	**6**	1.1
RR	ALERT	RA		RA		RA	ALERT	RA	ALERT	RA	ALERT
		Vol. Fishing & Pleasure Craft		**Tide & River Currents**		**Bottom Type**		**Volume of Chemicals**		**Health & Safety Impacts**	
		4	1.7	**8**	0.9	**13**	0.5	**15**	0.0	**16**	0.0
		RR		RA		RA		RA		RA	
		Traffic Density		**Ice Conditions**		**Waterway Complexity**					
		17	–0.1	**20**	–0.6	**2**	2.1				
		RA		RA		RA	ALERT				

Tool acronyms and definitions

Key

Risk Factor	
Rank	Risk Gap
Tool	ALERT

RA	Risk Acceptable
AN	Improve Aids to Navigation
CM	Improve Communications
RR	Improve Rules & Regulations
SI	Improve Static Navigation Info
DI	Improve Dynamic Navigation Info
VTIS	Vessel Traffic Information System
VTS	Vessel Traffic System
OTH	Other – not a VTM solution

Legend

Rank is the position of the Risk Gap for a particular factor relative to the Risk Gap for the other factors as determined by the participants.

Risk Gap is the variance between the existing level of risk for each factor determined in Book 4 and the average acceptable risk level as determined by each participant team. Negative numbers imply that the risk level could INCREASE

and still be acceptable. The teams were instructed as follows: *If the acceptable risk level is equal to or higher than to the existing risk level for a particular factor, circle RA (Risk Acceptable). If the mitigation needed does not fall under one of the VTM tools, circle OTH (Other) at the end of the line. Otherwise, circle the VTM tool that you feel would MOST APPROPRIATELY reduce the unmitigated risk to an acceptable level*.

The **Tool** listed is the one determined by the majority of participant teams as the best to narrow the Risk Gap.

An **ALERT** is given if no mathematical consensus is reached for the tool suggested.

Analysis:

The results shown are generally consistent with the discussion that occurred about risks in the Port of Portland. For 13 out of the 14 risk factors for which there was good consensus, the participants judged the risk to be at an acceptable level already due to existing mitigation strategies.

No consensus alerts occurred because votes were split between several VTM tools, as indicated:

- Economic Impacts – RA (4), RR (2), VTS (1), OTH (5)
- % of Deep Draft Shallow Vessels – RA (2), CM (1), RR (6), SI (1), DI (1), OTH (1)
- Channel Width – RA (5), AN (1), CM (1), RR (1), DI (3), OTH (1)
- Volume of Petroleum – RA (5), AN (1), CM (1), DI (3), VTIS (1), VTS (1)
- Environmental Impacts – RA (6), RR (1), VTS (1), OTH (4)
- Waterway Complexity – RA (4), CM (1), RR (1), DI (3), VTIS (2), OTH (1)

Summary of Risks

Scope of the port area under consideration: The participants defined the geographic bounds of the port area to be discussed.

- From Cape Elizabeth through the Precautionary Area inland through Portland Harbor and northwards through Casco Bay to Cousins Island.

FACTOR	RISKS	RISK MITIGATION STRATEGIES
Fleet Composition		
Percent High Risk Deep Draft Cargo & Passenger Vessels	Today: • Since OPA 90 the change has been positive. Majority of ships are less than 5 years old. • 98% of ships are foreign flagged including former Soviet Union. Crews are well trained overall. • Vetting process in place. Ships must be pre-approved before going to oil pipeline dock. • Vessels of concern are spot market vessels. Three oil terminals accept spot market vessels. These vessels may not go through pre-screening. • Central Maine Power took in ships. of questionable quality. Florida Power and Light has purchased power plant and is requiring better quality ships. • Nine Captain of the Port orders issued all of last year. Only one intervention leading to a detention was required.. • Only one priority one ship last year; 100 priority two's all of last year. • Deep draft cargo and passenger vessels do not seem to be a major area of concern. Trends: • Newer, well maintained ships are on the increase.	Existing Mitigations: • All priority one's are boarded by Coast Guard. New ideas: • None discussed.

FACTOR	RISKS	RISK MITIGATION STRATEGIES
Fleet Composition (continued)		
Percent High Risk Shallow Draft Cargo & Passenger Vessels	Today: • A major problem is quality of fishing vessels. – These vessels sink, leak oil and pollute the port. – Vessel operators under the influence of drugs and/or alcohol; a major cause of injuries and deaths. There were nine deaths last year • Condition of the local recreational fleet is good to excellent. • Recreational and fishing vessel operators do not have to meet any minimum qualifications. • Huge number of kayaks and other small boats are being sold and used in Portland area waterways. – These can not be seen – Training/knowledge is an issue • Crew competency in small boats is an issue. • Small boats not required to listen to marine channels. – Communication with deep draft vessels can be a problem. • Small boats may not realize the capabilities and limitations of deep draft vessels. • Leaking tankers are very infrequent. Trends: • Tugs and tows quality is improving.	Existing Mitigations: • All tugs towing barges at sea are inspected – Uninspected towing vessels must meet certain regulations. • Single skin barge must be towed by dual propulsion tug. • When a recreational boat is bought some (not all) boat dealers require a class in the operation of the boat. – This leads to more knowledgeable boat operators. New ideas: • Require licenses for recreational boat operators in Maine same as is being done in New Hampshire. • Public awareness campaign on rules of the road.

FACTOR	RISKS	RISK MITIGATION STRATEGIES
Traffic Conditions		
Volume of Deep Draft Vessels	Today: • Vessels transporting home heating oil and gasoline is remaining consistent. • There are approximately 45 passenger vessels. • Approximately 1,300 deep draft vessel movements a year. • Inter harbor movements are approximately 650. • A deep draft vessel is passing Portland Head every 6 hours. • Portland has the highest number of international cruise passengers in New England. • Vessels sometimes need to anchor out of port while awaiting an open berth. Trends: • The number of passenger vessels will be increasing to 100 visits per year. • Integrated Tug and Barge (ITB) traffic is increasing. • Portland is actively engaged in increasing vessel traffic. • International cruise passenger traffic is increasing. • Increase in terminals and cargo capacity, including bulk capabilities. • Port capacity is constrained by shore-side infrastructure. • Portland Pipe Line traffic is growing.	Existing Mitigations: • None discussed. New ideas: • None discussed.

FACTOR	RISKS	RISK MITIGATION STRATEGIES
Traffic Conditions (continued)		
Volume of Shallow Draft Vessels	Today: • Fishing fleet size is remaining fairly stable. • 55 million tons of fish is landed in Portland annually. • Portland is a good place to drop off your catch even if it is not the vessel's home port. • Portland does not have high speed craft operating at the present time. Trends: • Amount of fish landed in Portland and size of vessels is increasing. • City is actively increasing fish processing. • Casco Bay island transit traffic is increasing. – Freight traffic to build infrastructure on the islands. – Passenger service will increase by 1 million. • High sped craft are being looked at for the future.	Existing Mitigations: • Speed restrictions are in place. – This may restrict high speed craft. New ideas • None discussed.

FACTOR	RISKS	RISK MITIGATION STRATEGIES
Traffic Conditions (continued)		
Volume of Fishing & Pleasure Craft	Today: • Pleasure craft volume is seasonal. – May through September. • 800 recreational berths in the port. • 1,000 moorings in place. • Marinas are at maximum capacity. – This restricts number of recreational vessels. • Majority of marina locations are in vicinity of the harbor entrance. – Four marinas are in South Portland. – Two marinas are on the north side. – One small marina located in inner harbor. – One marina on Diamond Island. – One marina on Peaks Island. • Two active boat ramps: Eastend Beach and Spring Point. • Most recreational vessels operate in Casco Bay area. • There is a Wednesday afternoon sailing race in the middle of the channel. • Falmouth shore has a number of docks and moorings. Trends: • New marina, proposed near Back Cove, will add 250 slips. • New sailing school will be opening soon. • Growing population of islanders using their own boats to commute.	Existing Mitigations: • Traffic is seasonal. • Marine event permits are required for any event. – Event directors are required to check with tugs and pilots concerning incoming traffic. New ideas: • Restricting deep draft traffic on Wednesday evenings. • Share the waterways campaign. • On web sites increase static information about port conditions / vessel movements. • Webcams placed in various locations around the port to record and broadcast real-time information.

FACTOR	RISKS	RISK MITIGATION STRATEGIES
Traffic Conditions (continued)		
Traffic Density	Today: • Seasonal: recreational traffic increases May through September. – Wednesday between 1600-1830 sailing races in channel vicinity of Spring Point. • Cruise ship traffic increases August through October. – Vessels arrive early in the morning and depart in the evening. – Departures conflicts with sailing races. • Lobstering increases dramatically throughout the harbor in the summertime. • 4th of July fireworks festival. • Diamond Cove is a risk area in summertime due to high volume of recreational vessels and limited movement area. Trends: • Infrastructure improvements will move Scotia Prince, Casco Bay ferries, recreational vessels to the north entrance of the harbor. • Increase in population of commuters from the surrounding islands. • Increasing numbers of small commercial vessels. – Small repair vessels – Work boats • Increase in kayak/canoe rental companies. • Increasing loitering off port by tankers.	Existing Mitigations: • Op-Sail increased public awareness of harbor facilities and limitations. • Coast Guard will implement harbor restrictions when there is a harbor festival. • Marine event permits required for any event. – Event directors are required to check with tugs and pilots concerning incoming traffic. • Broadcast Notices to Mariners. New ideas: • Local notice to mariners continuously broadcast on a specific marine channel. • Restricting deep draft traffic on Wednesday evenings. • Share the waterways campaign to increase awareness.

FACTOR	RISKS	RISK MITIGATION STRATEGIES
Navigation Conditions		
Wind Conditions	Today: • Average wind speed is 6-8 knots. • Gale force winds occur 2% of the time. – At most, gale conditions generally last a day. • Current cruise ship pier can experience wind exposure problems. • Tugs abort operations 15-20 times per year due to wind conditions. – This occurs mostly in the winter months. • Wind is not a major issue as the port and Casco Bay are fairly protected. • Wind predictability is good. – Weather systems are organized and easy to read. – Real time feed from weather buoy through the internet. Trends: • Newer cruise ships and terminal may experience problems in September and October. • Northeast dock will be removed. This was a bad weather waiting area for coastal tugs.	Existing Mitigations: • Tugs will abort operations and wait until wind abates. New ideas: • The port is possibly adding a Physical Oceanographic Real-Time System. (PORTS).

FACTOR	RISKS	RISK MITIGATION STRATEGIES
Navigation Conditions (continued)		
Visibility Conditions	Today: • The port averages 167 days a year of foggy conditions – 2% of these days the visibility is less than ½ mile. • Small boaters have trouble navigating when visibility is limited. • Small boaters lack radar and will line up and follow a vessel equipped with radar. • Blowing snow is a major issue. – Wind and blowing snow will obscure buoys on radar. • Fog/snow increases problems for ferries, which must keep schedule. • Recreational vessels will still go out in limited visibility. – They then clutter the maritime radio channels causing congestion and distractions. Trends: • None discussed.	Existing Mitigations: • None discussed. New ideas: • None discussed.
Navigation Conditions (continued)		
Tide & River Currents	Today: • Local tidal currents typically run at 1 to 1½ knots. • Strong northwest winds cause very strong ebb tides. – This takes water from the bay and lowers the depth of the harbor. – Difficult to exit the Inner Harbor through the bridge on an ebb tide. • Currents cross approach channel from down Casco Bay at Spring Point. Trends: • None discussed.	Existing Mitigations: • Vessels will wait to enter the harbor when there is an ebb tide. New ideas: • Harbor Commission considering installing PORTS.

FACTOR	RISKS	RISK MITIGATION STRATEGIES
Navigation Conditions (continued)		
Ice Conditions	Today: • Last time harbor closed due to ice was 5-6 years ago. • Casco Bay infrequently freezes over. – When this happens, Coast Guard has to run continuous ice breaking operations. • Spring run-off can bring debris into harbor. Trends: • None discussed.	Existing Mitigations: • USCGC MARCUS HANNA home-ported in South Portland. New ideas: • None discussed.
Waterway Configuration		
Visibility Obstructions	Today: • Visibility for deep draft vessels is good, including around Spring Point bend. • There may be obstructions but they do not normally pose a problem as there is plenty of time to make corrections. • Visibility issues for ferries and recreational boats rounding southern tip of Little Diamond Island. Trends: • None discussed.	Existing Mitigations: • None discussed. New ideas: • None discussed.
Waterway Configuration (continued)		
Channel Width	Today: • Inner Harbor is narrow for deep draft vessels. • Eastern Approach channel too narrow for two deep draft vessels approaching each other. • Channel width may be an issue with tugs/tows meeting in vicinity of Catfish Rock / Portland Head. Trends: • None discussed.	Existing Mitigations: • Inner Harbor is restricted to one-way traffic. • Coast Pilot recommends that deep draft vessels do not meet in the Eastern Approach Channel. • Coast Pilot recommends that meetings do not occur in Portland Head area. New ideas: • None discussed.

FACTOR	RISKS	RISK MITIGATION STRATEGIES
Waterway Configuration (continued)		
Bottom Type	Today: • Outer harbor and inner harbor are mostly mud bottom. • Certain limited areas may be hard bottom. • Silting in anchorages may decrease available depth. Trends: • Portland Pipeline Company is increasing the allowable draft for arriving vessels. – Groundings may increase.	Existing Mitigations: • Areas of hard bottom and rock outcroppings are well marked by aids to navigation. New ideas: • None discussed.
Waterway Configuration (continued)		
Waterway Complexity	Today: • Adherence to rules of the road are not a problem except between May and September. • 120 degree bend in deep draft channel around Spring Point. • Recreational boaters from Spring Point are crossing approach channel and heading north or east. • Casco Bay lines also crossing traffic in a gradual manner. • Hussey Sound / Soldier Ledge area may see crossing traffic between recreational vessels, ferries, and tugs. • Bridge is not always reliable in opening. Trends: • Drawbridge reliability improving.	Existing Mitigations: • Casco Bay ferries have direct communications with tugs to avoid a crossing situation. • Call-in system has been implemented in this port. • Speed limits have been put in place by the Harbor Commission. • Tugs hold tankers far enough away from bridge to make sure that the drawbridge does open. • Vessels have priority over car traffic for drawbridge openings. • 95% of tank vessels taking Hussey Sound channel to Cousins Island have escorts. • Big ship / little ship pamphlet distributed by the Coast Guard. • Broadcast Notice to Mariners has been implemented. New ideas: • Increase static port information on web sites.

FACTOR	RISKS	RISK MITIGATION STRATEGIES
Waterway Configuration (continued)		
Waterway Complexity	Today: • Adherence to rules of the road are not a problem except between May and September. • 120 degree bend in deep draft channel around Spring Point. • Recreational boaters from Spring Point are crossing approach channel and heading north or east. • Casco Bay lines also crossing traffic in a gradual manner. • Hussey Sound / Soldier Ledge area may see crossing traffic between recreational vessels, ferries, and tugs. • Bridge is not always reliable in opening. Trends: • Drawbridge reliability improving.	Existing Mitigations: • Casco Bay ferries have direct communications with tugs to avoid a crossing situation. • Call-in system has been implemented in this port. • Speed limits have been put in place by the Harbor Commission. • Tugs hold tankers far enough away from bridge to make sure that the drawbridge does open. • Vessels have priority over car traffic for drawbridge openings. • 95% of tank vessels taking Hussey Sound channel to Cousins Island have escorts. • Big ship / little ship pamphlet distributed by the Coast Guard. • Broadcast Notice to Mariners has been implemented. New ideas: • Increase static port information on web sites.
Immediate Consequences		
Number of People on Waterway	Today: • Typical local ferry averages 250-300 passengers • Cruise ships average 3,500-4,000 passengers and crew. • Scotia Prince averages 1,400-1,500 passengers and crew. • Dinner cruise averages 150 passengers. • Whale watching excursions average 20-49 passengers. Trends: • Number and size of cruise ships increasing. • DWK operations averaging 45-50 passengers will increase.	Existing Mitigations: • Exercises have been conducted on evacuating one to many passengers. • Mass rescue has been discussed. – Scotia Prince exercise planned for September. • An ICS is in place and most agencies are involved. New ideas: • There needs to be a national initiative to create a Marine Incident Response Command.

FACTOR	RISKS	RISK MITIGATION STRATEGIES
Immediate Consequences (continued)		
Volume of Petroleum Cargoes	Today: • Petroleum is the largest volume commodity moving into the port – Total tonnage is 30-35 million per year. • The majority of marine petroleum terminals are on south side of port. • On average one ship per day carrying 700 thousand barrels of petroleum enters the port. Trends: • The use of double hulled tankers is on the increase.	Existing Mitigations: • Tankers are required by Portland Pipeline to have tug escorts and double-hulls. • Coast Pilot recommends barges have tug escorts into inner harbor. • The power plant requires tugs to be used to escort barges through Hussey Sound. • Prior risk assessments by companies have identified problem areas. • Regional ports have pollution response and salvage equipment that is readily available. • MSRC, NRC and State of Maine keep response barges in Portland Harbor. • OPA90 area committee meeting four times a year. • Boom deployment and response training exercises are conducted twice a summer. • Fire drills are conducted during the year. • Pre-booming is required around tankers during discharge operations. – Enhances readiness – Keeps training up • Regional Incident Command System is continually being expanded and trained together. New ideas: • Improving marine fire fighting capability.
Immediate Consequences (continued)		
Volume of Hazardous Chemical Cargoes	Today: • 10% of container cargo carries hazardous materials. Trends: • Unless industrial needs change, there is no foreseeable need for bulk shipments of hazardous materials.	Existing Mitigations: • There are no bulk shipments of hazardous materials entering the port at this time. New ideas: • None discussed.

FACTOR	RISKS	RISK MITIGATION STRATEGIES
Subsequent Consequences		
Economic Impacts	Today: • Impact of sudden closure of port would begin to be felt within days. • Most of the oil terminals are located close together. It is likely that if one terminal is impacted they all would be impacted. • Airport would not be significantly impacted. • Islanders would be immediately impacted – Shipments of food and other necessities could be stopped. – They may not be able to get to work on the mainland. • Casco Bay Ferries would be immediately impacted. • Ports to the north and south cannot handle diverted traffic if Portland closes. • Oil tank farms would be empty within a week. – Exact amount of reserves depends on time of year. – Majority of oil used in the region comes from bulk shipments imported through the port. – Heating oil for all of northern New England comes through this area. – The surrounding area would be impacted as prices would rise and quantity would drop dramatically. – Tourism would be impacted as gasoline prices rise. Trends: • None discussed.	Existing Mitigations: • 350 ton heavy lift vessel will be available very soon. • Regional ports have salvage equipment that is readily available. • MSRC, NRC and State of Maine have response barges on location. • Reduced speed required for tankers in the channel and harbor which would reduce the impact of a grounding. • Local Port Safety Forum discusses issues. • Local safety drills are conducted. • Fishing and other commercial vessels can dock at other ports. • Public/media relations in place to let locals and tourists know that things are under control. • Regional Incident Command System is in place to address major incidents. • Alternate transportation (rail and truck) of petroleum has been discussed. New ideas: • Vessel Traffic Information System possibly useful as a management and coordination tool. • Can Pipeline Terminal Dock #1 be used for product?

FACTOR	RISKS	RISK MITIGATION STRATEGIES
Subsequent Consequences (continued)		
Environmental Impacts	Today: • Scarborough and Port Elizabeth area includes the following endangered or sensitive species: – Piping Plovers – Least Terns – Roseate Terns • Important nesting sites and water fowl habitats as well as sensitive marshes and flats are located in the following areas: – South of Port Elizabeth – Ram Island – Fore River past inner harbor – Back Cove – Cousins Island • Tourist beaches are not located in immediate area but are in the vicinity. Trends: • None discussed.	Existing Mitigations: • As discussed under Volume of Petroleum. New ideas: • None discussed.
Subsequent Consequences (continued)		
Health & Safety Impacts	Today: • Portland metro area has approximately 120 thousand residents. • Local fisheries include – Scallops, shrimp, clams, lobster Trends: • Area is growing in population.	Existing Mitigations: • Water supplies come from inland. They would not be impacted by marine accident. New ideas: • None discussed.

Summary of Port of Portland Waterway Navigational Attributes

Ship Channel Complexity
- Non-complex with two sharp bends (Right turn at Portland Head Light and sweeping left turn into Fore River) and one drawbridge.

Converging or Crossing Traffic
- Some associated with recreational traffic, commercial fishing, and ferries.
- Generally from Spring Point into Casco Bay.

Ship Channel Configuration
- Moderately narrow

Ship Channel Traffic
- Light, moderate in the summer.
- Tug escorts to Portland Pipe Line.
- Tug escort through Casco Bay Bridge.
- Approximately 1300 deep draft movements per year.

Recreational and Local Fishing Activity
- Seasonally heavy.
- Lobster boats dramatically increase in the harbor area during the summertime.

Bottom
- Mostly mud with some rock outcroppings.

Currents
- Moderate strength.
- Current crosses main approach channel down Casco Bay to Spring Point.

Wind
- Average wind speed 6.6 - 8.7 knots.
- Gale force winds in effect 2% of the time.

Visibility
- An average of 167 days each year have foggy conditions with 2.4% of these days having less than 1/2 nm visibility.
- Blowing snow can also cause visibility hazards.

Port of Portland
Vessel Traffic Management Profile
(Presently in place)

Aids to Navigation (USCG and Private)

- Lighted & Unlighted – Fixed & Floating: USCG maintained
- Electronic Aids: GPS, Morse (A) RACON
- Traffic Separation Schemes (TSS) –IMO: Southeast and easterly approaches.
- Regulated Navigation Areas (RNA) – USCG: Single skin barges require twin screw tugs.

Vessel Traffic Systems (VTIS/VTS)

- None.

Situation Awareness (Each Ship)

- *Own Ship's & Other Ship's Position:* Bridge to bridge radio and radar. Voluntary vessel call-in system.
- *Other Ship's Intentions:* Bridge to bridge radio.

Port of Portland
Planned and Anticipated Changes

Planned Infrastructure Developments
- New multi-use passenger transportation facility.
- Portland Pipe Line Corporation pier strengthening / modernization.

Changes in levels and/or nature of waterway activities
- Cruise ship traffic has increased during the past year.

Forecast Traffic Levels
- Recreational boating traffic (increase / decrease).
- Commercial traffic is increasing.
- Crude oil traffic has significantly increased over the past 18 months

USCG Regulations to be implemented
- Recreational boating traffic (increase / decrease).

Changes under consideration, but not committed
- Marine Information System for the Port of Portland.