

Ports and Waterways Safety Assessment Workshop Report Narragansett Bay

Introduction

Risk identification and mitigation are and have been ongoing activities within the Narragansett Bay area. As a step toward standardizing methodology, a formal Ports and Waterways Safety Assessment (PAWSA) for Narragansett Bay was conducted in Seekonk, Massachusetts, on 7-8 September 2004. The results of that workshop are provided in this report and include the following information:

- Brief description of the process used for the assessment
- List of participants
- Numerical results from the following activities:
 - Team Expertise
 - Risk Factor Rating Scales
 - Absolute Risk Levels
 - Present Risk Levels
 - Intervention Effectiveness
- Summary of risks and mitigations discussion

Assessment Process

The PAWSA process is a structured approach for obtaining expert judgments on the level of waterway risk. The process also addresses the effectiveness of possible intervention actions for reducing risk in the waterway. A select group of waterway users / stakeholders evaluate risk factors and the effectiveness of various intervention actions. Thus the process is a joint effort involving waterway experts and the agencies / entities responsible for implementing selected risk mitigation measures.

The PAWSA methodology employs a generic model of waterway risk that was conceptually developed by a National Dialog Group on National Needs for Vessel Traffic Services and then translated into computer algorithms by Potomac Management Group, Inc. In that model, risk is defined as the product of the probability of a casualty and its consequences. Consequently, the model includes variables associated with both the causes and the effects of waterway casualties.

The first step in the process is for the participants to assess their expertise with respect to the six risk categories in the model. Those self assessments are used to weight inputs during all subsequent steps. The second step is for the participants to provide input for the rating scales used to assess risk. The third step is to discuss and then numerically evaluate the absolute risk levels in the waterway using pre-defined qualitative risk descriptors. In the fourth step, the participants discuss and then evaluate the effectiveness of existing mitigation strategies in

reducing risk. Next, the participants are asked to offer new ideas for further reducing risk, for those factors where risk is not well balanced with existing mitigations. Finally, the effectiveness of various intervention actions in reducing unmitigated risk is evaluated.

The process produces the group's consensus of risks in this waterway and is an excellent tool for focusing risk mitigation efforts. However, risk factors evaluated as being adequately balanced may still be worthy of additional risk mitigation actions. Any reasonable steps for minimizing or preventing the impacts of marine accidents should be encouraged for the benefit of the waterway community.

Participants

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

Participants	Organization	Phone	Email
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Geographic Area:

The participants defined the geographic bounds of the waterway area to be discussed.

- Narragansett Bay from Pt. Judith to Sakonnet Point northward including the Precautionary Zone, East and West Passages to the end of the Federal Navigation Projects on the Providence and Taunton Rivers, and the Sakonnet River.

Numerical Results

Book 1 – Team Expertise

In *Book 1*, the participants were asked to assess their level of expertise compared to the other participant teams in the workshop for each of the six categories in the Waterway Risk Model. Overall, 46% of the participant teams placed themselves in the upper third, 37% in the middle third, and 17% in the lower third of all teams. This distribution is fairly typical because the participants were chosen for their acknowledged expertise.

Book 2 – Risk Factor Rating Scales

Risk Factor	A Value	B Value	C Value	D Value
Vessel Quality	1.0	3.0	5.6	9.0
Deep Draft Mariner Proficiency	1.0	3.0	5.7	9.0
Shallow Draft Mariner Proficiency	1.0	3.1	5.7	9.0
Small Craft Operator Proficiency	1.0	3.1	5.7	9.0
Volume of Commercial Traffic	1.0	3.0	5.3	9.0
Volume of Small Craft Traffic	1.0	2.9	5.8	9.0
Traffic Mix	1.0	2.4	4.8	9.0
Congestion	1.0	2.8	5.1	9.0
Winds	1.0	2.5	5.2	9.0
Water Movement	1.0	2.9	5.1	9.0
Visibility Restrictions	1.0	2.9	5.7	9.0
Obstructions	1.0	2.1	4.5	9.0
Visibility Impediments	1.0	3.2	5.5	9.0
Dimensions	1.0	3.1	5.5	9.0
Bottom Type	1.0	2.5	5.2	9.0
Configuration	1.0	2.9	5.4	9.0
Personal Injuries	1.0	3.2	5.7	9.0
Petroleum Discharge	1.0	3.8	6.3	9.0
Hazardous Materials Release	1.0	3.7	6.2	9.0
Mobility	1.0	3.1	5.4	9.0
Health and Safety	1.0	3.1	5.6	9.0
Environmental	1.0	3.2	5.9	9.0
Aquatic Resources	1.0	2.9	5.6	9.0
Economic	1.0	3.0	5.7	9.0

Book 2 Results Analysis:

Book 2 is technically essential to the mathematical process used in the PAWSA model. The PAWSA risk assessment process uses an arbitrary 1 to 9 scale, where 1 represents very low risk and 9 represents extremely high risk. Participants calibrated intermediate points on the risk assessment scale for each risk factor, referred to as the “B” and “C” values in the table above. On average, participants from this waterway calculated the intermediate risk points as 3.0 and 5.5, which are identical to the national values established by prior PAWSA workshop participants around the country.

Book 3 – Absolute Risk Levels

Vessel Conditions	Traffic Conditions	Navigational Conditions	Waterway Conditions	Immediate Consequences	Subsequent Consequences
Vessel Quality	Volume of Commercial Traffic	Winds	Visibility Impediments	Personal Injuries	Health and Safety
4.2	2.9	3.1	5.4	5.7	8.6
Deep Draft Mariner Proficiency	Volume of Small Craft Traffic	Water Movement	Dimensions	Petroleum Discharge	Environmental
3.4	5.8	2.2	5.3	8.7	8.5
Shallow Draft Mariner Proficiency	Traffic Mix	Visibility Restrictions	Bottom Type	Hazardous Material Release	Aquatic Resources
5.5	5.6	4.8	6.2	8.1	8.4
Small Craft Operator Proficiency	Congestion	Obstructions	Configuration	Mobility	Economic
9.0	4.5	4.9	7.0	9.0	5.7

Risk values highlighted in red (values at or above 7.7) denote very high absolute risk levels. Risk values highlighted in green (values at or above 2.3) denote very low absolute risk levels.

Book 3 Results Analysis:

The participants evaluated the absolute risk level in the waterway by selecting a qualitative descriptor for each risk factor that best described conditions in the Narragansett Bay area. Those qualitative descriptors were converted to numerical values using the scales from the *Book 2* results. On those scales, 1.0 represents low risk (best case) and 9.0 represents high risk (worst case), with 5.0 being the mid-risk value.

In the Narragansett Bay area, 16 of the 24 risk factors were scored at or above the mid-risk value. They were (in descending order):

- Small Craft Operator Proficiency (9.0)
- Mobility (9.0)
- Petroleum Discharge (8.7)
- Health and Safety (8.6)
- Environmental (8.5)
- Aquatic Resources (8.4)
- Hazardous Materials Release (8.1)
- Configuration (7.0)
- Bottom Type (6.2)
- Volume of Small Craft Traffic (5.8)
- Personal Injuries (5.7)
- Economic (5.7)
- Traffic Mix (5.6)
- Shallow Draft Mariner Proficiency (5.5)
- Visibility Impediments (5.4)
- Dimensions (5.3)

Photo of Waterway:

As participants identified specific locations associated with particular risks, a nautical chart of the area was annotated with colored dots corresponding to the risk category being discussed, as follows:

Brown	Vessel Conditions
Yellow	Traffic Conditions
Green	Navigation Conditions
Blue	Waterway Conditions
Red	Consequences

The completed chart is shown at right. Note the concentrations of dots in four locations:

- Newport – East Passage
- Taunton River
- Providence River
- Greenwich Bay



Book 4 – Present Risk Levels

Vessel Conditions		Traffic Conditions		Navigational Conditions		Waterway Conditions		Immediate Consequences		Subsequent Consequences	
Vessel Quality		Volume of Commercial Traffic		Winds		Visibility Impediments		Personal Injuries		Health and Safety	
4.2	3.5	2.9	2.5	3.1	2.3	5.4	4.9	5.7	4.9	8.6	7.3
Balanced		Balanced		Balanced		Maybe		Balanced		NO	
Deep Draft Mariner Proficiency		Volume of Small Craft Traffic		Water Movement		Dimensions		Petroleum Discharge		Environmental	
3.4	2.7	5.8	6.0	2.2	2.0	5.3	3.9	8.7	7.3	8.5	7.4
Balanced		RISING		Balanced		Balanced		Maybe		Maybe	
Shallow Draft Mariner Proficiency		Traffic Mix		Visibility Restrictions		Bottom Type		Hazardous Materials Release		Aquatic Resources	
5.5	4.5	5.6	5.0	4.8	4.4	6.2	4.5	8.1	7.1	8.4	8.1
NO		Balanced		Balanced		Balanced		Maybe		Maybe	
Small Craft Operator Proficiency		Congestion		Obstructions		Configuration		Mobility		Economic	
9.0	8.5	4.5	3.8	4.9	3.8	7.0	5.2	9.0	8.1	5.7	6.2
NO		Balanced		Balanced		Balanced		Maybe		RISING	

KEY			
Risk Factor		Book 3	Absolute level of risk
		Book 4	Level of risk taking into account existing mitigations
Book 3 Book 4		OK	Consensus that risks are well balanced by existing mitigations
		Maybe	No consensus that risks are adequately balanced by existing mitigations
Consensus		NO	Consensus that existing mitigations do NOT adequately balance risk
		RISING	Mitigated risk level judged to be HIGHER than absolute risk level

Book 4 Results Analysis:

The participants examined all risk factors and the effects of existing mitigations on those risks in the Narragansett Bay area.

For 13 risk factors, the participants were in consensus that the risk was well balanced by existing mitigations. Consensus is defined as 2/3 of the participant teams being in agreement. For 3 risk factors, the participants were in consensus that risks were NOT adequately balanced by existing mitigations.

For 2 risk factors, participants judged that the risk level to be “rising”. Normally this would indicate that existing risk mitigation strategies are actually increasing risk levels because of their inadequacy. However, the discussions that occurred for both the Volume of Small Craft and Economic risk factors made clear that the participants feel that risk levels for those two factors will increase substantially in the near future, in spite of existing mitigations.

For the other 6 risk factors, there was not good consensus on whether existing mitigations adequately reduced risk.

Book 5 – Intervention Effectiveness

Vessel Conditions	Traffic Conditions	Navigational Conditions	Waterway Conditions	Immediate Consequences	Subsequent Consequences
Vessel Quality	Volume of Commercial Traffic	Winds	Visibility Impediments	Personal Injuries	Health and Safety
Balanced	Balanced	Balanced	Coordination/Planning	Balanced	Other Actions
			2.9		2.5
Deep Draft Mariner Proficiency	Volume of Small Craft Traffic	Water Movement	Dimensions	Petroleum Discharge	Environmental
Balanced	Coordination/Planning	Balanced	Balanced	Coordination/Planning	Coordination/Planning
	2.1			3.3	4.4
Shallow Draft Mariner Proficiency	Traffic Mix	Visibility Restrictions	Bottom Type	Hazardous Materials Release	Aquatic Resources
Rules & Procedures	Balanced	Balanced	Balanced	Coordination/Planning	Other Actions
1.8				3.2 Caution	2.9
Small Craft Operator Proficiency	Congestion	Obstructions	Configuration	Mobility	Economic
Rules & Procedures	Balanced	Balanced	Balanced	Rules & Procedures	Coordination/Planning
4.0				4.5	3.2

KEY

Risk Factor	Intervention	Intervention category that was judged most effective in further mitigating risk
Intervention	Risk Improvement	Expected improvement in risk level if new mitigation measures were implemented
Risk Improvement	Caution	No consensus alert

Legend:

The intervention category listed is the one category that most participant teams selected for further reducing risks. The Risk Improvement is the perceived reduction in risk when taking the actions specified by the participants. A green **Balanced** indicates that no intervention is needed

and risk is balanced in the waterway, and a yellow **Caution** indicates that there was a difference between the most effective category and the category most selected by the participants for action. Intervention category definitions are:

Coordination / Planning	Improve long-range and/or contingency planning and better coordinate activities / improve dialogue between waterway stakeholders
Voluntary Training	Establish / use voluntary programs to educate mariners / boaters in topics related to waterway safety (Rules of the Road, ship/boat handling, etc.)
Rules & Procedures	Establish / refine rules, regulations, policies, or procedures (nav rules, pilot rules, standard operating procedures, licensing, RNAs, <u>require</u> training and education, etc.)
Enforcement	More actively enforce existing rules / policies (navigation rules, vessel inspection regulations, standards of care, etc.)
Nav / Hydro Info	Improve navigation and hydrographic information (PORTS, BNTM, charts, coast pilots, AIS, tides and current tables, etc.)
Radio Communications	Improve the ability to communicate bridge-to-bridge or ship-to-shore (radio reception coverage, signal strength, reduce interference & congestion, monitoring, etc.)
Active Traffic Mgmt	Establish/improve a Vessel Traffic Service (info, advice and control) or Vessel Traffic Information Service (information and advice only)
Waterway Changes	Widen / deepen / straighten the channel and/or improve the aids to navigation (buoys, ranges, lights, LORAN C, DGPS, etc.)
Other Actions	Risk mitigation measures needed that do NOT fall under any of the above strategy categories

Book 5 Results Analysis:

For 10 of the 11 risk factors needing additional risk reduction action, the most selected intervention category had the largest risk improvement.

- Mobility – Rules & Procedures (4.5)
- Environmental – Coordination/Planning (4.4)
- Small Craft Operator Proficiency – Rules & Procedures (4.0)
- Petroleum Discharge – Coordination/Planning (3.3)
- Economic – Coordination/Planning (3.2)
- Visibility Impediments – Coordination/Planning (2.9)
- Aquatic Resources – Other Actions (2.9)
- Health and Safety – Other Actions (2.5)
- Volume of Small Craft Traffic – Coordination/Planning (2.1)
- Shallow Draft Mariner Proficiency – Rules & Procedures (1.8)

One consensus alert occurred because there were two strong risk mitigation categories chosen by the participants. The intervention category selected possibly offering the most risk improvement was:

- Hazardous Material Release – Coordination/Planning (3.2)

Planned Actions

The catalog of risks and possible mitigation strategies derived from the Narragansett Bay PAWSA workshop is set forth at the end of this report. This provides an excellent foundation from which the local harbor safety organization can further examine and take appropriate risk mitigation actions for both near-term action and for future risk mitigation planning.

The section has been annotated to include those initial actions that appear appropriate in response to the participants' expressed concerns. Identification of initial actions will help focus subsequent discussions with the local maritime community, waterway users, and stakeholders regarding each risk, permitting the testing of each proposed action for validity and appropriateness prior to implementation. The listing of initial possible actions should be viewed as a starting point for continuing dialogue between the local maritime community, leading to clear identification of risks and well conceived mitigation measures.

Vessel Conditions: Vessel Quality	
<p>Today:</p> <p><u>Deep Draft</u></p> <ul style="list-style-type: none"> • U.S. – low numbers, high standards. • Low value coal and scrap cargo carriers tend to be poorer quality. <ul style="list-style-type: none"> – Unsound cargo ships from Cape Verde transit to Fall River (10%). • Articulated Tug & Barge (ATB), car carriers, Liquid Petroleum Gas (LPG) and petroleum ships are good. • Port State Control (PSC) Priority I and II vessels 1-2 per week. 10% are not materially sound. <p><u>Shallow Draft</u></p> <ul style="list-style-type: none"> • Tug/tow equipment is very good. • 70% of F/V fleet poor. Point Judith fleet does not work in Narragansett Bay. <p><u>Small Craft</u></p> <ul style="list-style-type: none"> • 80% of boats are well maintained. Immigrant populations entering boating in old used boats (20%). <p>Trends:</p> <ul style="list-style-type: none"> • F/V maintenance and upkeep are sensitive to economic conditions. Good vessels are getting better. The poor are getting worse. • Larger new ships are replacing smaller / older vessels. 	<p>Existing Mitigations:</p> <p><u>Commercial</u></p> <ul style="list-style-type: none"> • Foreign flag inspected at port calls. Tug & tow participation in the Responsible Carrier Program (RCP). • At-sea USCG boarding of vessels and voyage termination if their condition is unseaworthy. • Insurance companies require survey of vessels; oil company ship vetting. • PSC program and STCW, SOLAS, etc. standards. • Navigation safety equipment (GPS, radar, etc.). • Single-hull barges 2004-05 phase-out schedule. They are inspected more. • Coast Guard vessel inspections. • Cheaper to operate safely! • IMO regulations, International Safety Management (ISM) Code, double hulls, and company vetting regimes. • All tow boats will be inspected within two years. • Voluntary CGAUX fishing vessel inspection program. <p><u>Recreational</u></p> <ul style="list-style-type: none"> • People are buying newer (safer) boats.
<p>New Ideas (number of times suggested) [action by]:</p> <ul style="list-style-type: none"> • Risk level judged to be well balanced with existing mitigations, so no new ideas were discussed. 	

Vessel Conditions: Deep Draft Mariner Proficiency

Today:

- Proficiency of crew parallels vessel quality as general economic conditions vary.
- Blue water crews are at sea for longer times. They become unfamiliar with coastal and port operating and emergency procedures.
- Few PSC Priority I vessels seen in this area.
- Ships that are in good shape are top notch.

Trends:

- Not much U.S. traffic.
- ATB crew qualification standards are consistently improving. Increased local knowledge.
- LNG operators will digitize their port navigation data for application into a simulator for direct training of LNG ship crews at the Newport MSI facility.

Existing Mitigations:

- U.S. licensing requirements.
 - License renewal every 5 years and annual medical exams required of crews.
- ISM Code; STCW. Simulator training gets better and is used much more.
- Mandatory pilotage.
- ATB units are all double hulled; companies require a 1,600 ton license to operate them.
- Increased use of escort tugs for movements; better tractor tug equipment.
- PSC inspections.
- Pilots carry precision navigation and situational awareness equipment provided by the State of Rhode Island.

New Ideas (number of times suggested) [action by]:

- Risk level judged to be well balanced with existing mitigations, so no new ideas were discussed.

Vessel Conditions: Shallow Draft Mariner Proficiency

Today:

- T-boats.
 - Licensed captain, unlicensed crews who are hired for the season; high crew turnover and retraining. 20% of these vessels are less proficient.
- Fishing Vessels.
 - Larger newer (80%) vessels are good, smaller older (20%) vessels not good.
 - No language communication difficulties.
 - Good local area knowledge.
 - Pressure on the industry to make money by economizing anywhere possible.
 - Casualty investigations show that crews involved had limited knowledge of Navigation Rules.
 - Vessels based in Narragansett Bay are much better than surrounding area.
- Tugs and Barges.
 - Commercial tug fleet crews are knowledgeable / experienced.

Trends:

- STCW and Responsible Carrier Program have improved the tug/barge fleet.
- F/V fleet improving by attrition and insurance company pressures.

Existing Mitigations:

- Tug and barge industry.
 - The American Waterway Operators (AWO) Responsible Carrier Program (RCP), providing standards of care for vessel operations, training and certification of vessel operators and crew, that meet / exceed Federal and international standards. AWO / CG studying ways to reduce fatigue factors; 2/3 done. To be incorporated into RCP.
 - Sweeping changes in licensing...proficiency demonstration requirements. More detailed and practical factor oriented. Check rides from designated examiners.
 - Local knowledge training of operators by companies.
 - Wireless access to PORTS info.
- F/V operators.
 - Insurance industry pressures owners to improve crew standards of general competence. Most F/Vs are insured. This group of vessels are more proficient.
 - Voluntary USCG F/V safety examination program.
 - USCG F/V safety day training programs.
 - Fleet is shrinking. Poorer vessels going out of service.
- Ferry operators have fatigue standards, licensing and professional organization efforts to improve.

New Ideas (number of times suggested) [action by]:

- Train / license all commercial vessel crews. (7) [COMDT (G-MSO)]
- More enforcement, especially equipment, logs, and skill demonstrations. (4) [MSO Providence, GRU Woods Hole, & RI DEM]
- Require navigation equipment carriage such as AIS, GPS, etc. [COMDT (G-MSO)]
- Create education program for unlicensed seasonal crewmembers. [MSO Providence]
- Provide education on F/V stability. [MSO Providence]
- Increase voluntary training efforts / outreach. [MSO Providence & CGAUX]
- Mandatory training for problem fleets. [COMDT (G-MSO)]
- More communication between the USCG and fishing fleets. [MSO Providence]
- Train / license fishing crews. [COMDT (G-MSO)]
- Urge quahoggers to take safety courses. [MSO Providence & RI DEM]

Vessel Conditions: Small Craft Operator Proficiency

Today:

- 43,000 registered boats in Rhode Island at average of 3+ passengers each.
- 40% of boaters are knowledgeable.
- New S/V racing skippers are more likely to be a problem. 10-20% of population.
- Little fishing in the channel. Problem with operators being aware of traffic and keeping good lookouts, especially from Castle Hill to Beavertail Point northward to Gould Island, Greenwich Bay and East Providence.
- Inebriation (Newport and E. Greenwich areas generally), and no understanding of effects of fatigue contribute to the population of poor boaters.
- 70% of accidents involve those without education, across all sizes of boats.
- Overloading of boats not a factor in accidents, but often cited by law enforcement officers, particularly late at night.
- Number of accidents per hour of boat use is a high number. Most fatalities are by drowning.

Trends:

- Growing boater population. Stable accident rate.
- Complaints against PWCs have dropped.
 - Operators are moving up to bigger boats. National PWC are sales down.
 - Increased regulation and prohibitions of their use make them less attractive toys.

Existing Mitigations:

- Power Squadron / CGAUX and State conduct training courses and voluntary safety checks. Rhode Island State law requires education for those born after Jan 1, 1986 and all PWC operators.
 - Small numbers of people trained.
 - State has a database of 15,000 people.
- Not many USCG boardings being accomplished. Harbormasters and environmental police also board.
- State educational outreach literature educates boaters.
- Harbormasters have authority to terminate PWC voyages for cause.

New Ideas (number of times suggested) [action by]:

- Mandatory training / licensing for all operators. (8) [COMDT (G-MSO), State Legislature]
- More enforcement of existing laws / increase officer presence and resources. (7)
[MSO Providence, GRU Woods Hole, RI DEM, & Harbor Masters]
- Integrate / coordinate education by all agencies to maximize efficiencies and minimize gaps. (3)
[MSO Providence, GRU Woods Hole]
- Establish mandatory nation-wide training / licensing. [COMDT (G-MSO)]
- Increase voluntary training efforts / outreach. [MSO Providence, RI DEM, & Harbor Masters]
- VHF carriage requirement. [COMDT (G-MSO)]

Traffic Conditions: Volume of Commercial Traffic

Today:

- Volume is not a problem.
 - An average of 10 commercial vessels / day transit the port, but transits are rather sporadic.
- 6 high-speed seasonal ferry crossing trips / day.
- Some dinner cruises.
- Few F/V transits per day.
- A few Subchapter R sail training vessels.
- 2-3 Naval vessels per month.
- Just-in-time delivery of coal at Brayton Point power plant.

Trends:

- In addition to the LPG deliveries currently received in Providence, two LNG terminal proposals will bring a potential increase of 1-2 transits per week to Providence and Fall River.
 - Impact: transit of gas ship is 2.5 hours each way with moving security zones and one-way traffic.
- Coal transshipments will increase considerably.
- Dredging of the Providence River will soon be complete. The port expects arrival of new products and shipments as a result.
- Larger vessels are replacing smaller/older vessels which results in fewer vessel transits per tonnage delivered.

Existing Mitigations:

- Naval vessels take pilots for passages.
- LPG ship transits are escorted with a moving security zone and one-way traffic restrictions.

New Ideas (number of times suggested) [action by]:

- Risk level judged to be well balanced with existing mitigations, so no new ideas were discussed.

Traffic Conditions: Volume of Small Craft Traffic

Today:

- 60,000 recreational boats use the Bay during the season including trailered boats, international and regatta boats (late June-September).
 - Trailered boats are not a large percentage of totals.
- Marine events, July 4th, sailboat races often focus boat concentrations. 20-30 marine event permits issued annually. Large events are really big and are focused at Quonset (air show), Americas Cup, Breton Reef, north of Conanicut & Barrington Points, Greenwich Bay, Wickford and Bristol Bay racing series.
- Weekend volume twice that of weekday.

Trends:

- Rapidly growing numbers.
- Portsmouth and Tiverton are planning marina developments. State encourages boating activity. Upward of 19 new marina proposals are under consideration.
- Popularity of PWCs waning.
- No state sales tax on boat purchases encourages more boats to be sold and used here.
- High fuel costs slowed boat use this year.
- Shore side infrastructure limitations will ultimately restrict future volume growth.

Existing Mitigations:

- Weather is biggest factor for small craft activity.
- Enforcement presence.
- Marine event permit process.
- Building new ramps and slips increases access but disperses activity more widely.

New Ideas (number of times suggested) [action by]:

- Initiate waterway capacity study. (8) [RI Coastal Resource Management Council]
- Control slips / moorings / ramps based on capacity study. (4) [Local Zoning Boards]
- Increase enforcement, especially in Newport Harbor. (2) [GRU Woods Hole, RI DEM, & Harbor Masters]
- Expand voluntary education opportunities. [MSO Providence, RI DEM, & Harbor Masters]
- Mandatory training and qualifications for operators. [COMDT (G-MSO), State Legislature]
- Require VHF radio carriage on small craft. [COMDT (G-MSO), State Legislature]

Traffic Conditions: Traffic Mix	
<p>Today:</p> <ul style="list-style-type: none"> • Multiple-use waterway. • Conflicts: <ul style="list-style-type: none"> – Distinguish between those events well planned by professional sponsors vs. those smaller, less-organized yacht club sponsors. – Davisville area conflicts resolve quickly. – Conflict between yacht clubs with impromptu races affecting commercial traffic to which they do not yield. – Many near-miss interactions between powerboats and kayaks south of Newport and Jamestown Bridges. – Greenwich Bay interactions between non-commercial vessels. • The use of GPS automated navigation equipment results in an overconfidence and inattentiveness to situational awareness. • High speed ferry operates from Providence to Newport. <p>Trends:</p> <ul style="list-style-type: none"> • E. Providence has a development planned that will increase the mix of vessels in Providence Harbor. • Davisville is requesting restricted area. • LNG / ferry transits might interfere with each other. 	<p>Existing Mitigations:</p> <ul style="list-style-type: none"> • Well-marked channels show boaters where ships must transit. • Planned and coordinated ferry movements during LPG security zone activation. • Navy exclusion zone at Coddington Cove restricts boater access. • Security Zones around LPG transits and high risk / hazardous cargoes. • Dialog between commercial and recreational groups help de-conflict the waterway.
<p>New Ideas (number of times suggested) [action by]:</p> <ul style="list-style-type: none"> • Risk level judged to be well balanced with existing mitigations, so no new ideas were discussed. 	

Traffic Conditions: Congestion	
<p>Today:</p> <ul style="list-style-type: none"> • Congested areas. <ul style="list-style-type: none"> – Fort Adams Newport Jazz Festival, etc. – The channel north of Fullers Rock down to Conimicut Point. – Queen Mary II and fireworks events draw large fleets. <p>Trends:</p> <ul style="list-style-type: none"> • No trends discussed. 	<p>Existing Mitigations:</p> <ul style="list-style-type: none"> • Marine event permitting/patrolling/advertising. • Active enforcement presence. • Federal regulation limiting traffic to one-way from north of Fullers Rock to Conimicut Point until the dredging project is completed later in the year. • Routine non-permitted marine events are well known by the locals. • Pre-planning meetings uncover difficulties. • Information shared at the Port Safety Committee meetings quarterly.
<p>New Ideas (number of times suggested) [action by]:</p> <ul style="list-style-type: none"> • Risk level judged to be well balanced with existing mitigations, so no new ideas were discussed. 	
Navigational Conditions: Winds	
<p>Today:</p> <ul style="list-style-type: none"> • Winds over 20-25 knots are experienced several times a month. May to June in afternoon (SW). Cold fronts in the winter (NW wind). • Difficult areas <ul style="list-style-type: none"> – Brayton Point power plant channel to Brightman St. Bridge construction site. – Davisville Basin. – Beavertail Point area for small craft. <p>Trends:</p> <ul style="list-style-type: none"> • No trends discussed. 	<p>Existing Mitigations:</p> <ul style="list-style-type: none"> • NOAA weather forecasts and warnings. • Vessel-to-vessel communications. • Weather avoidance. • LNG operators planning weather criteria into port transit operational decision making. <ul style="list-style-type: none"> – Simulating vessel movements in all conditions at MSI. • PORTS sensors located at Davisville, Newport Naval Base, Conimicut Point light, Providence State Pier, Newport Harbor State Pier, Sandy Point, and Brayton Point light. Need visibility info. • New and larger tugs coming into service soon. • Pilots make individual decisions on the equipment required for each transit based upon conditions.
<p>New Ideas (number of times suggested) [action by]:</p> <ul style="list-style-type: none"> • Risk level judged to be well balanced with existing mitigations, so no new ideas were discussed. 	

Navigational Conditions: Water Movement	
<p>Today:</p> <ul style="list-style-type: none"> • Tide and current tables are good predictors except when there are high-wind conditions that alter water levels. Study shows that predictions of slack water are less reliable. • Difficult areas. <ul style="list-style-type: none"> – Cross currents at Tiverton Channel and Quonset Channel but not causing unmanageable maneuverability problems. – Currents through the bridges at Tiverton and The Hummocks flow at 4 knots. <p>Trends:</p> <ul style="list-style-type: none"> • Year-round. 	<p>Existing Mitigations:</p> <ul style="list-style-type: none"> • Published tide books provide good general information in addition to predictions. <ul style="list-style-type: none"> – Weather conditions greatly effect actual times of tides and slack water, making PORTS data extremely useful. • Voyage planning to avoid strong currents. <ul style="list-style-type: none"> – Pilots time arrivals at Brayton Point power plant to minimize cross-current problems. • PORTS sensors at Quonset Point, Fall River. Providence and Newport provide full data.
<p>New Ideas (number of times suggested) [action by]:</p> <ul style="list-style-type: none"> • Risk level judged to be well balanced with existing mitigations so no new ideas discussed. 	
Navigational Conditions: Visibility Restrictions	
<p>Today:</p> <ul style="list-style-type: none"> • Fog causes restricted visibility (less than ½ mile) 10% of the year. Seasonal. March-May and fall seasons predominate. • Visibility varies across the Bay. • Occasionally snow and heavy rain can restrict vessels movement. Only a few days per year. • Small boats often follow each other; often don't slow down in fog, fail to keep lookout. <p>Trends:</p> <ul style="list-style-type: none"> • In time, the charted Recommend Traffic Lanes will be helpful. Commercial traffic is generally staying in those lanes. 	<p>Existing Mitigations:</p> <ul style="list-style-type: none"> • Radar (increasing number of boaters have it but may not be able to use it well). • GPS units give precise position, which may lead to greater risk of collisions because of operator inattention/over-confidence. • Automatic fog signals on electronic equipment. • Commercial vessels. <ul style="list-style-type: none"> – Are using chart plotting software programs (ECDIS), but may over-rely upon it. – Radar interpretation instruction / license endorsement. – Tug/barge will soon be required to carry AIS.
<p>New Ideas (number of times suggested) [action by]:</p> <ul style="list-style-type: none"> • Risk level judged to be well balanced with existing mitigations, so no new ideas were discussed. 	

Navigational Conditions: Obstructions	
<p>Today:</p> <ul style="list-style-type: none"> • Ice seldom obstructs navigation, once in ten years. <ul style="list-style-type: none"> – Winter 2004 was cold. Davisville, Mount Hope and Greenwich Bays, and Providence River were trouble areas. • Fish traps off Breton Reef, Sakonnet Harbor entrance & Scarborough Beach (seasonally); lobster farm at Dutch Harbor. • Sunken vessel located south of Prudence Island. • Gas pipeline crosses Providence Harbor whose depth is disputed. • Huge dock derelicts floating down Taunton River from abandoned marina; some storm debris. <p>Trends:</p> <ul style="list-style-type: none"> • None discussed. 	<p>Existing Mitigations:</p> <ul style="list-style-type: none"> • NOAA information great. New information will be updated in ECDIS quickly. • Fish traps are charted; also on some GPS systems. • Ice. <ul style="list-style-type: none"> – USCG buoy tenders break ice. – Buoys are changed to seasonal ice aids. – Broadcast Notice to Mariners warnings. – USCG website advises of ice conditions. – Ships have precision navigation information to stay within channel. – New ice operations plan incorporates lessons learned. • Sunken vessel located off T-wharf south of Prudence Island now marked with buoy).
<p>New Ideas (number of times suggested) [action by]:</p> <ul style="list-style-type: none"> • Risk level judged to be well balanced with existing mitigations so no new ideas discussed. 	

Waterway Conditions: Visibility Impediments	
<p>Today:</p> <ul style="list-style-type: none"> • Moored vessels cause visibility impediments at Newport, Wickford, Jamestown Harbors, and Tiverton Basin. • Providence hurricane barrier limits visibility on approach. • Limited sight line at the bend downbound from the Seekonk River entering the Providence River. • Background lighting obscures view of navigation aids: <ul style="list-style-type: none"> – Fort Adams new lighting. – Lights at Fields Point inbound to Providence at Bullocks Reach. – Lights on the coal pier on Brayton Point blind pilots. – Apponaug and Greenwich Coves approaches. <p>Trends:</p> <ul style="list-style-type: none"> • Increasing shoreline development results in more background lights. This affects small boats more than commercial vessels. 	<p>Existing Mitigations:</p> <ul style="list-style-type: none"> • Radar helps identify traffic. • VHF security calls. • Pilot boat precedes larger commercial vessels through. • New pier lighting schemes are sensitive to navigation needs. • New LNG vessels have infrared imaging to help identify boats, etc. Rhode Island patrol boats will have this also. • Replacement of the Brightman Bridge will help.
<p>New Ideas (number of times suggested) [action by]:</p> <ul style="list-style-type: none"> • Coordinate with facility managers to mitigate background lighting problems. (8) [MSO Providence, NE Marine Pilots Assoc., & Industry] • Voluntary radar training for recreational boaters. (2) [GRU Woods Hole, RI DEM, & Harbor Masters] • Publish known impediments in the Coast Pilot. [NOAA] 	

Waterway Conditions: Dimensions	
<p>Today:</p> <ul style="list-style-type: none"> • Brayton Street Bridge and coal dock channel are very narrow. • Dredging of Providence River restricts channel. • Bridge height clearances not a problem except for larger, new cruise ships. • Water salinity decreases in rivers could change effective draft of ships in the Taunton River. <p>Trends:</p> <ul style="list-style-type: none"> • One company planning three dimensional mapping of Mount Hope Bay to Brayton Point. • Weavers Cove LNG project plans to dredge to 37 feet in private funded project. • Airgap sensors to be incorporated into PORTS data. 	<p>Existing Mitigations:</p> <ul style="list-style-type: none"> • New Brightman Street Bridge resolves that obstruction. <ul style="list-style-type: none"> – Current operating adjustments: one-way traffic, daylight-only operating restrictions, under-keel clearance requirements. Precision navigation devices help. • DGPS ‘Ground Guard’ system. • Buoyage system. • VHF radio communications, ships arrange passings. (frequency congestion not a problem). • Precision navigation systems: ECDIS, GPS, etc. • PORTS data. • Pilots use 10% of draft guideline for vessels unassisted by tugs, otherwise the terminals determine under-keel requirements. • Pilots time transits for safer passage.
<p>New Ideas (number of times suggested) [action by]:</p> <ul style="list-style-type: none"> • Risk level judged to be well balanced with existing mitigation so no new ideas discussed. 	

Waterway Conditions: Bottom Type	
<p>Today:</p> <ul style="list-style-type: none"> • Hard bottom outside the channels, generally. • Small craft ground on rocky, hard bottoms in Greenwich Bay and at Sally Rocks. <p>Trends:</p> <ul style="list-style-type: none"> • No trends discussed. 	<p>Existing Mitigations:</p> <ul style="list-style-type: none"> • Charting, Coast Pilot, and hydrologic publications. • USACE dredged channels. • ATON. <ul style="list-style-type: none"> – CG WAMS done years ago dramatically improved channel markings. • Local knowledge, compulsory pilotage, one-way traffic, and NTMs. • Government surveys are identifying more bottom characteristics thru full-bottom surveys. • Electronic bottom-sounding technology more available to the recreational boater. • More double-hull vessels being used. • Tug escorts. • Pilots carry portable precision navigation equip.
<p>New Ideas (number of times suggested) [action by]:</p> <ul style="list-style-type: none"> • Risk level judged to be well balanced with existing mitigations, so no new ideas were discussed. 	
Waterway Conditions: Configuration	
<p>Today:</p> <ul style="list-style-type: none"> • Bends <ul style="list-style-type: none"> – Brayton Point Channel 90 degree bend. – No issues at “SP” buoy intersection. • Cross Traffic <ul style="list-style-type: none"> – Bristol-Prudence Island and Newport-Jamestown ferries. – Recreational traffic focuses south of the Newport Bridge, but is everywhere. <p>Trends:</p> <ul style="list-style-type: none"> • None discussed. 	<p>Existing Mitigations:</p> <ul style="list-style-type: none"> • VHF communications. • Required security calls. • Rules of the Road. • See Also: Dimensions and Bottom Type risk factor mitigations comments.

<p>New Ideas (number of times suggested) [action by]:</p> <ul style="list-style-type: none"> • Risk level judged to be well balanced with existing mitigations, so no new ideas were discussed. 	
<p>Immediate Consequences: Personal Injuries</p>	
<p>Today:</p> <ul style="list-style-type: none"> • Cruise ships anchor out at Newport. • Providence to Newport high-speed and Quonset to Marthas Vineyard ferries carry less than 150 passengers per voyage as Subchapter T boats. Local ferry boats carry about 500 people (Subchapter K) Fort Adams to Block Island seasonally. • Dinner cruise boats at Warren River and Newport (Subchapter T). <p>Trends:</p> <ul style="list-style-type: none"> • Static. 	<p>Existing Mitigations:</p> <ul style="list-style-type: none"> • Large number of vessel resources to evacuate passengers (Government, commercial ferries, other vessels of opportunity). • Incident Command System (ICS) is well known and recently tested during Tall Ship event and drill. Useful for mass rescue, environmental and security events. Pre-existing port relationships well established and coordinated. • RI Emergency Management Agency (EMA) contacts coordinated with COTP.
<p>New Ideas (number of times suggested) [action by]:</p> <ul style="list-style-type: none"> • Risk level judged to be well balanced with existing mitigations, so no new ideas were discussed. 	

Immediate Consequences: Petroleum Discharge

Today:

- Petroleum products
 - 73% of cargo through this area is refined petroleum product; no crude.
 - Volume of 60 million barrels per year.
 - Styrene and toluene going to Tiverton from time to time.
- Coal (26%) going to Brayton Point power plant can be switched to oil as commodity prices fluctuate.

Trends:

- None discussed.

Existing Mitigations:

- OPA 90 is a comprehensive regime for spill response.
- USCG approved / maintained Vessel Response Plans.
 - Vessel companies have spill management teams. Conduct drills.
- Oil Spill Response Organizations (OSROs): Propositioned equipment, MSRC and NRC.
- Sophisticated State response system.
- Shipboard Oil Pollution Emergency Plans (SOPEP).
- University of Rhode Island (URI) and NOAA Scientific Support Service waterway modeling services.
- Mostly light oil products delivered into port. Heavy oils transit offshore though.

New Ideas (number of times suggested) [action by]:

- Encourage / employ vessels of opportunity. (3) [MSO Providence]
- Mandatory response drills / skill testing. (3) [COMDT (G-MSO)]
- Update contingency plans. (3) [MSO Providence]
- Encourage additional voluntary drills. (2) [MSO Providence]
- Increase OSPAR funds and expand applicability (i.e., resources and training) (2) [RI DEM]
- Continuous updating of available response resources in contingency plans. [MSO Providence, RI DEM]
- Create additional safety zones. [MSO Providence]
- Identify resource needs. [Harbor Safety Committee]
- Mandatory boom deployment drills. [MSO Providence]
- Preposition equipment. [MSO Providence & Industry]
- Proper maintenance of spill equipment. [MSO Providence & Industry]

Immediate Consequences: Hazardous Materials Release

Today:

- 8-12 LPG ships per year (42,000 dwt).
- Caustic soda going to Providence and Fall River docks in multiple-product tankers.

Trends:

- Proposed deliveries of LNG.
 - A proposal exists to develop shore side infrastructure to deliver LNG to Weaver Cove, Taunton River circa 2008.
 - A proposal exists to deliver LNG to current Providence LPG facilities circa 2006.
 - Proposals would increase gas ship round-trip transits to about 2 per week. 3-4 hours per one-way transit.

Existing Mitigations:

- See Petroleum Discharge Mitigations.
- LNG response plans well thought out. Problem is if pool ignites either in water or on ship. Automatic shutdown system at discharge hose. Study funded to investigate LNG / LPG emergency responses to be completed by next year. Keyspan has sent local firefighters to training.
- Fall River has proper equipment to fight dockside toluene, etc., fires.
- Caustic soda spills not particularly hazardous.
- Software dealing with identification and dispersion models.
- International conventions for storage requirements and cleanup. Very regulated industry. Coming requirement for HAZMAT carriers to develop Vessel Response Plans.
- USCG National Strike Team.

New Ideas (number of times suggested) [action by]:

- Create database of HAZMAT in Narragansett Bay. (3) [MSO Providence]
- Mandatory response drills / skill testing. (3) [MSO Providence]
- Develop safety / security plan for LNG proposal. (2) [MSO Providence & LNG Industry]
- Update contingency plans. (2) [MSO Providence, RI DEM]
- Better coordination of existing resources. [MSO Providence]
- Continuous updating of available response resources. [MSO Providence]
- Create additional safety zones. [MSO Providence]
- Encourage additional voluntary drills. [MSO Providence & Industry]
- Establish a VTIS. [COMDT (G-MWV)]
- Proper maintenance of spill equipment. [Industry]
- Provide HAZMAT specific training for 1st responders. [MSO Providence, RI EMA]
- Provide MSDS sheets to terminals. [Industry]

Immediate Consequences: Mobility	
<p>Today:</p> <ul style="list-style-type: none"> • Obstruction of strategic points of the Providence River would close the port. <ul style="list-style-type: none"> – Would disrupt oil distribution from western Massachusetts to Cape Cod. • Taunton River blockage at the “MH” buoy in South Mount Hope Bay would close Fall River. <ul style="list-style-type: none"> – Mount Hope, Brightman Street and Mount Hope Bridges are vulnerable (Brightman Bridge being replaced). – The power plant at Brayton Point appears to reserve a limited coal supply. • East Passage could be blocked by a ship sinking that would affect three ports. <p>Trends:</p> <ul style="list-style-type: none"> • No trends discussed. 	<p>Existing Mitigations:</p> <ul style="list-style-type: none"> • Local tug resources are available up to about 4,500 and 5,000 hp (in December 2004). • Salvage equipment is available from New York up to a 20,000 hp tug. • Naval resources from Supervisor of Salvage in Norfolk. • Traffic cannot be diverted around the waterway due to shallow water. • NOAA navigation response team available within 48 hours to quickly survey an area. • Classification society emergency response resources. • Vessel Response Plans.
<p>New Ideas (number of times suggested) [action by]:</p> <ul style="list-style-type: none"> • Employ more safety and security zones. (4) [MSO Providence] • Create speed limits. (2) [MSO Providence] • Keep and enhance the PORTS system. (2) [NOAA & Local Community] • More fendering / bridge abutments. (2) [USACE] • Develop contingency plan for a marine casualty in the East Channel. [MSO Providence] • Enforce navigation equipment carriage requirements. [MSO Providence] • Identify salvage resources. [MSO Providence] • Increase tug capability and capacity (Industry will be providing in near future). [Industry] • Shallow draft barges use West Channel more. [Industry] 	

Subsequent Consequences: Health and Safety

Today:

- Populations.
 - 1,583,000 in the Providence Metropolitan statistical area.
 - Narragansett Bay well populated all along the shore in the area of discussion.
- Drinking water from wells and inland sources. A water pipeline crosses Providence Harbor supplying East Providence. Low risk of damage from ships.
- Providence, Somerset, and Brayton Point power plant draw cooling water from local water.
- No municipal fire boats in area.

Trends:

- No trends discussed.

Existing Mitigations:

- Community emergency response plans, including evacuation plans that have been table-top exercised and modeled. State has 39 county plans recently tested.
- Highway signs can be used to advise the general community of trouble.
- Media broadcasts.
- Vessel Response Plans also have an element requiring health and safety environmental monitoring.
- There are authorities who test and close beaches and shellfish beds pursuant to public health requirements. Well developed notification plans are in place.
- Public health agencies are available to react to air releases; extensive EPA air monitoring. These capabilities are drilled and exercised.
- RI Emergency Management Agency.
- The ICS concept is imbedded at both local and regional levels.
- Early notification of dangers to the community.
- Tugs equipped with fire monitors. ATBs have good capability 10,000 gallons per minute.
- Tractor tugs owned by private company.
- State hospitals are well prepared for coordinated response to large casualty situations. W. Warwick incident identified gaps for improvement.

New Ideas (number of times suggested) [action by]:

- Acquire water-side firefighting equipment. (4) [Local government]
- Increase response equipment and resource base (i.e., firefighting equipment). (3) [Local government]
- Preposition HAZMAT teams / response equipment. (2) [MSO Providence, Industry, State]
- Update contingency plans (2) [MSO Providence]
- Enforce safety / response equipment preventative maintenance. [MSO Providence]
- Evacuation planning. [MSO Providence, RI EMA]
- Expand use of moving security zones. [MSO Providence]
- Expand voluntary education about and training for new equipment. [MSO Providence & Industry]

Subsequent Consequences: Environmental	
<p>Today:</p> <ul style="list-style-type: none"> • Many mammals, birds, and fish on the list of over 60 threatened species. • All waters of the area are sensitive except for the urban harbors. • National Estuarine Sanctuaries designated on Patience Island and Hope Island. • Shellfish beds. • Hope Island breeding ground for several seabirds. <p>Trends:</p> <ul style="list-style-type: none"> • No trends discussed. 	<p>Existing Mitigations:</p> <ul style="list-style-type: none"> • Extensive knowledge of species and locations that might be impacted. • No discharge zones established. Aquatic Resources Trust Fund provided shore side facilities to receive effluent. • Good ability to muster teams: National NOAA scientific response team (chemical analysis) to analyze the chemistry; USCG: RI Emergency Management Agency; Federal and state Environmental Protection Agencies. • Many scientific resources available to assist monitoring and mitigating effects of discharges. • Targeting non-source point discharges.
<p>New Ideas (number of times suggested) [action by]:</p> <ul style="list-style-type: none"> • Update environmentally sensitive area database / prioritization (EIS) and ensure contingency plans reflect changes. (6) [MSO Providence, Save the Bay] • Coordinate pre-staged deflection boom (see Buzzards Bay Lessons Learned). (4) [MSO Providence] • Update equipment and coordinate resources. (2) [MSO Providence] • Educate public on environmentally sensitive areas. [MSO Providence, GRU Woods Hole, Save the Bay, Harbor Masters] 	

Subsequent Consequences: Aquatic Resources	
<p>Today:</p> <ul style="list-style-type: none"> • Extensive fisheries throughout of the Bay. <ul style="list-style-type: none"> – The Bay provides a spawning and breeding area for more than three species year round. – Commercial shell fishing, quahog, all use the same area and are extremely sensitive: Greenwich Bay, Jamestown to Mount Hope Bay. – Lobster farming at Dutch Harbor and general lobster fishery throughout area. – Recreational fishing is very active. – Shellfish and ground fish commercial fisheries. <p>Trends:</p> <ul style="list-style-type: none"> • Not discussed. 	<p>Existing Mitigations:</p> <ul style="list-style-type: none"> • Existing authorities to close shellfish beds. • NOAA has the only sensory analysis lab available to test and chemically analyze fitness of fish products. <ul style="list-style-type: none"> – NOAA restoration projects. • URI has a working hydrographic model of the Bay.
<p>New Ideas (number of times suggested) [action by]:</p> <ul style="list-style-type: none"> • Increase efforts toward pre-spill habitat restoration. (4) [State Legislature, NOAA] • Mandate or encourage expedited post-spill fish and shellfish testing. (2) [EPA, State Health Authority] • Require pre-spill habitat restoration. (2) [NOAA, EPA] • Close sensitive areas. [MSO Providence] • Closely monitor fisheries. [RI DEM] • Coordinate pre-spill equipment testing. [MSO Providence] 	

Subsequent Consequences: Economic	
<p>Today:</p> <ul style="list-style-type: none"> • Closure of the waterway north of Prudence Island would have a multifaceted affect on the regional area, especially for oil transshipments. <ul style="list-style-type: none"> – Heavily populated throughout the PAWSA area. <p>Trends:</p> <ul style="list-style-type: none"> • No trends discussed. 	<p>Existing Mitigations:</p> <ul style="list-style-type: none"> • OPA 90 framework for response and economic compensation. • More than one port in the waterway. • Alternate channel available for some parts of the waterway for some traffic. Some shippers would probably divert to other ports. • Lightering possible, but not many barges available and shore side storage capability is limited. • Required insurance coverage protects against short-term economic losses. • State provides fund to store oil in case of disruption of oil shipments.
<p>New Ideas (number of times suggested) [action by]:</p> <ul style="list-style-type: none"> • Maintain emergency supplies / stockpiles. (3) [Industry] • Do contingency planning for major waterway closure and identify most vulnerable areas. (2) [MSO Providence & RI DEM] • Identify heavy salvage equipment. (2) [MSO Providence] • Plan alternate ports and channel options. (2) [MSO Providence & Industry] • Plan alternative transport methods such as truck and rail. (2) [MSO Providence & Industry] • Ensure there is an integrated regional plan for major waterway closure. [MSO Providence] • Have voluntary training / education for major waterway closure to minimize economic impact. [MSO Providence & Industry] 	