Ports and Waterways Safety Assessment
Tampa Bay
Workshop Report

Introduction

A Ports and Waterways Safety Assessment (PAWSA) Workshop was conducted for Tampa Bay on January 7 - 8, 2003, in Tampa, Florida. This workshop report provides 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

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

Assessment Process

The PAWSA process is a structured approach to 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. The PAWSA process uses a select group of waterway users / stakeholders to evaluate risk factors and the effectiveness of various intervention actions. The process requires the participation of local Coast Guard officials before and throughout the workshops. Thus the process is a joint effort involving waterway experts and the agencies / entities responsible for implementing selected risk mitigation measures.

This 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 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.

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 the experts' 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.

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.

- All of Tampa Bay from the area of the sea buoy shorewards, including that portion of the intercoastal waterway which crosses Tampa Bay, Port Manatee, Big Bend Channel, Old Tampa Bay to the Gandy Bridge, the Alafia River Channel, and all of Hillsborough Bay.

Numerical Results

Book 1 – Team Expertise

In Book 1, the participants were asked to assess their level of expertise compared to the other participants in the workshop for each of the six categories in the Waterway Risk Model. Overall, 50% of the participant teams placed themselves in the upper third, 42% in the middle third, and 8% in the lower third of all teams.

Book 2 – Risk Factor Rating Scales

Risk Factor	A Value	B Value	C Value	D Value
Vessel Quality	1.0	2.8	5.3	9.0
Deep Draft Mariner Proficiency	1.0	3.0	5.6	9.0
Shallow Draft Mariner Proficiency	1.0	2.9	5.5	9.0
Recreational Boater Proficiency	1.0	2.9	5.6	9.0
Volume of Commercial Traffic	1.0	3.2	5.4	9.0
Volume of Recreational Traffic	1.0	2.9	5.7	9.0
Traffic Mix	1.0	2.4	4.9	9.0
Congestion	1.0	2.6	4.9	9.0
Winds	1.0	2.6	5.3	9.0
Currents	1.0	2.8	5.1	9.0
Visibility Restrictions	1.0	2.8	5.6	9.0
Obstructions	1.0	1.9	4.3	9.0
Visibility Impediments	1.0	2.9	5.6	9.0
Dimensions	1.0	3.1	5.6	9.0
Bottom Type	1.0	2.5	5.1	9.0
Configuration	1.0	3.1	5.5	9.0
Personal Injuries	1.0	2.9	5.5	9.0
Petroleum Discharge	1.0	3.4	6.0	9.0
Hazardous Materials Release	1.0	3.4	6.0	9.0
Property Damage	1.0	2.7	5.0	9.0
Health and Safety	1.0	3.0	5.6	9.0
Environmental	1.0	3.1	5.8	9.0
Aquatic Resources	1.0	3.0	5.5	9.0
Economic	1.0	3.2	6.0	9.0

Analysis:

The purpose of Book 2 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 (the B and C values shown above) between those two extreme limits. On average, participants from this waterway evaluated the difference in risk between the lower limit (Port Heaven, A value) and the first intermediate scale point (B value) as being equal to 1.9; the difference in risk between the first and second intermediate scale points (C value) was equal to 2.6; and the difference in risk between the second intermediate scale point and the upper risk limit (Port Hell, D value) was 3.6.

Book 3 – Risk Assessment

Vessel Conditions	Traffic Conditions	Navigational Conditions	Waterway Conditions	Immediate Consequences	Subsequent Consequences
Vessel Quality 4.3	Volume of Commercial Traffic 6.1	Winds 6.7	Visibility Impediments 3.8	Personal Injuries 7.1	Health and Safety 9.0
Deep Draft Mariner Proficiency 3.9	Volume of Recreational Traffic 5.5	Currents 4.1	Dimensions 7.7	Petroleum Discharge 7.3	Environmental 4.3
Shallow Draft Mariner Proficiency 5.0	Traffic Mix 7.3	Visibility Restrictions 5.5	Bottom Type 7.1	Hazardous Materials Release 7.2	Aquatic Resources 4.6
Recreational Boater Proficiency 8.6	Congestion 8.5	Obstructions 1.9	Configuration 8.4	Property Damage 6.4	Economic 6.0

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 Tampa 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 (Port Heaven) and 9.0 represents high risk (Port Hell), with 5.0 being the mid-risk value. In the Tampa Bay area, 17 of the 24 risk factors were scored at or above the mid-risk value. They were (in descending order):

- Health and Safety (9.0)
- Recreational Boater Proficiency (8.6)
- Congestion (8.5)
- Configuration (8.4)
- Dimensions (7.7)
- Traffic Mix (7.3)
- Petroleum Discharge (7.3)
- Hazardous Materials Release (7.2)
- Bottom Type (7.1)
- Personal Injuries (7.1)
- Winds (6.7)
- Property Damage (6.4)
- Volume of Commercial Traffic (6.1)
- Economic (6.0)
- Volume of Recreational Traffic (5.5)
- Visibility Restrictions (5.5)
- Shallow Draft Mariner Proficiency (5.0)

Book 4 – VTM Tool 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	
4.3	3.3	6.1	5.0	6.7	4.8	3.8	3.5	7.1	6.2	9.0	6.9
Maybe		Maybe		Maybe		OK		Maybe		NO	
Deep Draft Mariner Proficiency		**Volume of Recreational Traffic**		**Currents**		**Dimensions**		**Petroleum Discharge**		**Environmental**	
3.9	3.1	5.5	4.8	4.1	3.4	7.7	7.7	7.3	5.0	4.3	3.7
Maybe		Maybe		Maybe		NO		NO		Maybe	
Shallow Draft Mariner Proficiency		**Traffic Mix**		**Visibility Restrictions**		**Bottom Type**		**Hazardous Materials Release**		**Aquatic Resources**	
5.0	4.1	7.3	6.9	5.5	4.5	7.1	6.4	7.2	5.3	4.6	3.6
Maybe		NO		Maybe		Maybe		NO		Maybe	
Recreational Boater Proficiency		**Congestion**		**Obstructions**		**Configuration**		**Property Damage**		**Economic**	
8.6	8.0	8.5	7.8	1.9	1.8	8.4	7.5	6.4	4.5	6.0	6.3
NO		NO		OK		NO		NO		NO	

KEY

Risk Factor	
Book 3	Book 4
Consensus	

Book 3	Absolute level of risk
Book 4	Level of risk taking into account existing mitigations
OK	Consensus that risks are well balanced by existing mitigations
Maybe	No consensus that risks are adequately balanced by existing mitigations
NO	Consensus that existing mitigations do NOT adequately Balance risk

Analysis:

The participants examined all risk factors and the effects of existing mitigations on those risks in the Tampa Bay area. For 2 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 10 risk factors, the participants were in consensus that risks were NOT adequately balanced by existing mitigations. For the other 13 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**
Other Actions	Other Actions	Active Traffic Mgmt	OK	Rules & Procedures	Rules & Procedures
2.3 Caution	2.7 Caution	2.8 Caution		2.6 Caution	3.9 Caution
Deep Draft Mariner Proficiency	**Volume of Recreational Traffic**	**Currents**	**Dimensions**	**Petroleum Discharge**	**Environmental**
Active Traffic Mgmt	Active Traffic Mgmt	Rules & Procedures	Waterway Changes	Rules & Procedures	Info / Comms
1.5	2.3 Caution	1.4 Caution	4.6	2.0 Caution	1.7 Caution
Shallow Draft Mariner Proficiency	**Traffic Mix**	**Visibility Restrictions**	**Bottom Type**	**Hazardous Materials Release**	**Aquatic Resources**
Active Traffic Mgmt	Waterway Changes	Enforcement	Waterway Changes	Rules & Procedures	Coordination/Planning
2.2 Caution	4.4 Caution	2.5 Caution	2.8	2.3 Caution	0.6
Recreational Boater Proficiency	**Congestion**	**Obstructions**	**Configuration**	**Property Damage**	**Economic**
Rules & Procedures	Waterway Changes	OK	Waterway Changes	Active Traffic Mgmt	Other Actions
3.8 Caution	4.9		4.0	1.5 Caution	2.8 Caution

KEY

Risk Factor	
Intervention	
Risk Improvement	Caution

Intervention
Risk Improvement
Caution

Intervention category which was judged most effective in further mitigating risk

Expected improvement in risk level if new mitigation measures were implemented

No consensus alert

Legend:

The intervention category listed is the one participant teams indicated would be most effective in further reducing risks. The Risk Improvement is the perceived reduction in risk when taking the actions specified by the participants. A green OK 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 port stakeholders
Rules & Procedures	Improve rules, regulations, policies, or procedures (nav rules, pilot rules, standard operating procedures, licensing, RNAs, 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 & current tables, etc.)
Communications	Improve communications (radio reception coverage, signal strength, reduce interference & congestion, etc.)
Active Traffic Mgmt	Establish/improve a Vessel Traffic Service (info, advice & control) or Vessel Traffic Information Service (information & 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 do NOT fall under any of the above strategy categories

Analysis:

For 6 of the 22 risk factors needing additional risk reduction action, the most selected intervention category had the largest risk improvement.

- Deep Draft Mariner Proficiency – Active Traffic Management
- Congestion – Waterway Changes
- Dimensions – Waterway Changes
- Bottom Type – Waterway Changes
- Configuration – Waterway Changes
- Aquatic Resources – Coordination / Planning

16 consensus alerts occurred because the most selected category was not the most effective category. No consensus was reached, but the intervention category selected possibly offering the most risk improvement was:

- Vessel Quality – Other Actions
- Shallow Draft Mariner Proficiency – Active Traffic Management
- Recreational Boater Proficiency – Rules & Procedures
- Volume of Commercial Traffic – Other Actions
- Volume of Recreational Traffic – Active Traffic Management
- Traffic Mix – Waterway Changes
- Winds – Active Traffic Management
- Currents – Rules & Procedures
- Visibility Restrictions – Enforcement
- Personal Injuries – Rules & Procedures
- Petroleum Discharge – Rules & Procedures
- Hazardous Materials Release – Rules & Procedures
- Property Damage – Active Traffic Management
- Health and Safety – Rules & Procedures
- Environmental – Information / Communications
- Economic – Other Actions

RISKS	RISK MITIGATION STRATEGIES
Vessel Conditions: Vessel Quality	
Today: • Cruise ships are in excellent material condition. • Deep draft bulk carriers, particularly foreign flag and one-time port callers are generally in legal compliance, but are not as materially sound. Port State Control (PSC) detentions are rare. 90% of vessels are in compliance or not far off. • There is a correlation between cargo value and vessel condition—ships with more expensive cargo tend to be in better condition. • Foreign flag and small coastal traders tend to be of poorer quality. • Recreational boats are generally of very high quality. Many are new vessels. **Trends:** • Fishing vessel fleet has been upgraded over the past 20 years. Most wood vessels have been phased out. Primary materials are fiberglass (most) and steel.	**Existing Mitigations:** • Port State Control program. • Coast Guard inspection program for U.S. flag vessels. Voluntary commercial fishing vessel examination program is active in this area. • Company ISM programs. • Established communication protocol between pilots and Coast Guard MSO. • 96-hr notice of arrival allows CG Port State Control program additional time to screen and prepare for arriving vessels. • Sea Marshals—marine safety specialists on board high-risk vessels. Vertical boardings on all high-risk vessels (including HAZMAT). **New ideas:** • More stringent class society enforcement of regulations / requirements, particularly for vessels with flags of convenience. • Mechanism to communicate operational non-conformities / problems among shipping community and the Coast Guard. • Near-miss information submitted anonymously for purposes of lessons learned. Explore options for information collection through Harbor Safety Committee. Coast Guard collection of such information is problematic due to DOJ interests in using information for penalty / prosecution.

RISKS	RISK MITIGATION STRATEGIES
Vessel Conditions: Deep Draft Mariner Proficiency	
Today: • Mixed bag on deep draft mariner proficiency. Most are compliant with Standards for Training, Certification, and Watchkeeping (STCW) and IMO. Mariners on U.S. vessels generally are highly trained and understand the scope of their jobs. Foreign flag mariners are sometimes less proficient—depends on the country and the cargo. • Overall, 15% of deep draft mariners have marginal proficiency. • Correlation between mariner proficiency and maintenance standards. Generally the vessels that have high maintenance standards have high mariner proficiency. **Trends:** • STCW and IMO are having some positive effects on mariner proficiency, but overall impact is marginal. • Harder for companies to find mariners that are willing to get the required level of training to meet proficiency standards. Pool of eligible mariners is shrinking.	**Existing Mitigations:** • 96-hr rule allows more time for screening vessels for mariner compliance with proficiency standards before they come into port. • Coast Guard is able to assess mariners' true proficiency during fire and shipboard drills. • Mandatory pilotage for most vessels arriving in Tampa. • STCW. • International Safety Management Code (ISM Code). • Mariner licensing program (domestic and international). • Random drug testing. • Training simulators being used by pilots. • Economic incentives for cruise ships—reputation. • Economic incentives by insurance companies. **New ideas:** • Require simulator training. • Better utilization of VTAS / VTIS as a decision making tool. Encourage 100% utilization by all vessels using the navigable channels (including recreational vessels).

RISKS	RISK MITIGATION STRATEGIES
Vessel Conditions: Shallow Draft Mariner Proficiency	
Today: • Very few transient commercial fishing vessels; however, questionable proficiency for those with crews not resident to Tampa. Louisiana shrimp vessels not regularly calling on Tampa are not familiar with the port. • Despite concerns for shrimpers, there has been no real increase in citations for them. • Most shallow draft mariners speak English. Few language / cultural problems. • Differing requirements for pilotage, i.e. 1. State Pilotage 2. Federal Pilotage 3. "Acting as" Pilot • Each has increasing degree of performance requirements. **Trends:** • No trends discussed.	**Existing Mitigations:** • Domestic licensing program for crews serving on inspected vessels. • Domestic inspection program has training component. • Passenger Vessel Association. • Voluntary commercial fishing vessel inspection programs reveal deficiencies and non-compliance that may otherwise not be identified. • American Waterways Operators (AWO) Standards of Care (modeled after ISM). **New ideas:** • Education of port customs and conventions through website, outreach programs, pamphlets, radio announcement, Coast Pilot, etc. • Leverage organizations such as American Waterways Operators (AWO), Passenger Vessel Association (PVA) to facilitate outreach directly to shallow draft mariners. • Create organization similar to National Association of State Boating Law Administrators (NASBLA) to facilitate outreach directly to shallow draft operators and share information /coordinate with other educational organizations.

RISKS	RISK MITIGATION STRATEGIES
Vessel Conditions: Recreational Boater Proficiency	
Today: • Bimodal distribution in quality for recreational boaters. Regular boaters generally have situational awareness of commercial boats. Non-regular boaters do not. • Special events and holidays bring out non-regular boaters (e.g., Gasparilla Pirate Festival, King Fish tournament) • Regular problem of boaters on west side of Beer Can Island. Beaches are too close to main shipping channel and impacted by wake of large vessels, causing some minor injuries. • Recreational boater level of negligence, when present, is gross. Significant room for improved education. **Trends:** • People purchasing 30-75 ft range boat are seeking out some training with Power Squadron and Coast Guard Auxiliary; however, training is not adequate for the situations that people experience on the water. • Florida has one of the worst record in U.S. regarding recreational boater casualties / deaths. Trend of increasing deaths. Population 21-50 yrs old involved in 80% of accidents.	**Existing Mitigations:** • Coast Guard Auxiliary and Power Squadron training programs. • Boating Advisory Committee pushing for mandatory education for recreational boaters. • Mandatory education for persons under 21 (for persons born after 1980). NASBLA standards for training. Information distributed in retail establishments to promote program. • Courtesy / voluntary inspection program for safety equipment by FWCC, Power Squadron, and Coast Guard Auxiliary. • AWO currently provides members with educational handouts to give recreational boaters. **New ideas:** • Mandatory licensing with written and physical demonstration test. • Economic incentives for boater education through insurance companies (and/or state agencies (e.g., insurance discounts, refundable registration / user fees with proof of boater education). • Outreach / educational programs that connect recreational boaters with professional mariners. • FWCC follow up with recreational boaters engaged in close calls reported by commercial mariners or other recreational boaters. • More law enforcement officers on the water. Current regulations permit citations only if witnessed by a law enforcement official.

RISKS	RISK MITIGATION STRATEGIES
Traffic Conditions: Volume of Commercial Traffic	
Today: • Traffic flows smoothly with little congestion. • Volume is comprised of large ships, not necessarily a large number of ships. • Traffic volume has decreased over the past 20 years, but the traffic mix has changed dramatically. • Overall volume is understated and under reported. A lot of shallow draft traffic in private ports not reported. • Concentrated volume of traffic. Cruise ship and petroleum oil schedules and longshoremen rules drive concentration. If spread out over 24 hrs. / 7 days wk. there would be significantly less congestion. • Few berthing conflicts. • A lot of surprises / near-misses due to people not monitoring / participating in radio traffic. • 8,000 total vessel movements / yr., 100 commercial movements /day, 4,000 vessels come into Tampa (doesn't include work barges and shifting berths, etc.), 5,000 vessel movements / yr. escorted by state pilot vessels, and 1,000 movements / yr. in Port Manatee **Trends:** • Fantasy class vessel port calls increasing to 260 times / yr. • Port Manatee berthing is expanding to address current holding time issues. • Tugboat usage down (approximately 10% this yr.) Cruise ships don't use tugs. • VTAS is getting harder to manage. More shallow draft barges that do not use system or use voice communication (did not occur 2 years ago). • Ross transponder usage decreasing in tugs.	**Existing Mitigations:** • Two types of pilots: Federal and state. Maritrans and TECO have federally licensed pilots, and have most transits in the area—sometimes they use state, oftentimes they use their own pilots. • Major users and pilots work together closely. • VTAS: provides real time information to commercial vessel pilots (Channel 12). • Ross VIS system: 70% of main channel users are using (current goal is 100%). 95% of pilots are using (state, Federal, and TECO and Maritrans pilots). • Traffic Control Board (HSC) developed to proactively identify issues and develop solutions. All major stakeholders are involved. Three phased approach. • High professionalism of commercial operators on Tampa Bay. **New ideas:** • Need lessons learned for near-misses. • Establish gatekeeper for the channel. • Upgrading VTIS monitored by vessel traffic controller should increase efficiency without degrading safety. • Widen channel to facilitate two-way traffic.

RISKS	RISK MITIGATION STRATEGIES
Traffic Conditions: Volume of Recreational Traffic	

Today:
• Summertime is the peak recreational boater season.
• 130,000 registered boats in four surrounding counties.
• Only 5% of registered county boaters are out at any given time; however, there are many out-of-county boaters, particularly at Gandy Bridge and DeSoto Park.
• High volume of recreational vessel traffic during holidays and special events: Gasparilla, July 4th, Labor Day, Memorial Day, MacDill AFB air show, Davis Island Yacht Club racing.
  o Upper Hillsborough Bay
  o Main ship Channel from Egmont Key to Gadsden Cut
  o Old Tampa Bay
  o Big Bend Channel
• Port Manatee to Egmont Key: year round recreational fishers, not seasonal boaters.
Trends:
• Increasing number of recreational boaters
• Counties that have most registered vessels have the highest number of reported accidents. Hillsborough County is ranked 5th in the state.
	Existing Mitigations:
	• No existing mitigations discussed.
	New ideas:
	• No new ideas discussed.

RISKS	RISK MITIGATION STRATEGIES
Traffic Conditions: Traffic Mix	

Today:
• Multiple use waterway.
• Commercial fishing vessels monitor Channel 13; deep draft vessels monitor Channel 13 or 16. Small vessels, however, often do not monitor Channel 13 or 16, but rather Channel 68 instead—inattentive to deep draft commercial vessel movements.
• Traffic delays caused by recreational boaters on weekends and special events; do not communicate with commercial traffic. Cut "J" to Weedon Island is particularly problematic.
• Recreational and commercial traffic conflicts around approach to Old Tampa Bay. Narrow approach–commercial traffic has gone aground.
• Very limited bail out points in main channel.
• Need to also consider risk in terms of security:
  o Particularly with HAZMAT carriers.
  o Both spoil islands are used for duck hunting. Duck hunters "profiled" as terrorists on the water and land by security escorts for vessels.
Trends:
• Increased number of marinas in Old Tampa Bay.
• Increased recreational / commercial traffic conflict due to residential development in St. Petersburg.
	Existing Mitigations:
	• Vessels carrying Anhydrous Ammonia (NH_3) and Liquid Petroleum Gas (LPG) as well as cruise ships require safety and/or security zones.
	• Port Community Information Bulletin (PCIB) requires one-way traffic in main channel for Fantasy Class cruise ship movement. Pilots have determined that this in the only safe way to move those vessels.
	• Boater education organizations coordinate with FWCC and Coast Guard to educate recreational boaters on situational awareness of commercial vessels. Encourage them to monitor their radio especially channel 12, 13, 16.
	• Most recreational activity is physically segregated from commercial vessels—outside main navigation channels. Also, security zones for port infrastructure and high-risk vessels segregates recreational boats from commercial traffic.
	New ideas:
	• Anchorage area is necessary by Cut "B".
	• Increased enforcement of legislation restricting channel interference, particularly in Cuts "A", "B", and "C".
	• Restrict areas of ingress to the waterways for recreational boaters (limit ramps).
	• Explore implementation of traffic separation scheme concepts
	  o Dual draft channels to accommodate deep and shallow draft mix.
	  o Loop channel (deepen channel on west side of Tampa Bay, up to Cut "G" and around to Cuts "E" and "D".)

RISKS	RISK MITIGATION STRATEGIES
Traffic Conditions: Congestion	

Today:
• Special traffic conditions create congestion. Not just Fantasy Class vessels, but also larger vessels in general.
• Areas prone to congestion:
  o St. Petersburg dock.
  o Egmont Key: up to 12,000 recreational boats anchored on northwest end during certain holidays.
  o Congestion chokepoints at Port Sutton and Hillsborough delta (outbound and inbound).
  o Bifurcation buoy in main channel middle bay.
  o Big Bend Channel and East Tampa Junction: traffic merging.
  o Port Manatee.
  o Alafia River convergence with main channel.
Trends:
• In general vessels are getting larger which will lead to more congestion due to inability of the waterway to handle two-way traffic for large vessels.
• Increasing number of cruise ships and container ships anticipated.
• Increasing delays for vessels waiting in queue to get in / out of port.
	Existing Mitigations:
	• Permanent safety zone in place during Gasparilla.
	• Increased law enforcement patrols for special events.
	• Increased enforcement of marine permits issued (Coast Guard issues 10 permits / yr). Marine events communicated to the public.
	• Coordinated vessel traffic queuing by pilots and Tampa Port Authority.
	• Currently there is a scheme to mitigate traffic delays through vessel traffic control board.
	New ideas:
	• Queuing deep draft vessels addresses safety issues, but does not address economic impacts for these vessels and their companies.
	• Better VTIS / VTAS will accelerate queue and expedite movement of vessels in the queue. One consideration for priority could be vessel's speed so as not to slow other vessels behind it.
	• Viable anchorages could relieve congestion for shifting berths. Currently vessels must go in / out of port numerous times when shifting berths.
	• Widen the channel.
	• Cut B anchorage.

RISKS	RISK MITIGATION STRATEGIES
Navigational Conditions: Winds	
Today: • Sudden winds from summer thunderstorms occur unexpectedly (90 days / yr.). East / West coastal sea breezes, particularly near Big Bend Channel. Frontal activity during winter from southwest to northwest. Sustained, strong winds. • Rattlesnake Channel problematic if winds exceed 20 kts. because channel is narrow and shallow on sides. Problematic for commercial vessel due to close proximity of Gandy Bridge. • Port Manatee, Big Bend Channel, and Alafia River Channel: cross directional winds and narrow channel widths. • Recreational boats have more options within the channel due to less draft restrictions (i.e., edges vice center of channel) for additional maneuverability. **Trends:** • Weather forecasting has improved.	**Existing Mitigations:** • Physical Oceanographic Real Time System (PORTS). • Pilots communicate with national weather service personnel. • Live weather radar every 9 minutes on television / Internet. • Modeling of water levels on the University of South Florida (USF) website. Currently working with National Ocean Service (NOS) to be integrated into official NOS website. • Increasingly pilots are carrying Palm Pilots that can access the Internet. • Dedicated one-way traffic provides room for maneuverability to compensate for wind. • Local area knowledge. **New ideas:** • Where notice of winds is sufficiently timely, plan the use of tugs during strong winds. • Continue enhancement of information (i.e., overlay of radar information on Ross VIS boxes). • Increase the number of PORTS sensors between Port Manatee and Port Tampa. • Establish central facility to collect reported weather data and feedback to users on demand. • Enhance data from National Weather Service (NWS) to acquire real-time data—their data seems to be at least 1-hour old. • Expand data collection along U.S. coastline. Current effort underway by marine scientists.

RISKS	RISK MITIGATION STRATEGIES
Navigational Conditions: Currents	

Today:
• Cross channel currents exist in the following areas:
  o Gandy Bay.
  o Port Manatee.
  o Port Tampa.
  o Cut "C" (main channel).
  o Port Sutton: outwash from power plant.
  o Buoys 9 and 10—out of dredged channel into open ocean (weather driven).
  o North turn at Cuts "G" and "J" from main channel.
  o Weedon Island Channel.
• The deeper a vessel's draft, the more restricted the ability to maneuver / to mitigate currents.
Trends:
• No trends discussed.
	Existing Mitigations:
	• PORTS sensors at:
	  o Skyway Bridge.
	  o Entrance to Port Manatee (temporarily removed due to dredging activity).
	  o Old Port Tampa.
	  o Hookers Point (wind sensor only).
	  o Removed from Buoys 9 and 10 (repeatedly damaged by commercial traffic).
	• Pilots' Guidelines / Standard of Care.
	• Forecast models can predict anomalies in current changes. Available via USF website.
	• Local area knowledge.
	New ideas:
	• Federal funding of PORTS as part of Coast Guard ATON budget. PORTS needs identified, sustained funding. National Oceanographic and Atmospheric Administration (NOAA) will install PORTS, but local community must maintain it. Approximately $300K / yr.

RISKS	RISK MITIGATION STRATEGIES
Navigational Conditions: Visibility Restrictions	
Today: • Visibility after restricted in Cut "J" turn. • Fog problematic 30 days / yr, particularly at Egmont Key. Bay experiences both persistent advection fog and radiation fog. • Recreational fishers use waterways in fog. Only small percentage of recreational vessels use radar resulting in traffic mix conflicts with commercial vessels. • Restrictions due to summer rain 90 days / yr. **Trends:** • No trends discussed.	**Existing Mitigations:** • Radar and other precision navigation equipment. • Voice communication. • PORTS visibility sensors installed, but not released by FL state due to inability to monitor real-time accuracy. Information is available on the USF website. • Pilots sometimes convoy vessels through heavy fog (one-way traffic). **New ideas:** • Include visibility sensors in PORTS. • Establish ranges for inbound and outbound channels at Port Manatee, Weedon Island, Alafia River, Point Pinellas Channel. • Integration of complete radar system with VTS. Add CCTV to VTS.
Navigational Conditions: Obstructions	
Today: • Egmont Key (near lighthouse): underwater pipelines / power lines prevent anchoring. • Rattlesnake Channel: uncharted pipeline / powerline. • Sparkman Channel: pipelines (3) and power line (1). • Old Tampa Bay: pipeline to Weedon Island • Southwest Channel: crab traps **Trends:** • No trends discussed.	**Existing Mitigations:** • Most pipelines and power lines are charted. **New ideas:** • Identify all underwater obstructions / hazards on charts, specifically at Rattlesnake Channel. • Ensure all hazards charted accurately.

RISKS	RISK MITIGATION STRATEGIES
Waterway Conditions: Visibility Impediments	

Today:
• Areas of particular concern:
  o Hillsborough Cut (inbound): background light affects visibility.
  o Ratttlesnake Channel: unmarked pier (no lights).
  o Gandy Bridge (in bound): background lighting.
Trends:
• More opportunities for using informal aids to navigation (e.g., radio towers).
	Existing Mitigations:
	• Port Authority is encouraging property owners to turn off background lights and identify alternate security measures.
	• Port Authority / state often owns waterside properties and prohibits building that interferes with visibility.
	• Coast Guard coordinating with waterway users to keep ATON visible: using new technologies (e.g., day / night optics, range changes, lens changes.)
	• Regulated Navigation Area (RNA) requires radio use.
	New ideas:
	• Require transponders for all vessels that transit main channel.

RISKS	RISK MITIGATION STRATEGIES
Waterway Conditions: Dimensions	

Today:
• Channel widths:
  o Main channel: 700 ft. to 500 ft.
  o Upper Tampa Bay: 400 ft.
  o Ancillary channels: as narrow as 200 ft.
  o Port Manatee: 400 ft.
• Channel from Cut "A" north is too narrow. Originally designed to 600 ft., but built only 500 ft. 600 ft. channel would enable greater vessel passing. Current traffic usage is outside of USACE standards / guidelines.
• Dimensional restrictions particularly narrow in: East Tampa Channel, Port Manatee, Weedon Island, Cut "G" (due to shoaling), Sparkman Channel, Ybor Channel, Port Sutton.
• Port Sutton and Port Tampa are not wide enough to accommodate both a moored and transiting vessel.
• In upper bay (past Skyway Bridge), large vessels cannot turn around and have no anchorage area.
• In most conditions, passing available except with special handling vessels.
Trends:
• No trends discussed.
	Existing Mitigations:
	• Special one-way traffic requirements for certain ships due to narrow channels.
	• Formation of advisory committees; local area knowledge.
	• USACE allocates monies on today's needs, not projected needs. Advisory committees work with Fed. authorities to help make dredging cases.
	• Phase II dredging project: Port Manatee—expansion of wideners (N/S); Tampa and Manatee, expansion of turn basin at entrance to Manatee Harbor.
	• Harbor Safety Committee pursing federal and state funding to expedite dredging projects.
	• Coordinating traffic enables vessels to exceed USACE guidelines for channel limits.
	New ideas:
	• USACE wants to know when vessels are operating outside official channel so it can help designate auxiliary channel.
	• USACE needs to know current costs to shippers for queuing compromises to accommodate channel limitations. Strengthens their ability to make case for widening channel. (Timeline for USACE to commence a project is 10 years from bottom up, less time if actions initiated by Congressional direction.)
	• Safety and economic factors are USACE's major considerations. Look to Coast Guard to bring safety issues to their attention.
	• General anchorages needed particularly south side of Gadsden Cut; widening main channel Cut "B" anchorage.
	• Need channel deepening in areas where intra-harbor movements are made during high tide, slack tide, specifically Port Manatee Cut "B".
	• Queuing and gatekeeping with economic impact considered.

RISKS	RISK MITIGATION STRATEGIES
Waterway Conditions: Bottom Type	

Today:
• Specific channels with hard bottom types include:
  o Sparkman (limestone), E. Tampa Channel, Weedon Island Channel, Alafia Channel (limerock).
  o Limerock scattered throughout areas surrounding main channel—affects vessels over 35 ft. draft that stray out of main channel.
• Rocky bottom for most ancillary channels that go into the landmass.
Trends:
• No trends discussed.
	Existing Mitigations:
	• Channel at Skyway Bridge designed such that deep draft vessel will run aground before it hits any of the guarding pillars.
	• Channel depth of 43 ft. designed with safety clearance in mind due to hard bottom type.
	• Pilot's Standards of Care for under keel clearance.
	• Petroleum carriers must have tug escort.
	• High-risk vessel transits are scheduled around high tides.
	• PORTS is used to determine time / period of high water. More accurate than tide / current tables.
	New ideas:
	• Establish marked auxiliary channel(s) for vessels with shallow drafts.

Waterway Conditions: Configuration	

Today:
• Channels have multiple points of convergence.
• Crossing traffic is primarily recreational boats. Intracoastal waterway recreational boaters crossing main channel at Buoys 23-25 and Mullet Key Channel.
Trends:
• Discussions of establishing ferry route between downtown St. Petersburg and City of Tampa.
	Existing Mitigations:
	• Wideners in channel bends; however, they are not fully adequate for the size of current vessels. PORTS information facilitates negotiation of channel bends.
	• ATON improvements:
	  o Quantity of ranges (inbound and outbound).
	  o Changing lights from incandescent to LED (brighter and more reliable).
	• Assist tugs.
	New ideas:
	• Wideners in auxiliary channels.

RISKS	RISK MITIGATION STRATEGIES
Immediate Consequences: Personal Injuries	
Today: • Fantasy Class cruise ships carry 3,500 people onboard. • Scotia Prince has ferries to Mexico carrying 400-500 people. • Dinner cruise ship maximum capacity 300. • Tampa is homeport to most cruise ships that call at the port. • Navy frigate calls in Tampa once a year. **Trends:** • Number of cruise ship arrivals is increasing and expected to increase. St. Petersburg and Tampa may increasingly be port of call (not home port). • Establishing a day cruise (gambling) from St. Petersburg carrying 2,000 people.	**Existing Mitigations:** • Tampa General a trauma center and a burn center. Expanding trauma center for triage and terrorism. • Subchapter T, K, and H boats must have passenger list at home office to facilitate response efforts / notifications. • Coast Guard developing marine casualty response contingency plans. • Port rescue community has extensive drills: table top, mass rescue, incident command training certification. Wide participation by port stakeholders. • Good updated Area Contingency Plan (ACP) with wide distribution. • USF trajectory models for Search and Rescue (SAR). • Warm water temperatures facilitate mass rescue operations (with the exception of winter). **New ideas:** • Augment resources for marine firefighting and rescue resources. • Create a network of vessels of opportunity in advance. • Maintain awareness of POCs within network of stakeholders. • Establish protocol for Joint Incident Command (JIC) between Federal and local authorities—explore using VTAS as forum for coordinating / implementing JIC. Emergency Operations Center will coordinate mass rescue. • Diversion planning for inbound / outbound ships (need to consider berthing capabilities). • Mass Rescue exercises (one previously held on Port Manatee).

RISKS	RISK MITIGATION STRATEGIES
Immediate Consequences: Petroleum Discharge	
Today: • Maximum load 300,000 bbls./ vsl. Average carrier 40,000 DWT. • Refined, light product (motor fuels and jet fuels). • Some heavy oils. • 50 % of total gasoline for the state of Florida through the Port of Tampa. • 41% of cargo tonnage for Port Manatee and 30% of cargo tonnage for Port of Tampa are petroleum products. • 17 million tons total (2001). **Trends:** • Increase in area growth will call for more petroleum. • Single hull tankers being phased out.	**Existing Mitigations:** • OPA 90 requirements: VRP, FRP, ACP, drills, exercise, four OSROs, OSRO Standards, Double hull vessels. • Jones Act restricts petroleum movement in Tampa primarily to U.S. carriers. • PORTS has predictive models for spill trajectory. Marine scientists work closely with state and Coast Guard. • Three Level-3 OSROs in Port of Tampa. MSRC, NRC. National OSROs stage equipment in Tampa. Have adequate equipment for average most probable discharge. Not sure if can handle worst case discharge for 40,000 DWT vessel in inner harbor. • Point Manatee is easily boomed and equipment is staged on location. Holds regular exercises. • ACP is tested periodically, both area wide and individually by vessels and facilities to ensure viability. **New ideas:** • Need financial support for local spill trajectory modeling programs. • Test critical components of ACP to ensure ability to implement them.

RISKS	RISK MITIGATION STRATEGIES
Immediate Consequences: Hazardous Materials Release	
Today: • Bulk carriage of sulfuric acid, LPG, NH_3 in Port Sutton, Hooker Point, Rattlesnake, Port Tampa. • NH_3 tank across from Davis Island airport cannot withstand vertical hit. **Trends:** • Discussion of Liquefied Natural Gas (LNG) power plant in the future at Hooker Point. • Possible LNG facility establishment at Hookers Point. • Future shift from molten sulfur to dry sulfur in Big Bend. • Desalination plant coming next month in Big Bend.	**Existing Mitigations:** • Security zones for vessels carrying sulfuric acid, LPG and NH_3. • Wide area alarm system for potentially affected areas for NH_3 release. • 50 % mitigation of released NH_3 by natural environmental influences. • Shelter in place protocol for Davis Island and other areas. • Proactive industry protection of HAZMAT properties. Tanks double walled, dykes, sprinkler systems, wide area warning alarms. Security zones on vessels. **New ideas:** • Need to develop HAZMAT section of ACP. Anticipate completion in 1 yr. • Coordination of fire and rescue resources among multiple ports for exercises.

RISKS	RISK MITIGATION STRATEGIES
Immediate Consequences: Property Damage	

Today:
• Areas of particular concern are:
  o REK Pier – 5 terminals. Ammonia and petroleum terminals. Low speed and high mass (medium momentum). Pier was built for ships half the size of what is calling at that port.
  o Sparkman Channel (Gasoline Alley).
  o Cruise terminals in Ybor Channel.
  o Skyway Bridge–vessels typically transiting at 12 knots.
  o Hookers Point: old cruise terminal and bulk fertilizer dock (previously has been hit).
  o Entrance to Port Manatee.
Trends:
• No trends discussed.
	Existing Mitigations:
	• Location and design of protective barriers for Skyway Bridge.
	• Most critical infrastructure / docks in slow traffic zones.
	• Increased quality of tugs. Addition of tractor tugs to fleet.
	New ideas:
	• Create alternate channels through dredging Pinellas Channel around St. Petersburg (west side of the bay).

Subsequent Consequences: Health and Safety	
Today: • Discharge of HAZMAT facility could have direct impact on City of Tampa (pop. 250,000). Prevailing winds (highly variable but S.E. tendency) could also result in impacts to Old Port Tampa (residential area) and St. Petersburg (pop.300,000) (total Pinellas County pop. 1M). • Drinking water coming from Hillsborough River and aquifer. • Port Manatee has low population. Emergency evacuation loading port. **Trends:** • Desalination plant being built north of Big Bend.	**Existing Mitigations:** • Evacuation plans in place for hurricanes; however, would not map over well for HAZMAT discharge due to no advanced notice. **New ideas:** • Develop / revise evacuation plans. • Increase public awareness regarding HAZMAT risks. Public education via HSC, Spill Committee, and other forums across industry lines and locales that will capture public interest/participation.

RISKS	RISK MITIGATION STRATEGIES
Subsequent Consequences: Environmental	
Today: • Total area of bay is 250,000 acres. • Approximately 18-20% of bay is considered environmentally sensitive area, includes wetlands, submerged wetlands, etc. • Protected species include mangroves, sea grass, birds (nests). Certain sea turtle species are endangered. • Manatees migrate twice yearly throughout the bay east west across main channel of the bay. Particular habitats include waters near power plants at Big Bend, Port Sutton, and Weedon Island. **Trends:** • No trends discussed.	**Existing Mitigations:** • Light refined oils (vs. heavy oils) will dissipate. • ACP identifies volunteer organizations for clean up efforts. • Large marine science community to guide clean up effort and many civic organizations to assist decision-making for long term planning. • Continue prevention efforts focused on (1) minimizing risk of vessel casualty and (2) minimizing risk of discharge. **New ideas:** • Most oil products and all HAZMAT moving in double hull tankers. • Explore alternate means for oil spill recovery (i.e., in-situ burning, dispersants). Review contingency plans to determine alignment with current political sensitivities / realities.
Subsequent Consequences: Aquatic Resources	
Today: • Limited commercial shrimping in the Upper Bay. Five or 6 boats grand-fathered for commercial shrimping. • Limited commercial fishing for bay shrimp, shellfish, and blue and stone crabs outside Skyway Bridge. • Extensive recreational fishing. • Bay is the cleanest waterway in the state and therefore has a high value of aquatic resources. **Trends:** • No trends discussed.	**Existing Mitigations:** • See mitigations in Environmental category. **New ideas:** • No new ideas discussed.

RISKS	RISK MITIGATION STRATEGIES
Subsequent Consequences: Economic	

Today:
• Port closures history: ranged from 12 hrs to 1 wk.
  o Grounded ship caused 12-14 hrs port closure.
  o Three vessel collision closed port 3 - 4 days with 2 days of limited traffic.
  o Bridge allision closed port completely for 1 wk, 1 month restricted movements.
  o Vessel sank and waterway closed for 1 wk.
• Port is biggest economic driver in Hillsborough County—larger than tourism and agriculture. Port is also large economic driver of Pinellas County ($12 billion / yr.).
• Power plants are fueled by coal and heavy oil supplied solely via shipping. They supply MacDill AFB and Orlando area.
• Impacts of lack of fertilizer could be extensive. Port supplies 25% of world's fertilizer. Time sensitive delivery depending on season. During farming season, lack of fertilizer would impact multiple economies.
• No heavy salvage equipment staged in Tampa Bay.
Trends:
• No trends discussed.
	Existing Mitigations:
	• LPG inventory 5-7 days.
	• Gasoline inventory 5 days.
	• Ammonia inventory 2-3 days
	• Sulfur inventory 3 days.
	• Coal inventory 7-10 day.
	• Fertilizer plants can receive supplies via rail.
	• Alternate transportation is not available or sufficient for certain resources.
	• Less than 3% of commercial vessels can use alternate channels.
	• Limited options for lightering product from vessels within the port.
	New ideas:
	• Need faster options for salvage operations.
	• Widen channels.
	• Establish / deepen anchorage areas.
	• During channel closure, reduce draft considerations.
	• Establish forum of stakeholders to equalize / mitigate economic impacts and develop strategy for reopening port. HSC is a viable option for this forum.
	• Implement provisions in County Emergency Management Plan.