

# Port and Waterways Safety Assessment Workshop Report Cincinnati

## Executive Summary

Risk identification and mitigation are and have been ongoing activities within the Cincinnati area. In support of that overall safety improvement activity, a formal Port and Waterways Safety Assessment (PAWSA) for a portion of the Ohio River was conducted in Florence, Kentucky on 29 – 30 July 2008, sponsored by the U.S. Coast Guard. The workshop was attended by nineteen participants representing waterway users, regulatory authorities, and stakeholders (i.e., organizations with an interest in the safe and efficient use of the Ohio River for commercial and recreational purposes). A previous PAWSA for Cincinnati, conducted in January 2001, included the waterways addressed by this report.

A Waterway Risk Model, incorporating 24 risk factors associated with both the causes and the effects of waterway casualties, was used throughout the workshop to guide discussions and numerical assessments. That model was originally conceived by a United States Dialog Group on National Needs for Vessel Traffic Services and subsequently has been refined based on experience gained during the 40 PAWSA workshops that preceded the Cincinnati session.

Waterway Risk Model					
Vessel Conditions	Traffic Conditions	Navigational Conditions	Waterway Conditions	Immediate Consequences	Subsequent Consequences
Deep Draft Vessel Quality	Volume of Commercial Traffic	Winds	Visibility Impediments	Personnel Injuries	Health and Safety
Shallow Draft Vessel Quality	Volume of Small Craft Traffic	Water Movement	Dimensions	Petroleum Discharge	Environmental
Commercial Fishing Vessel Quality	Traffic Mix	Visibility Restrictions	Bottom Type	Hazardous Material Release	Aquatic Resources
Small Craft Quality	Congestion	Obstructions	Configuration	Mobility	Economic

The PAWSA process uses a structured approach for obtaining expert judgments on the level of waterway risk for each factor in the Waterway Risk Model. The process also addresses the effectiveness of possible intervention actions for reducing risk in the waterway. The first step in the PAWSA process is for the participants to discuss and then numerically evaluate the baseline risk levels in the waterway using pre-defined qualitative risk descriptions. The second step is for the participants to assess the expertise of each other with respect to the risk categories in the

model. Those expertise assessments are used to weigh inputs obtained during the other steps in the process. In the third step, the participants discuss and then evaluate the risk reducing effectiveness of existing mitigation strategies. Next, the participants offer new ideas for further reducing risk, for those factors where risk is judged to be not well balanced with existing mitigations. Finally, the potential effectiveness of those new ideas for additional interventions is evaluated. The PAWSA process produces a consensus view of risks in the waterway and has proven to be an excellent tool for focusing follow-on risk mitigation efforts.

Based on extensive discussions during the workshop, concentrations of risks were noted by the participants in three locations:

- The three miles between the Cincinnati Southern Railroad Bridge and the I-475 Bridge
- The three miles between the Dayton Bar Light and the entrance to the Little Miami River
- The vicinity of River Bend Park

The PAWSA Cincinnati participants judged that additional risk reduction actions were needed with respect to eleven of the twenty-four risk factors in the Waterway Risk Model. The table below summarizes that information and is ordered from highest to lowest possible risk improvement. The specific action listed is the one recommended by the most participant teams; see the detailed information at the end of this report for a full list of alternatives suggested during the workshop.

<b>Risk Factor Name</b>	<b>General Strategy</b>	<b>Specific Action</b>
Small Craft Quality	Rules & Procedures	License for small craft operators
Visibility Impediments	Radio Communications	Improve pilothouse to pilothouse radio communications by eliminating “dead” spots
Traffic Mix	Rules & Procedures	Require license for small craft operators
Volume of Small Craft	Rules & Procedures	Require license for small craft operators and establish a “through transit only” area between the downtown bridges
Congestion	Rules & Procedures	Require Marine Event Permit for River Bend Park concerts
Configuration	Radio Communications	Improve pilothouse to pilothouse radio communications by eliminating “dead” spots
Petroleum Discharge	Voluntary Training	Conduct more oil spill response drills
Hazardous Materials Release	Coordination / Planning	Identify evacuation routes
Obstructions	Coordination / Planning	Ensure pier placement for new bridges allows for safe navigation by large tows
Visibility Restrictions	Voluntary Training	Emphasize risks during boater education classes
Economic	Coordination / Planning	Address these consequences in the Marine Transportation System Recovery Plan

## Report Contents

This PAWSA Cincinnati workshop report includes the following information:

- List of attendees
- Geographic bounds of the area included in the PAWSA
- Numerical results from the following activities:
  - Book 1 – Baseline Risk Levels
  - Book 2 – Team Expertise Cross Assessment
  - Book 3 – Mitigation Effectiveness
  - Book 4 – Additional Interventions
- Summary of risks and mitigations discussion

## Attendees

The following waterway users and stakeholders attended this PAWSA workshop:

<b>Participant</b>	<b>Organization</b>	<b>Email Address</b>
Mr. Bob Alexander	Ohio River Launch Club	alexanders.homeport@juno.com
Capt. Paul Anderson	Anderson Ferry	PWAnderson789@aol.com
Capt. Dale Appel	Boone County Water Rescue	appel100@msn.com
Capt. Alan Bernstein	B B Riverboats Inc.	abernstein@bbriverboats.com
Officer Rich Cates	Division of Watercraft, Ohio DNR	Rich.Cates@dnr.state.oh.us
Ms. Erin Crowley	Ohio River Foundation	orf@cinci.rr.com
Mr. Larry Doss	USCG Sector Ohio Valley	Larry.W.Doss@uscg.mil
Mr. George Groene	Coast Guard Auxiliary	georgebob@fuse.net
LT Heather Hanning	USCG MSD Cincinnati	Heather.E.Hanning@uscg.mil
Capt. Doug Hedrick	McGinnis Inc.	dhedrick@mcginnisinc.com
LCDR Phillip Ison	USCG Sector Ohio Valley	Phillip.Ison@uscg.mil
Mr. Jim Jarrell	Madison Coal & Supply Co.	jjarrell@portamherst.com
Capt. Martin Leake	Marathon Oil Company	msleake@marathonoil.com
Mr. Rick Lewis	Army Corps of Engineers	rick.lewis@usace.army.mil
LT Bobby Newman	Kentucky Dept. of Fish & Wildlife Services	Bobby.Newman@ky.gov
Capt. David Reed	Crouse Corporation	dreed@crouse.com
Mr. Denny Schalk	Four Seasons Marina	Denny@TP1.com
Capt. Joe Vancil	Ingram Barge	Joe.Vancil@ingrambarge.com
MCPO Brian Williams	USCGC OBION	Brian.C.Williams@uscg.mil

<b>Observer</b>	<b>Organization</b>	<b>Email Address</b>
CAPT Hung Nguyen	USCG Sector Ohio Valley	Hung.M.Nguyen@uscg.mil
Mr. Mort Mullins	Coast Guard Auxiliary	Mmullins7@cinci.rr.com

<b>Facilitation Team</b>	<b>Organization</b>	<b>Email Address</b>
Mr. Burt Lahn	Commandant (CG-5413)	Burt.A.Lahn@uscg.mil
LCDR Jim Larson	Commandant (CG-7413)	James.W.Larson@uscg.mil
Mr. Robert Hennessy	ATS Corporation	rhennessy@atsva.com
Ms. Stephanie Muska	ATS Corporation	smuska@atsva.com
Mr. Doug Perkins	ATS Corporation	dperkins@atsva.com

### **Geographic Area**

The geographic bounds of the waterway area were defined as:

- The Ohio River from mile 461 (River Bend Park) to mile 477 (Anderson Ferry)
- The Licking River from the mouth to mile 3 (Marathon Oil facility)

## Numerical Results

### Book 1 – Baseline Risk Levels:

Baseline Risk Levels					
Vessel Conditions	Traffic Conditions	Navigational Conditions	Waterway Conditions	Immediate Consequences	Subsequent Consequences
Deep Draft Vessel Quality	Volume of Commercial Traffic	Winds	Visibility Impediments	Personnel Injuries	Health and Safety
1.0	2.8	2.2	8.5	9.0	8.7
	<b>RISING</b>		<b>RISING</b>	<b>RISING</b>	<b>RISING</b>
Shallow Draft Vessel Quality	Volume of Small Craft Traffic	Water Movement	Dimensions	Petroleum Discharge	Environmental
4.9	5.8	7.2	6.5	5.1	4.6
		<b>RISING</b>	<b>RISING</b>		<b>RISING</b>
Commercial Fishing Vessel Quality	Traffic Mix	Visibility Restrictions	Bottom Type	Hazardous Materials Release	Aquatic Resources
2.2	6.8	3.7	4.7	5.0	2.1
		<b>RISING</b>	<b>RISING</b>		
Small Craft Quality	Congestion	Obstructions	Configuration	Mobility	Economic
9.0	5.6	4.5	8.1	7.0	6.3
		<b>RISING</b>			<b>RISING</b>

Risk values highlighted red (values at or above 7.7) denote very high baseline risk levels; risk values highlighted green (values at or below 2.3) denote very low baseline risk levels. Risk factors flagged with **RISING** denote that the risk level was judged to be higher by the 2008 PAWSA participants than by the 2001 PAWSA participants.

### Book 1 Analysis:

The participants evaluated the baseline risk levels in the waterway by selecting a qualitative description for each risk factor that best described conditions in the Cincinnati area. Those qualitative descriptions were converted to discrete values using numerical scales that were developed during ten earlier PAWSAs. 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 Cincinnati area, fourteen risk factors were scored at or above the mid-risk value. They were (in descending order):

- Small Craft Quality (9.0)
- Personnel Injuries (9.0)
- Health and Safety (8.7)
- Visibility Impediments (8.5)
- Configuration (8.1)
- Water Movement (7.2)
- Mobility (7.0)
- Traffic Mix (6.8)
- Dimensions (6.5)
- Economic (6.3)
- Volume of Small Craft Traffic (5.8)
- Congestion (5.6)
- Petroleum Discharge (5.1)
- Hazardous Materials Release (5.0)

**Photo of Waterway Chart:**

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

Note the concentrations of dots in three locations:

- The area between the Cincinnati Southern Railroad Bridge and the I-475 Bridge
- The area between the Dayton Bar Light and the mouth of the Little Miami River
- The vicinity of River Bend Park

## Book 2 – Team Expertise Cross Assessment

The workshop participants assessed their own and all the other participant teams' level of expertise for each of the six categories in the Waterway Risk Model. Overall, 37% of the participant teams were placed in the upper third, 34% in the middle third, and 29% in the lower third of all teams. This result was very close to the "ideal" 33% / 33% / 33% distribution. The expertise ranking for each team was used to weight the inputs that each team provided in the other three books used during the PAWSA workshop.

## Book 3 – Mitigation Effectiveness

Mitigation Effectiveness											
Vessel Conditions		Traffic Conditions		Navigational Conditions		Waterway Conditions		Immediate Consequences		Subsequent Consequences	
Deep Draft Vessel Quality		Volume of Commercial Traffic		Winds		Visibility Impediments		Personnel Injuries		Health and Safety	
1.0	1.0	2.8	2.7	2.2	1.9	8.5	8.5	9.0	8.0	8.7	7.8
Balanced		Balanced		Balanced		RISING		Balanced		Balanced	
Shallow Draft Vessel Quality		Volume of Small Craft Traffic		Water Movement		Dimensions		Petroleum Discharge		Environmental	
4.9	4.2	5.8	6.8	7.2	6.6	6.5	5.8	5.1	5.3	4.6	4.3
Balanced		NO		Balanced		Balanced		RISING		Balanced	
Commercial Fishing Vessel Quality		Traffic Mix		Visibility Restrictions		Bottom Type		Hazardous Materials Release		Aquatic Resources	
2.2	2.0	6.8	7.4	3.7	4.1	4.7	4.7	5.0	5.4	2.1	2.0
Balanced		NO		RISING		Balanced		NO		Balanced	
Small Craft Quality		Congestion		Obstructions		Configuration		Mobility		Economic	
9.0	8.6	5.6	6.5	4.5	4.5	8.1	7.5	7.0	5.9	6.3	6.4
NO		NO		RISING		Maybe		Balanced		RISING	

See explanation key on next page.



KEY		EXPLANATION	
<b>Risk Factor</b>		Book 3	Baseline level of risk
		Book 4	Level of risk taking into account existing mitigations
Book 3   Book 4		Balanced	Consensus that risks are well balanced by existing mitigations
		Maybe	No consensus that risks are adequately balanced by existing mitigations
		RISING	No consensus that risks are adequately balanced by existing mitigations and risk level is above previous PAWSA or is higher than the baseline risk level from this PAWSA
Consensus		NO	Consensus that existing mitigations do NOT adequately balance risk

### Book 3 Analysis:

The participants examined the effectiveness of existing risk mitigation activities in the Cincinnati area with respect to all risk factors in the Waterway Risk Model. For thirteen risk factors, the participants were in consensus that risks were well balanced by existing mitigations; for five risk factors, the participants were in consensus that risks were NOT adequately balanced by existing mitigations; and for the other six risk factors, there was no consensus on whether existing mitigations adequately reduced risk. Consensus is defined as 2/3 of the participant expertise being in agreement. For four of the six risk factors with no consensus, the participants in this workshop judged the mitigated risk level to be higher than was the case during the 2001 PAWSA.

**Book 4 – Additional Interventions**

Additional Interventions					
Vessel Conditions	Traffic Conditions	Navigational Conditions	Waterway Conditions	Immediate Consequences	Subsequent Consequences
Deep Draft Vessel Quality	Volume of Commercial Traffic	Winds	Visibility Impediments	Personnel Injuries	Health and Safety
Balanced	Balanced	Balanced	Radio Communications	Balanced	Balanced
			7.2		
Shallow Draft Vessel Quality	Volume of Small Craft Traffic	Water Movement	Dimensions	Petroleum Discharge	Environmental
Balanced	Rules & Procedures	Balanced	Balanced	Voluntary Training	Balanced
	6.5			4.9	
Commercial Fishing Vessel Quality	Traffic Mix	Visibility Restrictions	Bottom Type	Hazardous Materials Release	Aquatic Resources
Balanced	Rules & Procedures	Voluntary Training	Balanced	Coordination / Planning	Balanced
	7.1	3.9		4.9	
Small Craft Quality	Congestion	Obstructions	Configuration	Mobility	Economic
Rules & Procedures	Rules & Procedures	Coordination / Planning	Radio Communications	Balanced	Coordination / Planning
7.7	6.2	4.3	5.1		3.4 <b>Caution</b>

KEY		EXPLANATION	
Risk Factor		Intervention	Intervention category that most participants selected for further risk mitigating actions
Intervention		Risk Improvement	The amount that present risk levels might be reduced if new mitigation measures were implemented
Risk Improvement	<b>Caution</b>	<b>Caution</b>	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 because risk in the waterway was judged to be well balanced by existing mitigations. A yellow

**Caution** indicates a consensus alert meaning there was a difference between the most effective category and the category most selected by the participants for action.

### Intervention Category Definitions:

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

### Book 4 Analysis:

The eleven risk factors needing additional risk reduction action (per the *Book 3* results) are shown below along with the general mitigation strategy selected by most participant teams, ordered from highest to lowest possible risk improvement.

- Small Craft Quality – Rules & Procedures (7.7)
- Visibility Impediments – Radio Communications (7.2)
- Traffic Mix – Rules & Procedures (7.1)
- Volume of Small Craft Traffic – Rules & Procedures (6.5)
- Congestion – Rules & Procedures (6.2)

- Configuration – Radio Communications (5.1)
- Petroleum Discharge – Voluntary Training (4.9)
- Hazardous Materials Release – Coordination / Planning (4.9)
- Obstructions – Coordination / Planning (4.3)
- Visibility Restrictions – Voluntary Training (3.9)
- Economic – Coordination / Planning (3.4)

### **Recommended Actions**

The catalog of risks and possible mitigation strategies derived from the Cincinnati PAWSA workshop is set forth in the next section of this report. This listing provides an excellent foundation from which safety organizations can further examine and take appropriate risk mitigation actions for both near-term action and for future risk mitigation planning.

This listing should be viewed as a starting point for continuing dialogue within the local maritime community, leading to refined risk identification and more fully developed mitigation measures.

<b>Vessel Conditions: Deep Draft Vessel Quality</b>	
<b>Baseline Risks:</b> <ul style="list-style-type: none"><li>• None</li></ul> <b>Trends:</b> <ul style="list-style-type: none"><li>• None identified</li></ul>	<b>Existing Mitigations:</b> <ul style="list-style-type: none"><li>• No deep draft vessels use this waterway</li></ul>
<b>New Ideas (number of times suggested):</b> <ul style="list-style-type: none"><li>• Risks judged to be well balanced with existing mitigations.</li></ul>	

### Vessel Conditions: Shallow Draft Vessel Quality

#### Baseline Risks:

- Shortage of experienced tow boat operators because of licensing. Finding qualified personnel to stand watch is becoming difficult. The experience pool is not deep.
- River knowledge is less. Operators relying on new technology vs historical experience and knowledge. Transition ongoing from old to new mariners.
- Wage scales have increased causing inexperienced personnel to be attracted to positions.
- Crew fatigue due to 6 on 6 off duty rotation. Documented by American Commercial Lines study. Somewhat balanced by better vessel conditions (air conditioning / noise reduction) which have decreased crew fatigue.
- Generally a single watch stander in the wheel house but may be supplemented as needed.
- Passenger vessel crews' experience is above average.
- Crew overload due to additional administrative duties.
- Technology is becoming a hindrance – typing, cell phones, electronic logs.
- 90% of commercial operators are doing what they are supposed to do.
- Language barriers do exist – some operators sound like they're talking with a "mouth full of marbles".

#### Trends:

- Tow boat crews getting more knowledgeable because of new licensing requirements.
- Passenger vessel crew experience is improving.

#### Existing Mitigations:

- New electronic navigation technology.
- Coast Guard initiative to work on radio communications problems by installing a repeater site.
- Renewed emphasis on crew training and education; use of simulators that replicate high water river stages.
- Attention to crew fatigue – awareness.
- Voluntary one-way traffic through the downtown bridges.
- Self inspections under the American Waterway Operators (AWO) responsible carrier program and subchapter M (proposed towing vessel inspection regulation).
- Change in licensing scheme for towing vessels to Master of Towing Vessel.
- Some companies now prohibit use of cell phones while handling the boat.

**New Ideas** (number of times suggested):

- Navigation lighting needs to be stronger (1)
- Towing vessel Captains could supplement Coast Guard Auxiliary boating classes (1)
- Take video of recreational boats interacting with towboats (1)

<b>Vessel Conditions: Commercial Fishing Vessel Quality</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• Small number of john-boat size commercial fishing vessels in the area.</li> <li>• Some trout lines on the main stem, but mostly on the tributaries and close to river banks.</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• None identified.</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Commercial fishing is mainly out of sight and out of mind.</li> </ul>
<p><b>New Ideas (number of times suggested):</b></p> <ul style="list-style-type: none"> <li>• Risks judged to be well balanced with existing mitigations.</li> </ul>	



## Vessel Conditions: Small Craft Quality

### Baseline Risks:

- River Bend concerts causing thousands of boats to anchor in or very near the shipping channel, usually without anchor lights because they attract bugs.
- Rivertown high speed poker runs (start at mile 464.5).
- Lack of knowledge / awareness of commercial traffic; operator inattention most common cause of conflicts.
- Except for youngest operators, no requirement for knowledge to operate a recreational boat.
- Complete disregard for rules of the road at the ballparks (mile 470.5).
- 80% of recreational boat operators seem to have no knowledge of the rules of the road. Percentage that operate properly very low; not above 50%.
- Worst problems at night. Also weekends / holidays worse than weekdays.
- Lighting on recreational boats blinding operators and other boats.
- Insufficient resources to enforce rules and regulations with recreational boats. Differences between KY and OH boating laws. Local law enforcement was pulled due to funding shortages.
- Riverside restaurants – especially after dark and serving alcohol.
- Anderson Ferry has a lot of problems with small craft crossing situations.
- Boat design – boats with high bows restrict awareness of water and traffic conditions.
- Liability insurance not required for small boats.

### Trends:

- Knowledge of the rules getting better, but common courtesies, respect, and politeness is decreasing.
- Problems are getting worse due to more traffic and the younger average age of recreational boat operators.
- Attendance in Coast Guard Auxiliary and Power Squadron boating safety classes is declining due to availability of web-based substitute training. One third now take the course online.

### Existing Mitigations:

- Boating safety classes for operating a recreational boat. WV requires rules of the road training class. Kentucky requires boat operators ages 12-17 to have a boating safety class. Kids under 12 must wear a life jacket. In Ohio, if born after January 1982 must have a boating safety certificate; based on national standard.
- Posting speed limit signs in a joint effort with industry and DNR.
- No wake zone between the downtown bridges after dark.
- Coast Guard small boat performs recreational boating safety enforcement.
- Coast Guard Auxiliary boating safety classes and patrols; although Auxiliary has no enforcement authority.
- Power Squadron training classes.
- Buoys have been placed by Coast Guard to mark the channel near River Bend to help DNR enforce boats anchoring during music concerts.
- Video by University of Cincinnati about towboats and small craft interactions.
- AWO brochures. Towing companies support public service announcements.
- Interagency notification book (CD) gives jurisdictions for the Cincinnati area.
- Small Vessel Security Strategy / Program (DHS) may help out with safety.
- Insurance rate break in KY for taking boating safety class.

### Vessel Conditions: Small Craft Quality

**New Ideas** (number of times suggested):

- Mandatory license for operating on navigable waterway – recommend minimum licensed operator age of 16 (6)
- Better coordinate law enforcement efforts between agencies (6)
- Conduct more law enforcement patrols (4)
- Require a boating skills test in front of examiner before obtaining a boating education certificate or license (2)
- Require a boating endorsement on driver's license (1)
- Provide boat class distinctions for education / licensing (wave runner v. 40 ft cabin cruiser) (1)
- Mirror the Louisville Great Lawn anchorage requirements for concerts at River Bend (1)
- Establish a Regulated Navigational Area in the River Bend area (1)
- Coordinate public outreach efforts / public service announcement to educate public at beginning of boating season – provide lessons learned at maritime learning day (2)
- Make available flyers / brochures for Rules of the Road; educate public when boating supplies purchased at Wal-Mart, K-Mart, sporting goods stores (1)
- Require boat dealers to run 15-minute boater education video at point of sale or rental (1)
- Require insurance companies to require demonstration of knowledge before issuing policy (1)
- States should require education certificate before boat registration (1)

<b>Traffic Conditions: Volume of Commercial Traffic</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• Volume of traffic could go up due to fuel prices causing cargo to shift from highway and rail to barge; but haven't seen this yet.</li> <li>• Vessels going through locks don't do much for spacing because of different tow speeds.</li> <li>• Lock maintenance has changed from preventative to reactive. Lock maintenance affects the amount of commercial traffic.</li> <li>• One way traffic through the Cincinnati bridges causes some delays.</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• Volume of commercial traffic may be increasing by 10% each year according to VTS Louisville data.</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Self-regulation of towing industry; good cooperation in managing the voluntary one-way traffic through the Cincinnati bridges.</li> <li>• Repeater is being put in at Fort Thomas; concept has been tested, but site is not operational yet.</li> <li>• No additional commercial facilities being build on this stretch of the Ohio, only condominiums and boat docks; CBT / CVT (?) to move is only planned change</li> </ul>
<p><b>New Ideas:</b></p> <ul style="list-style-type: none"> <li>• Risks judged to be well balanced with existing mitigations.</li> </ul>	

<b>Traffic Conditions: Volume of Small Craft Traffic</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• Seasonal variations – high water keeps them off the river; low water means more traffic.</li> <li>• Day of week affects volume – higher on weekends / holidays.</li> <li>• Baseball and football stadiums cause high volume of small craft traffic during games.</li> <li>• Riverside Park and Schmidt Field boat ramps are high volume spots.</li> <li>• Extraordinary high volume at River Bend Park during big rock concerts.</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• Volume going down maybe because of gas prices; but if gas was cheaper the volume would be increasing.</li> <li>• Seeing fewer big boats and more jet skis.</li> <li>• More boat ramps being built which will increase access to the river.</li> <li>• Increasing numbers of hand-powered craft using the river (sculls, kayaks, canoes).</li> <li>• Every proposed condominium development plans to have a marina.</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Army Corps of Engineers (USACE) permitting process for new docks; Regional General Permit 3 – originally said that private docks under 50 ft may could be put in without public comment period; changed so that anything in this area will have comment period.</li> <li>• The number of boat registrations has leveled off in both Ohio and Kentucky.</li> </ul>
<p><b>New Ideas:</b></p> <ul style="list-style-type: none"> <li>• Mandatory licensing of small boat operators would decrease traffic volume (4)</li> <li>• State planning agencies establish other desirable destinations for boating (3)</li> <li>• Establish transit lanes for small craft between the bridges (3)</li> <li>• Restrict use of waterway – establish destination / transit usage only areas for small craft (3)</li> <li>• Conduct more enforcement patrols (2)</li> <li>• Allow boats with even number registrations to operate on even-numbered days, odd-numbered boat registrations operate on odd-numbered days (1)</li> <li>• Restrict use of waterway – establish no use zones for pleasure boats and/or water skiing (1)</li> <li>• Increase boat registration fees and charge for using launch ramps (1)</li> <li>• More boater education (1)</li> </ul>	

<b>Traffic Conditions: Traffic Mix</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• Commercial traffic using the Licking River (up to mile 3) takes up the <u>entire</u> channel; power boats also conflict with hand-powered craft (kayaks / sculls) using Licking River.</li> <li>• Marinas located all along this portion of the Ohio River.</li> <li>• No buoys marking the navigation channel at stadiums.</li> <li>• Anderson Ferry often conflicts with high speed recreational traffic.</li> <li>• Recreational fishing boats congregate at the grain terminals (mile 474).</li> <li>• Drifting boats common – lack of situational awareness</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• Increasing numbers of conflicts between waterway users.</li> <li>• Condominium development and associated marinas will cause further problems (miles 468 – 470)</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Buoys marking channel help to separate commercial / recreational traffic at River Bend.</li> <li>• No wake zone between the Cincinnati bridges and entrance to Licking River from sunset to sunrise.</li> <li>• Good cooperative traffic separation between commercial / recreational traffic during major marine events; mini-VTS used during Tall Stacks Festival.</li> </ul>
<p><b>New Ideas (number of times suggested):</b></p> <ul style="list-style-type: none"> <li>• License small craft operators, including mandatory rules of road satisfactory examination to get a license (5)</li> <li>• Establish traffic patterns for small pleasure craft (e.g., down-bound via right descending bank) (5)</li> <li>• Provide more pronounced day-to-day law enforcement presence (5)</li> <li>• Increase boater education via videos, flyers; show what could happen / stress rules of the road (5)</li> <li>• Establish buoys in downtown area to mark the commercial navigation channel (2)</li> <li>• Prohibit drifting in navigable channels (1)</li> </ul>	

<b>Traffic Conditions: Congestion</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• Notable congestion areas / times:               <ul style="list-style-type: none"> <li>○ River Bend Park during concerts</li> <li>○ Stadiums during ball games</li> <li>○ Tall Stacks, Riverfest, 4<sup>th</sup> of July</li> <li>○ Downtown on the weekends by all vessel types</li> </ul> </li> <li>• Anchoring in the channel by recreational boats during events.</li> <li>• No reports being made of near misses.</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• None identified.</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Law enforcement patrols to move / control congestion during major marine events.</li> <li>• Buoys at River Bend help contain congestion.</li> <li>• Informal / courtesy communications between commercial vessels when recreational events are occurring.</li> <li>• Notice to / coordination with towboats during major marine events.</li> </ul>
<p><b>New Ideas:</b></p> <ul style="list-style-type: none"> <li>• Require promoters to get a Marine Event Permit for specific concerts at River Bend Park (5)</li> <li>• Increase on-water law enforcement presence (5)</li> <li>• Increase boater education about congestion – sitting in middle of channel is like sitting in middle of railroad tracks (5)</li> <li>• Provide more enforcement for boating while intoxicated law (2)</li> <li>• Establish waterway use restrictions for small craft – certain areas would be transit only (2)</li> <li>• Enforce traffic pattern with buoys marking navigation channel (1)</li> <li>• Establish a Designated Anchorage Area at River Bend Park (1)</li> <li>• Require shore-side event venues to provide on-water security / crowd-control presence (1)</li> <li>• Photo record near misses (1)</li> </ul>	

<b>Navigational Conditions: Winds</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• This area generally experiences westerly winds; sometimes blow pretty hard.</li> <li>• Strong winds generated by strong thunderstorms.</li> <li>• Towboats don't typically monitor the broadcast weather.</li> <li>• No good place for towboats to hold up between the Southern Railroad Bridge and the I-75 bridge.</li> <li>• Recreational boats get caught in weather; don't pay any attention until it is too late.</li> <li>• Problematic high wind usually where the westerly winds move through east-west channel areas. North-south channels generally afforded a lee by the river bluffs.</li> <li>• No Physical Oceanographic Real-Time System (PORTS) installed.</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• None identified.</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Weather forecasts generally accurate. National Weather Service puts out severe weather alerts weather radio channel.</li> <li>• Capability to see weather on computers / laptops and local TV stations.</li> <li>• Recreational traffic don't go out during strong winds.</li> <li>• Companies give commercial vessel captains latitude to determine whether to hold for weather, no matter the impact on schedules.</li> <li>• Sirens used for severe thunderstorm / tornado warnings.</li> </ul>
<p><b>New Ideas (number of times suggested):</b></p> <ul style="list-style-type: none"> <li>• Risks judged to be well balanced with existing mitigations.</li> </ul>	

<b>Navigational Conditions: Water Movement</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• USACE dams are for navigation and not flood control. Dams have some effect on river flow, but river flow is no longer predictable.</li> <li>• River rises and falls fast. Fast rise makes navigation more difficult than a slow rise.</li> <li>• USACE not controlling the fall – maintaining the river level – but generally doesn't let the river fall more than one foot per hour.</li> <li>• Heavy storms cause quick rises and current can reach four knots, especially at the Southern Railroad Bridge where waterway is narrowest.</li> <li>• A significant cross-current is present after a big rain where the Licking River empties into the Ohio.</li> <li>• Bridge area the most difficult for towboats to transit due to currents.</li> <li>• No Physical Oceanographic Real-Time System (PORTS) installed.</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• None identified.</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Corps – very little that can be done; can regulate flow; flow out of reservoirs is minute.</li> <li>• RNA – controlling traffic; who can travel and under what circumstances.</li> <li>• Mill Creek – no significant current because of the dam.</li> <li>• Louisville VTS, no VTS in Cincinnati.</li> <li>• Voluntary company cutbacks; captain comfort level and expertise determines – maneuverability.</li> <li>• Waterways action plan – recommended practices; produced by CG, industry, and Corps and distributed to industry.</li> <li>• High water conference calls with CG and interested parties.</li> <li>• In-water sensors – just NOAA forecast; use river stages during high water; NOAA predictions are more accurate when water is falling, not rising.</li> </ul>
<p><b>New Ideas (number of times suggested):</b></p> <ul style="list-style-type: none"> <li>• Risks judged to be well balanced with existing mitigations.</li> <li>• Need to control fall of river better (1)</li> </ul>	



<b>Navigational Conditions: Visibility Restrictions</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• Seasonal fog condition – spring and fall almost every day. Summer maybe once a month.</li> <li>• Snow and rain impact navigation safety through the bridges.</li> <li>• Rain attenuates radar signals. No RACON buoys used in the Cincinnati area.</li> <li>• ½ mile visibility not enough to safely navigate the downtown area.</li> <li>• Fog not as bad in the downtown area... maybe due to a microclimate caused by building heat.</li> <li>• Data is uploaded electronically to USACE when Coast Guard moves / adds / discontinues buoys, but USACE still figuring on how to get data out to electronic chart vendors in timely manner.</li> <li>• One case of buoy stolen for scrap metal; fleeting area mooring shackles being stolen for scrap.</li> <li>• Recreational craft sometimes go out during fog (especially during fishing tournaments), or get caught in it.</li> <li>• Very few small craft have radar.</li> <li>• Fleeting areas are on banks; recreational may move towards banks during low visibility.</li> <li>• Rowers sometimes go out in fog when scheduled to row; not required to have lifejackets on scull.</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• None identified.</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Radar on commercial vessels.</li> <li>• Fog is sometimes forecast ,but fog is always changing.</li> <li>• Commercial vessels relying more electronic navigation systems / charts; paper charts aren't updated.</li> <li>• Pilot decides whether to go out / continue in fog.</li> </ul>

### Navigational Conditions: Visibility Restrictions

**New Ideas** (number of times suggested):

- Stress dangers of operating in low visibility during boater education courses (5)
- Put controllable light signage on Southern Railroad and I-271 Bridges (5)
- More stringently enforce navigation light standards (4)
- Add reflective material to bridges (radar and visual) (4)
- Place more buoys with radar reflectors at bridges (3)
- Increase intensity of lighting to mark center channel of bridges (2)
- Establish low visibility warning (fog warning) system for recreational vessels (2)
- Use flags to notify users of waterway conditions (e.g., fog) (1)
- Increase number of lights required on tows to mark unlit center portion between bow and stern ends (1)
- Place low level solar powered lights on sides of barges (1)
- Require radar reflectors on human-powered craft (1)
- Increase navigation light luminosity standards (1)

<b>Navigational Conditions: Obstructions</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• Drift (flotsam and jetsam) can include washing machines, refrigerators, propane tanks, drums, old docks, and dead heads.</li> <li>• Significant drift is present after a big rain where the Licking River empties into the Ohio.</li> <li>• No policy / requirement for USACE to remove drift from lock areas or elsewhere along the river.</li> <li>• Sunken barges at Ludlow (mile 473.3) on the left descending bank.</li> <li>• Ice piers (mile 465).</li> <li>• Always possibility of sunken barges not in channel moving when water levels and/or currents are high.</li> <li>• Fleeting areas, especially Ohio 3 right below Southern Railroad Bridge (mile 472.5) on the right descending bank.</li> <li>• USACE Regional General Permit 3 says that docks that are under 50 feet in length don't have to go through a public comment period.</li> <li>• Licking and Miami Rivers discharge ice floes into the Ohio. Ohio doesn't generally freeze solid in Cincinnati area.</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• None identified.</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Drift on shore is the responsibility of the land owner to remove; not supposed to burn or push back into the water.</li> <li>• If in channel, sunken vessels and other obstructions removed by USACE.</li> <li>• Coast Guard got USACE to require public comment on any new dock structure (regardless of length) between the Cincinnati bridges.</li> </ul>
<p><b>New Ideas:</b></p> <ul style="list-style-type: none"> <li>• Ensure that pier placement during bridge replacements provides a safe span for navigation (7)</li> <li>• Include ice and heavy drift events in Waterways Action Contingency Plan (7)</li> <li>• Further identify high drift areas and review policies on managing drift (1)</li> <li>• Designate responsibility for drift removal (1)</li> </ul>	

## Waterway Conditions: Visibility Impediments

### Baseline Risks:

- Background lighting problem areas:
  - Downtown
  - Navigation lights on bridges are obscured
- Bridges where visibility is obscured:
  - Southern Railroad Bridge – narrow span
  - Big Mac (I-475) blocks view downtown while transiting down bound
  - 12th street bridge on the Licking River – narrow and a dock right below the bridge
- Bends. Southern Railroad Bridge (mile 472.5) through Dayton Bar Light (mile 466.8) is a dead area for radio communications between up bound and down bound traffic.
- Vegetation issues with every light on shore, but especially Virginia Bennett light, Dayton Bar light, and Schletker light.
- Fleeting areas – can cause visibility problems for small craft.
- Automatic Identification System (AIS) carriage is voluntary in the Western Rivers and not all commercial vessels have AIS installed. Can set up “surprises” when towboat operators rely too heavily on that technology to let them know about other vessels.

### Trends:

- Planned condominium development may lead to worse background lighting problems.

### Existing Mitigations:

- Coast Guard buoy tender crew cutting vegetation down around lights.
- Electronic navigation chart systems increasingly used and enhance situational awareness.
- Commercial traffic good about exchanging information via radio.
- Sound signal requirements upon nearing blind bend – however, minimal use in practice.
- AIS – increasingly used aboard commercial vessels in Western Rivers.
- Companies and agencies receive notices for comment on large docks, riverfront developments.
- Positive example of what can be done: Louisville Great Lawn – lights were a problem. Also: open dialog with city developers on baseball stadium lights.
- Ambient light around downtown / background lighting in Cincinnati not as much of a problem as other areas.

## Waterway Conditions: Visibility Impediments

### **New Ideas:**

- Improve radio communications with additional repeaters (8)
- Establish a full-time Vessel Traffic Information Service and a high-water VTS (8)
- Ensure maritime involvement in planning new construction projects so that background lighting concerns are addressed (6)
- Educate recreational boaters on night vision (3)
- Seek exemption so herbicides can be used around navigation lights and day marks (3)
- Increase intensity of navigation lighting on bridges (1)
- Mandate AIS carriage for all motorized craft (1)

<b>Waterway Conditions: Dimensions</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• 800 – 1,200 foot wide channel in this section of the Ohio River. Licking River about 300 feet wide up to Marathon Oil facility (mile 3).</li> <li>• Minimum width is 500 foot span at Southern Railroad Bridge.</li> <li>• Channel Depth – 9 feet is all USACE guarantees; pool depth generally maintained to at least 12 feet; water is pretty good throughout the area.</li> <li>• Drafts typically 9.5 to 10.5 feet. Tow beams limited to 105 feet due to locks.</li> <li>• Southern Railroad Bridge (mile 472.5) through Dayton Bar Light (mile 466.8) dead area for radio communications between up bound and down bound traffic.</li> <li>• Air draft – not a huge problem on the Ohio; some problems with the bridges on the Licking River during high water.</li> <li>• No range lights used on this stretch of river.</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• None identified.</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Voluntary one way traffic for tows through the downtown Cincinnati bridges.</li> <li>• Shoaling – not a problem; USACE does not need to dredge in this area. USACE does regular surveys to ensure advertised depth is available.</li> <li>• USACE permitting process for new docks and marinas.</li> <li>• Air drafts clearly marked on bridges; new standard is higher (up to 74 / 78 feet – changed by USACE).</li> <li>• “If you can get through the lock, you can get through the bridges.”</li> <li>• ATON marks where good water is. Also used to mark the navigation span on some bridges.</li> </ul>
<p><b>New Ideas:</b></p> <ul style="list-style-type: none"> <li>• Risks judged to be well balanced with existing mitigations.</li> <li>• Ensure any new bridges have minimum 1,000 feet navigation span (1)</li> </ul>	

<b>Waterway Conditions: Bottom Type</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• Mostly a mud and silt bottom.</li> <li>• Upriver of the Big Mac (I-475 bridge) there is a sheet metal dock on the right descending bank – not on the chart.</li> <li>• Sunken cars near the Anderson Ferry on the right descending bank up stream from ferry landing.</li> <li>• Debris a constant problem.</li> <li>• Old Lock 36 (above the I-275 bridge).</li> <li>• Coal haven ice piers (mile 484).</li> <li>• Shoaling – not really a problem; groundings have only occurred outside of the channel.</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• None identified.</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Coast Guard resets buoys to mark any shoaling areas</li> <li>• Only a couple of hard spots (serpentine wall, old lock walls, ice piers). Mariners using the waterway know where the hard stuff is.</li> <li>• Double hull, double bottom barges for petroleum and other dangerous cargoes.</li> </ul>
<p><b>New Ideas (number of times suggested):</b></p> <ul style="list-style-type: none"> <li>• Risks judged to be well balanced with existing mitigations.</li> </ul>	

<b>Waterway Conditions: Configuration</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• Bends exist greater than 45 degrees.</li> <li>• Waterway convergences at mouth of Licking River and marina entrances.</li> <li>• Crossing traffic: <ul style="list-style-type: none"> <li>○ Hooters restaurant / stadium shuttle – only running since 4<sup>th</sup> of July; putting radios on the boat but not required; use public landing; pretty slow; licensed captains and inspected under Subchapter T regulations; one right now but want two more.</li> <li>○ DUKW (Duck) tours – new operation that many might not be aware of operating pattern.</li> <li>○ Anderson Ferry – can see 1 – 1.5 miles up and down river.</li> </ul> </li> <li>• Radio communications poor between Southern Railroad Bridge and I-475 Bridge.</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• None identified.</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Radio repeater site being established at Fort Thomas.</li> <li>• Good coordination between ferry crossing and other commercial traffic.</li> <li>• Radar and electronic chart display and information systems (ECDIS).</li> <li>• Towboats sometimes post a bow lookout when recreational traffic is heavy and/or visibility is low.</li> <li>• AIS being installed on increasing number of Western Rivers towboats and other commercial vessels.</li> <li>• Experienced crews with excellent local area knowledge.</li> <li>• Simulator training available for this specific area; companies taking advantage of this training; uses case studies for added realism.</li> <li>• No wake zone from sunset to sunrise keeps small craft traffic slowed down.</li> </ul>
<p><b>New Ideas:</b></p> <ul style="list-style-type: none"> <li>• Improve radio communications by adding repeater stations (8)</li> <li>• Establish a full-time VTIS and a high-water VTS (7)</li> <li>• Mandatory AIS carriage on Western Rivers (4)</li> <li>• Establish transit only areas (4)</li> <li>• Require installation of radios on Hooters Restaurant stadium ferry (1)</li> </ul>	



<b>Immediate Consequences: Personnel Injuries</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• Large passenger carrying vessels –               <ul style="list-style-type: none"> <li>○ Bell of Cincinnati – 1,000 people</li> <li>○ Delta Queen – 500</li> <li>○ American Queen – 500</li> <li>○ River Explorer – 250</li> <li>○ Anderson Ferry – 100</li> <li>○ Celebration – 150</li> <li>○ Queen City – 150</li> </ul> </li> <li>• Seasonable – summer the highest.</li> <li>• Tall Stacks festival brings in a dozen or so large passenger carrying vessels.</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• Tall Stacks festival frequency decreasing to every three years.</li> <li>• Dinner cruise and other passenger carrying business staying about the same.</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Emergency evacuation plans written.</li> <li>• Crowd management training; drills on large passenger vessels. Drill held for rescue operations with fire department resources.</li> <li>• Not far to shore where resources are available; vessel would push to beach; other vessels / shores-hide assets would then remove people.</li> <li>• A lot of other resources available – fire &amp; police rescue; sizable amount of resources to assist; McGinnis fleeting towboats less than 1 hour away; four fire boats – however not sized to evacuate large numbers of people.</li> <li>• Boone County Water Rescue has boats out during the week; central location during the week – true for everyone else – coming from different directions.</li> <li>• Mass rescue operation – local dinner cruise vessel did e drill evacuating 300 off boat and to hospitals – Greater Cincinnati Hospital Council coordinated; land side is prepared with hospital, Red Cross, etc.</li> <li>• Sheriff’s Department helicopters can do vessel medical evacuations.</li> <li>• Watertight integrity and fire fighting capabilities built into passenger vessels.</li> </ul>
<p><b>New Ideas:</b></p> <ul style="list-style-type: none"> <li>• Risks judged to be well balanced with existing mitigations.</li> </ul>	

<b>Immediate Consequences: Petroleum Discharge</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• Bulk shipments of petroleum products               <ul style="list-style-type: none"> <li>◦ 24 % of traffic is tank barges</li> <li>◦ 10 million tons per year pass through the area</li> </ul> </li> <li>• 2,500 barrels in a 195' x 30' barge equates to 750,000 gallons in a single barge.</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• Barge sizes staying the same.</li> <li>• Tonnage is on the increase – Cincinnati is between two pipelines.</li> <li>• Fuel cost may have an influence – getting more expensive to ship via tank truck and railcar.</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Hazardous materials facilities have co-op; have response trailers.</li> <li>• Oil Spill Response Organizations (OSROs) located in area – Clean Harbors (biggest) and Evergreen.</li> <li>• Every vessel carries some containment boom; contracts in place for significant spill.</li> <li>• If major spill, Clean Harbors would be called; if contained quickly, most facilities have boom and could borrow from them to contain spill.</li> <li>• Facilities have done individual drills (full scale exercises).</li> <li>• Some question whether there is enough equipment in the Cincinnati area – would additional have to come from up or down river?</li> <li>• Incident Command System (ICS) used in case of spill and other emergencies.</li> <li>• USCG / EPA MOU – Coast Guard has lead for commercial vessel spills; Environmental Protection Agency has lead for all other spills.</li> <li>• Spill of National Significance (SONS) drill recently done – earthquake scenario with broken pipeline.</li> <li>• Regional Contingency Plan exists.</li> <li>• Vessel Response Plans / Facility Response Plans required.</li> </ul>
<p><b>New Ideas (number of times suggested):</b></p> <ul style="list-style-type: none"> <li>• Ensure boom inventory is accurate and sufficient for largest most probable discharge (7)</li> <li>• Conduct more oil spill response drills (6)</li> <li>• Continue development of Incident Action Plan, to include mass casualty evacuation, bridge collapse, petroleum spill, identification of sensitive areas and threatened species (3)</li> <li>• Provide more response personnel training (2)</li> <li>• Ensure procedures are in place for USACE to manage river flow if needed to aid in controlling / containing oil spills (1)</li> <li>• Discuss with Regional Response Team pre-approval of sprays and dispersants (1)</li> </ul>	

### Immediate Consequences: Hazardous Materials Release

#### Baseline Risks:

- Hazardous materials (hazmat) make up 6% of the cargo tonnage – 4 million tons a year; up to 400,000 gallons in a single barge.
- Chlorine, anhydrous ammonia, butadiene, propylene oxide most dangerous shipments.
- Some of hazmat cargoes are seasonal, e.g., anhydrous ammonia used for making agricultural fertilizer.
- No fixed air sampling stations available for federal response personnel to use.

#### Trends:

- Hazmat barge sizes staying the same.

#### Existing Mitigations:

- Restrictions on chemicals running the bridges when the RNA is in effect due to water height (stage).
- Ohio River Valley Sanitation Commission (ORSANCO) actively monitors water quality.
- Hazmat co-op exists and facilities required to have response plans.
- Hamilton County recently conducted table top drill for rail car release scenario, plume from Cincinnati to Kentucky
- Plans in place to deal with air quality issues.
- Ongoing crew training aboard vessels; predefined procedures for notifications and emergent action, e.g., don open air respirator and sink chlorine barge if in populated area; COTP to set safety zones / local authorities to conduct emergency evacuation of area.
- Regulatory requirements for hazmat vessel construction designed to prevent cargo release if barge is in accident; positive example: two chlorine barges broke free and fetched up on Louisville dam with no release.

#### New Ideas (number of times suggested):

- Identify evacuation routes (7)
- Conduct more hazmat release response drills (7)
- Use the tornado warning sirens to warn people about a chemical release using a distinct signal (5)
- Coordinate waterborne hazmat releases with existing land-based emergency teams (2)
- Continue development of Incident Action Plan, to include hazardous materials release response and emergency evacuation (1)
- Put in fixed air sampling stations for use by federal / state / local authorities (1)
- Establish radio frequencies common to all response agencies (1)

<b>Immediate Consequences: Mobility</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• Waterway closure is possible.</li> <li>• Critical marine transportation system infrastructure could be damaged by a vessel impacting any of the bridges.</li> <li>• Prior strikes have temporarily closed a bridge it could be inspected.</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• None identified.</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Structures, particularly the waterline piers, are solidly built out of rock; structures regularly inspected by Departments of Transportation.</li> <li>• Prior allisions have not resulted in bridge damage.</li> <li>• Multiple crossings – other bridges can be used.</li> </ul>
<p><b>New Ideas (number of times suggested):</b></p> <ul style="list-style-type: none"> <li>• Risks judged to be well balanced with existing mitigations.</li> </ul>	

<b>Subsequent Consequences: Health and Safety</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• Bulk hazardous materials cargoes are moving through the waterway.</li> <li>• In a hazardous gas release scenario 300,000 – 400,000 people potentially could be affected.</li> <li>• Three intakes on the Ohio (miles 463 and 464) supply drinking water to the entire region.</li> <li>• Also there is an intake on the Licking River.</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• None identified.</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Recent LEPC drill – rail car release of chemical posing immediate danger to life and health.</li> <li>• EPA plume projections.</li> <li>• Counties maintain lists of people to call (elderly, etc.).</li> <li>• Tornado alert sirens warn people to turn on radios and TVs. Coast Guard uses alert warning system through Homeport and has tried to get local agencies added to the National Response Center automatic distribution list.</li> <li>• Red Cross shelters pre-established.</li> <li>• Mitigation steps in place and flexible.</li> <li>• In an incident over notification is likely – but might be lag time for surrounding areas.</li> <li>• ORSANCO monitors / warns water intakes; their system works well.</li> </ul>
<p><b>New Ideas (number of times suggested):</b></p> <ul style="list-style-type: none"> <li>• Risks judged to be well balanced with existing mitigations.</li> <li>• Sector could put out alert warning system that continues until notification received (1)</li> </ul>	

<b>Subsequent Consequences: Environmental</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• Protected / endangered species                             <ul style="list-style-type: none"> <li>○ Mussels</li> <li>○ Paddle Fish</li> <li>○ Beavers</li> <li>○ Salamanders</li> </ul> </li> <li>• Downtown area is mostly commercial / industrial.</li> <li>• No formal designated sensitive areas.</li> <li>• Population is sensitive to water quality issues.</li> <li>• Tourism – excursion boats – not necessarily coming to the Ohio for water recreation.</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• Water quality is getting better over time.</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Water quality monitoring by ORSANCO.</li> <li>• EPA and Coast Guard investigate spills.</li> <li>• Sanitation districts deal with permitting and discharge into sewers.</li> <li>• Interagency cooperation is good – discuss cases and work jointly.</li> <li>• ICS structure used to deal with public relations aspects of an oil spill or hazmat release.</li> <li>• Adequate assets believed to be available to deal with natural resource remediation.</li> </ul>
<p><b>New Ideas (number of times suggested):</b></p> <ul style="list-style-type: none"> <li>• Risks judged to be well balanced with existing mitigations.</li> </ul>	

<b>Subsequent Consequences: Aquatic Resources</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• Very small commercial fishing industry and most activity takes place outside of the geographic area of this assessment.</li> <li>• Recreational fishing – more than three species targeted and occurs year round; no real fish runs in this area.</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• None identified.</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Education efforts through fishing guidelines and regulations.</li> <li>• ORSANCO monitors water quality and provides notifications; does testing whether there has been a discharge or not, and also monitors river for bacteria; recent cancellations of swimming in river based on ORSANCO reports.</li> <li>• Resource remediation strategies may be in company response plans.</li> </ul>
<p><b>New Ideas (number of times suggested):</b></p> <ul style="list-style-type: none"> <li>• Risks judged to be well balanced with existing mitigations.</li> </ul>	

<b>Subsequent Consequences: Economic</b>	
<p><b>Baseline Risks:</b></p> <ul style="list-style-type: none"> <li>• Affected by waterway closure: <ul style="list-style-type: none"> <li>○ Power plants</li> <li>○ Feedstock</li> <li>○ Up and down stream industrial / commercial facilities</li> </ul> </li> <li>• Worst case waterway closure anticipated to be 1 – 2 weeks, but maybe with longer vessel movement restrictions.</li> <li>• Impact would be regional if lasted longer than two weeks.</li> <li>• Facilities can't plan / manage inventory for unplanned closures.</li> <li>• Water intake shut down can impact industry and firefighting.</li> <li>• Waterway was closed for a few weeks in 1978 due to ice and barge breakaways.</li> <li>• Licking River closed in 1999 because of a gasoline barge breakaway.</li> </ul> <p><b>Trends:</b></p> <ul style="list-style-type: none"> <li>• None identified.</li> </ul>	<p><b>Existing Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Economic impacts would be manageable so long as waterway closure lasted less than three weeks, which is quite likely.</li> <li>• Maritime Transportation System Recovery Plan (MTSRP) includes new requirement for minimizing economic impact through prioritization.</li> <li>• Major salvage equipment located in Pittsburgh and St. Louis; if needed, should be available within 3 – 4 days; Aquarius Salvage is local, but not real large.</li> <li>• Local towboats available and able to move things out of the way; through haul towboats also would be available if more power was needed (5,000 – 6,000 hp); would expect coordinated self-help effort in the event of an incident.</li> <li>• Many ways to move traffic if part of MTS infrastructure was damaged – multiple alternate spans across the rivers.</li> <li>• Rail lines near waterway – could offload vessel cargoes if needed.</li> </ul>
<p><b>New Ideas:</b></p> <ul style="list-style-type: none"> <li>• Continue developing Maritime Transportation System Recovery Plan (MTSRP) – to include salvage capabilities and coordination procedures (8)</li> <li>• Identify alternate transportation mode capabilities (rail, truck) to get cargoes around waterway closure (5)</li> <li>• Establish priorities for critical cargoes (1)</li> </ul>	