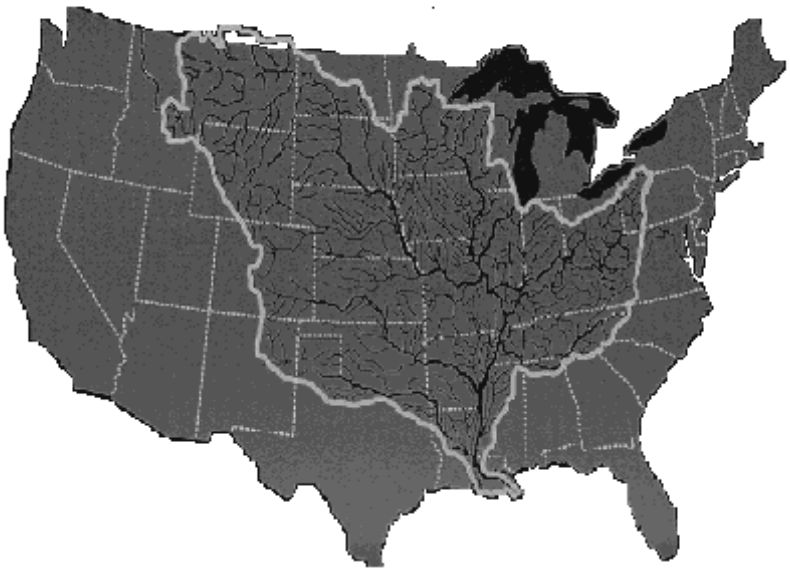
Waterways Action Plan

A Joint Project of the Marine Industry, the U.S. Coast Guard,
and the U.S. Army Corps of Engineers



October 4, 2007

Executive Summary

The Waterways Action Plan (WAP) provides the marine industry, U.S. Coast Guard (USCG), U.S. Army Corps of Engineers (USACE), States and local governments with a plan for facilitating the safe and orderly movement of traffic during extreme conditions on the inland rivers. In the event the implementation of a security plan conflicts with the WAP, the requirements of the security plan shall take precedence.

The 2005 Ohio River and Lower Mississippi River high water events led to the activation of river contingency plans throughout the Eighth Coast Guard District. During the activation of these plans, several problems were encountered. One major issue that was discovered was that different plans used different terminology, which created confusion when trying to deal with similar river conditions on different rivers.

A close look at the plans also revealed that some did not address each of the possible river extremes, and not all of the major waterways, including those tributaries that influence some of the larger waterways, were included in the plan. To address these problems, it was proposed to consolidate the existing contingency plans into one comprehensive document. The two major existing plans that were used are the Mississippi River Crisis Action Plan and the Ohio River Valley Waterways Management Plan, which served as the foundation to develop the WAP. Lessons learned from past events were consolidated and incorporated into this plan.

The WAP is a living document that should be frequently updated. The WAP and each annex shall undergo annual review to verify the accuracy of the plan and the communications information. This review shall take place each August unless the plan is exercised and reviewed during the year. The sole intended purpose of the WAP is to address all river extremes, including high water, high velocity, low water and ice conditions as a joint partnership between the USCG, USACE and industry. This plan establishes one common framework for all parties to use when taking either proactive or reactive steps to deal with these river extremes. Common terminology and communications will allow inter-agency and industry cooperation during emergency response and life saving operations. The overall goal of this plan is to ensure safety of life and navigation, protection of infrastructure and property, and to prevent marine casualties.

Conference calls between USCG, USACE and industry stakeholders have proven critical throughout years of response to river emergencies, and they are useful tools to successfully manage river emergencies.

As the situation develops, and throughout each phase of river emergencies, conference calls with wider participation should be initiated for broader information collection and sharing. Incident command leadership will determine the frequency of these calls based upon the nature of the emergency. Local USCG commands will pre-identify needed conferencing capabilities, and normally host these conference calls unless the emergency primarily affects an USACE navigation project, during which events, the USACE will host the calls.

USCG and USACE personnel should initially lead the brief and host the call as described above. All participants are requested to exercise standard conference call protocols: dial into the call in a timely manner; remain quiet until the initial status briefing is concluded; mute telephones when not speaking; speak in turn as the conference host calls on participants.

Response Phases

The response to a transportation emergency can be broken down into three distinct phases: the Watch Phase, Action Phase, and Recovery Phase. Key events are associated with each phase and specific actions must be executed to ensure that safe and efficient responses are conducted. The phases are defined as follows:

Watch Phase

Situation: The Watch Phase is the start of the waterways management activity. It exists when navigation conditions are deteriorating and hydrological projections and weather forecasts signal abnormal river stages and continued deterioration of navigating conditions. The COTP, local USACE personnel and the local river user groups will be the first to become aware of difficulties being experienced by the commercial navigation interests. When river conditions deteriorate, or are forecasted, any of these local navigation stakeholders may initiate a call. This group must confer and discuss whether the developing scenario has the potential of evolving into a large-scale transportation emergency.

Action Phase

Situation: The Action Phase is when active traffic control and extraordinary information coordination become necessary due to further deterioration of navigation conditions. Vessels are navigating with difficulty and local navigation advisories and safety zones are in effect to address hazardous areas. Weather forecasts and hydrological projections indicate conditions may continue to worsen. The Aids to Navigation (ATON) system is deteriorating and USCG river tenders cannot meet the demands for marking the river. As the situation worsens, river segments may be closed, and active vessel control may be essential to avert casualties. At this point, river conditions and ATON reliability are significantly deteriorated, causing navigation difficulties.

Recovery Phase

Situation: The Recovery Phase starts once navigation conditions begin to improve on the affected river system. It is characterized by improving navigation and weather conditions, rivers returning to normal stages and re-establishment of the ATON system. In the early part of the Recovery Phase, traffic may move at reduced capacity under active control of the USCG in coordination with the USACE and industry. As conditions improve, operating restrictions are gradually removed and navigation is conducted without active direction. This phase ends when active management is no longer required and navigational advisories are used in lieu of operating restrictions. As soon as possible after this phase, all stakeholders should meet to discuss

problems, concerns and lessons learned, as well as verify the accuracy of the action thresholds. Any needed plan revisions should be incorporated at this time.

The U.S. Army Corps of Engineers, U.S. Coast Guard and senior towing industry leaders approve the Waterways Action Plan for use as a comprehensive plan to address high water, low water, ice and high velocity river conditions on all of the major Western Rivers. This plan is a guide for all entities involved in safe navigation and should be regularly updated to incorporate lessons learned and regulation changes. Additional waterways may be added as detailed annexes are developed by the local U.S. Army Corps of Engineers personnel, U.S. Coast Guard Captain of the Port, and industry waterway groups.

Joel R. Whitehead
Rear Admiral, U.S. Coast Guard
Commander, Eighth Coast Guard District
Date 5 March, 2007

Don T. Riley
Major General, U.S. Army
Director of Civil Works
U.S. Army Corps of Engineers
Date 14 March 2007

David Shaw
Chairman
River Industry Executive Task Force
Date 03/05/07

Table of Contents

Chapter 1: Waterways Action Plan Introduction

The purpose of the WAP is to ensure safety of life and navigation, protection of infrastructure and property, and to prevent marine casualties. This goal will be achieved with a comprehensive contingency planning document that will address all extreme river conditions – high water, high velocity, low water and ice conditions – on the major inland rivers and their tributaries, as well as how to respond at the different response phases.

This plan provides guidance regarding the activities needed to respond to a marine transportation emergency on the inland rivers. River emergencies significantly disrupt navigation and commerce, and they may be caused by a natural or man-made disaster, or a combination of both. The goal of the plan is to serve as a guide for officials of the USCG, the USACE and the marine industry to facilitate the safe and orderly movement of traffic during a navigational crisis, while minimizing the loss of life, and damage to the environment and equipment.

The information in the WAP is not intended to provide a "cookbook" solution to the complex waterways management problems that may arise. This does, however, contain examples of proven techniques and processes used with success in past crises. Included in Appendix B is historical data and commentary on response actions during "The Midwest Drought of 1988," "The Great Flood of 1993, and "High Water on the Ohio and Lower Mississippi Rivers of 2005." These events should be used as a guide for future crisis response.

Each crisis has its own unique set of issues, variables and controlling elements that require constant evaluation and adjustment. No plan can replace a clear, logical and analytical approach to problem solving; although security of vessels and facilities is essential, if the vessel master or facility operator determines the situation to be a risk to employees, safety shall take precedence to quickly resolve the threat. Critical to this effort is early and open communication with all parties to assure that response actions reflect fair and equal consideration of the interests of all parties, including the public at risk.

Personnel involved in waterways management activities on the inland river system should be very familiar with this WAP. The principles discussed can be used in any waterways management activity, and will assist USCG, USACE and industry managers fulfill their roles in waterways management activities.

The WAP is a living document and should therefore be updated as needed. Regular meetings will allow the Regional Quality Steering Committee (RQSC), a group of USCG, USACE and industry executives, to evaluate the validity of the information in the plan, as well as the need for revisions. The terms of this agreement on **page 9**, will remain in effect until modified or terminated by a subsequent agreement.

Chapters 1–5 of the plan detail the essential issues, authorities and traffic management tools that enable government and industry to manage a river crisis. Particularly critical

is the guidance for executing waterway management intervention actions. Responses are broken down into 3 phases: Watch Phase, Action Phase and Recovery Phase. The respective river annexes break down these response actions by geographic segments of the inland rivers and apply trigger points and recommended actions for each phase of response. Actions which should avert casualties are automatically triggered when certain thresholds are attained.

15 March 2005
Nashville, TN

The U.S. Army Corps of Engineers, U.S. Coast Guard and senior towing industry leaders agreed to initiate an effort to consolidate several existing plans into one comprehensive plan to address high water, low water, ice and high velocity river conditions. The plan will include all major Western Rivers and will approach the rivers as a system. This effort will necessitate the commitment of time and personnel by all involved parties, but will be a large step forward in optimizing safety for the industry, the public and the valuable waterway infrastructure.

R. F. DUNCAN
Rear Admiral, U.S. Coast Guard
Commander, Eighth Coast Guard District

D. T. RILEY
Major General, U.S. Army
Director of Civil Works
U.S. Army Corps of Engineers

David Shaw
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Chapter 2: Authorities and Responsibilities

Authorities & Instructions in General

Federal Agencies

The successful management of any traffic crisis is dependent on the cooperation of the waterway system participants. This includes agencies of the federal, state and local governments, industry groups and the general public. This chapter identifies the key organizations in these areas, outlines their authority and responsibilities and explains their involvement with traffic management during a river crisis.

The United States Code (USC), provides regulatory authority for establishing and maintaining navigation throughout U.S. territorial waters. Included as part of a national waterway system are numerous rivers, lakes and streams that comprise the inland waterway system. Navigation on these navigable waters of the United States: are regulated primarily by the USCG. The USACE provides technical advice to the USCG to enable them to properly evaluate and make decisions on navigation safety matters. The USACE is also responsible for authorizing waterway projects, evaluating and maintaining navigable channels and directing emergency flood control operations.

United States Coast Guard: Title 14, USC, defines the USCG roles and responsibilities in establishing and maintaining the safety of ports and waterways. 33 CFR Part 265.20 gives COTPs and the USCG District Commanders the authority to impose safety zones, security zones and other restrictions to ensure the safe flow of navigation. Activities of the COTPs are overseen by the Commander, Eighth Coast Guard District, in New Orleans, LA (CCGD8). The Illinois River, miles 187-291 is overseen by the Commander, Ninth Coast Guard District, in Cleveland, OH (CCGD9).

Eighth Coast Guard District: The District Office is in New Orleans, La. The Eighth Coast Guard District is comprised of North Dakota, South Dakota, Wyoming, Nebraska, Iowa, Colorado, Kansas, Missouri, Kentucky, West Virginia, Tennessee, Arkansas, Oklahoma, New Mexico, Texas, Louisiana, Mississippi, and Alabama; that part of Pennsylvania south of 41^{o}N. latitude and west of 79^{o}W. longitude; those parts of Ohio and Indiana south of 41^{o}N. latitude; Illinois, except that part north of 41^{o}N. latitude and east of 90^{o}W. longitude; that part of Wisconsin south of 46^{o}20'N. latitude and west of 90^{o}W. longitude; that part of Minnesota south of 46^{o}20'N. latitude; those parts of Florida and Georgia west of a line starting at the Florida coast at 83^{o}50'W. longitude; thence northerly to 30^{o}15'N. latitude, 83^{o}50'W. longitude; thence due west to 30^{o}15'N. latitude, 84^{o}45'W. longitude; thence due north to the southern bank of the Jim Woodruff Reservoir at 84^{o}45'W. longitude; thence northeasterly along the eastern bank of the Jim Woodruff Reservoir and northerly along the eastern bank of the Flint River to Montezuma, GA.; thence northwesterly to West Point, GA.; and the Gulf of Mexico area west of a line bearing 199 T. from the intersection of the Florida coast at 83^{o}50'W. longitude (the coastal end of the Seventh and Eighth Coast Guard District land boundary.)

The Eighth District of the USCG realigned the boundaries of its sectors to facilitate integration of field units into a structure that will enhance our ability to perform prevention, compliance, and response operations. The sectors that were realigned are Sector Corpus Christi, Sector Houston-Galveston, Sector New Orleans, Sector Mobile, Sector Lower Mississippi River, Sector Upper Mississippi River and Sector Ohio Valley.

Sector New Orleans: Marine Inspection Zone, Captain of the Port Zone, and Area of Responsibility; Marine Safety Unit Morgan City. Sector New Orleans' sector office is located in New Orleans, LA. A subordinate unit, Marine Safety Unit (MSU) Morgan City, is located in Morgan City, LA, and is responsible for all Coast Guard missions in its Area of Responsibility. Sector New Orleans' Area of Responsibility includes those areas described in paragraphs (a) and (b).

(a) Sector New Orleans: Marine Inspection Zone and Captain of the Port Zone starts at latitude 30°10'00"N, longitude 89°10'00"W; thence west along latitude 30°10'00"N to longitude 89°31'48"W; thence north along longitude 89°31'48"W to the west bank of the Pearl River (at the mouth of the river); thence northerly along the west bank of the Pearl River to latitude 31°00'00"N; thence due west along latitude 31°00'00"N to the east bank of the Mississippi River; thence southerly along the east bank to mile 303.0, thence westerly to the west bank at mile 303.0; thence northerly to the southern boundary of the Old River Lock Structure, thence westerly along the south bank of the Lower Old River, to the intersection with the Red River; thence west along the south bank of the Red River to Rapides Parish, thence southerly along the western boundaries of Avoyelles, Evangeline, Acadia and Vermillion Parishes to the intersection of the sea and longitude 92°37'00"W; thence southerly along longitude 92°37'00"W to the outermost extent of the EEZ; thence easterly along the outermost extent of the EEZ to longitude 88°00'00"W; thence northerly along longitude 88°00'00"W to latitude 29°00'00"N; thence northwesterly to latitude 30°10'00"N, longitude 89°10'00"W.

(b) Marine Safety Unit Morgan City: Marine Inspection and Captain of the Port Zones are encompassed by the Sector New Orleans Area of Responsibility and starts at latitude 28°50'00"N., longitude 88°00'00"W.; thence proceeds west to latitude 28°50'00"N., longitude 89°27'06"W.; thence northwesterly to latitude 29°18'00"N., longitude 90°00'00"W.; thence northwesterly along the northern boundaries of Lafourche, Assumption, Iberia, and St. Martin Parishes, Louisiana; thence northwesterly along the northern boundary of Lafayette and Acadia Parishes, Louisiana; thence southerly along the west boundary of Acadia and Vermillion Parishes, Louisiana to the Louisiana Coast at longitude 92°37'00"W., thence south along longitude 92°37'00"W. to the outermost extent of the EEZ; thence easterly along the outermost extent of the EEZ to longitude 88°00'00"W.; thence north to latitude 28°50'00"N., longitude 88°00'00"W.

Sector Mobile: Marine Inspection Zone, Captain of the Port Zone, and Area of Responsibility. Sector Mobile's sector office is located in Mobile, AL. Sector Mobile's Area of Responsibility is coterminous with its Marine Inspection Zone and Captain of the Port Zone, which start near the Florida coast at latitude 29°59'14" N, longitude 83°50'00" W, proceeding north to latitude 30°15'00" N, longitude 83°50'00" W; thence west to latitude 30°15'00" N, longitude 84°45'00" W; thence north to a point near the southern bank of the Seminole Lake at latitude 30°45'57" N,

longitude 84°45’00" W; thence northeast along the eastern bank of the Seminole Lake and north along the eastern bank of the Flint River to latitude 32°20’00" N, longitude 84°01’51" W; thence northwest to the intersection of the Georgia-Alabama border at latitude 32°53’00" N; thence north along the Georgia-Alabama border to the southern boundary of Dekalb County, AL, thence west along the northern boundaries of Cherokee, Etowah, Blount, Cullman, Winston, Marion Counties, AL, to the Mississippi-Alabama border; thence north along the Mississippi-Alabama border to the southern boundary of Tishomingo County, MS, at the Mississippi-Tennessee border; thence west along the southern boundaries of Tishomingo and Prentiss county; thence northerly along the western boundaries of Prentiss And Alcorn Counties; thence west along the northern boundaries of Tippah, Benton, and Marshall Counties, MS; thence south and west along the eastern and southern boundaries of DeSoto, Tunica, Coahoma, Bolivar, and Washington Counties, MS; thence east along the northern boundary of Humphreys and Holmes Counties, MS; thence south along the eastern and southern boundaries of Holmes, Yazoo, Warren, Claiborne, Jefferson, Adams, and Wilkinson Counties, MS; thence east from the southernmost intersection of Wilkinson and Amite Counties, MS, to the west bank of the Pearl River; thence southerly along the west bank of the Pearl River to longitude 89°31’48”W (at the mouth of the river); thence south along longitude 89°31’48”W to latitude 30°10’00”N; thence east along latitude 30°10’00”N to longitude 89°10'00”W; thence southeasterly to latitude 29°00’00”N, longitude 88°00'00”W; thence south along longitude 88°00'00”W to the outermost extent of the EEZ; thence easterly along the outermost extent of the EEZ to the intersection with a line bearing 199°T from the intersection of the Florida coast at longitude 83°50’00”W; thence northeasterly along a line bearing 199° T from the Florida coast at longitude 83°50’00”W to the coast.

Sector Lower Mississippi River: Sector Lower Mississippi River Marine Inspection Zone, Captain of the Port Zone, and Area of Responsibility. Sector Lower Mississippi River’s sector office is located in Memphis, TN. Sector Lower Mississippi River’s Area of Responsibility is coterminous with its Marine Inspection Zone and Captain of the Port Zone, which starts with all of Arkansas and all of Oklahoma with the exception of the Red River and Lake Texoma. In Missouri: Dunklin and Pemiscot Counties. In Tennessee: Dyer, Lauderdale, Obion, Tipton, and Shelby Counties; and all portions of Lake County with the exception of the area North and West of a line drawn from Mississippi River at Latitude 36^{o}20’00 N and Longitude 89^{o}32’30” W due East to Highway 78 thence NE along Highway 78 to the Kentucky/Tennessee state line. In Mississippi: Desoto, Tunica, Coahoma, Bolivar, Washington, Humphreys, Holmes, Sharkey, Yazoo, Issaquena, Warren, Claiborne, Jefferson, Adams, and Wilkinson Counties. In Louisiana, all the areas north of a line drawn from the east bank of the Mississippi River at the Louisiana-Mississippi border, thence south along the east bank to mile 303.0, thence westerly to the west bank at mile 303.0, thence northerly to the southern boundary of the Old River Lock Structure, thence westerly along the southern bank of the Lower Old River, to the intersection with the Red River, thence westerly and northwesterly along the southern bank of the Red River to the northern most boundary of Red River Parish, thence westerly along the northern boundary of Red River Parish and DeSoto Parish to the Texas-Louisiana Border; including Lasalle, Caldwell, Caddo, Bossier, Webster, Claiborne, Union, Morehouse, West Carroll, East Carroll, Madison, Richland, Ouachita, Lincoln, Jackson, Bienville, Winn, Grant, Franklin, Tensas, Catahoula, and Concordia Parishes; those parts of Avoyelles, Natchitoches, Rapides, and Red River Parishes north of the Red River; and that part of West Feliciana Parish north of the Lower Old River. That part of the Lower Mississippi River below mile 869.0 and above mile 303. All of the Red

River below the Arkansas-Oklahoma border.

Sector Ohio Valley: Sector Ohio Valley Marine Inspection Zone, Captain of the Port Zone, and Area of Responsibility Sector Ohio Valley's sector office is located in Louisville, KY. A subordinate unit, Marine Safety Unit (MSU) Pittsburgh, is located in Pittsburgh, PA, and is responsible for all Coast Guard missions in its Area of Responsibility. Sector Ohio Valley's Area of Responsibility includes those areas described in paragraphs (a) and (b).

(a) Sector Ohio Valley: Marine Inspection Zone and Captain of the Port Zone comprise all of Kentucky and West Virginia; in Missouri: Perry, Cape Girardeau, Scott, Mississippi and New Madrid Counties, in Tennessee: that portion of Lake County north and west of a line drawn from the Mississippi River at latitude 36°20'00" N and longitude 89°32'30" W due east to Highway 78, thence northeast along Highway 78 to the Kentucky/Tennessee state line, and all other counties in Tennessee except Shelby, Tipton, Lauderdale, Dyer and Obion Counties; in Alabama: Colbert, Franklin, Lawrence, Morgan, Marshall, Lauderdale, Limestone, Madison, Jackson and DeKalb Counties; in Mississippi: Alcorn, Prentiss and Tishomingo Counties; that portion of Pennsylvania south of latitude 41°00'00" N and west of longitude 79°00'00" W; those parts of Indiana and Ohio south of latitude 41°00'00" N; in Illinois: Jackson, Williamson, Saline, Gallatin, Union, Johnson, Pope, Hardin, Alexander, Pulaski, and Massac Counties, and in Randolph County, that part of the Upper Mississippi River below mile 109.9, including both banks; that part of the Lower Mississippi River above mile 869.0.

(b) Marine Safety Unit Pittsburgh: is a sub-zone of Sector Ohio Valley. The boundaries of the MSU Pittsburgh Marine Inspection and Captain of the Port Zones are encompassed by the Sector Ohio Valley Area of Responsibility and include that portion of Pennsylvania south of latitude 41°00'00" N and west of longitude 79°00'00" W; in West Virginia: Preston, Monongalia, Marion, Marshall, Ohio, Brooke, and Hancock Counties, and that part of the Ohio River north of a line drawn from latitude 39°39'18" N (approximately mile 127.2) on the Ohio River, just below the Hannibal Lock and Dam; and in Ohio: Stark, Columbiana, Tuscarawas, Carroll, Harrison, Jefferson, and Belmont Counties, and those parts of Summit, Portage, and Mahoning Counties south of latitude 41°00'00" N.

Sector Upper Mississippi River: Sector Upper Mississippi River Marine Inspection Zone, Captain of the Port Zone, and Area of Responsibility. Sector Upper Mississippi River's sector office is located in St. Louis, MO. Sector Upper Mississippi River's Area of Responsibility is coterminous with its Marine Inspection Zone and Captain of the Port Zone, which include all of Wyoming except for Sweetwater County; all of North Dakota, South Dakota, Nebraska, Colorado, Kansas, and Iowa; all of Missouri with the exception of Perry, Cape Girardeau, Scott, Mississippi, New Madrid, Dunklin, and Pemiscot Counties; that part of Minnesota south of latitude 46°20'00"N; that part of Wisconsin south of latitude 46°20'00"N, and west of longitude 90°00'00"W; that part of Illinois west of longitude 90°00'00"'W and north of latitude 41°00'00"N; and that part Illinois south of latitude 41°00'00"N, except for Jackson, Williamson, Saline, Gellatin, Union, Johnson, Pope, Hardin, Alexander, Pulaski, and Massac Counties. That part of the Upper Mississippi River above mile 109.9, including both banks, and that part of the Illinois River below latitude 41°00'00"N.

Sector Lake Michigan (D9): Sector Lake Michigan Marine Inspection Zone, Captain of the Port Zone, and Area of Responsibility. Sector Lake Michigan's sector office, Marine Inspection Office, and Captain of the Port Office are located in Chicago, IL. Sector Lake Michigan's Area of Responsibility is coterminous with its Marine Inspection Zone and Captain of the Port Zone, which include all navigable waters of the United States and contiguous land areas within the boundaries of an area starting from a point at latitude 44°43'00" N, longitude 84°30'00" W, proceeding northwest to a point near the eastern shore of Lake Michigan at latitude 45°38'00" N, longitude 85°04'13" W; thence northwest to latitude 45°50'00" N, longitude 85°43'00" W; thence southwest to latitude 45°41'00" N, longitude 86°06'00" W; thence northwest to latitude 46°20'00" N, longitude 87°22'00" W; thence west to latitude 46°20'00" N, longitude 90°00'00" W; thence south to latitude 41°00'00" N; thence east to the Ohio-Indiana border at latitude 41°00'00" N, longitude 84°48'12" W; thence north along the Ohio-Indiana border to the intersection of the Ohio-Indiana-Michigan border at latitude 41°41'59" N, longitude 84°48'22" W; thence east along the Ohio-Michigan border to latitude 41°42'13" N, longitude 84°30'00" W; thence north to the start point.

There are seven COTP zones on the inland waterways: Sector New Orleans, Sector Mobile, Sector Lower Mississippi River, Sector Upper Mississippi River, Sector Lake Michigan, Sector Ohio Valley and MSU Pittsburgh. The inland river system COTP authority is outlined on **page 14**, and the USCG organization is shown on **page 21**.

Inland River System – COTP Authority

Allegheny River
MSU Pittsburgh 0-72

Arkansas River
Sector Lower Mississippi River All

Cumberland River
Sector Ohio Valley All

Green River
Sector Ohio Valley All

Illinois River
Sector Upper Mississippi River 0-187
Sector Lake Michigan, District 9 187 – 291

Kanawha River
Sector Ohio Valley 0-82

Lower Mississippi River
Sector Ohio Valley 869.1 - UMR
Sector Lower Mississippi River 869.0 – 303.0
Sector New Orleans 302.9 – Mouth of Gulf

Missouri River
Sector Upper Mississippi River 0-980

Monongahela River
MSU Pittsburgh All (0-127.8)

Ohio River
MSU Pittsburgh above 127.2
Sector Ohio Valley 981 – 127.1

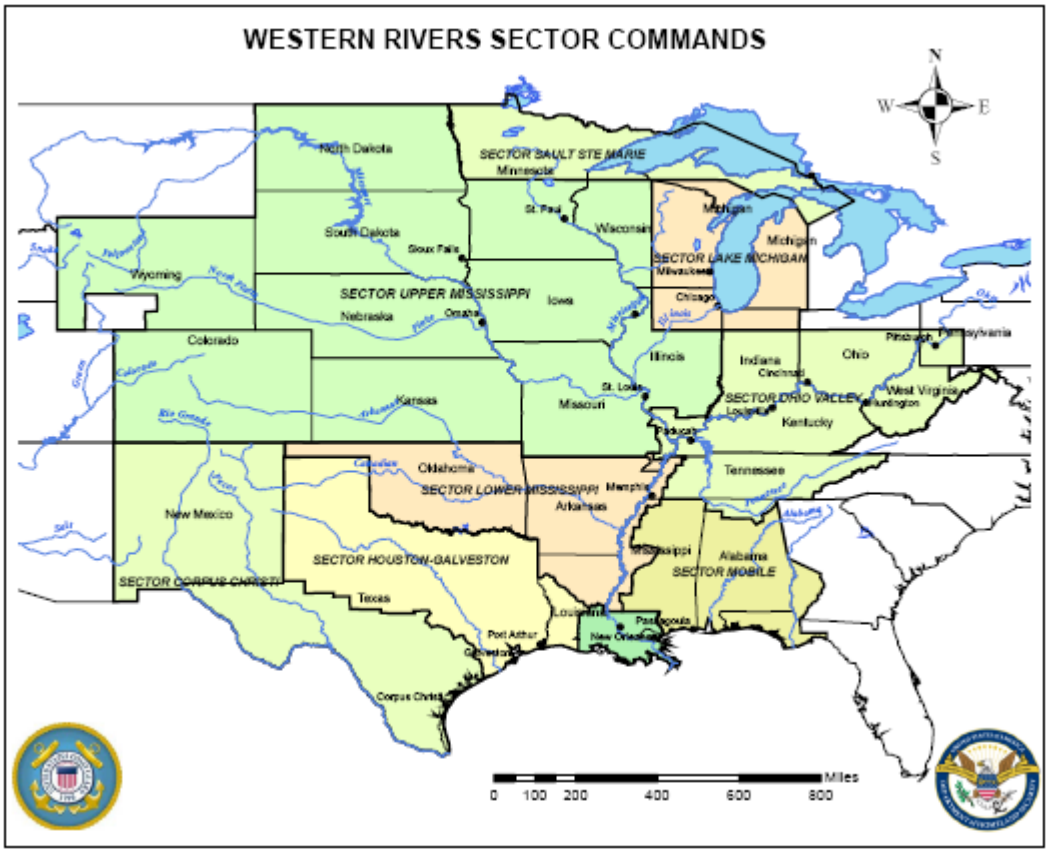
Ouachita River
Sector Upper Mississippi River All

Tennessee River
Sector Ohio Valley All (0-652)

Tennessee-Tombigbee Waterway
Sector Mobile 195.1 - 234
Sector Ohio Valley 0 – 195

Upper Mississippi River
Sector Ohio Valley 0 – 109.0
Sector Upper Mississippi River 109.1 – 863.0

White River
Sector Lower Mississippi River All


WESTERN RIVERS SECTOR COMMANDS
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E
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SECTOR SAULT STE MARIE
North Dakota
Minnesota
St. Paul
Wisconsin
Michigan
Michigan
SECTOR LAKE MICHIGAN
Milwaukee
Chicago
South Dakota
Sioux Falls
Wyoming
SECTOR UPPER MISSISSIPPI
Iowa
Nebraska
Omaha
Colorado
Illinois
Indiana
Cincinnati
Ohio
Pittsburgh
Pennsylvania
St. Louis
Missouri
SECTOR OHIO VALLEY
Louisville
West Virginia
Huntington
Kansas
Kentucky
Paducah
Oklahoma
Tennessee
SECTOR LOWER MISSISSIPPI
Memphis
Arkansas
New Mexico
Mississippi
Alabama
SECTOR MOBILE
SECTOR HOUSTON-GALVESTON
SECTOR CORPUS CHRISTI
Texas
Louisiana
Pascagoula
New Orleans
Port Arthur
Galveston
Corpus Christi
Miles
0
100
200
400
600
800

United States Army Corps of Engineers: Title 33, USC defines the Army Corps of Engineers (USACE) roles and responsibilities regarding the development and management of or changes to water resource facilities. These facilities serve the following purposes:

Flood and storm damage reduction
Navigation
Hydroelectric (hydropower) generation
Natural and cultural resources (including fish and wildlife)
Recreation
Water supply

Specifically, the USACE plans, designs, supervises construction of, operates and maintains, and performs major rehabilitation on facilities for these purposes. As part of the navigation mission, the USACE monitors and dredges federally-owned navigation channels to ensure that navigation continues efficiently and effectively. The USACE is also responsible for directing emergency response and recovery actions in the event of natural or man-caused incidents.

There are four **Army Corps of Engineers Divisions** that are totally or partially contained within the USCG Western Rivers:

Great Lakes and Ohio River (LRD): Cincinnati, OH; responsible for the Allegheny, Monongahela, Kanawha, Kentucky, Green, Cumberland, and Tennessee Rivers.

Mississippi Valley (MVD): Vicksburg, MS; responsible for the Mississippi and Ouachita-Black Rivers and Illinois Waterway.

Northwestern (NWD): Portland, OR, with a regional office in Omaha, NE; responsible for the Missouri River.

Southwestern (SWD): Dallas, TX; responsible for the Kerr-McClellan Arkansas River.

Army Corps of Engineer Districts within the Western Rivers include:

LRD: Pittsburgh, PA (LRP), OHR 0.0 to 127.2
Huntington, WV (LRH), OHR 127.2 to 438.0
Louisville, KY (LRL), OHR 438.0 to 981.0
Nashville, TN (LRN), TNR 652.0 to 0.0 and CUR 313.5 to 0.0

These **districts oversee tributaries joining the Ohio River** within these Ohio River mile designations:

MVD: Minneapolis-St. Paul, MN (MVP), UMR 857.6 to 614.0
Rock Island, IL (MVR), UMR 614.0 to 300.0 and ILWWR 350.0 to 0.0
St. Louis, MO (MVS), UMR 300.0 to 0.0
Memphis, TN (MVM), LMR 953.8 to 600.0
Vicksburg, MS (MVK), LMR 600.0 to 320.7

New Orleans, LA (MVN), LMR 320.7 to 0.0

NWD: Omaha, NE (NWO), MOR 734.8 to 498.4
Kansas City, KA (NWK), MOR 498.4 to 0.0

SWD: Tulsa, OK (SWT), ARR 444.8 to 308.6
Little Rock, AR (SWL), ARR 308.6 to 0.0

SWD, **MVD**, and **South Atlantic Division** share responsibilities for the Gulf Intracoastal Waterway through four districts:

Galveston, TX (SWG), 681.9 to 266.13 West of Harvey Lock [WHL]
New Orleans, LA (MVN), 266.13 WHL to 36.0 East of Harvey Lock [EHL]
Mobile, AL (SAM), 36.0 to 376.0 EHL
Jacksonville, FL (SAJ), 376.0 to 452.6 EHL

The USACE organization is shown on **page 23**.

State and Local Governments

State and County Emergency Management personnel, Levee District managers, County Commissioners, City Mayors and local public safety personnel represent local interests and can significantly impact traffic management decisions. Though it is not always practical to involve local interests in traffic management decisions, particularly when they involve federal statutory requirements, State Emergency Management Agencies (SEMA) should be consulted and informed of decisions that may have an effect on local levees, waterways and overall public safety. If necessary for successful problem resolution, state and local agencies should be invited to participate in a particular traffic emergency.

Industry Groups

As the principal river users and experts, industry groups should be called upon to provide assistance during waterways management activities. There are several organizations available to provide these services, including RIAC, LOMRC, CORMIG, ORIC, HDWA, MNSA, UMWA, GNOBFA, GICA, WAOP, IRCA and harbor associations. Each of these organizations fall under the umbrella of RIETF. The AWO also acts in an advisory capacity to the organizations listed above and represents the interests of the towing industry on a national level. **Page 24** depicts the organizational relationship of these groups.

River Industry Executive Task Force – The RIETF, established in 1988 as a government – industry partnership to address existing low water conditions, is a senior executive industry body representing the towing industry. RIETF co-chairmen include the commanders of the U.S. Coast Guard – Eighth District and U.S. Army Corps of Engineers – Mississippi Valley Division and Great Lakes and Ohio Valley Division. RIETF serves as the leadership group of the inland rivers. RIETF is the umbrella organization to RIAC, LOMRC, CORMIG, ORIC, HDWA, MNSA, UMWA, GNOBFA, GICA, WAOP, IRCA and harbor associations.

River Industry Action Committee – RIAC covers the Upper Mississippi River. Its responsibilities derive from its charter and periodic executive committee officer elections. RIAC collects river condition data including depth soundings, channel widths and obstruction locations through deployment of available vessels of opportunity. RIAC's Inland Traffic Communications System (ITCS) network is used in conjunction with the USCG Broadcast Notice to Mariners (BNM) communications system to ensure timely dissemination of information critical to waterway safety.

Lower Mississippi River Committee – LOMRC covers the entire length of the Lower Mississippi River. Periodic elections in addition to a charter define LOMRC responsibilities. LOMRC is composed primarily of companies that transport commodities between Cairo, IL and New Orleans, LA. Like RIAC, LOMRC accesses the ITCS and can supplement USCG BNMs.

Illinois River Carriers Association – IRCA covers the Illinois River. Periodic elections in addition to a charter define IRCA responsibilities. IRCA is composed primarily of companies

that transport commodities on the Illinois Waterway. Like RIAC, IRCA accesses the ITCS and can supplement USCG BNMs.

American Waterways Operators – AWO is the national trade association for the towboat, tugboat, and barge industry. AWO staff facilitates RIETF's fulfilling its responsibilities and works with the USCG and USACE on numerous initiatives.

Central Ohio River Maritime Industry Group – A regional group of navigation interests; Ohio River from Meldahl L/D to JT Meyers L/D plus the Licking and Green Rivers.

Gulf Intracoastal Canal Association (GICA) – Founded in August 1905, for the purpose of building an Intracoastal Waterway across the Gulf States. From its founding until June 1949, the association lobbied Congress, local entities, and government bodies for funding of the construction of the GIWW. Today, GICA exists to protect, maintain, and insure the efficient operation of the GIWW for all who benefit from it. GICA serves as "The Voice of the Barge Industry", to and from the Coast Guard and Corps of Engineers on matters impacting waterway traffic. The GIWW runs from Brownsville, TX to St. Marks, FL, and is 1300 miles long, 12 feet deep, and 125 feet wide.

Greater New Orleans Barge Fleeting Association – A non-profit association of companies engaged in the operation of barge fleets and towboats in the New Orleans to Baton Rouge corridor. The purpose of the Association is to promote a closer professional relationship between members, to disseminate information pertaining to fleeting and the river industry, to support member companies when consistent with the interests of the organization as a whole, and to improve relations with communities, regulating government bodies, and other professional organizations.

Huntington District Waterway Association – A regional association of commercial river users; boundaries coincide with the Army Corps Huntington District boundaries, including Ohio River, from Hannibal L/D to Meldahl L/D plus Kanawha River and Big Sandy River.

Lower Mississippi River Waterways Safety Advisory Committee – A federally mandated safety advisory committee. Members are appointed by the Secretary of the Department in which the Coast Guard operates. The committee advises the Coast Guard of issues affecting the Lower Mississippi River from Baton Rouge to the mouth of the river. The committee was established by an Act of Congress in 1983, and its members comprise a cross section of the River's users. LOMARSAC members:

(1) Five members representing River Port Authorities between Baton Rouge, Louisiana and the head of passes of the Lower Mississippi River, of which one member shall be from the Port of St. Bernard and one member from the Port of Plaquemines.

(2) Two members representing vessels owners or ship owners domiciled in the State of Louisiana.

(3) Two members representing organizations which operate harbor tugs or barge fleets in the geographical area covered by the committee.

(4) Two members representing companies which transport cargo or passengers on the navigable waterways in the geographical areas covered by the committee.

(5) Three members representing State Commissioned Pilot organizations, with one member each representing the New Orleans/Baton Rouge Steamship Pilots Association, the Crescent River Port Pilots Association, and the Associated Branch Pilots Association.
(6) Two at large members who utilize water transportation facilities located in the geographical area covered by the committee.
(7) Three members representing consumers, shippers, or importers/exporters that utilize vessels which utilize the navigable waterways covered by the committee.
(8) Two members representing those licensed merchant mariners, other than pilots, who perform shipboard duties on those vessels which utilize navigable waterways covered by the committee.
(9) One member representing an organization that serves in a consulting or advisory capacity to the maritime industry.
(10) One member representing an environmental organization; and
(11) One member representing the general public

Maritime Navigation Safety Association – A group of over 45 navigation industry businesses, towing companies, fleeters, and pilot groups, focused on addressing navigation safety issues on the lower Mississippi River, from Baton Rouge, LA (mile 243) to the sea buoy.

Ohio River Ice Committee – A regional group of navigation interests for the lower Ohio River from JT Meyers L/D to Cairo plus Cumberland and Tennessee Rivers.

St. Louis Harbor Association – A regional group of businesses in the Port of St. Louis, including fleeters, shipyards, construction companies, docks and terminals, which address navigation safety issues (high water, low water, ice and drift) with the USCG and USACE. It additionally reviews new infrastructure proposals that could affect fleets or navigation within the Port of St. Louis. The area covered is Selma, MO (mile 146.4 UMR) to Grafton, IL (mile 216.7 UMR.)

Tennessee River Valley Association – TRVA was organized in 1967 by public-spirited citizens of the Tennessee and Cumberland River Valleys region who felt the need for a non-partisan organization who could serve as a unified "voice" in promoting the region, its interests and resources. TRVA is a non-profit (501-C-4), membership organization that serves the states of Alabama, Kentucky, Mississippi, Tennessee and the valley portions of Georgia, North Carolina and Virginia. TRVA members represent business and industry, transportation, financial services, education, chambers of commerce, city/county/state government, trade associations, recreation, agriculture, news media and private citizens. Financed by its membership, TRVA is guided by a Board of Directors elected from its private sector members to geographically represent the region. TRVA promotes the development of economic projects which meet urban, industrial, business, recreational, agricultural, educational and transportation needs.

Tennessee-Cumberland Waterways Council – TCWC is a division of the TRVA formed in 1981 by a group of individuals who saw the need to have an active voice in the operation, maintenance and development of the Tennessee and Cumberland Rivers and their tributaries. TCWC was created to represent the users, shippers, receivers, operators and beneficiaries of the Tennessee and Cumberland Rivers. Its members consist of towing companies, barge lines, terminals, receivers and shippers on these waterways and other parties that have an interest in the

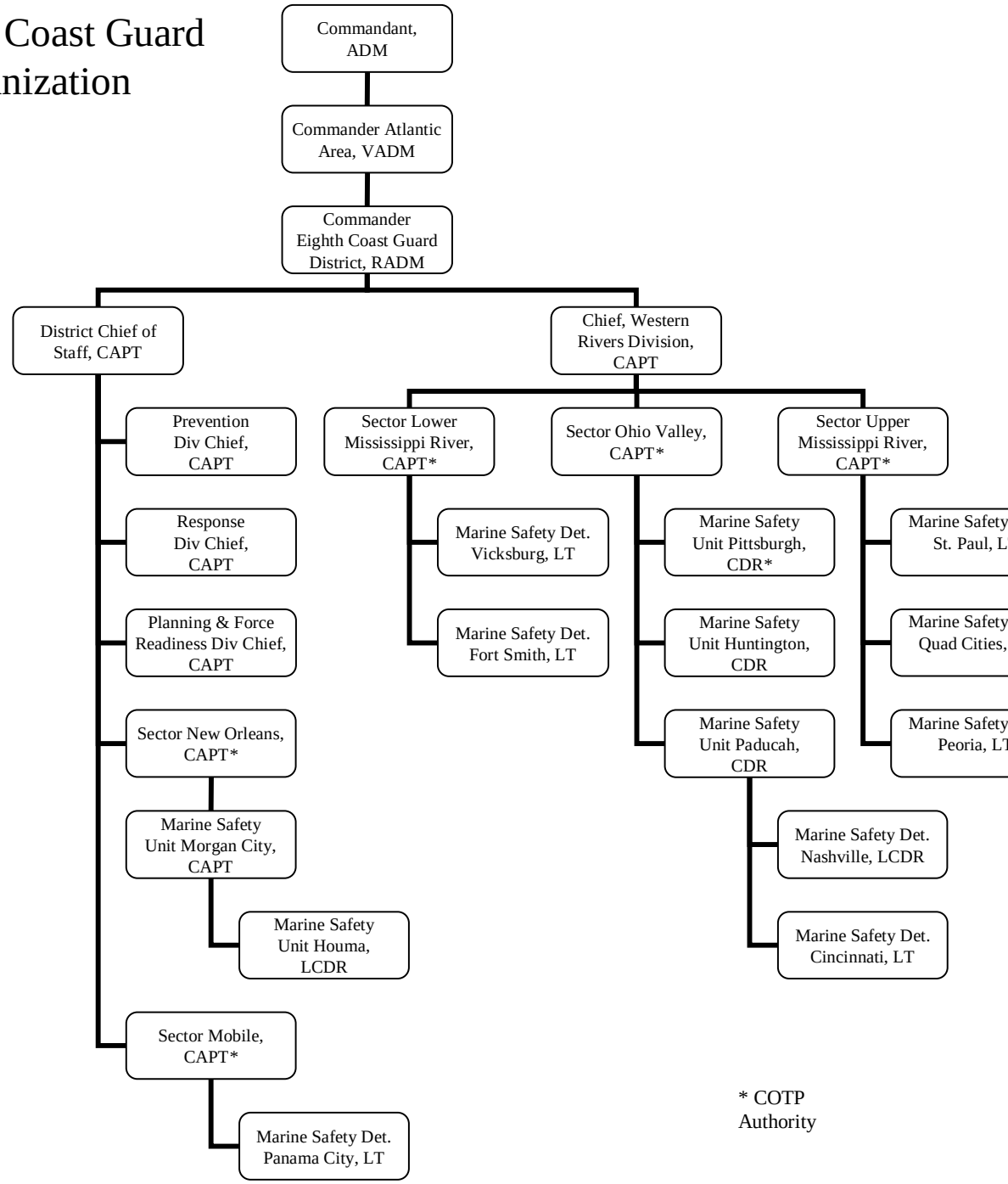
future of our waterway network. TCWC serves as a liaison with the private sector, U.S. Army Corps of Engineers, U.S. Coast Guard and Tennessee Valley Authority regarding navigation issues, operation, maintenance and development of the Tennessee and Cumberland Rivers.

Tennessee Valley Authority – The Tennessee Valley Authority was created by Congress in 1933. The TVA was established to construct and operate dams and reservoirs in the Tennessee River and its tributaries to promote navigation and to control destructive floods. The TVA headquarters is in Knoxville, TN.

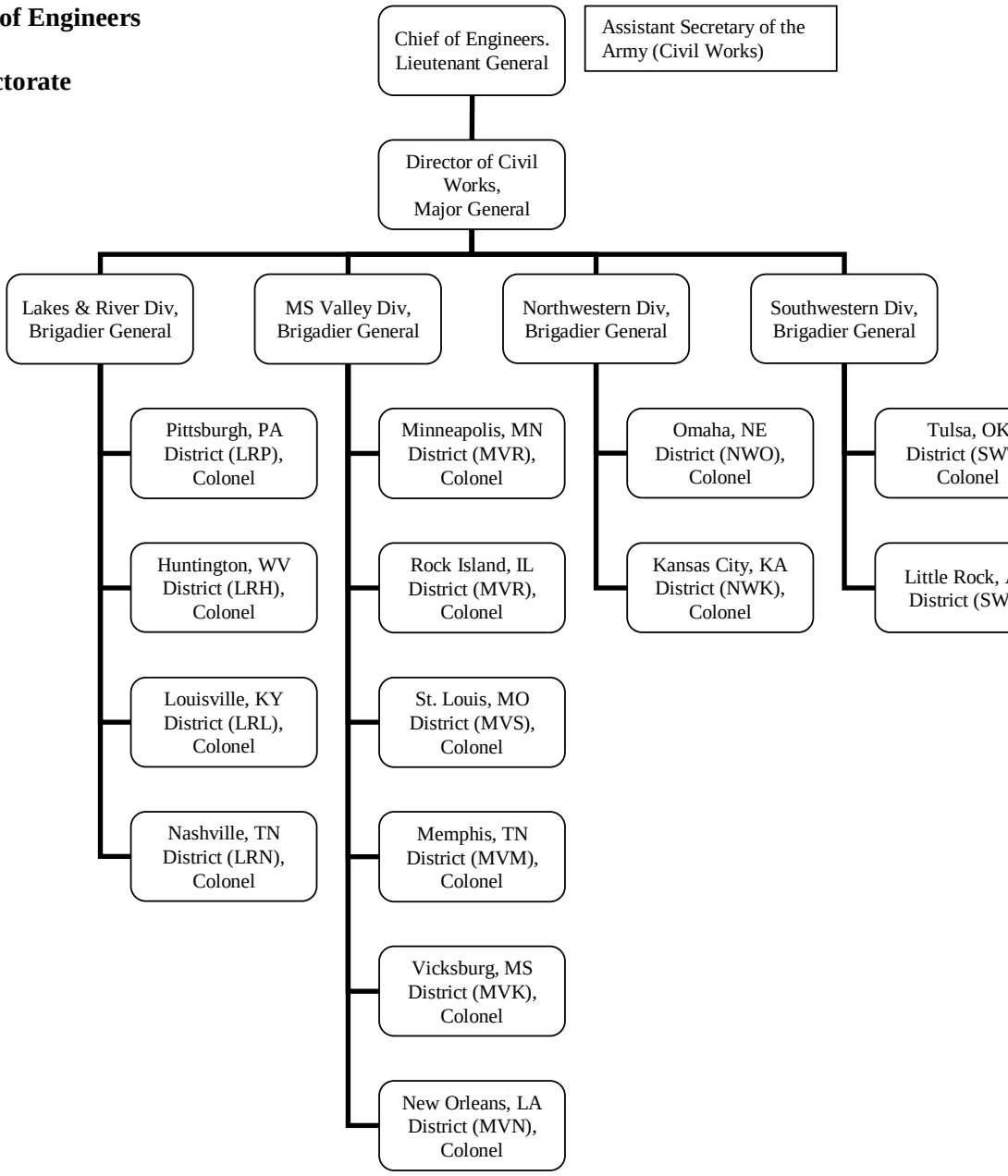
Upper Mississippi Waterway Association – Incorporated in 1932, UMWA is an association of waterway operators, shippers and consumer goods manufacturers working together to ensure that the UMR navigation system is used and maintained in a safe and environmentally responsible manner. UMWA represents interests in Illinois, Iowa, Minnesota, Missouri and Wisconsin. Members include industrial, utility and consumer goods manufacturers, recreational boaters and marina operators, as well as representatives of the USCG, USACE, and the Minnesota Department of Transportations.

Waterway Association of Pittsburgh – A regional group of navigation interests; Ohio River above Hannibal L/D plus Allegheny and Monongahela Rivers.

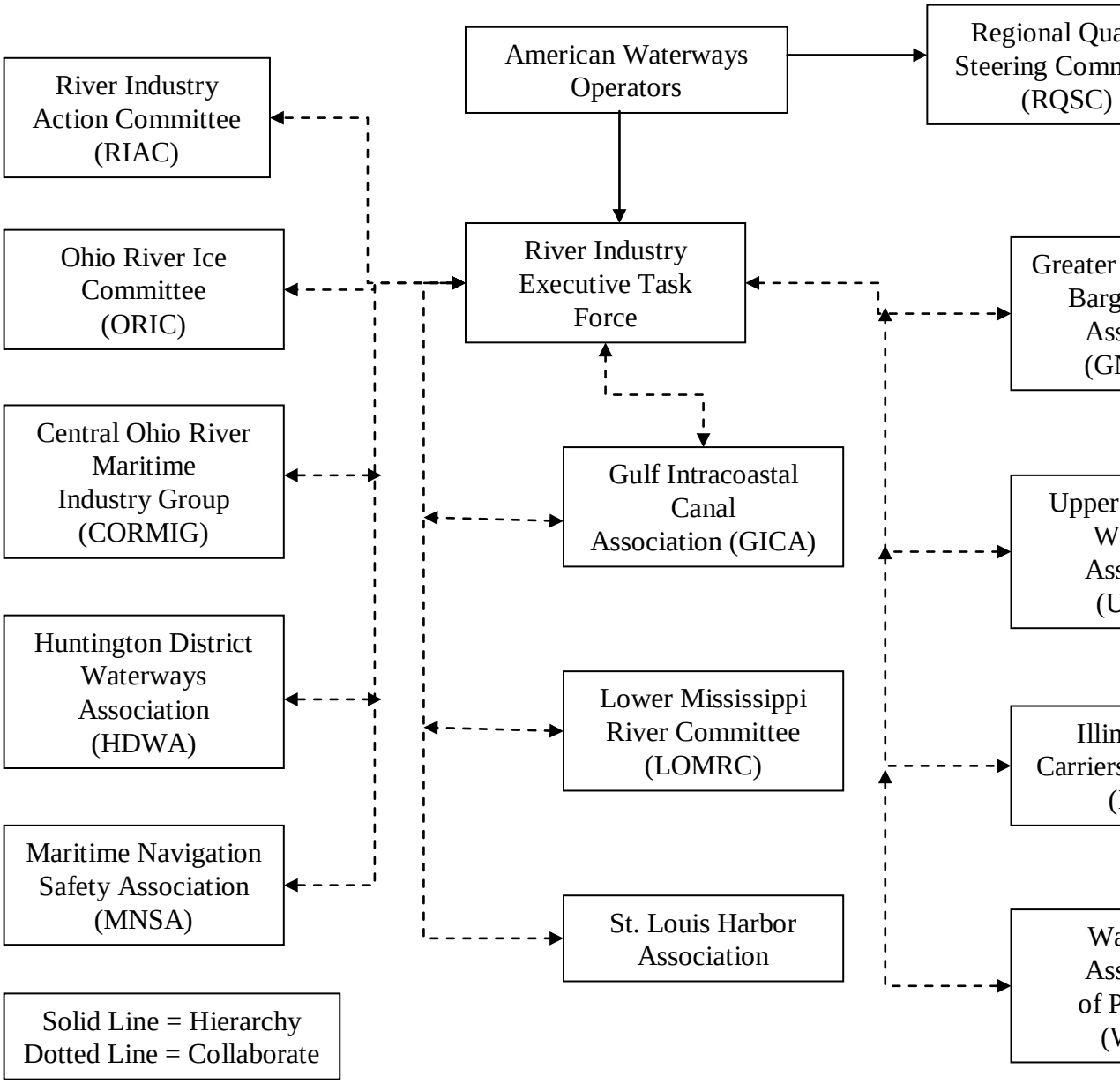
U.S. Coast Guard Organization



U.S. Army Corps of Engineers
Organization
Civil Works Directorate



River Industry Organizations



Chapter 3: Glossary and Definitions

USCG Control Measures:

1. **Safety Zone** - A water area, shore area, or water and shore area to which, for safety or environmental purposes, access is limited to authorized persons, vehicles or vessels. It may be stationary and described by fixed limits or it may be described as a zone around a vessel in motion. No person may enter a safety zone unless authorized by the Captain of the Port or the District Commander. No person may bring or cause to be brought into a safety zone any vehicle, vessel or object unless authorized by the Captain of the Port or the District Commander. No person may remain in a safety zone or allow any vehicle, vessel or object to remain in a safety zone unless authorized by the Captain of the Port or the District Commander. Each person in a safety zone who has notice of a lawful order or direction shall obey the order or direction of the Captain of the Port or District Commander. (See 33 CFR 165.20-23)

2. **Regulated Navigation Area (RNA)** - A water area within a defined boundary for which regulations for vessels navigating within the area have been established. Each District Commander may control vessel traffic in an area which is determined to have hazardous conditions, by issuing regulations: (a) specifying times of vessel entry, movement, or departure to, from, within, or through ports, harbors or other waters; (b) establishing vessel size, speed, draft limitations, and operating conditions; and (c) restricting vessel operation, in a hazardous area or under hazardous conditions, to vessels which have particular operating characteristics or capabilities which are considered necessary for safe operation under the circumstances. The master of a vessel in a regulated navigation area shall operate the vessel in accordance with the established regulations. No person may cause or authorize the operation of a vessel in a regulated navigation area contrary to the established regulations. (See 33 CFR 165.10-13)

3. **Safety Advisory** - Notification of a hazardous condition along with recommended actions. Advisories are not regulatory control measures. Advisories use terms such as "recommended, should, urged, & advised" as opposed to regulatory control measures (safety zones, RNA) that use terms such as "shall, must, required, directed, & will."

4. **Marine Information Broadcast (MIB)** - The Coast Guard transmits urgent and safety messages and scheduled Marine Information Broadcasts as required. Safety broadcasts will normally be used to convey important navigational or meteorological warnings. Safety broadcasts shall be made only when the information is so important to the safety of navigation that a delay in its dissemination would create a hazard to shipping. Each safety message will normally consist of only one subject. Safety broadcasts that remain in effect at the next scheduled broadcast shall be repeated. Marine Information Broadcasts will be used to notify mariners of safety zones, RNAs, or advisories.

Infrastructure Terms:

1. **Guard Wall** – A concrete or metal sheet pile cell wall up or downstream from the navigation lock that helps to keep the approaching barge tow or vessel lined up with the lock chamber and reduces the risk of the barge tow or vessel being swept into the dam section by cross current or outdraft conditions.

2. **Guide Wall** – A concrete, timber, plastic or metal sheet pile cell wall up or downstream from the navigation lock that helps to keep the approaching barge tow or vessel lined up with the lock chamber and reduces the risk of the barge tow or vessel becoming grounded on the shoreline adjacent to the lock structure.

3. **Intermediate Wall** – A term used to describe the concrete or metal sheet pile cell wall between side-by-side lock chambers.

4. **Land Lock** – Where there are two lock chambers side-by-side, the land lock is the chamber closer to the riverbank and high ground.

5. **Lock Approach Channel** – The channel found at either end, but outside, of a navigation lock.

6. **Lock Chamber**- The chamber with gates at both ends that permit the water level within to be raised or lowered so vessels can pass by the lock (and dam) structure.

7. **Miter Gate** – Double gates which swing on a vertical axis allowing vessel entry or egress and water level within to be adjusted upward or downward to match the water level outside the lock chamber.

8. **Navigation Dam** – A gated or ungated concrete or concrete/earthfilled structure across a navigable waterway designed to maintain a fairly uniform or consistent river or pool elevation upstream.

9. **Navigation Pass** – A low part of a concrete dam crest. When river levels are high on some rivers, as during flood conditions, the navigation lock does not have to be used. Barge tows and other vessels can navigate over and through the navigation pass and will not impact lock or dam operations. As river levels recede, manual or hydraulic wickets must be raised in the navigation pass to maintain the required navigation pool depth and level.

10. **Navigation Pass Abutment Pier** – A concrete wall or abutment immediately adjacent to navigation pass which, when manual or hydraulic wickets are raised, forms the limit of the navigation pass and provides continuity with the remainder of the dam crest (such as at Montgomery Point Lock and Dam, White River, AR).

11. **Restricted Area** – An USACE designated area up and downstream from navigation lock or lock and dam to protect a barge tow or other vessel from turbulent or hazardous waters adjacent to the structure. This designation is for safety reasons.

12. **River Lock** – Where there are two lock chambers side-by-side, the river lock is the chamber closest to the center of the river or dam.

13. **Roller Gate** – A type of gate used to control the level of the forebay upstream from a navigation dam.

14. **Sector Gate** – A type of lock gate used for low upstream and downstream water level differential. Also used when water levels on either side of the lock or lock and dam can be higher or lower.

15. **Tainter Gate** – A type of gate used to control the level of the forebay upstream from a navigation dam.

16. **Vertical Drop Gate** – A type of lock gate unique in that the drop gate opens by sinking below the water level in the lock approach channel. Usually used in moderate to high lift locks and on the upstream end of the lock chamber.

17. **Vertical Lift Gate** – A type of lock gate unique in that the lift gate opens by being pulled upward out of the water and suspended in the air as the approaching barge tow or vessel enters the lock chamber. Used at the downstream end of just a few high lift lock chambers across the country.

Waterway Terms:

1. **Armored Levees** - An embankment, surfaced with rock, concrete or other armoring material, designed to prevent flooding of the low-lying area behind it. Levees are designed to protect against a set return frequency flood plus a freeboard intended to prevent structural failure.

2. **Chevrons** – Chevron structures are two stone dikes placed next to each other positioned in a "V" pattern with the pointed end upstream. Each dike is constructed between 45 and 60 degrees either clockwise or counter clockwise to the flow of the river to make the "V" pattern. The upstream end point is typically notched to allow flow through, but may be closed. The purpose of the chevrons is to develop shallow water habitats, increase depth/velocity diversity, widen the effective top width of the river, and maintain a reliable thalweg location. Chevrons generally are not connected to the riverbank. Chevrons are generally placed along dike fields between dikes, and are generally associated with major modifications to the adjacent dikes. They can also be used to replace dikes. Chevrons may be constructed above or below normal navigation river stages, but are generally constructed to an elevation that is approximately equal to normal navigation stages.

3. **Dike** – A hard river structure that is constructed perpendicular to the flow on the inside of a river bend. The purpose of dikes is to contract the river channel to a desired width and protect the inside bankline from erosion. They were also used to cut off side channels and chutes, thereby concentrating the river flow into a single channel. These structures are made of stone or wood piling filled with stone. These structures were placed at lengths of ¼ - ½ mile in length to

the bluff lines in the early construction period. Only the riverward 100 – 200 foot portions of the dike structures are visible in the river today. The rest of the structures are buried under several feet of sediment deposits. Various names are associated with different dike structures: pile dike, stone fill dike, L-head dikes and vane dikes.

4. **Dredge** – An implement or machine for scooping or digging objects or earth from the bed of a body of water. Dredges can be of several varieties:

a. **Clamshell** – Uses a barge-mounted crane and bucket to dig or scoop material from the channel bottom and place the dredged material into a barge for disposal or directly into an in-water or upland disposal site.

b. **Cutterhead Pipeline** – Dredged material is carried from the channel bottom through a pump and discharge line to a disposal location within the river or at an upland site.

c. **Hopper** – A chamber on the dredge is filled and the dredge is moved to a discharge location for emptying. This is a self-propelled dredge.

d. **Specialty Dredge** – Modified dredge for special purposes, such as dredging to deep depths, jetty construction and beach nourishment, removal of hazardous material, sediment removal at dams, and sand and gravel excavation.

i. **Dustpan** – A hydraulic, self-propelled dredge that uses a suction mouth shaped like a large dustpan or vacuum cleaner – for finer sediments – sands, silts, and clays.

ii. **Sidecast** – A self-propelled dredge, normally a hopper dredge, equipped with a boom on which the discharge is located. As the dredge operates, the dredged material is discharged to the side of the channel, allowing natural currents and processes to move the dredged material from the dredging site. A sidecaster removes coarse-grained materials and pumps them out of the navigation channel to a nearby in-water disposal area.

e. **Combination Dredges** – Can have hopper and sidecaster dredge capabilities.

5. **Dredging Plant** – The dredge and discharge line. (including needed disposal pump barge when the pipeline dredge is far from the disposal site, for a cutterhead pipeline dredge) or dredge and dredged material barge (for a clamshell dredge).

6. **Attendant Plant** – The positioning vessel (tug) used to maneuver a cutterhead pipeline dredge into dredging position or out of the navigation channel as needed, and the channel survey vessel, and any crew or other vessels used during the dredging operation. This also includes the equipment used to move dredged material around in a disposal site.

7. **Construction Reference Plane (CRP)** – An imaginary sloping plane, established to facilitate the design and maintenance of the structure heights on the Missouri River Bank Stabilization and Navigation Project from Sioux City, IA, to the mouth. The CRP was established by the Missouri River Commission in 1889 with eight subsequent revisions. The last revision was in 2002. Revisions are necessary to accommodate the changing river bed because of channel degradations and aggradations.

8. **Disposal Islands/Rookeries** – Environmental sustainability is critical to continued navigation channel maintenance in some locations along the inland waterways. Critical habitats which are created from dredged material for plants and animals could be impacted by high

water/flow, low water or ice conditions. Disposal Islands/Bird rookeries are an example of critical habitat that must be protected from damage during extreme climatic conditions.

9. **Erosion Protection/Shoreline Matting** – Erosion protection (revetment) can be of several forms (stone, vegetation, wood, rock-filled crib [gabions], etc.). Along the lower Mississippi River downstream from the Ohio River, articulated concrete mats are regularly used to form a protective overcoat to shield the riverbank from erosion and sloughing caused by channel currents and turbulent water associated with River flood stages. This mat-sinking operation is carried out annually during the traditional low water months of August – November.

10. **Floating Pipelines** – In most cases, the discharge line from a hydraulic dredge (except a hopper) must span some open water between the dredge and the disposal site. This discharge pipe is normally attached to floating pontoons between the dredge and the disposal site. There are connections between the dredge and the discharge pipe and between sections of the discharge pipe so that the dredge can be moved out of the navigation channel when required.

11. **Groin** – A rigid structure built out at an angle from a shore to protect the shore from erosion by currents, tides, or waves or to trap sand (for beach building).

12. **Jetty** – A structure extended into a body of water to influence the current or tide or protect a harbor.

13. **Levee** – An embankment designed to prevent flooding of the low-lying area behind it. Levees are designed to protect against a set return frequency flood plus a freeboard intended to prevent structural failure.

14. **Notched Dikes** – Since 1975, the Corps of Engineers has undertaken a "Riverine Habitat and Floodway Restoration" program on the Missouri River. The program attempts to arrest further losses for water area in the riverine system and to restore some open water area lost to accretion behind previously built revetment and dike structures. This is accomplished by constructing openings or notches in selected dikes, thus removing existing sediment deposits and developing slack water areas. The notching provides habitat diversity and improvement in flow conveyance for the passage of floods. Today the notched dikes are also being incorporated into the Missouri River Recovery Program that provides for general ecosystem restoration as well as endangered species habitat construction.

15. **Ordinary High Water** – The water surface that approximately equals the 1-year flood stage.

16. **Pile Dike** – A river structure composed of driven or set timber pilings that is constructed perpendicular to the flow on the inside of a river bend. The purpose of pile dikes is to contract the river channel to a desired width, control sedimentation within the navigation channel, and protect the inside bank line from erosion. They were also used to cut off side channels and chutes, thereby concentrating the river flow into a single channel.

17. **Rectified Channel Line** – The right and left banks of the revised alignment of the Missouri River defined by bank-stabilization structures. Also referred to as the "designed channel line".

18. **Revetment** – A hard river structure that is constructed parallel to the flow on the outside of a bend. The purpose of revetments is to guide the flow of the river along a desired sinuous alignment and to harden (prevent erosion of) the bank line. These structures are made up of stone or wood piling filled with stone. Some revetments were constructed with asphalt paving, but proved inadequate. The revetments are continuous along a bank line or they are segmented with gaps at various intervals. Various names associated with different revetment types have the following names: stone revetment, pile revetment, stone filled pile revetment, toe trench revetment, standard revetment, reinforced standard revetment, kicker revetment and asphalt revetment.

19. **Sills** – Sills are low elevation stone extensions of dikes constructed riverward into the river channel. Sills are built approximately perpendicular to the flow at elevations that are always below the water level during the navigation season. Constructed along troublesome navigation reaches, sills control the shape of the river cross section so that navigation depths can be maintained.

20. **Submerged Pipelines** – The discharge line from a pipeline dredge that crosses a navigation channel or open water by lying on the channel bottom. This reduces ship traffic interference to the dredging.

21. **Thalweg** – Refers to a line drawn to join the lowest points along the entire length of a streambed or valley. It marks the natural direction (the profile) of a watercourse.

Organizational Structures

US Coast Guard:

1. **District Commander** – Final authority for the performance within the confines of his or her district of the functions of the Coast Guard, which in general terms are homeland security, maritime law enforcement, saving and protecting life and property, safeguarding navigation on the high seas and navigable waters of the United States, and readiness for military operations, is delegated to the District Commander by the Commandant. In turn, delegations of final authority run from the District Commander to commanding officers of units under the District Commander for the performance of the functions of law enforcement, patrol of marine regattas and parades, and the saving of life and property which come within the scope of their activities.

2. **Captain of the Port** – Captains of the Port and their representatives enforce within their respective areas port safety and security and marine environmental protection regulations, including, without limitation, regulations for the protection and security of vessels, harbors, and waterfront facilities, anchorages, security zones, safety zones, regulated navigation areas, deepwater ports, water pollution, and ports and waterways safety.

3. **Sector** – Sector Commanders have COTP and inspection authority throughout their area of responsibility. Field unit commanding officers and supervisors report to the Sector Commander, who reports to the District Commander via the District Chief of Staff (coastal units), or the District Western Rivers Division Chief (inland units).

Army Corps of Engineers:

1. **Major Subordinate** (also called an MSC or Division) **Commander** – Regional authority overseeing civil works (and possibly military) missions within the geographic boundary of the MSC. The MSC Commander's responsibilities generally lie within a river basin or area of the country. There are eight Civil Works MSCs: Great Lakes and Ohio River, Mississippi Valley, North Atlantic, Northwestern, Pacific Ocean, South Atlantic, South Pacific, and Southwestern. The MSCs ensure that USACE missions are carried out in accordance with established law and USACE rules and regulations. MSC Commanders are either Army Major or Brigadier General Officers. MSC Commanders with Civil Works missions and activities are responsible to the Headquarters USACE (in Washington DC) Director of Civil Works and to the Secretary of the Army for Civil Works. Within each MSC office, the Commander has Planning, Engineering, Construction, Operations, and other expertise to efficiently carry out the MSC's Civil Works functions.

2. **District Commander** – Within the USACE MSCs are Districts covering smaller geographic areas. The District Commander, usually an Army Colonel or Lieutenant Colonel, is responsible for carrying out USACE civil works and military missions in accordance with established law and USACE rules and regulations. Within each District Office, the Commander has Planning, Engineering, Construction, Operations, and other expertise to efficiently carry out the District's Civil Works functions. There are 38 Districts across the country. The District is responsible for

conducting timely hydrographic surveys of channels and disseminating the hydrographic bulletin periodically to the users and project stakeholders.

3. **Operating Project Manager (OPM)** – OPMs work within operating Districts with a navigation mission. OPM projects are comprised of one or more physical facilities, to include the 195 locks and dams and 240 lock chambers along the inland and intracoastal waterways. One OPM may be responsible for one or multiple physical facilities. The OPM has Planning, Engineering, Construction, Operations, and other expertise to efficiently carry out the OPM's Civil Works functions.

Chapter 4: Acronyms

AHP	Above Head of Passes on the Mississippi River
ATON	Aids to Navigation (USCG)
AWO	American Waterways Operators
BNM	Broadcast Notice to Mariners (USCG)
CAC	Crisis Action Center
CAP	Crisis Action Plan
CEO	Chief Executive Officer
CFR	Code of Federal Regulations
CFS	Cubic Feet Per Second (volume of flow)
CORMIG	Central Ohio River Maritime Industry Group
COTP	Captain of the Port
CRP	Construction Reference Plane
CUL	Communications Unit Leader
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
EPA	Environmental Protection Agency
ERT	Emergency Response Team
ESF	Emergency Support Function
FEMA	Federal Emergency Management Agency
FOSC	Federal On-Scene Coordinator
FR	Federal Register
GICA	Gulf Intracoastal Canal Association
GNOBFA	Greater New Orleans Barge Fleeting Association
HAZMAT	Hazardous Materials
HDWA	Huntington District Waterway Association
IAP	Incident Action Plan
IC	Incident Commander
ICP	Incident Command Post
ICS	Incident Command System
ILWW	Illinois Waterway
IMAT	Incident Management Assist Team
IMH	Incident Management Handbook (replaced Field Operations Guide)
IMS	Information Management Supervisor
IO	Information Officer
IRCA	Illinois River Carrier's Association
ISP	Incident Safety Plan
ITCS	Inland Traffic Communications System
JIC	Joint Information Center (ICS term replaced PIC – Public Information Center)
JRCC	Joint Rescue Coordination Center
LMR	Lower Mississippi River
LMRWSAC	Lower Mississippi River Waterways Safety Advisory Committee
LNTM	Local Notice to Mariners
LO	Liaison Officer
LOMRC	Lower Mississippi River Committee
LSC	Logistics Section Chief
MAC	Multi-agency Coordination
MIB	Marine Information Broadcast
MMR	Middle Mississippi River
MNSA	Maritime Navigation Safety Association
MOA	Memorandum of Agreement
MOR	Missouri River
MOU	Memorandum of Understanding
MRCC	Maritime Rescue Coordination Center

MSU	Marine Safety Unit
MUL	Medical Unit Leader
NIC	National Incident Command
NIIMS	National Interagency Incident Management System
NIMS	National Incident Management System
NN	Navigation Notice (USACE)
NOAA	National Oceanic and Atmospheric Administration
NRC	National Response Center
NRS	National Response System
NTNI	Notice to Navigation Interests (USACE)
NTSB	National Transportation Safety Board
NWS	National Weather Service
OCC	Operations Coordination Center
OIC	Officer-In-Charge
OHW	Ordinary High Water
OPA 90	Oil Pollution Act of 1990
OPCEN	Operations Center
OPCON	Operational Control
OPLAN	Operations Plan
OPORDER	Incident Operations Order
OPSEC	Operations Security
ORIC	Ohio River Ice Committee
O/S	On-Scene
OSC	Operations Section Chief
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration
PA	Placement Area/Disposal Area (USACE)
PAO	Public Affairs Officer
PSC	Planning Section Chief
QI	Qualified Individual
QRT	Quick Response Team
R&A	Rescue and Assistance
RCC	Rescue Coordination Center
RCL	Rectified Channel Line
RIAC	River Industry Action Committee
RIC	Regional Incident Command
RIETF	River Industry Executive Task Force
RM	River Mile
RNA	Regulated Navigation Area
RP	Responsible Party
RPIC	Responsible Party Incident Commander
RQSC	Regional Quality Steering Committee
RRT	Regional Response Team
RSC	Rescue Sub-Center
RUL	Resources Unit Leader
SAR	Search and Rescue
SC	SAR Coordinator
SCI	Seaman’s Church Institute
SEMA	State Emergency Management Agency
SITREP	Situation Report
SLHA	St. Louis Harbor Association
SMC	Mission Coordinator
SO	Safety Officer
SONS	Spill of National Significance
SOSC	State On-Scene Coordinator
SRR	Search and Rescue Region

SRU	Search Rescue Unit
SSC	Scientific Support Coordinator
SUL	Situation Unit Leader
SZ	Safety Zone
TAV	Traffic Assist Vessel
TCC	Traffic Control Center
TCWC	Tennessee-Cumberland Waterways Council
TIC	Traffic Information Center
TRVA	Tennessee River Valley Association
TVA	Tennessee Valley Authority
UC	Unified Command
UMIB	Urgent Marine Information Broadcast
UMWA	Upper Mississippi Waterway Association
UMR	Upper Mississippi River
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USCG	U.S. Coast Guard
USGS	U.S. Geological Survey
VTS	Vessel Traffic Service

Chapter 5: Communications and Public Relations

This chapter provides guidance on the methods of communicating and receiving information. Poor communications can cause significant problems during a navigation crisis. Tow boat operators may make dangerous operating decisions, recreational boaters may operate in perilous waters, and businesses could make costly decisions if they are not armed with timely and accurate information. Effective communications is a key focus of this waterways action plan.

Communication Methods

When inland navigation is affected, myriad groups will be interested. Since the degree of interest in the river varies, it is important that communications are tailored to the target audience. For example, a high degree of detail is not as important to the recreational boater as it is to commercial barge companies. Additionally, communication of information during a crisis must minimize reliance on voice to voice contact. Voice to voice communications, although the most personable form of communication, are time consuming, inefficient and subject to misunderstanding and misinterpretation.

The very best method of communicating information in a standard and effective manner is by using technology such as facsimiles, auto attendant phone systems, messages, text messaging and the internet. There are a number of internet sites available from the USACE, NWS, the USCG and other organizations which provide a wealth of information. They are not only an excellent means to retrieve information but an efficient and inexpensive means of dissemination. **Appendix C** provides a list of websites that can be contacted for emergency information.

Emergency Waterways Management

The complexity of the river system and the number of factors involved in its management make it essential that a pro-active approach be taken concerning waterways management activities. To ensure prevention and response activities are conducted efficiently, it is essential that river users and managers participate in decisions. Critical to success is the implementation of a Unified Command, which promotes synergy among all river stakeholders and ensures joint evaluations and decisions are made that take all perspectives into account.

Public Relations

The general public has a major stake in the timely restoration of marine commerce following a river crisis. Extended river closures have a tremendous impact on local and regional economies. The flow of basic, everyday essentials such as gasoline, building materials, coal, and farm products is either stopped or diverted to a more expensive mode when river navigation is impacted.

Timely traffic restoration requires the understanding, support and cooperation of both the general public and the impacted river communities. The purpose of this section is to provide guidance to the Public Information staff on establishing and operating a Joint Information Center (JIC).

A JIC is a facility established within or near the Incident Command Post (ICP) where the information officer (IO) and staff can coordinate and provide information on the incident to the public, media, and other agencies. The JIC is designed to assist government and industry leaders in their efforts to ensure successful outreach are conducted, the general public is aware of the actions taken, and cooperation is enhanced. The JIC is an essential element in these efforts.

During the initial event planning stage, the JIC activation should be given the same consideration as that given to the activation of any other response staff. The UC should determine the need for, the size and the scope of the JIC based on the event at hand. Once activated, the basic mission of the JIC should remain relatively unchanged from one event to another. The mission of the JIC is as follows:

- Provide timely and accurate information for media consumption.
- Establish an "affected community" information network.
- Promote a positive government-industry partnership image.

Public Information Guidance

Guidance should be provided to the JIC which outlines the actions it should take in meeting the IC's information sharing responsibilities. These guidelines should be developed by the IC and IO. The following public information activities should be included:

- Daily or periodic media releases: Describe the coordination and scheduling of information releases. Schedules should target local news programs and printed publications.
- Media briefings and news conferences: Media briefings and conferences should be outlined. Development of materials for individual and pooled sessions should be described.
- Info website: A website should be created and updated to provide nearly "real time" information to government agencies, industry and the general public. Access may be limited to the public by creating both an internet and intranet website.

- Affected community direct line: The means and level of access to affected community groups, responsibility for promoting cooperation and acceptance should be described.

- Coordinated site visits: The use of site visits should be described. These events bring public officials, media, and UC personnel together to foster assurances and show efforts.

Public Information Releases

Under ideal circumstances the JIC is the sole provider of crisis information to the public. Unfortunately, misinformation, speculation and rumors often surface, which raises the level of anxiety and frustration even further. To minimize this problem, the following actions should be taken:

1. Proactive distribution: The JIC should create an information distribution chain applicable to the crisis at hand. Identifiable, impacted parties should be regularly updated. Each impacted party should be considered a potential avenue to the general public. They should be provided the same safety, economic and operational information that the JIC provides the press or other media sources.

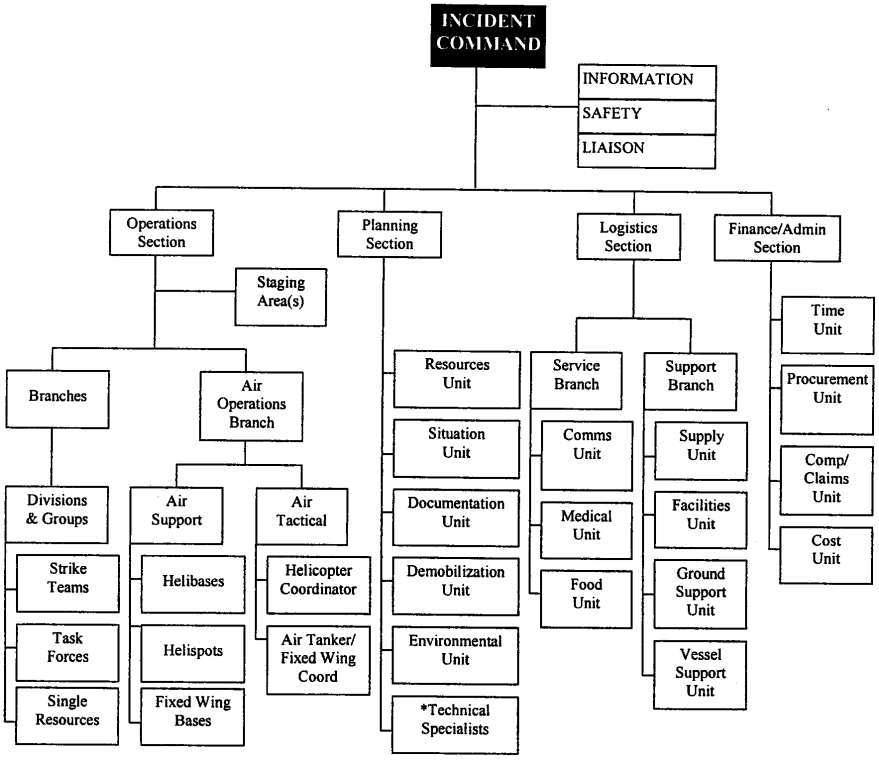
2. Timeliness of communications: The JIC must not only establish itself as the official information source, it must establish itself as the most current source of information. This will discourage the media and other interested individuals from seeking out alternative, less accurate sources. Timeliness is often the key. The JIC must establish itself as the provider of the most current and most accurate information. This may require daily or twice daily information releases.

3. Common message: The JIC should work with the agencies, the industry and other affected parties to develop a common message. Recipients of network distributions should continuously be prompted with key messages – safety, security, environmental protection – that capture the essence of the crisis restoration efforts. Distribution recipients should be encouraged to refer media calls to the JIC for handling rather than speculating on crisis management efforts and successes. Industry representatives who typically receive media calls should be encouraged to confine their comments to the specific impact the crisis is having on their business and refer crisis restoration questions to the JIC.

Event Closure

Closure is critical to any crisis management process. The public needs to know when the crisis is resolved. The JIC can play a key role in how that message is received. The inland rivers typically receive very little attention or notoriety. A river crisis is one of the few times the public actually hears about the waterways, and that generally comes with the negative overtone of flood, drought or catastrophe. The conclusion of a crisis should be viewed as an opportunity to highlight successes, lend praise to those involved, and reinforce already stimulated public awareness of the economic and environmental advantages of river transportation.

Appendix A: Incident Command System Structure



* May be assigned wherever their services are required.

ICS ORGANIZATION GUIDE

COMMAND

1. Incident Commander - one per incident. Unless incident is multi-jurisdictional.
2. Multi-jurisdictional incidents establish Unified Command with each jurisdiction supplying individual to represent agency in Unified Command Structure.
3. Incident Commander may have Deputy.
4. Command Staff Officer - one per function per incident.
5. Command Staff may have assistants as needed.
6. Agency Representatives report to Liaison Officer on Command Staff.

INCIDENT BASE RECOMMENDED MINIMUM PERSONNEL REQUIREMENTS
(PER TWELVE (12) HOUR OPERATIONAL PERIOD)

(If camps are established, the minimum personnel requirements for the Base may be modified or additional personnel may be added to support camps.)

	UNIT POSITION	SIZE OF INCIDENT (NUMBER OF DIVISIONS)				
		2	5	10	15	25
OPERATIONS	Operations Section Chief	One Per Operational Period				
	Branch Director		2	3	4	6
	Division/Group Supervisor	2	5	10	15	25
	Strike Team Leaders	As Needed				
	Task Force Leaders	As Needed				
	Air Operations Director		1	1	1	1
	Air Tactical Group Supervisor	1	1	1	1	1
	Air Tanker/Fixed Wing Coordinator	As Needed				
	Helicopter Coordinator	As Needed				
	Air Support Group Supervisor	1	1	1	1	1
	Helibase Manager	One Per Helibase				
	Helispot Manager	One Per Helispot				
	Fixed Wing Support Leader	One Per Airport				
	Staging Area Manager	One Per Staging Area				
PLANNING	Planning Section Chief	One Per Incident				
	Resources Unit Leader	1	1	1	1	1
	Status Recorders	1	2	3	3	3
	Check-In Recorders	As Needed				
	Volunteer Coordinator	As Needed				
	Technical Specialists	As Needed				
	Situation Unit Leader	1	1	1	1	1
	Field Observer		1	2	2	3
	Weather Observer	As Needed				
	Aerial/Ortho Photo Analyst	As Needed				
	Display/Report Processor		1	1	1	2
	IR Equipment Operators	Two (If Needed)				
	Computer Terminal Operator		1	1	1	1
	Photographer			1	1	1
	Environmental Unit Leader	1	1	1	1	
	Documentation Unit Leader		1	1	1	1
	Demobilization Unit Leader			1	1	1
	Demob Recorders from Resources	As Needed				

	UNIT POSITION	SIZE OF INCIDENT (NUMBER OF DIVISIONS)				
		2	5	10	15	25
LOGISTICS	Logistics Section Chief	One Per Incident				
	Service Branch Director	As Needed				
	Communications Unit Leader	1	1	1	1	1
	Incident Communications Manager	1	1	1	1	1
	Incident Dispatcher	1	2	3	3	4
	Message Center Operator		1	1	2	2
	Messenger		1	2	2	2
	Communications Technician		1	2	4	4
	Medical Unit Leader	1	1	1	1	1
	Medical Unit Leader Assistant	As Needed				
	Responder Rehabilitation Manager	As Needed				
	Food Unit Leader		1	1	1	1
	Food Unit Assistant (each camp)	As Needed				
	Cook		1	1	2	2
	Assistant Cook		2	2	6	12
	Helper		8	8	16	24
	Support Branch Director	As Needed				
	Supply Unit Leader		1	1	1	1
	Camp Supply Assistant (each camp)	As Needed				
	Ordering Manager			1	1	1
	Receiving/Distribution Manager		1	1	1	1
	Tool/Equipment Specialist			1	1	1
	Recorders		1	1	2	2
	Helpers		2	2	2	2
	Facility Unit Leader		1	1	1	1
	Base Manager		1	1	1	1
	Camp Manager (each camp)	As Needed				
	Facility Maintenance Specialist		1	1	1	1
	Security Manager		1	1	1	1
	Helpers		6	6	12	12
	Ground Support Unit Leader	1	1	1	1	1
	Equipment Manager		1	1	1	1
	Assistants	As Needed				
	Equipment Timekeeper		1	1	1	1
	Mechanics	1	1	3	5	7
	Drivers	As Needed				
	Operators	As Needed				
	Vessel Support Unit Leader	As Needed				
FIN-ADMIN	Finance/Administration Section Chief	One Per Incident				
	Time Unit Leader		1	1	1	1
	Time Recorder, Personnel		1	3	3	5
	Time Recorder, Equipment		1	2	2	3
	Procurement Unit Leader		1	1	1	1
	Compensation/Claims Unit Leader		1	1	1	1
	Compensation Specialist	As Needed				
	Claims Specialist	As Needed				
	Cost Unit Leader		1	1	1	1
	Cost Analyst			1	1	1

Appendix B: Hydrology and Meteorology

General Hydrology, Meteorology and Waterways Management

The purpose of this appendix is to provide the waterways manger with basic information on the hydrological and meteorological factors that affect the inland rivers system, and to identify how these factors affect river levels and navigation safety. This appendix outlines the general philosophy for dealing with navigation safety issues and discusses the tools available to conduct waterways management activities

Hydrological and Meteorological Factors Affecting Waterways Management

The inland rivers and their tributaries form a complex waterway system spread out over millions of square miles. In order to predict changes in conditions in this system, waterways managers must constantly monitor a number of hydrological and meteorological factors. These factors include water flow, soil moisture, snow cover, precipitation, temperature, weather patterns and geography. Effective waterways managers must constantly monitor these factors and forecast river conditions in order to ensure they are adequately prepared to deal with a regional transportation emergency.

The area most significantly affected by the factors mentioned above is the Upper Mississippi River (UMR). This portion of the river system, from the confluence of the Ohio River (OHR), northward, consists principally of pooled waters created by a series of locks and dams operated by the USACE. The purpose of these structures is to maintain water levels to provide the minimum channel depth of nine feet required by law for commercial navigation. Major tributaries to the UMR, including the Missouri River (MOR), Illinois River (ILR), Iowa River, Des Moines River and the Ohio River (OHR), have impoundments that create reservoirs. Flows from these reservoirs impact the water levels of the UMR.

Numerous variables affect how much water is in the system at any given time. Listed below are some of the key variables waterways managers must consider:

1. **Base flow** – The amount of water flow (measured in cubic feet per second (cfs)) along a section of the river (usually measured at a dam). The USACE has established an average flow rate for each section of a river. Average rates are based on flows consistent with normal weather patterns. A comparison of the actual flow against the base flow is an indicator of the duration of the increased or decreased flows. Base flow and flow rate information are available from the USACE.

2. **Soil moisture** – The amount of moisture concentrated in the soil. High soil moisture content means a large percentage of new precipitation will not be absorbed in the soil. This will result in increased runoff and a corresponding increase in water levels. Soil moisture averages and current levels are available from the U.S. Geological Survey (USGS) and State water and soil conservation agencies.

3. **Precipitation** – The amount of rain, sleet or snow. This becomes runoff and impacts water levels in the river systems. The amount and duration of precipitation are equally important factors. Precipitation averages and totals can be obtained from the USGS, the National Oceanic and Atmospheric Association (NOAA), the National Weather Service (NWS) and State agencies.

4. **Snow cover** – Snow cover is the buildup of snow that will melt and enter the water table and/or turn into runoff. Increase in snow cover will result in a corresponding increase in runoff and spring water levels. Information on snow cover can be obtained via NOAA, NWS, and State agencies.

5. **Temperature** – Average fall and winter temperatures determine the depth of frost, the amount of water entering the soil, and the amount and duration of river ice. Below normal temperatures in the fall and winter increase the depth of frost, allowing less water to enter the soil during periods of precipitation, increasing the amount of runoff. This situation may also cause an increase in ice and subsequent problems due to ice dams or gorges, and difficulties with the lock and dam system. Above normal temperatures in the spring increases the amount of runoff from snow melt. Temperature information is available from USGS, NOAA, NWS, and State agencies.

6. **Geography and Terrain** – The physical characteristics of the river bend and shoreline. These characteristics impact river currents and the rate of change in water levels. Steep banks, levees, revetments, narrow channels, rock bottoms, adjacent flood plains and wetlands are just a few of the factors that determine how the river will rise or fall. In addition, geography has an affect on ice build up, the effect of flooding, the time and complexity of maintenance and dredging and the effectiveness of traffic control measures.

7. **River Slope** – Rivers slope downstream toward their mouths. Slope is the change in elevation of the river, expressed in a ratio between the change in elevation and the number of miles between reference points. A working knowledge of slope is one of the best tools to quickly determine river conditions and the duration of low or high water events. As flow rates from the upper dams increase, the slope will increase as the upper end of the river in the vicinity of the upper dam increases in depth. If the increased flow rates remain constant, water levels downstream will rise and be sustained. As upper river water flow decreases, the river slope will decrease and water levels will crest sequentially down the river. The term for this decrease in flow and subsequent decrease in slope is called “leveling.” Once the crest has passed through the system, and flow rates become more consistent, water levels and slope will return to normal.

“Leveling” also occurs when low water conditions prevail in the system. As the dams reduce flow in order to maintain their pools, less water becomes available downstream. As each successive dam reduces flow to maintain the nine foot channel, short term low water is caused in the next pool downstream until that dam holds enough water to maintain its required level. When dams are only able to maintain minimum pool or unable to maintain a minimum channel depth, traffic management may have to be initiated.

Changes in weather patterns impact the river system by themselves and in conjunction with the factors listed above. One of the best known examples of this is the abnormal pattern that

contributed significantly to the Great Flood of 1993. In this case, a wet-weather pattern persisted over the upper Midwest for over six months. This was caused by weather front convergence zones which generated frequent and prolonged thunderstorms. In addition to the excessive rain, the area experienced an early snow melt, increasing spring runoff.

Waterways Management Case Histories

NOTE: The term Middle Mississippi River (MMR) is used throughout this section. It refers to he open portion of the UMR extending from Cairo, IL (00.0 UMR) to just north of St. Louis Harbor (190.5 UMR). This term is used to differentiate between the open and pooled sections of the UMR.

This section contains a synopsis of three Mississippi River transportation crises: "The Drought of 1988," "The Great Flood of 1993," and "High Water on the Ohio and Lower Mississippi Rivers of 2005." It also provides an overview of the waterways management techniques used in each case.

I. The Drought of 1988

The prolonged drought and the resultant low water of 1988 affected river stages in the Mississippi River Valley. The following area will be examined herein:

1. The lower open section of the Ohio River from Mount City, IL (L&D 53) to the confluence of the Mississippi River at Cairo, IL.

2. The Lower Mississippi River from Cairo, IL to Natchez, MS.

3. The Middle Mississippi River from Cairo, IL to St. Louis, MO.

The drought and subsequent disruption to navigation in the UMR, MMR and MOR systems lasted long after navigation was re-established on the LMR and OHR, and the effect on the inland towing industry had a prolonged national impact.

The Lower Ohio River Drought Response at Mound City L&D 53 to Cairo

In May 1988, the lower open section of the OHR was the first location to experience navigational disruption due to drought. The abnormally low flow in the MMR caused the OHR to bottom out. The 18-mile open river between L&D 53 and the confluence of the LMR began to shoal in late May and 265 groundings occurred in the area in early June. The COTP Paducah, in coordination with the Louisville USACE, established a safety zone, imposing tow size and horsepower limitations and restricting traffic to one-way passage to prevent future groundings.

The COTP Paducah initiated a consultation process with the marine industry through the Ohio River Ice Committee (ORIC). Vessel groundings and subsequent recovery efforts during early June caused the channel to silt in, resulting in an uneven channel bottom. By 14 June, conditions worsened and the river was closed to all navigation while awaiting the arrival of a dredge to re-establish the channel. After a limited period of emergency dredging, a pilot channel was established. Traffic resumed on 18 June with restrictions on tow size and horsepower, with passage through the work site coordinated by the Dredge Master. Dredging operations took most of the summer and traffic control was used effectively to permit around the clock dredging. The COTP Paducah, in concert with ORIC, established a traffic management scheme to allow for the

passage of traffic during the dredging operations: one-way traffic with tow-size and minimum horsepower restrictions. Within days, tows began to collect upstream and downstream of the safety zone causing congestion in Cairo harbor and at the lower approaches of L&D 53. On 21 June a mobile Traffic Control Center (TCC) was established at Mound City, IL, which was staffed by USACE and industry representatives during periods of peak activity. This center managed the queues of vessels in Cairo and at the lower approaches of L&D 53.

The controlling factor was the LMR stage at the Cairo, IL gauge, which is normally 24.4 feet. When the Cairo gauge fell and flow from the mainstream of the Ohio Valley was insufficient to maintain a passable channel, traffic halted indefinitely. The gauge at Cairo was at 7.1 feet on 21 June, fell to 5.3 feet on 7 July, and remained between 5.0 and 6.0 feet until 20 July. On 23 July, the gauge reached 13.5 feet after rain fell in the UMR Valley. On 31 July, the gauge again stabilized between 5.0 and 6.0 feet. These transient gauge events complicated traffic management activities, but did not hamper dredging operations.

The TCC actively controlled traffic through the "choke points" and remained in place until 21 August, when dredging activities were completed. The river was opened to traffic with limited restrictions on tow size and horsepower on 22 August, and all restrictions were removed shortly thereafter. This eight week emergency operation was a success due to the early integration of USCG, USACE and marine industry representatives. Throughout the "Drought of 1988," most of the publics' attention was focused on the problems in the LMR Valley, while the crisis at the mouth of the OHR Valley went virtually unnoticed, even though it had the potential for causing significant economic loss to the region.

The Drought on the Lower Mississippi River (506.0 LMR to 882.7 LMR)

During the spring of 1988, the LMR experienced abnormally low water velocity and river stages. Channels and crossing began to narrow and silt in, causing sand bars and sand waves to develop. Record low stages occurred at gauge stations between Cairo, IL and Arkansas City, AR. The decline in river stages continued throughout the summer, when the Memphis gauge hit a record low of -10.7 feet on 11 July. There were periods during the summer when flow for the mainstream of the river was 20% of the normal seasonal flow. Drought conditions gripped the MMR Valley for more than a year and a half, and subjected the area to periods of navigational disruptions requiring restrictions on tow sizes and drafts, and minimum horsepower requirements.

On 1 June 1988, the Memphis gauge read 0.0 feet, with forecasts for a continued steady decline. The COTP Memphis initiated contact with the USACE and the marine industry representatives concerning river conditions. At this time, there was no unified marine industry user group established in the LMR Valley to represent marine interests or assist the USCG and the USACE in coordinating industry response to navigation problems.

Various areas of shoaling were beginning to develop throughout the LMR Valley. Channel surveys indicated that 22 crossings in the area registered less than 11.0 feet in depth. On 15 June, the river at Greenville, MS, became impassable with no identifiable channel available. A safety zone was established at Greenville, and the river was closed to navigation with 71 tows

awaiting passage. The Greenville Reach was reopened to vessel traffic on 18 June after four days of emergency dredging operations.

On 20 June 1988, the Memphis gauge had fallen to -8.7 feet, and the channel upstream from Memphis at mile 743 LMR became impassable. The COTP Memphis contacted marine industry representatives and scheduled a planning meeting to discuss the need for tow size and draft restrictions. A safety zone was established and the river was closed for emergency dredging. On 21 June, the marine industry formed and chartered an advisory group to assist in the response to the navigation problems in the LMR. The group was called the Lower Mississippi River Committee (LOMRC). This committee's membership consisted of representatives from major towing companies and the USACE.

A USCG Command Center was established in Memphis to coordinate traffic management activities, which was staffed by USCG, USACE and marine industry personnel. The command center maintained an around the clock watch to monitor river conditions and disseminate information to interested parties. The entire LMR was designated a safety zone, and drafts of barges operating within the zone were restricted to 8.5 feet. The safety zone contained a "grandfather clause" to accommodate barges trapped in the affected area by the emergency restrictions.

On 24 June 1988, the Memphis gauge was at -8.5 feet. The emergency dredging operations at mile 743 LMR were completed and the river was re-opened to vessel traffic. Seventy-three tows were delayed for five days during the closure, and after re-establishment of navigation, groundings continued to occur unabated. By 27 June, 11 dredges were operating on the LMR and approximately 110 tows were delayed at various dredging sites.

The marine industry grew concerned as barges with drafts over 8.5 feet queued above Cairo and below Greenville due to the restrictions of the Memphis safety zone. In response to the traffic back-up, the COTP Memphis and LOMRC representatives designed a convoy protocol to allow tows with drafts of 8.5 feet or greater to navigate through the Memphis safety zone. The convoy concept was designed to allow deep draft tows to navigate as a group using the lead tow to reconnoiter the passage. When groundings occurred, the accompanying vessels assisted in the refloating efforts. The goals were to prevent repeated groundings and to preserve the channels during refloating activities. 57 tows, with over 600 barges, used the convoy protocol to transit the safety zone between 4 and 24 July.

On 3 July, the Memphis gauge was at -10.0 feet, and the river at Greenville was again severely shoaled and impassable. A safety zone was established and the river was closed to navigation to allow emergency dredging. The closure lasted five days and delayed 101 tows. On 6 July, the American Waterways Operators (AWO) hosted a meeting in St. Louis for the senior management of the major barge lines. The purpose of the meeting was to discuss the crisis on the LMR. The industry felt the government could have responded more effectively if it had the assistance of a senior level industry group during the planning of waterways management activities. As a result, the group chartered the River Industry Executive Task Force (RIETF). RIETF's membership included senior representatives from the major barge lines, senior USACE

personnel and the Commander, Second Coast Guard District. RIETF immediately became involved in the waterways management activities on the Mississippi River.

On 11 July, the Memphis gauges registered -10.7 feet and traffic continued to move under safety zone restrictions. The river began a slow rise as a result of upstream rain. By 14 July, the Memphis gauge registered -9.3 feet, the grounding rate was reduced to one fifth of that experienced in the previous week and channel conditions stabilized. On 1 September, the COTP Memphis rescinded the safety zone. Navigation continued under an advisory that recommended tows have a maximum draft of 8.5 feet and a maximum tow size of 20 barges northbound, with no more than 12 loads in the tow, and a maximum of 20 barges southbound. This advisory remained in effect until river stages increased later in the year.

In reviewing the chronology of events, and the data available at the time preceding the institution of the safety zone and navigation restrictions, it is apparent that the USCG, USACE and the marine industry were caught off guard by the severity of the drought. Some felt that the COTP in Memphis did the very best that he could, given the lack of an organized industry group that represented the LMR. Others felt COTP Memphis' initial actions were too little, too late. Regardless of how the response to the "Drought of 1988" is viewed, it is clear that once industry formed the RIETF, waterways management and communication among all parties improved.

The operation was a success despite the problems that arose during the early stages of the crisis. Dredging activities, continuous remarking and surveying of channels, the convoy program and industry compliance with navigation restrictions greatly improved the navigability of the LMR. Operators quickly adjusted to the challenges of low water navigation, and groundings and channel blockages became less frequent. One of the greatest benefits resulting from this event was the establishment of the LOMRC and RIETF organizations. These organizations were extremely helpful during the "Drought of 1988," and have since been an invaluable resource in managing transportation emergencies.

Drought Impact in St. Louis Harbor and on the Middle Mississippi River

The water that flows past St. Louis harbor is the sum of the inflows of the MOR, ILWW and the UMR systems. The MOR system contributes an average of 45% of the normal flow, while the UMR and ILWW systems contribute the remaining 55% of the flow. When meteorological events or conservation interventions occur that cause significant variations of inflow, the navigation conditions in St. Louis harbor and the MMR change.

While the LMR Valley and the Lower OHR were suffering the severe impact of the drought during the summer of 1988, the MMR was experiencing both reduced flows and depressed river stages. Channels narrowed and shoaling was present, but conditions on the MMR were not severe enough to require a safety zone or operating restrictions.

The St. Louis gauge has historically been relied upon to serve as an indicator of navigability of St. Louis harbor and the MMR south to Cape Girardeau. The Cape Girardeau gauge is the indicator of navigability for the river downstream to Cairo Harbor. The St. Louis gauge hovered at 0.0 feet with slight variations until the end of September 1988. From September to December,

the river continued to fluctuate. It then fell to a record low of -3.2 feet in early December. This depressed condition persisted through calendar year 1989.

Due to the reduced inflows from the MOR and UMR systems, there was not sufficient water to maintain channel depths in the vicinity of Grand Tower, IL (mile 78.8 to mile 79.5), and several other locations between Grays Point and Commerce, MO (mile 46.0 to mile 38.4). Rock formations in these channels reduced the depth to well below the 9.0 foot minimum depth. The USACE recommended that an extensive emergency rock removal program be initiated to accommodate traffic during the extreme low stages that were predicted for the coming winter months. Work was scheduled to start on 2 November with all dredging completed at Grand Tower, IL by mid November.

COTP St. Louis, in coordination with the USACE, RIAC, and the dredging contractor, designed a plan to establish a safety zone and tow restrictions to permit passage of traffic during the rock removal. The plan called for a USCG command post to be established at Grand Tower to monitor and direct traffic through the work site. The plan identified target stages, based on the gauge at St. Louis, at which restrictions for the safety zone would change. This approach provided the opportunity to advise the marine industry well in advance of the requirements and allowed them to prepare for this critical period of navigation. As the St. Louis gauge fell, additional restrictions were imposed.

While dredging operations continued at Grand Tower, the St. Louis gauge started to fall and reached a record low of -3.2 feet. Three areas of channel blockage developed between mile 125 and 182, causing a traffic jam in St. Louis Harbor. This complex traffic problem complicated the difficult transit through the MMR. A total of 56 tows and 1049 barges were awaiting passage through the harbor.

A safety zone was implemented and 2 TCC's were established to control traffic through the harbor: one at mile 159 and another at mile 171. Emergency dredging operations were conducted at both locations. Coordinating with the lock masters at Lock and Dams 26 and 27, southbound traffic was first staged through the harbor and past the dredge sites to clear harbor congestion. Northbound traffic was then moved into the harbor. COTP Paducah used the same approach as COTP St. Louis for the work conducted in the Paducah zone (below mile 55.3). The work continued well into the early summer of 1989.

The "Drought of 1988" is an excellent example of the varied scenarios waterways managers must face. Analysis of the USACE and the USCG response to this complex series of events demonstrates the importance of timely and proactive planning that involves stake holders in the decision making processes. The luxury of being ahead of the problem can not be over emphasized. Although somewhat caught off guard during the early stages of this crisis, ultimately the USCG, USACE and the marine industry handled this prolonged, intense period of emergency operations adroitly. Clear and articulate goal setting, coupled with open communications among all stake holders were critical to the maintenance of safe navigation.

Many factors contributed to the overall success of the efforts to keep the river system viable during the drought: the timely implementation of water conservation and flow management

programs, the coordinated responsive dredging activities, and the cooperation of the marine industry. All of these actions assisted in resolving the various waterways management issues during the drought. The USCG's ability to use a wide variety of waterways management tools in a way that optimized safety, yet ensured continued navigation demonstrated the value of innovative thinking and risk taking to achieve a defined goal. Most importantly, this crisis response would have not succeeded without the involvement and contributions of RIAC, LOMRC, RIETF and the USACE.

II. The Great Flood of 1993

The "Great Flood of 1993" occurred on the UMR and its major tributaries from mid spring to early fall. It was one of the most disastrous natural events to affect the Midwest in history, leaving more than fifty dead and causing damage to homes, farmlands and crops that totaled approximately $14 billion. Preliminary estimates put marine industry losses in excess of $200 million.

The "Great Flood of 1993" began as a spring high water period that was wetter and longer than normal, causing the UMR and its tributaries to remain at elevated stages through the month of April. This prolonged period of high water caused inordinate stress on the levee systems in the region. Levees designed for exposure to high water for weeks at a time were submerged for months and the face vegetation, the natural protective armor of earthen levees, was destroyed due to extreme saturation. The extended spring high water period set the stage for the coming crisis.

Just as the spring high water started to recede, a weather pattern settled over the Midwest that was dubbed by the media as the "Rain Machine." This highly unusual weather pattern remained stationary over the Midwest, dropping 36 inches of rain on many parts of the UMR Basin between April and August. The abnormally saturated soil did little to reduce or slow the rain run off, and rivers quickly swelled causing levee failures, massive widespread regional flooding and interruptions of river, road and rail transportation.

On 1 August, the UMR crested in St. Louis at 49.6 feet, 19.6 feet above flood stage, only five inches below the elevation of the main flood wall that protects the city. The flood crest continued south and on 7 August, crested in Cairo, IL, at 45.8 feet, 5.8 feet above flood stage. As the flood crest continued southward and combined with the flow of the OHR, the LMR rose dramatically but remained within its banks. The UMR crested in New Madrid, MO, at 34.6 feet on 8 August, 6 feet over the flood stage. The extraordinary flows experienced in the UMR Basin did not cause massive flooding in the LMR Valley because the channels of the LMR are wider and deeper than those of the UMR.

The crests during the flooding would have been significantly higher if the upstream MOR and UMR reservoirs has not captured and controlled much of the continuing run-off. Additionally, upstream levee failures and flooding diverted and held significant flow from entering the main stem of the UMR. These levee failures acted as safety valves by lessening the height of the developing flood crest. However, the failed levees also protracted the eventual recession of flood waters.

Throughout the flood period, there were public and political concerns that once vessel traffic began to move along the Mississippi River and its tributaries, the weakened levees would fail from stress caused by vessel wakes, causing additional flooding. To address these concerns an "outreach program" was developed by the marine industry and federal government so that both the public and local political sectors were involved in the processes of restarting marine traffic.

Beginning in May, senior managers of the USCG, USACE and RIETF were discussing navigation conditions in the UMR Basin. It was agreed that a coordinated industry and government effort for the eventual resumption of vessel traffic was necessary. In early July, USCG, USACE and RIETF met to discuss the rivers conditions needed before commercial vessel traffic could begin. The group's position was that the resumption of traffic would only be attempted when conditions were such that it would not threaten the stressed levee systems. The group also concurred that the public and local political groups needed to be involved in the decision making process.

The waterways management activities undertaken in the aftermath of the "Great Flood of 1993" were an unparalleled success. It is an outstanding example of the beneficial value a dynamic government and industry partnership provides during a regional transportation emergency. The close cooperation, the candid and open communication, and the high degree of customer involvement throughout the flood produced a unique synergy.

This prolonged response activity required the full spectrum of waterway management techniques and tools available to resolve the complex issues involved. The team used both active and passive vessel control systems coupled with a unique mix of well defined and artificial temporary operating restrictions to test the waterway and restart traffic. The flexible management approach and the ability to rapidly adjust to the changing flood scenario contributed greatly to keeping marine commerce moving during the extraordinary event.

III. High Water on the Ohio and Lower Mississippi Rivers of 2005

The Ohio and Lower Mississippi Rivers faced high water, with gauge readings rising above actions stages throughout the river systems at the beginning of January 2005 and continuing into February.

In Louisville, KY the Ohio River was swollen with melted snow and heavy rains, and caused disruptions in several Kentucky communities, roads were submerged, businesses were closed, people evacuated, and floodgates were raised. The Ohio River gauge in Paducah reached 41 feet, two feet above flood stage, and continued to rise for a week, until it crested as 47.5 feet. Many high water related casualties resulted, including the loss of life.

One tragic event that resulted from the high water was the sinking of the towboat Elizabeth M on 9 January 2005. The Coast Guard issued a river advisory due to the treacherous water, but the locks were open for any towboats who wanted to take barges through. Three crew members died tragically and another was missing and later found dead after the towboat was swept over the Montgomery Dam in Beaver County, Pennsylvania and sank. This tragedy also left six barges, and more than 6,000 tons of coal and thousands of gallons of diesel fuel in the Ohio River.

Rain fell throughout Kentucky, adding to the rising river water. The flooded river delayed East Kentucky Power Cooperative from unloading coal barges at its coal-fired electric plant at Maysville, which supplied electric power to 480,000 customers in 89 Kentucky counties. The Louisville gauge crested at 28.7, more than 5 feet above the 23 foot flood stage. Parts of Ohio, West Virginia and Kentucky were flooded the week prior to the high water due to rain falling on ground already saturated by melted snow.

Melting snow and rain created a thick fog in northwest Ohio, leading to numerous car accidents, and one death. After the crest of the Ohio River moved past southwest Ohio, flooding along several other rivers and streams remained a problem. The Great Miami River at Miamitown, overran its banks, flooding the surrounding area, and a cold front caused winds of 25 to 35 mph, with gusts up to 60 mph, showers and thunderstorms in several northern Ohio counties.

The Ohio governor declared a state of emergency in 56 of Ohio's 88 counties, making them eligible for state assistance to clean up debris from flooding and ice that knocked down tree limbs and power lines. Ice snapped trees and power lines leaving thousands without power in northern Ohio, and people left their homes in some central and southern cities as water crept in from several days of steady rain.

High water on UMR between miles 179.0 - 184.0, in the St. Louis COTP Zone resulted in the following restrictions: southbound tows greater than 600 ft in length were limited to daylight transit, and towing vessels needed a minimum of 250 horsepower per 1500 tons of cargo in the tow, and should proceed at the slowest safe operating speed.

Severe high water conditions threatened the LMR. When the Baton Rouge gauge reached 28 feet, two feet below the action stage and continued to rise, the following limitations were recommended to towing companies and tow operators by the USCG and USACE: use traffic assist vessels when entering and exiting Port Allen Locks, limit the number of barges on southbound tows to 35, with a minimum brake horsepower of 240 per barge, and staff vessels

with the most experienced crews. Predictions showed the Baton Rouge gauge reaching a 39 foot crest, 4 feet above flood stage, and on 1 February 2005 the New Orleans gauge, rose from 13.9 feet to 16 feet, just below flood stage. Elements of the Mississippi River Crisis Action Plan (RCAP) were implemented, and 21 January 2005, COTP New Orleans established a safety zone from mile 223 AHOP to mile 241 AHOP. By taking these actions, the COTP was effectively entering the Implementation Phase of the RCAP, as the Baton Rouge gauge approached 35 feet. Some of the established safety limitations included: a towboat power minimum of 280 brake horse power per barge ratio, tow sizes were limited to 30 barges, private assist vessels were used when a minimum of 3 MPH could not be maintained, tow configurations were set up such that any spiked barge did not extend more than 50 feet beyond the head of the tow, and daytime transit limitations for southbound tows.

The winter 2005 high water involved multiple rivers, many USCG, USACE and industry personnel and several river crisis action plans and waterways management plans. Having multiple plans with different terminology, river emergencies and response requirements resulted in unnecessary confusion, as well as the need for a consolidated plan that may be used on all river systems for any water condition. The tragedies of this high water resulted in the creation of the Waterways Action Plan.

Appendix C: Information Sources – Suggested Websites

Weather Information

The following websites provide real-time weather information or specific surface or upper air analysis or prognostic forecasts. Some products require familiarity with weather symbols and/or terminology (particularly using upper air or horizontal weather charts).

1. National Weather Service http://www.weather.gov
2. The Weather Channel http://www.weather.com
3. NOAA Flood Warning www.nws.noaa.gov
4. WeatherNet http://cirrus.sprl.umich.edu/wxnet/
5. Purdue WX Board http://thunder.atms.purdue.edu
6. University of Illinois http://www.atmos.uiuc.edu/weather/

Precipitation Accumulations (covers latest 24 hour period)

1. National Weather Service http://www.weather.gov
2. Intellicast.com http://www.intellicast.com/

U.S. Army Corps of Engineers: The USACE maintains several databases including navigation information, ice reports and general USACE information.

1. USACE Home Page http://www.usace.army.mil
2. Navigation Information Center http://www2.mvr.usace.army.mil/nic2/default.cfm

U.S. Coast Guard: The Offices of Prevention and Response at Coast Guard Headquarters publish numerous documents on regulatory projects, changes in regulations and general maritime information via the National Maritime Center Home Page. In addition, the Coast Guard's primary home page offers a variety of information from the various Coast Guard District's and individual units.

1. U.S. Coast Guard Homepage http://www.uscg.mil
2. National Maritime Center http://www.uscg.mil/hq/g-m/nmc/web
3. Marine Safety Center http://www.uscg.mil/hq/msc or
4. http://homeport.uscg.mil (click “Vessel Standards,” click “Marine Safety Center”)
5. Regional Exam Centers http://www.uscg.mil/STCW/mmic-regions.htm
6. National Pollution Funds Center http://www.uscg.mil/hq/npfc/index.htm
7. Eighth Coast Guard District http://www.uscg.mil/d8/index.htm

Federal Emergency Management Agency (FEMA): This website provide prevention, response and training information for federal, state, local, tribal and community first responders, as well as response information during incident of national significance.

1. FEMA homepage http://www.fema.gov

2. Incident Command System (ICS) training
   http://www.fema.gov/emergency/nims/nims_training.shtm

River Industry Bulletin Board: This bulletin board provides valuable information on current river stages and conditions, current lock conditions, a chat area and links to other industry and government Internet sites.

1. RIBB http://www.ribb.com

State Websites, and Transportation Department Sites: The State Internet addresses listed below provide a wealth of information on transportation related activities in the state (roads, river transportation, etc.) The user needs to browse these areas to determine useful products.

1. Alabama http://www.alabama.gov, http://www.dot.state.al.us
2. Arkansas http://www.arkansas.gov, http://www.arkansashighways.com, http://www.waterways.dina.org
3. Illinois http://www.illinois.gov, http://www.dot.il.gov
4. Indiana http://www.in.gov, http://www.in.gov/dot
5. Iowa http://www.iowa.gov, http://www.dot.state.ia.us
6. Kansas http://www.kansas.gov, http://www.ksdot.org
7. Kentucky http://www.kentucky.gov, http://www.transportation.ky.gov
8. Louisiana http://www.louisiana.gov, http://www.dotd.louisiana.gov
9. Minnesota http://www.state.mn.us, http://www.dot.state.mn.us
10. Mississippi http://www.mississippi.gov, http://www.gomdot.com
11. Missouri http://www.missouri.gov, http://www.modot.mo.gov
12. Nebraska http://www.nebraska.gov, http://www.dor.state.ne.us/rca
13. North Dakota http://www.nd.gov, http://www.dot.nd.gov/
14. Ohio http://www.ohio.gov, http://www.dot.state.oh.us
15. Oklahoma http://www.oklahoma.gov, http://www.okladot.state.ok.us
16. South Dakota http://www.state.sd.us, http://www.sddot.com
17. Pennsylvania http://www.state.pa.us, http://www.dot.state.pa.us
18. Tennessee http://www.tennessee.gov, http://www.tdot.state.tn.us
19. Texas http://www.texas.gov, http://www.dot.state.tx.us
20. West Virginia http://www.wv.gov, http://www.wvdot.com
21. Wisconsin http://www.wisconsin.gov, http://www.dot.wisconsin.gov

Media Sites: The media addresses listed below provide up-to-date information on current affairs or on-line access to the news.

1. ABC News http://www.abc.com
2. CBS News http://cbs.com
3. CNN http://www.cnn.com
4. FOX News: www.foxnews.com
5. MSNBC http://www.msnbc.msn.com
6. NBC News http://www.nbc.com

Appendix D: Broadcast Notice to Mariners

Overview
There are three types of BNMs. Only local time references will be used in the text of a BNM, with "AM" and "PM" suffixes. If the time is 12:00 AM or 12:00 PM, it shall be designated as 12 midnight or 12 noon, to avoid confusion. The originator of the broadcast is responsible for determining the type and priority of each broadcast, utilizing the following guidelines:

Urgent Broadcasts (UMIB)
An Urgent Marine Information Broadcast (UMIB) is an immediate precedence message, which shall be broadcast upon receipt, 15 minutes following receipt, and then at each scheduled broadcast time until cancelled or replaced by an updated UMIB or a BNM. The originator of the UMIB may prescribe a more frequent broadcast schedule if the situation calls for it. UMIB's are identified by the urgency signal "PAN PAN, PAN PAN, PAN PAN" and contain information concerning the safety of a vessel, aircraft, vehicle or person. UMIB's are usually issued by field units, but may be issued by the District Office, if circumstances warrant.

Safety Broadcasts
A safety broadcast is a priority or immediate message, which shall be broadcast upon receipt and at scheduled broadcasts unless cancelled, unless otherwise specified by the originator. Safety broadcasts are prefaced by the safety signal "SECURITE, SECURITE, SECURITE" and contain information that is of such importance to the mariner that the delay of an initial broadcast would create a hazard to marine traffic.

Scheduled Broadcasts
A scheduled broadcast is used for information important enough to require a broadcast, but not urgent enough to necessitate a UMIB or safety broadcast. Scheduled broadcasts are generally of routine or priority precedence and shall be broadcast in the next scheduled broadcast and thereafter as specified by the originator.

BNM's for Channel Conditions, Obstructions or Hazards

Required Information
BNM requests concerning channel conditions, obstructions, shoaling, dredging, etc. should contain as much information as possible to aid the mariner in safely navigating the area. Required information as previously described should be augmented with additional information regarding gauge readings, depth of water over shoaling and obstructions, channel width, aids established to mark obstructions or shoals, hours of operation and dredging information, lock and dam schedules, radio frequencies of work boats, etc. The goal is to have enough information to process the request accurately.

Updating
It is important to keep abreast of changes in channel conditions, schedules for dredging operations and locks and dams, etc. to ensure that only the most current and accurate information is presented to the mariner. Much of the information contained in BNM's for obstructions,

channel conditions, shoaling, construction, locks and dams, etc. changes often. BNM's should be cancelled and reissued with the most up to date information.

Example BNMs

P 191523Z FEB 06 ZUI ASN-A13050000002
FM COMCOGARDGRU UPPER MISSISSIPPI RIVER KEOKUK IA
TO CCGDEIGHT NEW ORLEANS LA//OAN/OBR/CC/M/O//
INFO COGARD MSO ST LOUIS MO
USCGC CHEYENNE
CDRUSAED ST LOUIS MO
BT
UNCLAS //N16502//
SUBJ: WESTERN RIVERS BNM NR 0031-06 UM
SAFETY AND SCHED BCSTS UNTIL CANCELLED
USCG NOTICE TO MARINERS EIGHTH DISTRICT NR 0031-06 UM
UPPER MISSISSIPPI RIVER
DUE TO ANTICIPATED **LOW WATER** CONDITIONS ON THE UMR, THE U.S. COAST GUARD IN CONJUNCTION WITH RIAC AND THE ARMY CORPS OF ENGINEERS HAS ISSUED THE FOLLOWING SAFETY ADVISORY: ST. LOUIS GAUGE READINGS ON THE UMR ARE EXPECTED TO DROP INTO THE NEGATIVE RANGE. ALL MARINERS ARE ADVISED TO USE EXTRA CAUTION FOR PREVAILING CONDITIONS AND REMAIN COGNIZANT OF TOW DRAFTS AS LOW WATER CONDITIONS DEVELOP. HEAVY DRAFT VESSELS ARE ADVISED TO MOVE OFF THE UMR AS SOON AS PRACTICAL DUE TO EXPECTED LOW WATER CONDITIONS. MARINERS SHOULD BE AWARE OF SHIFTING CHANNELS AS BUOYS ARE ADJUSTED FOR CHANGING WATER LEVELS AND POTENTIAL SHOALING CONDITIONS ALONG BUOY LINES.
HEAVY BARGES SHOULD BE PLACED IN THE MIDDLE OF THE TOW TOWARDS THE STERN. MARINERS SHOULD USE EXTREME CAUTION WHEN TRANSITING NEAR FLEETING AREAS AND TO TRANSIT AT THE SLOWEST SAFE NAVIGABLE SPEED TO MINIMIZE IMPACT. THIS SAFETY ADVISORY WILL REMAIN IN EFFECT UNTIL FURTHER NOTICE.
BT
NNNN

P 211716Z FEB 06 ZUI ASN-A13052000025
FM COMCOGARD SECTOR LOWER MISSISSIPPI RIVER MEMPHIS TN
TO CCGDEIGHT NEW ORLEANS LA//DPW/DRMC/DP/DW//
INFO CDRUSAEDMV VICKSBURG MS
CDRUSAED NEW ORLEANS LA
CDRUSAED MEMPHIS TN
COGARD MSD GREENVILLE MS
COGARD MSU PADUCAH KY
USCGC PATOKA
USCGC KICKAPOO
USCGC GREENBRIER
USCGC KANKAKEE
USCGC CHENA
USCGC KANAWHA
BT
UNCLAS //N16502//
SUBJ: WR BROADCAST NOTICE TO MARINERS NR 0042-06 LM
SAFETY AND ALL SCHEDULED BROADCASTS UNTIL CANCELLED
USCG EIGHTH DISTRICT NOTICE TO MARINERS NR 0042-06 LM
LOWER MISSISSIPPI RIVER
LOW WATER CONDITIONS EXIST BETWEEN CAIRO AND BATON ROUGE. USACE

MAINTAINED DEPTH AND WIDTH MAY NOT BE OBTAINABLE ON ALL BUOY
LINES.IT
IS REQUESTED THAT ALL MARINERS MONITOR GAUGE READINGS FOR SAFE
NAVIGATION.
BT
NNNN

P 151320Z FEB 06 ZUI ASN-A08046000094
FM COMCOGARD SECTOR CORPUS CHRISTI TX
TO CCGDEIGHT NEW ORLEANS LA//OAN/CC//
INFO USCGC STEELHEAD
USCGC BRANT
USCGC AMBERJACK
USCGC MANATEE
USCGC MALLET
USCGC HARRY CLAIBORNE
COGARD ANT PORT OCONNOR TX
COGARD STA PORT OCONNOR TX
BT
UNCLAS //N16502//
SUBJ: SAFETY BROADCAST NOTICE TO MARINER
BROADCAST UPON RECEIPT AND ALL SCHEDULED BROADCASTS UNTIL CANCELED.
0068-06CC
TEXAS - GULF INTRACOASTAL WATERWAY AND MATAGORDA BAY SHIP CHANNEL.
HAZARDOUS **SHOALING** HAS OCCURRED BETWEEN MATAGORDA BAY, ICW, MILE
MARKER 469 AND 470.5, THE ALTERNATE ROUTE HAS ALSO EXPERIENCED
SHOALING AROUND BUOY 13A. MARINERS ARE URGED TO USE EXTREME CAUTION
WHILE TRANSITING THE AREA. THERE HAVE BEEN NUMEROUS GROUNDINGS WHEN
DRAFTS EXCEED 9 FEET. THERE HAVE ALSO BEEN GROUNDINGS WITH DRAFTS
OF LESS THAN 8 FEET DURING LOW WATER PERIODS. THE COAST GUARD
RECOMMENDS ALL VESSELS WITH DRAFTS GREATER THAN 7 AND ONE HALF FEET
TRANSIT THE AREA DURING HIGH TIDE ONLY AND EXERCISING EXTREME
CAUTION.
CANCEL AT TIME// 151700Z MAR 06
BT
NNNN

P 081958Z FEB 06 ZUI ASN-A13039000018
FM COMCOGARD SECTOR OHIO VALLEY LOUISVILLE KY
INFO CCGDEIGHT NEW ORLEANS LA//CC/OAN//
COGARD MSU HUNTINGTON WV
USCGC OSAGE
USCGC OBION
CDRUSAED LOUISVILLE KY
BT
UNCLAS //N16502//
SUBJ: WESTERN RIVERS BNM 0091-06 OV
SAFETY AND ALL SCHEDULED BROADCASTS UNTIL 101600Z FEB 06.
USCG EIGHTH DISTRICT NOTICE TO MARINERS NR 0091-06 OV
OHIO RIVER
THE CAPTAIN OF THE PORT SECTOR OHIO VALLEY, ADVISES ALL MARINERS
TO PROCEED WITH CAUTION DUE TO **HIGH WATERS** ON THE OHIO RIVER. HIGH
CURRENT VELOCITIES AND OUT DRAFT CONDITIONS EXIST AT MANY LOCKS
WITHIN THE COTP OHIO VALLEY ZONE. BRIDGE PIERS SHOULD NOT BE PASSED

TOO CLOSELY, DUE TO THE POSSIBILITY OF THE WIDER BASE BEING SUBMERGED BY HIGH WATER. MARINERS ARE URGED TO EXERCISE EXTREME CAUTION WHILE TRANSITING THESE AREAS. ALL VESSELS MUST HAVE ADEQUATE HORSEPOWER TO MAINTAIN CONTROL OF THEIR TOWS. ALL FLEET OPERATORS SHALL REGULARLY
CHECK THEIR FLEETS. ANY BARGE BREAKAWAYS SHALL IMMEDIATELY BE REPORTED TO USCG SECTOR OHIO VALLEY ON CHANNEL 16 VHF/FM OR AT 1-800-253-7465.
BT
NNNN

P 251610Z JAN 06 ZUI ASN-A13025000014
FM COMCOGARD SECTOR OHIO VALLEY LOUISVILLE KY
INFO CCGDEIGHT NEW ORLEANS LA//CC/OAN/M//
COGARD MSU PADUCAH KY
COGARD MSD NASHVILLE TN
USCGC OBION
USCGC CIMARRON
USCGC CHIPPEWA
USCGC OUACHITA
USCGC CHENA
BT
UNCLAS //N16502//
SUBJ: WESTERN RIVERS BNM 0050-06 OV
SAFETY AND ALL SCHEDULED BROADCASTS THROUGH 03 FEB 2006.
USCG EIGHTH DISTRICT NOTICE TO MARINERS NR 0050-06 OV
OHIO RIVER
THE U.S. COAST GUARD CAPTAIN OF THE PORT OHIO VALLEY, IN CONJUNCTION WITH THE OHIO RIVER ICE COMMITTEE, HAS ISSUED THIS SAFETY ADVISORY DUE TO **HIGH WATER** AND ASSOCIATED STRONG CURRENTS THAT EXIST IN THE VICINITY OF THE ILLINOIS CENTRAL RAILROAD BRIDGE MILE MARKER 977.7 OF THE OHIO RIVER. IN ACCORDANCE WITH THE INLAND RIVERS WATERWAYS MANAGEMENT PLAN, ALL MARINERS ARE ADVISED TO EXERCISE CAUTION WHILE NAVIGATING THROUGH BRIDGES OF THE LOWER OHIO RIVER DUE TO HAZARDOUS CONDITIONS ASSOCIATED WITH HIGH WATER AND STRONG CURRENTS THAT MAY CAUSE UNEXPECTED SET. MARINERS ARE ADVISED TO CONSIDER HORSEPOWER CAPABILITY, TOW SIZE AND POTENTIAL EFFECTS OF STRONG CURRENTS WHILE NAVIGATING IN THE VICINITY OF BRIDGES.
FOR QUESTIONS REGARDING THIS BROADCAST PLEASE CONTACT CG MSU PADUCAH AT 270-442-1621 OR CG SECTOR OHIO VALLEY AT 1-800-253-7465.
BT
NNNN

Appendix E: Risk Assessment Tools and Tasking from Eighth Coast Guard District

Navigation Workgroup Guidance and Waterway Specific Annex Format

Task Statement:

Navigation Workgroups, which will consist of USCG Sectors/Captain of the Ports, USACE Districts, and appropriate maritime industry representatives, will use the Waterways Action Plan Risk Assessment Tool to conduct an analysis of the waterways falling within their area of responsibility to determine problem locations for the following conditions: high water, low water, high current/velocity, ice (if applicable) and special circumstances. Once problem locations are identified, refine or develop a continuum of control measures (i.e. active guidance, advisories and controls) to encompass the Watch, Action and Recovery phases as defined in the Waterways Action Plan (see Section 4 of this document).

Risk Assessment Tool:

The risk assessment tool and accompanying conceptual document will be used to identify geographic areas that may require substantial precision control in order to safely navigate. The tool evaluates the waterway based upon “fixed” or “uncontrollable” factors such as channel width, bend radius or navigation obstructions plus casualty history. This tool evaluates risk independent of the river conditions such as "Rate of change in river stage" and "Current". These two factors are to be considered as part of efforts to determine when to implement the Waterways Action Plan and the continuum of control measures.

The acceptable risk threshold currently is a score of less than 480. The threshold value is 80% of the maximum risk score of 600. If the specific area evaluated scores 480 or higher, then mitigating strategies to improve precision control are to be developed.

It is important to remember that because you are calculating risk independent of river conditions, evaluation of two separate areas having similar risk factors should both produce similar risk scores.

Section Formatting:

Section 1 – Geographic Description

Narrative Form – Provide a brief description of area. Include waterway boundaries and any outstanding features and particular hydrology specific to the area being addressed. The Jurisdiction Matrix may be useful in developing this section.

Section 2 – Parties and Roles

Tabular Form – Describe USCG and USACE duties and responsibilities in specific detail and in tabular format as provided. If all of the people in a certain position (i.e. Lockmasters) report to the same position, they may all be listed together. If they report to different positions, list them separately. Where appropriate, indicate position equivalencies. Position titles rather than names of people are to be used.

Separately identify all appropriate industry groups and companies in the area in tabular format as provided.

Example:

USACE POSITION	DUTIES & RESPONSIBILITIES	EQUALS	USCG POSITION	DUTIES & RESPONSIBILITIES
			Chief, Prevention Department	Manages daily waterway management and casualty operations
REPORTS TO:				
Lockmaster for Meldahl, Markland & McAlpine Locks	Supervise and maintain locks		Chief, Response Department	Supervises operational response issues
REPORTS TO:				
District Engineer, Louisville	Supervise Corps activities in Louisville District		Sector Louisville Commander	Senior USCG officer in area

AREA	**COMPANY**	**MAIN POC**	**Industry Group(s)**	**Main POC**
All	Kirby Corporation	Dispatcher, Houston	AWO, GICA	AWO VP Mid Continent

Section 3 – Communications

Narrative Form – Discuss in general terms who needs to be notified and when, as well as who has the authority to make such notifications. Include major waterway users, facilities, locks and dams, etc.

Tabular Form – Create phone lists that, as best possible, use positions and company phone numbers rather than specific names and individual phone numbers. Create e-mail contact lists by position titles as well as individual names. Companies and organizations involved may want to establish an email address with wide distribution within the company or organization for use in emergencies.

Establish a procedure to keep the contact lists current as people, addresses and phone numbers frequently change within the USCG, USACE and Marine Industry organizations.

Provide a separate listing of local websites and the services offered, if appropriate. National level websites will be captured in the main plan and do not need to be listed here.

Example table on following page.

COMPANY / ORGANIZATION	DESIGNATED CONTACT	PHONE NUMBER	E-MAIL ADDRESS	WHEN CONTACTED
Ingram Barge Co.	Dispatcher	555-555-5555 (24 hr)	dispatch@ingram.com	All Situations
	Fred Flinstone	555-555-1555 – W 555-555-2555 – H	fred@bedrock.com	All Situations
Joe's Shallow Water Skiff Service	Executive Vice President	433-323-4323 (24hr)	joe@shallowskiff.com	High Water, High Current
Nuclear Power Plant	Water Intake Office	343-234-4543 (24hr)	All_water_intake@refinery.net	Low Water

GOVERNMENT AGENCY	DESIGNATED CONTACT	PHONE NUMBER	E-MAIL ADDRESS	WHEN CONTACTED
Coast Guard	Sector Commander	444-444-4444	cotp@msolouisville.uscg.mil	All Situations
USACE	District Engineer	333-333-3333	joe@usace.army.mil	All Situations
McAlpine Locks	Lockmaster	Etc.	Etc.	All Situations

INTERNET SITE PURPOSE	ADDRESS
USACE Pittsburgh River Stage Report	www.orp-wc.usace.army.mil

Section 4 – Action Plan

Narrative Form – Any extraneous discussion regarding actions may be mentioned here, however, the main source of information will be outlined in a table. It is not necessary to define the three stages in the annexes as they will be defined in the main body of the plan.

Tabular Form – Using the results of the risk assessment tool, list the critical areas and develop trigger points and a continuum of control measures (i.e. active guidance, advisories and controls) to encompass the Watch, Action and Recovery phases (see examples on following pages). Some areas may use different trigger point criteria, such as tailwater readings and flow. Tailor the information in the table to meet your particular need. The purpose of this section is to pre-determine thresholds and actions. It is not to generate a list of potential actions for the group to pick from in the midst of a waterway event. These phases are:

Watch Phase

1. Start of waterway management activity
2. Initiate dialog between USCG, USACE, chairman of navigation committee; any party can initiate request
3. Evaluate river and weather forecasts
4. Establish schedule for future meetings
5. Verify communication tree
6. Establish avenue(s) for communicating advisories
7. Communicate initial advisories (this can be standardized and incorporated into the plan)
8. Evaluate likely resources needed
9. Assess availability of supporting assets
10. Review next steps

Action Phase

1. Industry can expect impacts upon navigation up to and including river closures
2. Establish a continuum of thresholds and active guidance, advisories and controls within the plan
3. Continue scheduled dialog
4. Initiate sustained planning
5. Adjust the plan's next steps to the present situation, as necessary
6. Provide for river stakeholder liaison (local municipalities, river industries, EOCs, public entities, other river users, etc.)
7. Identify and provide for initiation of a public information function

Recovery Phase

1. Initiated when river conditions improve as determined by through the collective agreement of the unified command (COTP, USACE and Industry)
2. Walk back down the continuum where appropriate however threshold levels may be different than those going up the continuum
3. Establish actions to be taken that may involve test tows, channel surveys, ATON adjustments, dredging, etc.
4. Determine when final meeting will be held

5. Develop and communicate after-action / hot wash (standardized format) and need for plan revision or changes

CRITICAL AREA DESCRIPTION	*TRIGGER READING*	TREND	TRIGGERCURRENT	DESCRIPTION	PHASE	ACTION
DESCRIPTOR (if applicable, i.e. WILKERSON POINT) **WATERWAY NAME** **MILE MARKERS** **FLOOD STAGE READING OR OTHER USEFUL DATA**	Below 8’0”	Rising		Normal Operations		As stage rises towards 8’0”, consider need to initiate communications plan
	8’0”	Rising		High Water	Watch	Issue advisory; indicate high water, exercise caution
	10’0”	Rising		High Water	Watch	Issue advisory; indicate high water, exercise extreme caution; discuss voluntary horsepower and tow size restrictions
	12’0”	Rising		High Water	Action	Activate pre-established RNA limiting upbound transits to minimum of 3.0 mph; downbound transit to 300 hp/loaded barge, 250 hp/empty barge
	15’0”	Rising		Extreme High Water	Action	Activate pre-established RNA limiting upbound transits to minimum of 3.0 mph; downbound transit to 300 hp/loaded barge, 250 hp/empty barge, 12 barges maximum, and requiring assist vessel for all transits
	16’5”	Rising		Max Locking Ability	Action	Cease lock operations. RNA as per 15’0” remains in effect for pools.
	17’0”	Rising		Extreme High Water	Action	Implement Safety Zone prohibiting traffic
	17’0”	Falling		Extreme High Water	Recovery	Cancel Safety Zone. Re-establish RNA as per 15’0” rising stage
	16’5”	Falling		Max Locking Ability	Recovery	Resume lock operations. Continue RNA.
	15’0”	Falling		Extreme High Water	Recovery	Remove assist vessel requirement and re-establish RNA as per 12’0” rising stage
	12’0”	Falling		High Water / Silting	Recovery	Cancel RNA. Issue advisory; indicate high water condition but falling, exercise extreme caution, assess horsepower and tow size, report hazardous conditions or areas experiencing silting to Coast Guard
	10’0”	Falling		High Water	Recovery	Issue advisory; indicate high water, exercise caution; report hazardous conditions to Coast Guard
	9’0”	Falling		Normal Operations	Recovery	Issue final advisory, indicate return to normal operations, report hazardous conditions to Coast Guard

CRITICAL AREA DESCRIPTION	*TRIGGER READING*	TREND	TRIGGERCURRENT	DESCRIPTION	PHASE	ACTION
DESCRIPTOR (if applicable, i.e. JOE'S CROSSING) **WATERWAY NAME** **MILE MARKERS** **NAVIGATION CHANNEL PROJECT DEPTH OR OTHER USEFUL DATA**	Above 5'0"	Falling		Normal Operations		As stage falls towards 5'0", consider need to initiate communications plan
	5'0"	Falling		Low Water	Watch	Issue advisory; indicate low water, exercise caution, report shoaling / channel reduction areas to Coast Guard
	0'0"	Falling		Low Water	Watch	Issue advisory; indicate low water, exercise caution, report shoaling / channel reduction areas to Coast Guard. Discuss voluntary draft and tow size restrictions
	Negative 5'0"	Falling		Extreme Low Water	Action	Activate pre-established RNA limiting draft to 10'6" and tow size to 12 barge maximum
	Negative 7'0"	Falling		Extreme Low Water	Action	Activate pre-established RNA limiting draft to 9'0" and tow size to 12 barge maximum, daylight transit only allowed
	Negative 9'0"	Falling		Loss of Navigable Channel	Action	Implement Safety Zone prohibiting traffic
	Negative 9'0"	Rising		Reconstitution of Navigable Channel	Recovery	Continue Safety Zone. Employ test tow(s) pushing non-regulated cargo loaded to 9'0" to gain sense of channel's ability to support limited navigation
	Negative 8'0"	Rising		Extreme Low Water	Recovery	If favorable results from test tow(s), cancel safety zone. Re-establish RNA limiting draft to 9'0" and tow size to 12 barge maximum, daylight transit only allowed Continue to employ test tow(s) pushing non-regulated cargo loaded 10'6"
	Negative 7'0"	Rising		Extreme Low Water	Recovery	If favorable results from test tow(s), re-establish RNA limiting draft to 10'6" and tow size to 12 barge maximum. Continue to employ test tow(s) pushing non-regulated cargo loaded 12'0"
	Negative 5'0"	Rising		Extreme Low Water	Recovery	If favorable results from test tow(s), cancel RNA. Issue advisory; indicate low water, exercise caution; report hazardous conditions to Coast Guard
	0'0"	Rising		Low Water	Recovery	Issue advisory; indicate low water, exercise caution, report shoaling / channel reduction areas to Coast Guard
	5'0"	Rising		Normal Operations	Recovery	Issue final advisory, indicate return to normal operations, report hazardous conditions to Coast Guard

CRITICAL AREA DESCRIPTION	*TRIGGER READING*	TREND	TRIGGERCURRENT	DESCRIPTION	PHASE	ACTION
DESCRIPTOR (if applicable, i.e. JOE'S CROSSING) **WATERWAY NAME** **MILE MARKERS** **OTHER USEFUL DATA**		Rising	Below 3.0 mph	Normal Operations		As current rises towards 3.0 mph, consider need to initiate communications plan
		Rising	3.0 mph	High Current	Watch	Issue advisory; indicate swift currents, don't pass close to piers, be alert for outdrafts, report hazardous conditions to Coast Guard
		Rising	3.5 mph	High Current	Watch	Issue advisory; indicate swift currents, don't pass close to piers, be alert for outdrafts, report hazardous conditions to Coast Guard. Discuss voluntary horsepower and tow size restrictions
		Rising	4.0 mph	Very High Current	Action	Activate pre-established RNA limiting upbound transits to minimum of 3.0 mph; downbound transit to 300 hp/loaded barge, 250 hp/empty barge
		Rising	4.5 mph	Very High Current	Action	Activate pre-established RNA limiting upbound transits to minimum of 3.0 mph; downbound transit to 300 hp/loaded barge, 250 hp/empty barge, daylight transit only
		Rising	5.0 mph	Very High Current	Action	Implement Safety Zone prohibiting traffic
		Falling	5.0 mph	Very High Current	Recovery	Cancel Safety Zone. Re-establish RNA limiting upbound transits to minimum of 3.0 mph; downbound transit to 300 hp/loaded barge, 250 hp/empty barge, daylight transit only
		Falling	4.5 mph	Very High Current	Recovery	Re-establish RNA limiting upbound transits to minimum of 3.0 mph; downbound transit to 300 hp/loaded barge, 250 hp/empty barge
		Falling	4.0 mph	High Current	Recovery	Cancel RNA. Issue advisory; indicate swift currents, don't pass close to piers, be alert for outdrafts, report hazardous conditions to Coast Guard
		Falling	3.0 mph	Normal Operations	Recovery	Issue final advisory, indicate return to normal operations, report hazardous conditions to Coast Guard

Section 5 – Risk Assessment

Insert the completed risk assessment to include the "Casualty History by Location" and "Risk Factors" pages.

Things to Avoid

1. Do not include a historical account of high water events in your area.

2. Do not overanalyze casualty data. Instead, use the data to identify problem areas and develop mitigating strategies.

Standardized Terms

Standardized terms and definitions are provided in Enclosure (1). These definitions should be used when necessary to avoid confusion between plans.

Continuum of Control Measures – Suggestive vs. Prescriptive:

In developing the Continuum of Control Measures as described in the Navigation Workgroup Guidance and Waterway Specific Annex Format (relevant documents from the old D8 (m) website are saved in the D8(dw) public folder to be added as needed. This link will be changed). document, careful consideration should be given as to whether or not certain actions are to be suggestive or prescriptive. A suggestive action is one that has no regulatory requirement associated – for example, at a certain river condition, vessel operators should consider limiting tow sizes. A prescriptive action is one that is associated with a regulatory requirement and is mandatory upon implementation – for example, at a certain river condition a regulated navigation area is activated that limits tow size to a predetermined number.

The USCG and USACE have the legal authority to create and implement prescriptive actions. However, in developing the regulations needed to implement a prescriptive action, flexibility should be built into the regulation that allows for deviation in certain situations. For example, per the plan, a regulated navigation area (prescriptive action) is activated when a river reaches a certain condition. However, if the river barely reaches the level where a regulated navigation area would be utilized, and the predictions are for that condition to exist for only a short period of time, the regulatory agency can opt not to activate the regulated navigation area.

Barge Fleeting:

Navigation Workgroups should address barge fleeting operations when developing the "Action Plan" (Section 4) of the Waterway Specific Annex. Consideration should be given as to whether or not suggestive or prescriptive measures should / are to be taken.

Existing Prescriptive Actions:

33 CFR 165.803 – Mississippi River RNA (miles 88.0-240.0)

33 CFR 165.810 – Mississippi River RNA (miles 233.0-Southwest Pass)
33 CFR 165.815 – Ohio River at Louisville, KY, RNA (miles 603.5-604.4)
33 CFR 165.817 – Arkansas River at Little Rock, AR, RNA (miles 118.2-125.4)
33 CFR 165.821 – Ohio River at Cincinnati, OH, RNA (miles 466.0-473.0)
33 CFR 161.30 – VTS Louisville (miles 606.8-593.0)