REGION 6 REGIONAL RESPONSE TEAM (RRT)
SUMMER, 2011 MEETING -- Little Rock, AR

MONDAY, JUNE 13, 2011 1430 – 1700 Executive Committee Meeting

TUESDAY, JUNE 14, 2011

0830 – 0900	Introduction / Welcome/Administrative Notes (RRT 6 Co-Chairs) / Approval of December, 2010 Meeting Minutes	CAPT James Hanzalik/ Chris Petersen, EPA
0900 – 0945	Committee Reports Executive – Steve Mason, EPA Response – Chris Petersen, EPA	Preparedness -- Karolien Debusschere, LOSCO Science & Technology – Michael Baccigalopi, TGLO Industry Work Group (IWG) -- John Temperilli
0945 – 1015	ISPR Review/Impact to RRT	Greg Pollock, TGLO
1015 – 1030	BREAK	
1030 – 1050	Sub-Surface Dispersant Injection (technology and Industry perspective)	Mike Drieu, Wild Well Control
1050 – 1130	EDRC Calculation and Response & Future Planning Impacts	Mike Crickard, USCG NSFCC
1130 – 1300	LUNCH	
1300 – 1400	NLE 11 Exercise – Lessons Learned	Federal Agency Reps, ADEM, ADEQ
1400 – 1430	HSPD-8 Review of 2011 revision	John Temperilli
1430 – 1500	ERMA & COP & New NOAA Disaster Response Center	Charlie Henry, NOAA
1500 – 1515	BREAK	
1515 –1600	State Agency Reports	
1600 – 1630	Defining the Role of Toxicity Monitoring in Oil Spill Response Activities	Gina Coelho, EM & A
1630 – 1715	Bioremediation Technology	Claude Klein, LA BioEnvironmental Services
1715 – 1730	FEMA's New PLAN System	Mike Goldsworthy, FEMA

REGION 6 REGIONAL RESPONSE TEAM (RRT) 2011 SUMMER MEETING -- LITTLE ROCK, AR

WEDNESDAY, JUNE 15, 2011

0800 – 0930	USCG Captain of the Ports Reports	USCG Captain of the Ports
0930 – 0945	BREAK	
0945 – 1015	Salvage & Marine FF Requirements	Joe Leonard, USCG
1015 - 1045	In-Situ Burns Efficacy & Review for DWH	LTJG Crystal Barnett, USCG Gulf Strike Team
1045 – 1130	USGS Water Science Center Flood Warning System	Jaysson Funkhouser, USGS Little Rock
1130 – 1245	LUNCH	
1245 – 1315	Safety Issues During DWH – Lessons Learned	Dean Wingo, OSHA
1315 – 1345	Booming Efficacy Review During DWH	Joe Leonard, USCG
1345 - 1400	BREAK	
1400 – 1515	Federal Agency Reports / LA River Flooding Event	Federal Agency Reps
1515 – 1530	Closing Remarks	CAPT James Hanzalik / Chris Petersen, EPA

Deepwater Horizon
Incident Specific Preparedness Review
Important Findings

Regional Response Team Meeting

Little Rock, Arkansas

June 14-15, 2011

About the ISPR

- Created by USCG Commandant Robert Papp on June 14, 2010
- In thirty plus years only five ISPRs have been stood up
- Membership included States (Texas, Alabama, Mississippi, Maine, Alaska), Federal (DHS, USCG, EPA,DOI, MMS, NOAA , private sector (API, SCAA) and NGOs (Ocean Conservancy) – 14 total members
- Lead by retired VADM Roger Rufe (chairman) and RADMR retired Carl Moore (vice)
- Affiliated with the President's National Commission

ISPR Charter Highlights

- Review and examine the implementation and effectiveness of the response within confines of the NCP, ACP, OSRP and VRP
- Evaluate the intersection of the NCP with the NRF and HSPD 5
- Review response and recovery operations
- Review strengths and weaknesses of the preparedness system
- Evaluate the effectiveness of the FOSC and NIC, and communications with key federal, state and local partners

ISPR Limitations

- Did not investigate the cause of the explosion, nor identify fault, blame or violation of federal or state law
- No attribution given to individual interviewees
- Names of interviewees listed in appendix

General Findings

- The OPA 90 response structure under the NCP was fundamentally sound
- The size and duration of the incident magnified shortcomings in dealing with a SONS
- The intensity of political demands was unprecedented and unanticipated
- Difference between the NCP and the NRF was a major issue affecting relationships outside the traditional response community
- Oversight of preparedness and response has been lax for years

General Findings (cont)

- Effective Crisis Management is not a core competency
- USCG structure is not optimum for sustaining a long-term response campaign
- NRT should develop a comprehensive dispersant use policy
- Toxicological effects of dispersants needs to be better understood and rigorous testing conducted
- RRTs should update pre-authorization protocols for dispersant use and specify limitations
- USCG needs a comprehensive response MOU with states

General Findings (cont)

- USCG should establish a formal process for capturing lessons learned; review lessons learned; and incorporate them
- SONS exercises should be elevated to a Tier 1 Level National Exercise and involve the NIC and PFO

Area Committee Related Findings

- USCG needs to provide top-down direction for minimum requirements, standardization, and review of all coastal area plans
- Expand Area Committee representation
- Meet more frequently and regularly
- USCG should engage in active outreach to local governments
- States should co-chair the Area Committees with the USCG

Area Contingency Plan Findings

- WCD scenarios for offshore operations need to be incorporated into ACPs
- Regional Contingency Plans (like our One Gulf Plan) need to be developed or enhanced and made part of the contingency planning continuum
- Active outreach needs to be undertaken to broaden participation in contingency plan development
- Standards for OSRPs need to be improved
- Additional funding should be secured to enhance plans

"If you are going to play on game day, you have to come to practice."

Doug Suttles

Subsea Dispersant Injection Technology and Industry Perspective

Mike Drieu
Wild Well Control Inc
RRT 6 Meeting
June 2011

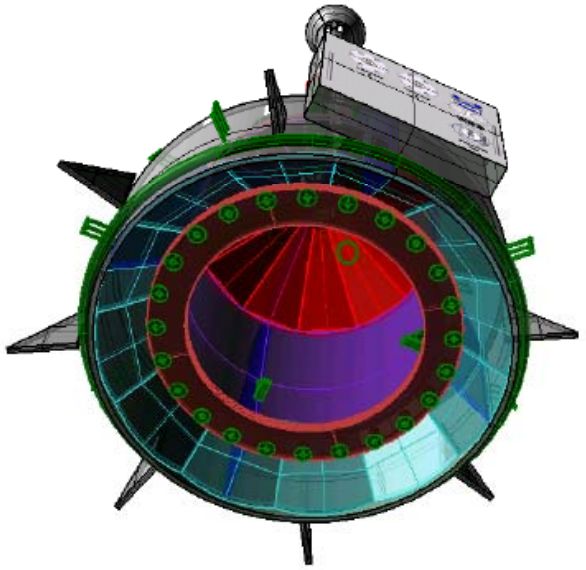
History

- “One of the more promising solutions for dealing with a deep water out-flow of oil is to mix the oil with dispersant at the source. Experiments (Westergaard, 1987) indicate that this way of dealing with the problem could be a practical and cost effective method. Only 1% by volume dispersant might be sufficient in order to treat the oil due to the good mixing which will be a result from the violent and turbulent fluid stream. Technical devices and methods to inject the dispersants are not available and a number of technical hurdles can be foreseen. The major hurdle is the method and apparatus for delivering the dispersion to the plume.”

Section 7.2, Oil Spill Containment, Remote Sensing and Tracking For Deepwater Blowouts: Status of Existing and Emerging Technologies, PCCI August 1999, MMS funded study

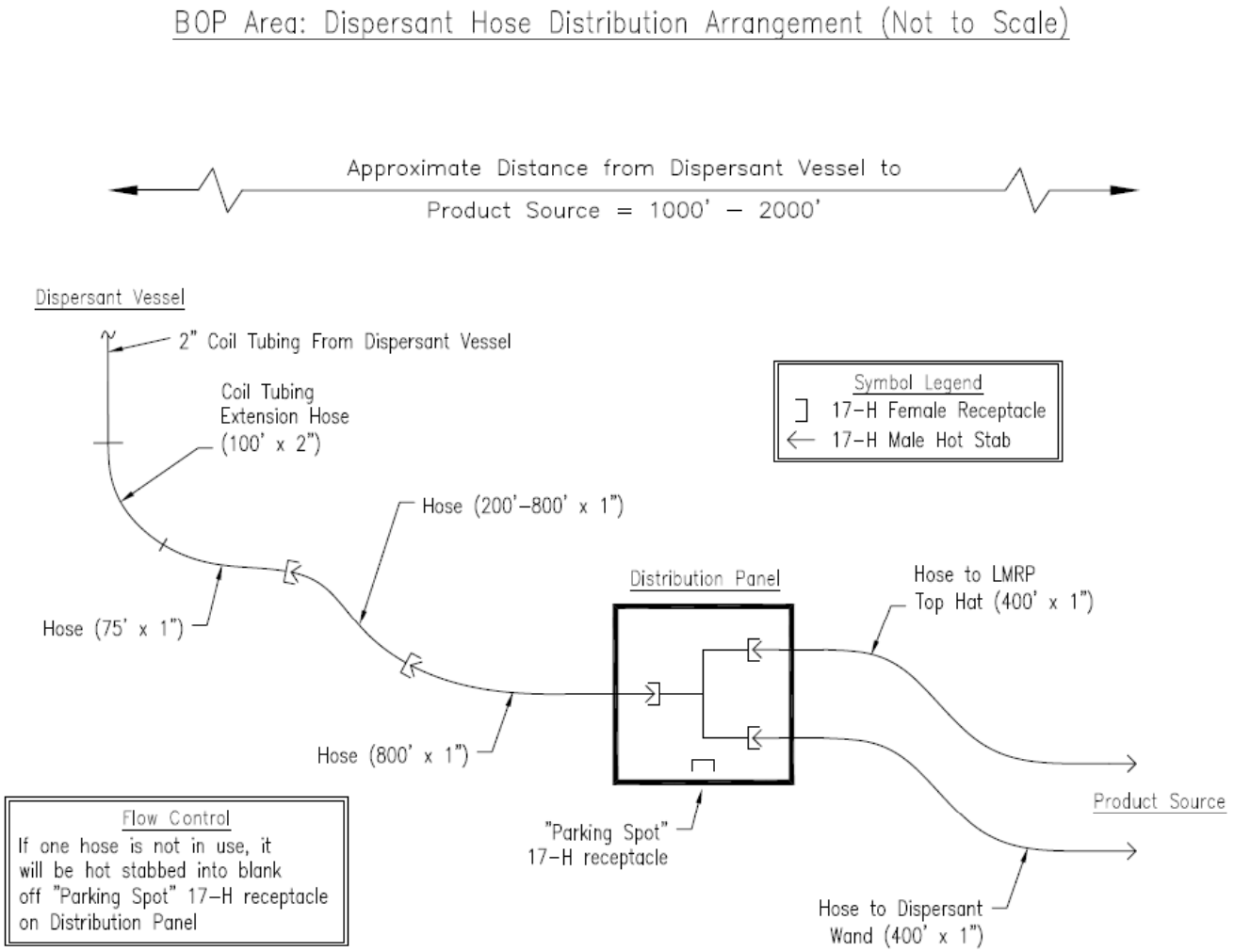
What is Subsea Dispersant Injection?

- First time used for a blowout or subsea use
- Does not spray over a large area like surface or aerial application
- Inject dispersants at the source of the hydrocarbons release
  - Into BOP
  - Into ruptured riser
  - Into dispersant ring on Top Hat



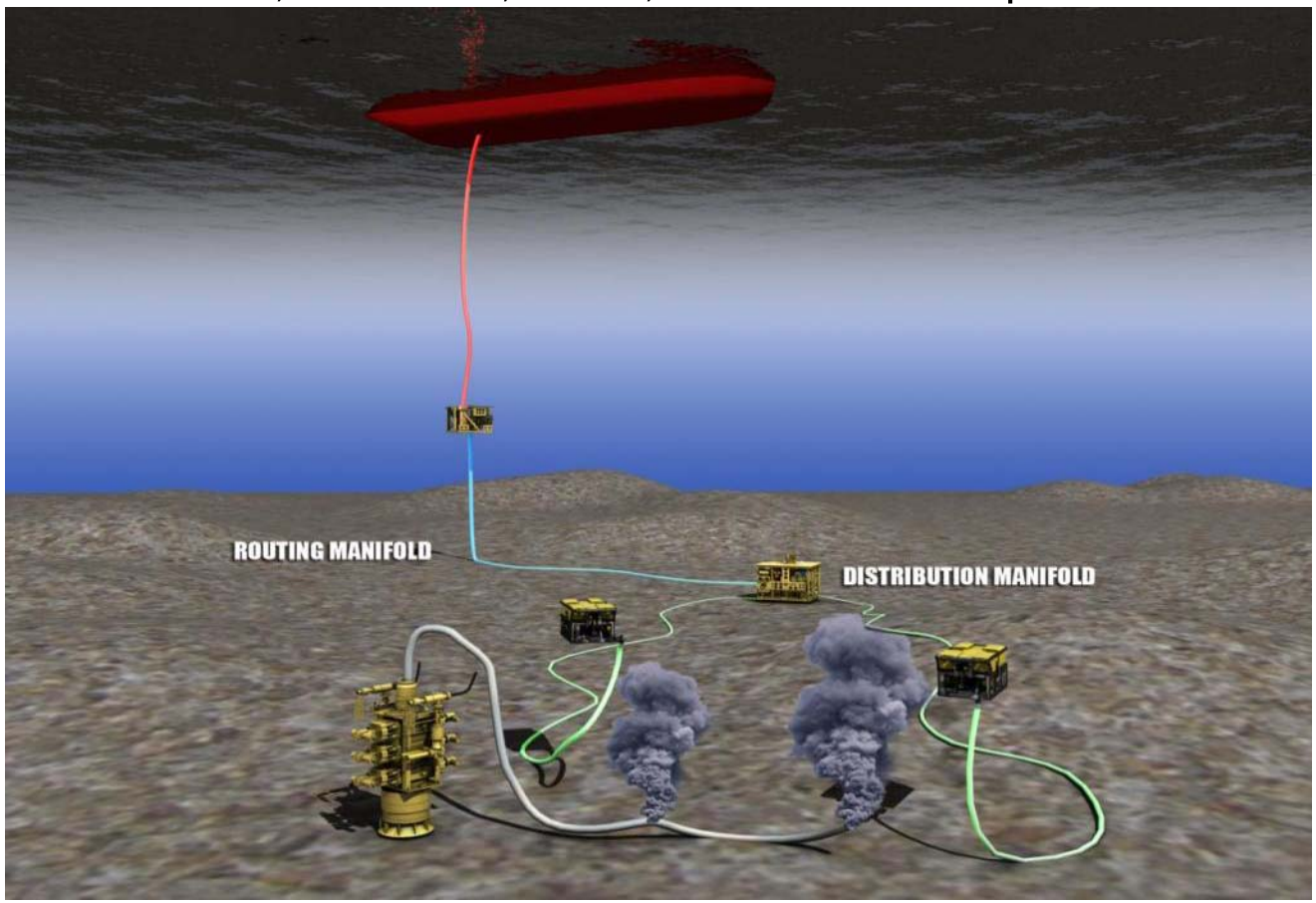
Subsea Dispersant Injection Systems

- System used on Macando



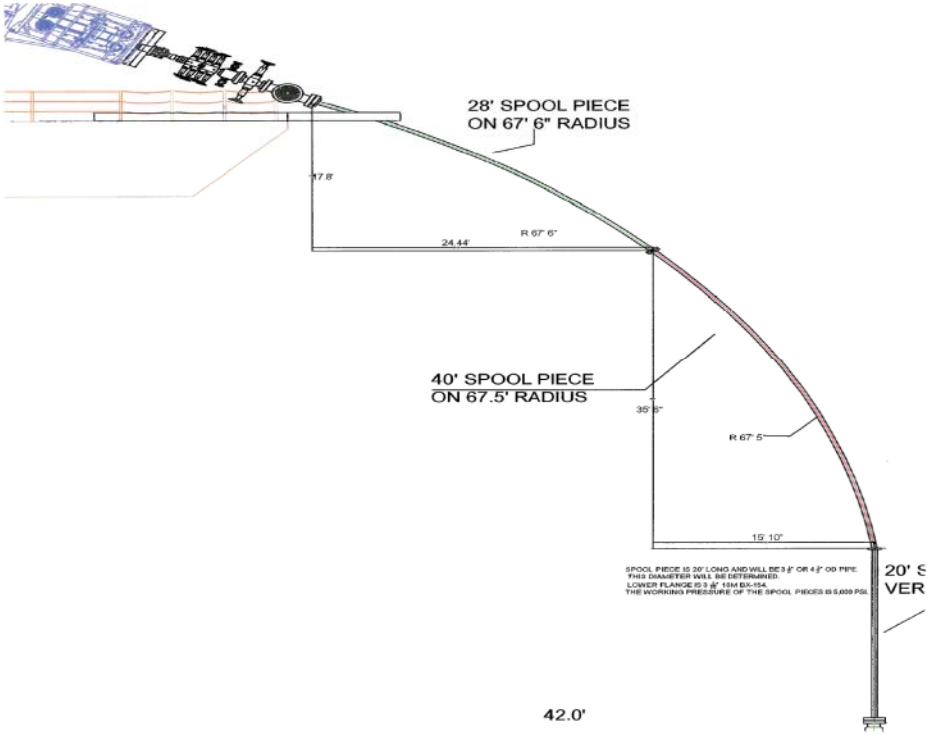
Subsea Dispersant Injection Systems

- WWC system
  - DNV verification, mid level, to 10,000 ft water depth



Subsea Dispersant Injection Systems

- Other systems
  - SADE system: developed during Macando but not used
    - Intended for use during hurricanes if vessels vacate area
    - Stores disperant in bladders for x amount of days
  - Coil tubing based systems to pump from deck to source



Existing Policies

- Macondo set precedence for existing policies for subsea dispersants use
  - RP request use of subsea dispersants to FOSC
    - Justification for use: Safety and Pollution Mitigation
    - Safety: VOCs and LEL exceeded safe working limits
      - VOCs: 100-400 ppm (wear full face mask with cartridges if over 50 ppm
      - LEL: 15-20 % (in explosive range)
  - RRT convenes and approves with the following parameters:
    - Limitation of 15,000 gallons per day
    - **Monitoring guidelines - KEY PART OF APPROVAL AND GUIDANCE**

Existing Policies

- PART I - Proof of Concept - Data Collection Requirement
  - Towed Fluorometer at 1 meter
  - LISST Particle Analysis at various intervals from surface to 550 meters
  - Dissolved Oxygen at various intervals from surface to 550 meters
  - CTD -- Conductivity, Temperature, and Depth at various intervals from surface to 550 meters
  - Water sampling from surface to 550 meters for PAH analysis
  - Aerial Visual Observation, weather permitting
- PART 2 - Characterization Plan - Data Collection Requirement
  - Cast Fluorometer - surface to sea floor
  - LISST Particle Analysis at various intervals from surface to sea floor
  - Dissolved Oxygen at various intervals from surface to sea floor
  - CTD – Conductivity, Temperature, and Depth at various intervals from surface to sea floor
  - Water sampling from surface to 550 meters for PAH analysis
  - Aerial Visual Observation
  - Rototox toxicity testing
  - UV-Fluorescence testing to meet objectives in Appendix A
- PART 3 - Subsurface Injection of Dispersant - Parameter Requirements
  - Type of dispersant to be used
  - Rate of dispersant injection
  - Process for monitoring pumping rate
  - Procedures for FOSC to start and stop injection

Subsea Dispersants Use - Before and After

- Before
  - Used fire-fighting vessels to spray water and suppress VOCs and LELs
  - Crew wear full face masks with cartridges

Subsea Dispersants Use - Before and After

- After
  - Crew did not have to wear any respiratory PPE do to zero or very low readings
  - Water clear within a day
  - Less oil to clean on the surface

Where Do We Go From Here?

- BOERME NTL 2010-10 requires subsea dispersant injection capability to obtain a drilling permit
- NRT provide interim subsea dispersant use guidelines
  - Current guidelines follows more of a NRDA assessment instead of monitoring for efficacy as with current SMART protocol
  - Balance between Safety, Clean Water Act and NEBA
- RRT 6 engage with industry thru Industry Work Group
  - Proven record for government-industry solutions
  - Helped develop FOSC pre-approval guidance
  - Helped develop FOSC expedited approval for near shore disperants
  - Helped develop in situ burn, bioremediation, surface washing guidance

Where Do We Go From Here?

- Engage with other industry organizations
  - API initiated a Subsea Dispersant Joint Industry Task Force (JITF)
    - **Project Objectives:**

    Overall: Conduct research and development on subsea injection of dispersants to provide optimal implementation methods, data on effectiveness, and potential environmental effects focus is ice-free open-water environments
      - **Effectiveness:** develop subsea injection methods / equipment and evaluate effectiveness
      - **Fate and effects:** evaluate the biodegradation, bioaccumulation, and toxicity of dispersed oil on deepwater communities
      - **Modeling:** enhance existing numerical tools to track dispersed oil plumes resulting from subsea injection
      - **Monitoring:** evaluate field monitoring criteria and provide a recommended monitoring plan (includes near, mid, far field monitoring)
        - Surface dispersant ratio 20:1, actual use subsea 100:1
      - **Project communication:** Conduct Net Environmental Benefit Analysis and perform regulatory outreach
  - Engage with EPA, Coast Guard, NOAA, science community, Universities
  - POC: Tim Nedwed, ExxonMobil, Upstream Research

    tim.j.nedwed@exxonmobil.com

    713-431-6923 – work phone

Where Do We Go From Here?

- Observations and Recommendations
  - If an event occurred tomorrow, would current guidance from Macando be the path forward, or would stricter guidance be implemented?
  - Current dispersant supplies are limited and will compete with surface dispersant supplies
  - Industry has not been involved with any formal discussions or policy development
  - To revitalize Industry Work Group in RRT 6, a project like this could help bridge and mend industry relationships
    - ADM Papp is promoting partnerships as part of guiding principles
  - Safety and NEBA needs to be linked for policy development
    - Use of subsea dispersants is a response tool for both objectives

Any Questions?

Mike Drieu
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U.S. Coast Guard
National Strike Force
Coordination Center

Effective Daily Recovery Capacity

Mike Crickard

NSFCC Logistics Management Specialist

Homeland Security

Determining EDRC

- **Plan Holders**
  - Meet AMPD, MMPD, & WCD planning criteria

- **Three ways of determining:**

  - R = T X 24 X E

  - Actual verified performance data in spill conditions (e.g. – actual spill)

  - R = D X U (tested to ASTM standard)

Current Industry Practice for Skimmer Nameplate Capacity

- **Arbitrarily set by manufacturer**
- **Typically - Discharge rating of its offload pump**
- **Nameplate rating – *Does not* take into account the ability of a skimmer, as a system, to recover oil under actual spill conditions**
- **Without test data - USCG derates nameplate capacity by 80% or more to determine EDRC**

EDRC Primary Formula

$$EDRC_1 = T \times 24 \times E$$

Where: $EDRC_1$ **is in bbl/d**

T = throughput rate (or oil recovery rate) in bbl/hr, based on the skimmer nameplate capacity, as provided by the manufacturer

24= based on 24 hour working day

E = the efficiency factor (e.g.: 0.2), which may vary depending on potential limitations

EDRC Based on Actual Spill

- **Vessel or Facility Plan holder or OSRO will have to provide “adequate evidence that a different EDRC should be applied”**

- **Adequate evidence = actual verified performance**

EDRC Alternative Formula

$$EDRC_2 = D \times U$$

Where: $EDRC_2$ **in bbl/d**

D = the average Oil Recovery Rate (bbl/hr) as determined through acceptable alternate means

U = typically 10 hours per day (hr/d)

Questions or Comments

Presidential Policy Directive/ PPD-8 Update

Region VI RRT Meeting

Little Rock, AR

June 14, 2011

John Temperilli – Industry Work Group

- **Presidential Directive - March 30, 2011**
- Subject: National All-Hazard Preparedness
- Aim: Strengthen U.S. Security and Resilience
- Intents: Galvanize Federal Government action
- Facilitate an integrated, All-of-Nation, capabilities-based approach to preparedness cutting across prevention, protection, mitigation, response & recovery
- Develop a National Preparedness Goal and a National Preparedness System to achieve that goal

- DHS Secretary is responsible for cordinating domestic all-hazards preparedness efforts of all executive departments and agencies, in consultation with ……
- Will report through the Assistant to the President for Homeland Security (John Brennan)

- Directive replaces Homeland Security Presidential Directive (HSPD-8), HSPD-8 Annex I (except for paragraph 44 of HSPD-8 Annex I).

- **HSPD 8 Annex 1 Section 44**
- **Conforming Amendments to HSPD-5**
- **44. HSPD-5 (Management of Domestic Incidents) of February 28, 2003 is amended as follows:**
- Striking "prevent, prepare for, respond to, and recover from" in section 3 and inserting "prevent, protect against, respond to, and recover from";
- After "coordinating Federal" in section 4, inserting "preparedness activities and", and striking "prepare for";
- Striking "preventing, preparing for, responding to, and recovering from" in section 7 and inserting "preparedness and activities to prevent, protect against, respond to, and recover from";
- Striking "prevention, preparation, response, and recovery from" in section 10 and inserting "preparedness and activities to prevent, protect against, respond to, and recover from";
- Striking "prepare for," in section 12 and inserting "protect against,";
- Striking "prevention, preparedness, response, and recovery plans" in section 16 and inserting "prevention, protection, response, and recovery plans for use during an impending or actual incident"; and
- Striking "prevention, preparedness," in section 18 and inserting "preparedness and operational prevention, protection,".

- Nothing in the Directive is intended to alter or impede the ability to carry out the authorities of executive departments and agencies to perform their responsibilities under law.
- (Specifically mentions the Post Katrina Management Reform Act of 2006, and its assignments of responsibilities to FEMA administrator.)

- Not intended to interfere with the authority of the Attorney General or the Director of the FBI (DOJ)
- Not intended to limit the authority of the Secretary of Defense or the allocation of DOD resources

National Preparedness Goal

- Address specific threats and vulnerabilities (accounting for regional variations)
- Include concrete, measurable, prioritized objectives to mitigate risk
- Define core capabilities to address incidents posing the greatest risk

National Preparedness Goal

- Emphasize achieving integrated, layered, All-of-Nation preparedness approach
- Based upon existing doctrine and policy, and reviewed regularly

National Preparedness System

- An integrated set of guidance, programs and processes that will enable the nation to meet the National Preparedness Goal
- Guidance for the domestic efforts of all levels of government, private, non-profit and citizens groups

National Preparedness System

- Guidance for planning, organization, equipment, training, and exercises.
- All-of-Nation approach for building and sustaining a cycle of preparedness over time.
- Includes a pyramid of support structures – Integrated National Planning Frameworks, Interagency Operational Plans, Department Level Operational Plans

- National Preparedness Goal
- National Preparedness System
- Integrated National Planning Framework
  - Interagency Operational Plan
  - Department Level Operational Plan

Timeline

- Within 60 Days (End of May) - Submittal of Implementation Plan for National Preparedness Goal and National Preparedness System w/ Departmental responsibilities and timelines

Timeline

- Within 180 Days (end of Sept.) – DHS Secretary submits National Preparedness Goal to POTUS. "The Secretary shall coordinate this effort with other executive departments and agencies, and **consult** with State, local, tribal, and territorial governments, the private and nonprofit sectors, and the public."

Timeline

- Within 240 Days (End of November) – DHS Secretary submits a description of the National Preparedness System to POTUS. "The Secretary shall coordinate……,, and consult……."

Timeline

- Within 1 Year (end of March, 2012) – DHS Secretary will submit the first National Preparedness Report to POTUS. Report will be submitted annually to inform budget preparation. "The Secretary shall coordinate this effort….., and consult……."

Questions?

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RRT VI - Industry Work Group

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Boom Efficacy During the DEEPWATER HORIZON Response

LCDR Joseph J. Leonard, Jr.
Chief-Planning & Readiness
USCG Sector Houston-Galveston

Homeland Security

Overview

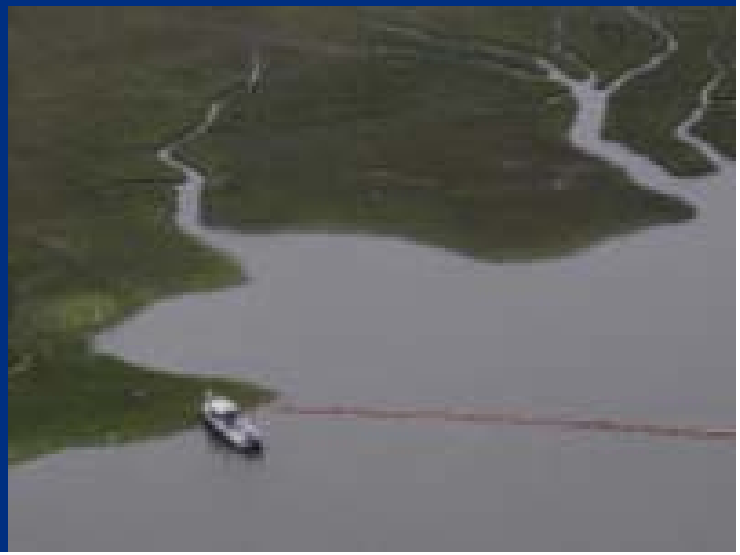
- Boom Selection
- Responder Skill Sets
- Boom Utilization
- Site Specific Discussion

Boom Selection

- Type of product to be contained.
- Operating conditions (wind, wave height, current, tides, etc.).
- Logistical requirements for deployment and availability of manpower.
- Compatibility with other types of boom.
- Local access points for recovery equipment.
- Anchoring locations ashore and in the water.

Boom Selection

- Buoyancy of the boom.
- Freeboard height and skirt depth.
- Visibility in daylight.
- Ease to transport, assemble, deploy and retrieve.
- Presence of debris and recovery capabilities.



Where Boom Doesn’t Work

- On land
- In bird rookeries
- Underwater
- Adrift

Responder Skill Sets

- Strike Team / OSRO–Advanced
- USCG/State/Local Responders—Basic-Intermediate
- VOOs/Volunteers—Questionable

Containment Techniques

- Exclusion booming
- Diversion booming
- Containment booming
- Sorbent boom
- Sorbent barriers

Exclusion Booming

- Used to exclude spilled oil from impacting environmental or historical sensitive areas, water intakes, and private property.
- Quantity needed and placement will depend on geography and weather conditions.

Bird Rookeries

Diversion Booming

- Used to minimize the impact of oil in strategic locations and to direct its flow elsewhere.
- Most effective when current is < .7 knots and waves are negligible.
- Quantity needed and placement will depend on geography and weather conditions.

Diversion Boom Deployment

- **Chevron Pattern**—the boom is angled in a chevron or inverted V-pattern so that all floating oil and debris is deflected to either side of the stream.
- **Cascading Pattern**—varying lengths of boom are progressively staggered along the watercourse so that the oil is directed to one side of the watercourse.

Boom Staging

Boom Deployment

Boom Deployment

Anchors

- Laying them with boom
- Lifting boom without them
- Relocating/recovering them
- Wishing you had nothing to do with them

Containment Booming

- Deployed in a U or V shape to direct flow of oil to recovery resource, such as a skimmer.
- Quantity needed and placement will depend on geography, weather conditions, and quantity of oil to be recovered.

Containment Booming

- Often used in combination with skimming resources.
- When used in sheltered waters, containment booms is often anchored to the bottom. Ensure anchoring systems take into consideration current direction, velocity, and tidal shifts.

Hard Boom

Sorbent Booming

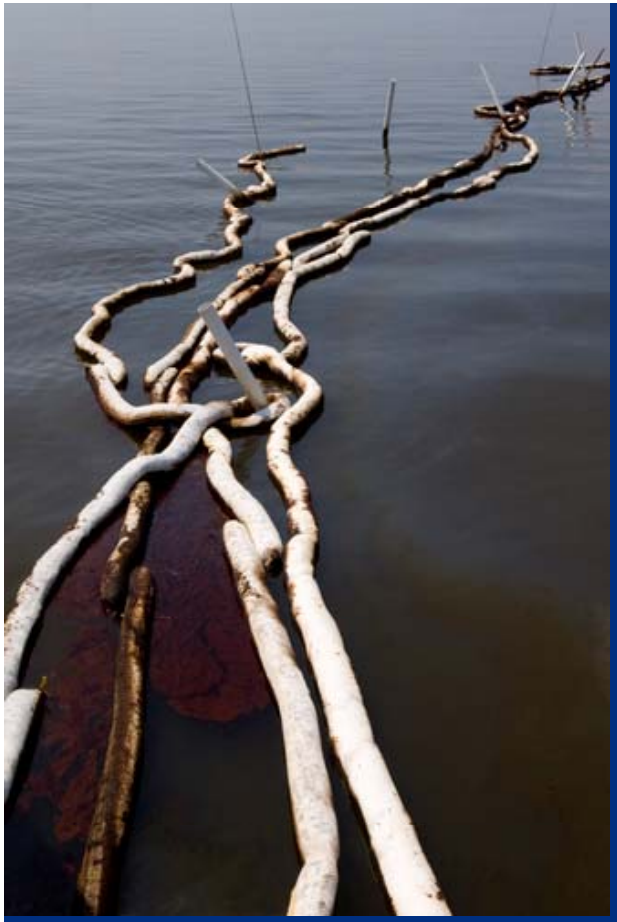
- Boom is composed of sorbent material (primarily adsorbent).
- Usually deployed along shoreline to protect sensitive areas or to keep heavier, emulsified oils from spreading.
- May be used in concert with conventional boom to better control oil slicks.
- Primarily used in quiet waters that are not heavily contaminated.

Sorbent Barriers

- Usually constructed of wire mesh, stakes, and loose sorbent materials.
- Often deployed across a waterway or outfall.
- Allows water to flow through it but it retains and absorbs oil on the water's surface.
- Primarily used in small, low-velocity streams, tidal inlets, and channels.


TEXAS

Sorbent Boom



Marsh Flushing

Fire Booms

Used to contain oil in strategic location to facilitate in situ burning. Quantity needed and placement will depend on geography, weather conditions, and quantity of oil to be burned.

Improvised Booms

- Used to control relatively small spills that occur in sheltered waters or as a temporary measure until more suitable boom is available. Examples include:
  --Inflated fire hose
  --Telephone poles
  --Logs
  --Linked railroad ties
  --Pipes
  --Barges
  --Earthen dams

Improvised Booms Uses

- To divert oil to an area where commercial boom is already deployed.
- To collect debris and protect the main containment boom.
- Good in streams or ditches that are too shallow or too narrow for conventional boom.
- Remember that oil can readily spill over the top or in between sections of improvised boom.

Barge Booms

Pipe Booms

Boom Recovery

Boom Washing


www.hotzone.org
TEXAS

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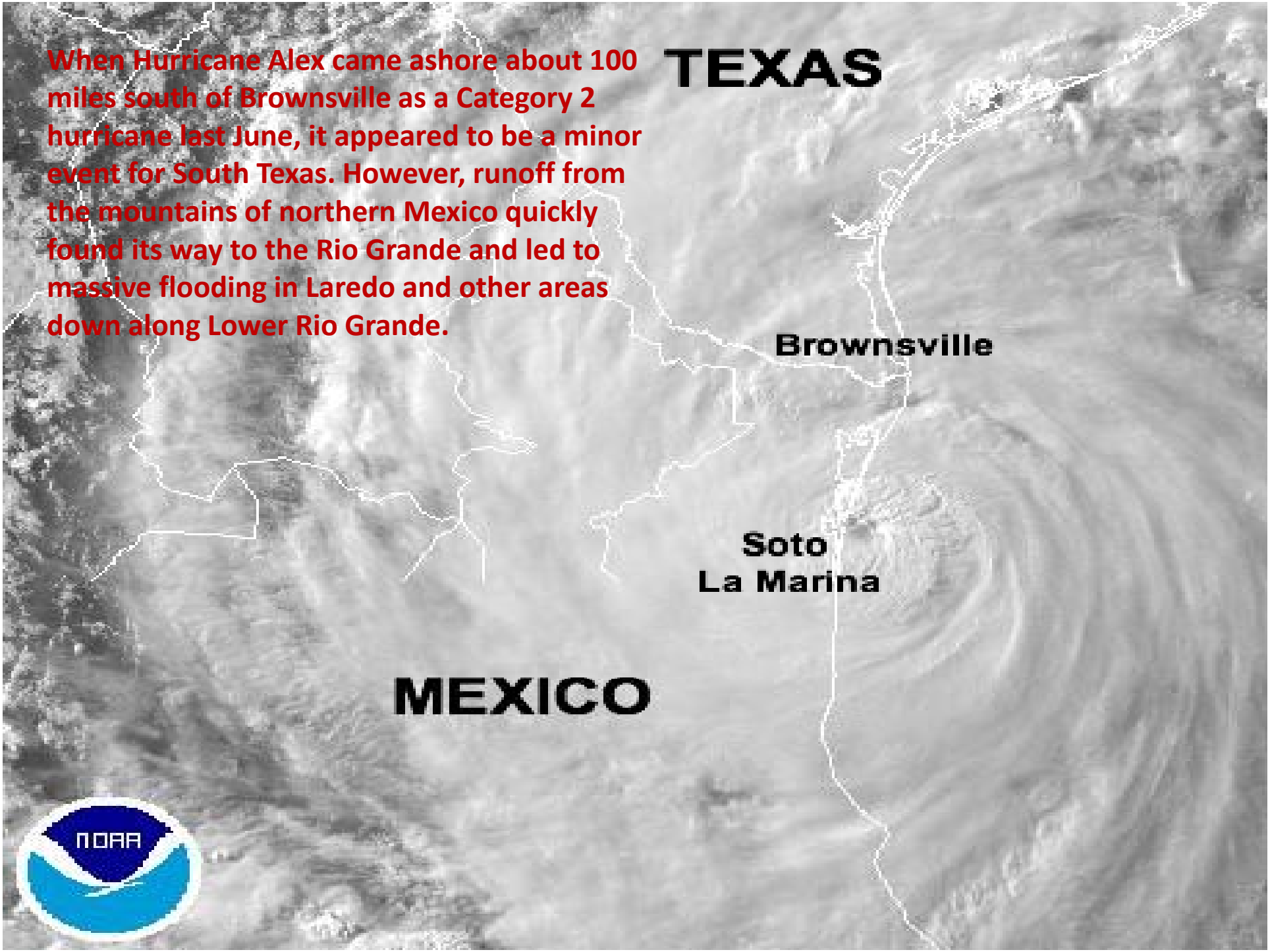
Homeland Security

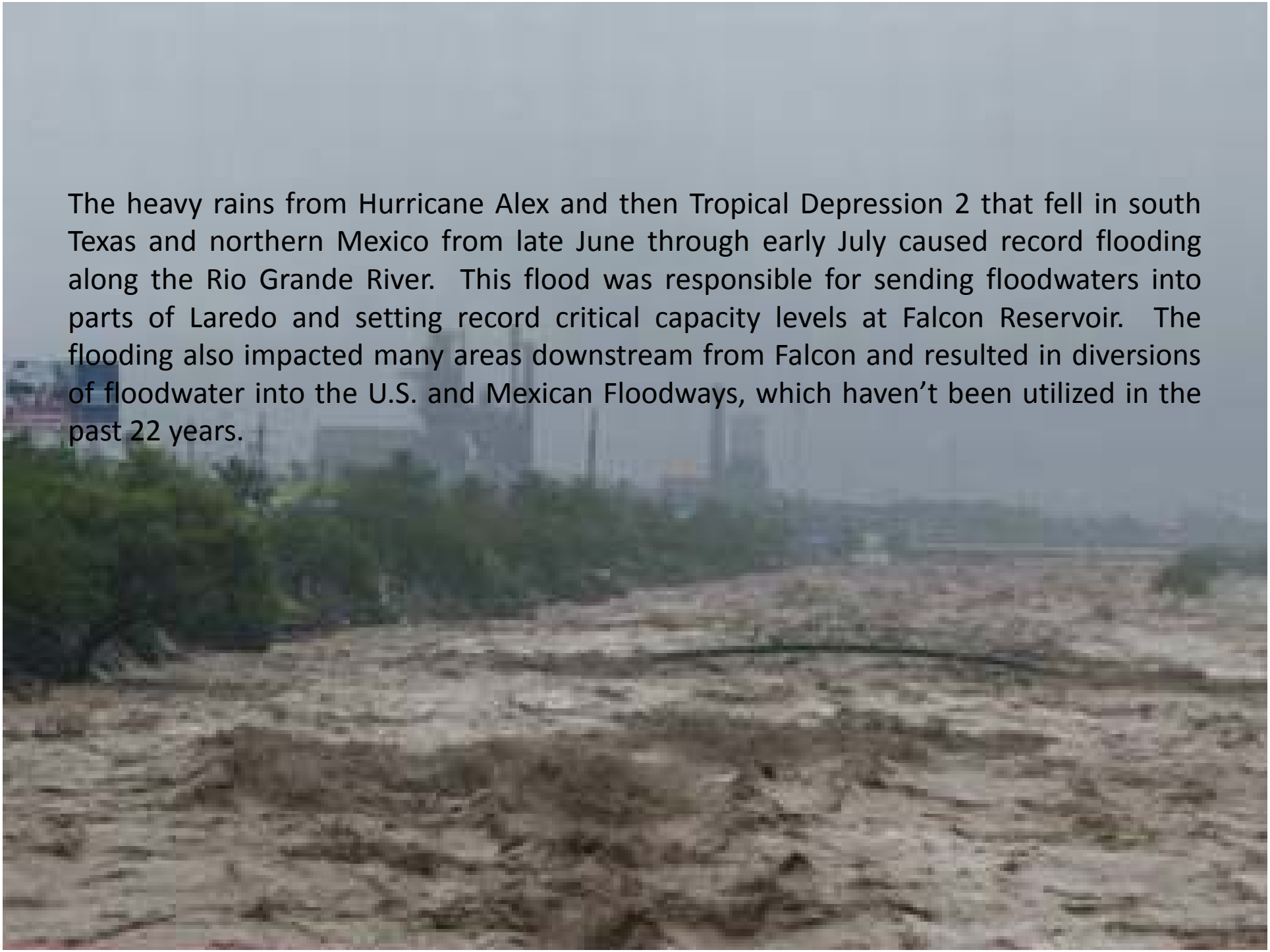
Texas Commission on Environmental Quality Hurricane Preparedness Meeting
June 10, 2011

Agenda

- 1. Welcome and Introductions
- 2. Review of 2010 Hurricane Season
  - a. Hurricane Alex and Flooding along the Rio Grande River
- 3. Predictions for 2011 Hurricane Season
- 4. Update from the Texas Division of Emergency Management (TDEM) 2011 Emergency Management Council Hurricane Preparedness Workshop
- 5. TCEQ Plans and Responsibilities for 2011 Hurricane Season
  - a. TCEQ's New "All Hazards" Response Plan, Hurricane Plan and Debris Management Plan
  - b. TCEQ Hurricane Communication Plan
  - c. TCEQ Incident Action Plan (IAP) – Pre/Post Landfall
  - d. National Incident Management System (NIMS)
    - I. TCEQ ICS for Hurricane Response
    - II. NIMS ICS Training
  - e. TDEM Rapid Response Task Force Teams
    - I. Team Texas (Heavy Team) San Antonio
    - II. Light Teams
      - Team Austin
      - Team Waco
      - Team Dallas
  - f. TCEQ Regional Incident Support Teams (ISTs)
  - g. TCEQ Mobile Response Team/Strike Team
    - I. Team Update
    - II. Review of Team Equipment and Capabilities
  - h. Response Manager Database
- 6. TCEQ Tasks by Timeline on the TDEM H-120 Hurricane Matrix
- 7. TCEQ Coordination with Texas Military Forces
  - a. New JTF 71st Homeland Response Force
  - b. Texas 6th Civil Support Team (CST)
- 8. Cost Recovery Issues
  - a. Using ICS 214 Forms
  - b. TCEQ "Vehicle Monthly Use" Report
  - c. Using PCA Numbers
- 9. Questions?

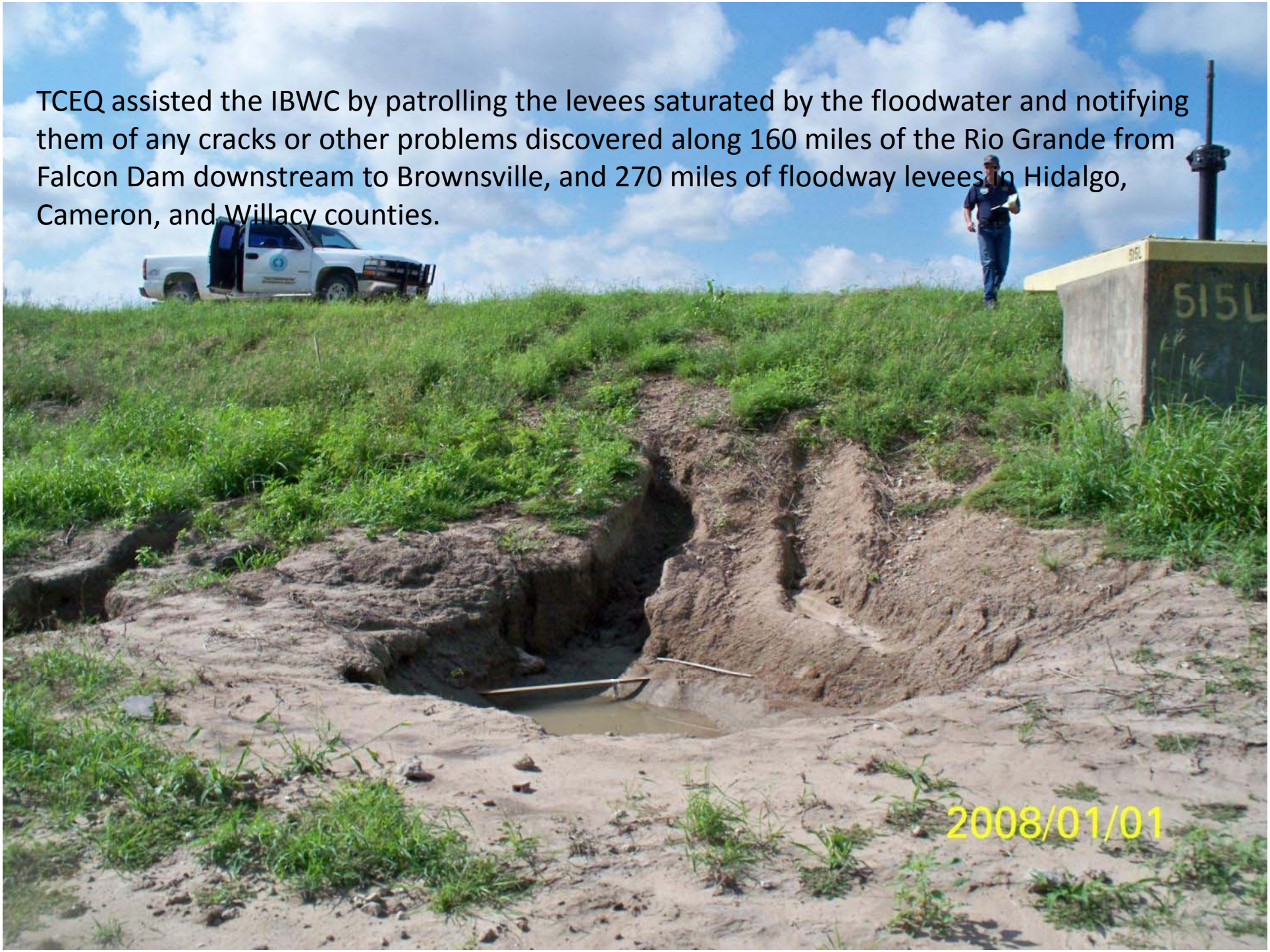
The call-in number is: 866-456-0016, meeting ID *3480647* (dial the asterisks)


When Hurricane Alex came ashore about 100 miles south of Brownsville as a Category 2 hurricane last June, it appeared to be a minor event for South Texas. However, runoff from the mountains of northern Mexico quickly found its way to the Rio Grande and led to massive flooding in Laredo and other areas down along Lower Rio Grande.
TEXAS
Brownsville
Soto
La Marina
MEXICO
NOAA



The heavy rains from Hurricane Alex and then Tropical Depression 2 that fell in south Texas and northern Mexico from late June through early July caused record flooding along the Rio Grande River. This flood was responsible for sending floodwaters into parts of Laredo and setting record critical capacity levels at Falcon Reservoir. The flooding also impacted many areas downstream from Falcon and resulted in diversions of floodwater into the U.S. and Mexican Floodways, which haven't been utilized in the past 22 years.

Flood at Laredo looking up stream from bridge No. 1.

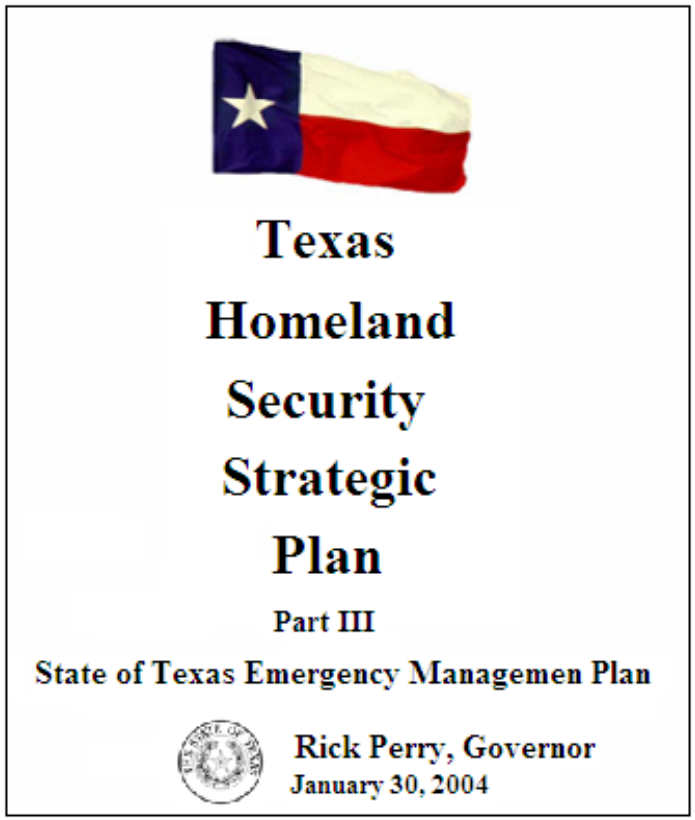


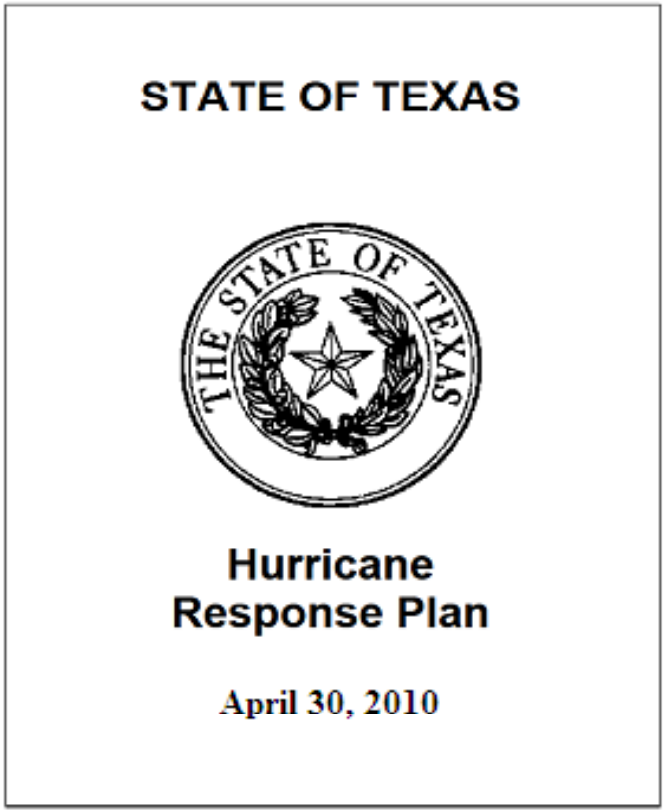
TCEQ assisted the IBWC by patrolling the levees saturated by the floodwater and notifying them of any cracks or other problems discovered along 160 miles of the Rio Grande from Falcon Dam downstream to Brownsville, and 270 miles of floodway levees in Hidalgo, Cameron, and Willacy counties.

TCEQ testing chlorine levels while conducting PWS recons along the Rio Grande.

HURRICANE PREPAREDNESS

Texas Division of Emergency Management (TDEM):
Texas Homeland Security Strategic Plan/Emergency Management Plan
Hurricane Response Plan





5. TCEQ Plans and Responsibilities for 2011 Hurricane Season

a. TCEQ's Hurricane Plans

New "All Hazards" Response Plan, with Hurricane Plan and Debris Management Plan

Texas Commission on Environmental Quality

TCEQ PARTICIPATION IN MANAGEMENT OF STATE-LEVEL EMERGENCIES--ALL HAZARDS

Annex Y to TCEQ CONTINUITY OF OPERATIONS PLAN (COOP)

Homeland Security Program

DRAFT JUNE 7, 2011

TABLE OF CONTENTS

APPENDICES:

ATTACHMENTS:

REFERENCES:

State of Texas Emergency Management Plan and Annexes
Texas Hurricane Response Plan and Annexes
Texas Drought Preparedness Plan and Annex A, Emergency Drinking Water Contingency Annex

5. c. TCEQ Incident Action Plan (IAP) – Pre/Post Landfall

TCEQ Homeland Security

1. Incident Name HURRICANE NAME	2. Operational Period to be covered by IAP (Date/Time) PRE-LANDFALL PLAN	IAP COVER SHEET

3. Approved by:

IC/HSC _____

OCE DD _____

DED _____

ED _____

HURRICANE NAME
PRE-LANDFALL INCIDENT ACTION PLAN

A SUMMARY OF NECESSARY ACTIONS FROM TCEQ "ALL HAZARDS" PLAN FOR PARTICIPATION IN MANAGEMENT OF STATE-LEVEL EMERGENCIES AND ATTACHMENTS

The items checked below are included in this Incident Action Plan:

- [X] ICS 202-OS (Response Objectives)
- [X] ICS 203-OS (Organization List) – OR – ICS 207-OS (Organization Chart)
- [ ] ICS 204-OSs (Assignment Lists)
  One Copy each of any ICS 204-OS attachments:
  - [ ] Map
  - [ ] Weather forecast
  - [ ] Tides
  - [ ] Shoreline Cleanup Assessment Team Report for location
  - [ ] Previous day's progress, problems for location
- [X] TCEQ COMMUNICATIONS PLAN (REPLACES LCS 205a)
- [ ] ICS 206-OS (Medical Plan)
  - [ ] General Information
  - [ ] Hotel Map & directions
  - [ ] Hotel Room Assignments
  - [ ] Hospital Info/Maps for Work Areas
  - [ ] _____
  - [ ] _____

4. Prepared by: LAUREL CARLISLE

Date/Time: DATE

TCEQ Homeland Security

Incident Name	Operational Period (Date/Time)	INCIDENT OBJECTIVES
HURRICANE NAME	**PRE-LANDFALL PLAN**	ICS 202-IMT

Objectives:

1. Ensure health and safety of responders and public by conducting operations in accordance with safety regulations, standards and rules. (All)

2. Place all Rapid Response Task Force (RRTF) Teams (1 Heavy and 3 Light) on standby for Emergency Support Function (ESF) 10 (HazMat) response and for ESF-3 assessment of PWS and WWTP facilities in affected areas. Pre-stage Teams as called for by the TDEM Rapid Response Task Force SOPs. (HS, Field Operations)

3. Decide on protocol for enforcement discretion and waiver requests. Inform affected programs and regions of protocol. Coordinate with EPA as necessary. (OCE Admin)

4. Post contact information for waiver and enforcement discretion requests on external web, and distribute to facility contacts at SOC (Include in regulatory guidance). (FOSD, EXEC Communications)

5. Develop regulatory guidance, including debris management, household hazardous waste disposal, burn authorizations, sediment sampling, carcass disposal, etc. for distribution and for posting on external web. (FOSD)

6. Post regulatory guidance, including contact information for enforcement discretion requests, to external web. Distribute as appropriate to affected jurisdictions prior to H-60. Develop Public Service Announcements as appropriate. (FOSD, Agency Communications)

7. Notify staff responsible for processing fuel waiver requests. Coordinate with EPA and DOE as needed to respond to requests. (OCE, HS, CEO, OLS)

8. Secure all capital assets in targeted areas (move outside surge and strike zones) by H-72, before evacuation of citizens as necessary. Refuel vehicles. (Regions)

9. Develop and institute protocol to coordinate with PWS and WWTP facilities to confirm operational status after landfall and to prepare for assessments. (OW)

10. Confirm and report on mutual aid agreements, including generator needs, for PWS and WWTP (TXWARN). (OW)

11. Coordinate with EPA for ESF 3 and ESF 10 response. (HS, Field Operations)

12. Develop draft templates for possible EPA Mission Assignments (MA) prior to H-60. (HS, Field Operations)

13. Evaluate status of dams and related structures at risk from storm-related conditions. Dam Safety Program on stand-by. (Dam Safety)

14. As requested by SOC, verify and report on operational status of refinery and petrochemical facilities. (Air Permits Division)

15. Activate SOC Team staffing. (HS)

16. Participate in and report to management regarding conference calls as called for in TCEQ Communications Plan. (HS, All Offices)

17. Provide logistical support for response staff (RRTFs, Incident Support Teams and regional offices), affected regions, and HQ staff as needed. (OAS)

TCEQ Homeland Security

18. Identify, train and prepare response staff. (SERT, RRT, RRTFs, regional offices, HQ [e.g., PWS, Remediation], and relief staff) (Field Operations)

19. Identify "sister region" staff/regions to fulfill work obligations (e.g. complaint calls) for affected regions, and prepare them for transferred activities. (Field Operations)

20. Develop "sister region SOPs, so that staff supporting affected regions will understand what needs to be done. (ADs, Field Operations)

21. Develop Incident Support Teams, and train senior emergency response personnel in Incident Command protocols, interactions with other state and federal agencies, and forms, 3 per region. (HS, Field Operations)

22. Develop deployment protocols for trained staff. (FOD)

23. Develop protocol to provide GIS mapping assistance to affected regions (e.g., PWS, WWTP, debris sites). (IRD)

24. Coordinate with local entities to develop candidate acceptable debris management sites prior to H-120. (Field Operations)

25. Alert TCEQ Emergency Response contractors and place on standby. (FOSD)

26. Activate Regional Hurricane Plans, including evacuation of regional staff and securing capital assets as required. (Field Operations)

27. Activate Estuary Program and Houston Laboratory Hurricane Plans as required. (CEO)

28. Identify method to communicate with evacuated staff. (ADs, RDs)

29. Identify staff familiar with the impacted area to participate in flyovers of oil refineries and chemical plants to investigate damage and releases and of communities to mark for investigation areas with displaced hazardous materials and water system damage. (Field Operations)

30. Develop a protocol to staff and operate a debris management hotline and plan to activate it within 24 hours as needed after landfall. (FOSD)

31. Develop a storm surge sediment residue sampling and management plan or protocol. (Remediation)

32. Develop a protocol for risk-based inspections of debris management sites. (Field Operations)

33. Identify and train staff in FEMA protocols for cost recovery. Develop efficient processes to track expenses eligible for reimbursement. (OCE, HS, OAS)

34. Identify items eligible for FEMA reimbursement, and track these expenses according to FEMA requirements for reimbursement. (All Offices)

35. Identify and document equipment and supplies that would be needed to restore the operational status of each regional office, including use as sleeping quarters for TCEQ staff and other agencies providing assistance to TCEQ. (Field Operations)

36. Develop protocol for securing air monitoring site equipment and resuming operations. (Field Operations)

37. Develop and activate agency communications plan. (HS)

TCEQ Homeland Security

38. As called for by TDEM, research staging sites for potential contamination, review spill prevention, control and countermeasure plans provided by TDEM (developed by their contractors), and provide GDEM approval letters. (HS, Remediation)

39. Coordinate with DSHS to ascertain recommended vaccinations for responders. Ensure that responders have appropriate vaccinations. All Offices)

39. Coordinate with International Boundary Water Commission (IBWC) as indicated to ascertain status of dam and related facilities under their jurisdiction. (HS)

40. Coordinate with the Public Works Response Team (PWRT) regarding ESF-3 PWS and WWTP restoration of service. (HS)

41. Evaluate status of all at-risk remediation sites in the strike zone. (Remediation)

42. Provide trained staff for Communication Coordination Group headquarters at Camp Mabry in Austin as needed for deployments. (IRD)

43. Provide IT support for RRTF teams. (IRD)

44. Provide two certified purchasers to the TDEM to deploy with RRTF teams. (OAS)

45. Ensure agency representation on Communications Coordination Group (FOSD)

46. Ensure that State of Texas radio interoperability statutes, standards, policies, and policies are followed in agency emergency communications. (FOSD)

Operational Period Command Emphasis (Safety Message, Priorities, Key Decisions/Directions:

1. Verify preparations for landfall and response.

Approved Site Safety Plan Located at:

ATTACHMENTS (Mark if Attached)

- ☒ Organization List – ICS 203
- ☐ Medical Plan – ICS 206
- ☒ TCEQ Communications Plan (replaces LCS 205A)
- ☐ Unit Log
- ☐ Org Chart – ICS 207
- ☐ Safety Message
- ☐ Other Hot Zone Map
- ☐ Other Staging Area/Hospital Map
- ☐ Assignment Lists ICS 204
- ☐ Weather Forecast
- ☐ Information Statement
- ☐ Other _____

Prepared by: (Planning Section Chief)	Date/Time
Laurel Carlisle	June 18, 2010
Approved by: (Incident Commander)	**Date/Time**
Kelly Cook	June 18, 2010

Notes:
CEO = Chief Engineer's Office
ESF = Emergency Support Function
Field Operations = FOSD, Area Directors, Regions
FOSD = Field Operations Support Division
HAZMAT = Hazardous Materials
HS = Homeland Security
IRD = Information Resources Division
JFO = Joint Field Office
MA = Mission Assignment
OAS = Office of Administrative Services
OCE = Office of Compliance and Enforcement
OLS = Office of Legal Services
OW = Office of Water
PWS = Public Water Supply
RRTF = Rapid Response Task Force
SOP = Standard Operating Procedure
WSD = Water Supply Division
WQD = Water Quality Division
WWTP = Wastewater Treatment Plant

ORGANIZATION ASSIGNMENT LIST

1. Incident Name	
HURRICANE NAME	
2. Date	3. Time
DATE	
4. Operational Period	
PRE-LANDFALL	

Position	Name
5. Incident Commander and Staff	
Incident Commander	KELLY COOK
Deputy	DALE KOHLER
Safety Officer	RON LOWERY
Information Officer	TERRY CLAWSON
Liaison Officer	DAVID DAVIS, DAVID BOWER, PATTIE DE LA CRUZ, LORI WILSON
6. Agency Representative	
Agency	Name
7. Planning Section	
Chief	LAUREL CARLISLE
Deputy	VACANT - NEEDED
Resources Unit	
Situation Unit	
Documentation Unit	VACANT - NEEDED
Demobilization Unit	
Technical Specialists	
IHW/ER	MERRIE SMITH
Air Permits Division	TONY IONESCU
Water Quality Division	LOUIS HERRIN
Water Supply Division	ELSTON JOHNSON/JAMES BEAUCHAMP
Remediation	RONNIE EASON
8. Logistics Section	
Chief	PAT FONTENOT
Deputy	VACANT
Supply Unit	
Facilities Unit	
Ground Support Unit	
Communications Unit	
Medical Unit	
Security Unit	
Food Unit	

9. Operations Section		
Chief	AREA DIRECTORS	
Deputy	AREA/REGIONAL DIRECTORS	
a. Branch I - Division/Groups		
Branch Director		
Deputy		
Division/Group		
Division/Group		
Division/Group		
Division/Group		
Division/Group		
b. Branch II - Division/Groups		
Branch Director		
Deputy		
Division/Group		
Division/Group		
Division/Group		
Division/Group		
Division/Group		
c. Branch III - Division/Groups		
Branch Director		
Deputy		
Division/Group		
Division/Group		
Division/Group		
Division/Group		
Division/Group		
d. Air Operations Branch		
Air Operations Branch Director		
Air Attack Supervisor		
Air Support Supervisor		
Helicopter Coordinator		
Air Tanker Coordinator		
10. Finance Section		
Chief	DENA WOODALL	
Deputy	VACANT	
Time Unit	VACANT	
Procurement Unit	VACANT	
Compensation/Claims Unit		
Cost Unit		

Prepared by (Resource Unit Leader)
NAME/DATE

TCEQ Homeland Security

1. Incident Name HURRICANE NAME	2. Operational Period to be covered by IAP (Date/Time) POST-LANDFALL PLAN	IAP COVER SHEET

3. Approved by:

IC/HSC _____

OCE DD _____

DED _____

ED _____

HURRICANE NAME
POST-LANDFALL INCIDENT ACTION PLAN

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- ☐ Map
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- ☐ Tides
- ☐ Shoreline Cleanup Assessment Team Report for location
- ☐ Previous day's progress, problems for location

X TCEQ COMMUNICATIONS PLAN (REPLACES LCS 205a)

☐ ICS 206-OS (Medical Plan)

☐ General Information

☐ Hotel Map & directions

☐ Hotel Room Assignments

☐ Hospital Info/Maps for Work Areas

☐ _____

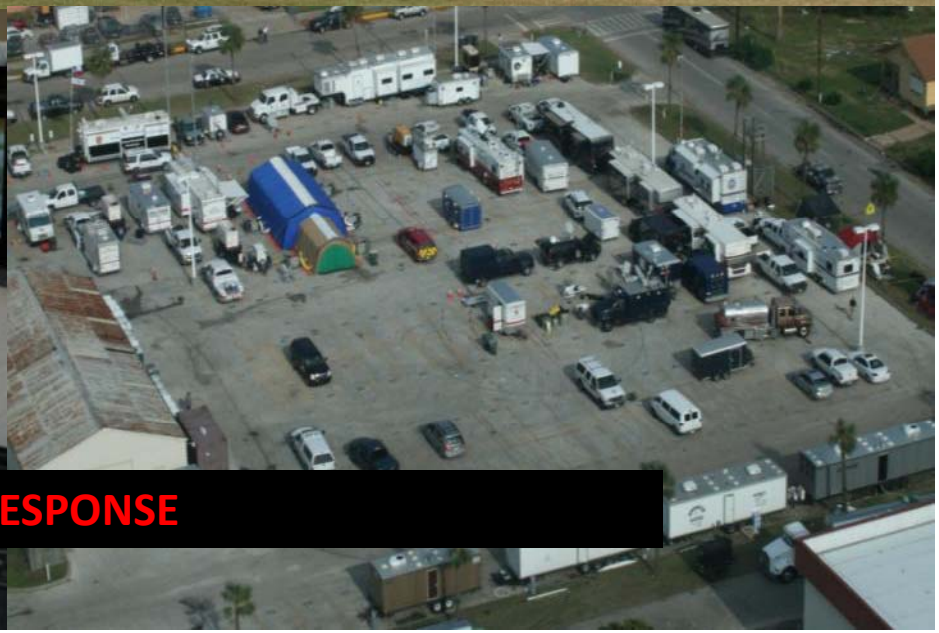
☐ _____

4. Prepared by:	Date/Time
LAUREL CARLISLE	DATE

5g. TCEQ Mobile Response Team /Strike Team

Team Update
Review of Team Equipment and Capabilities

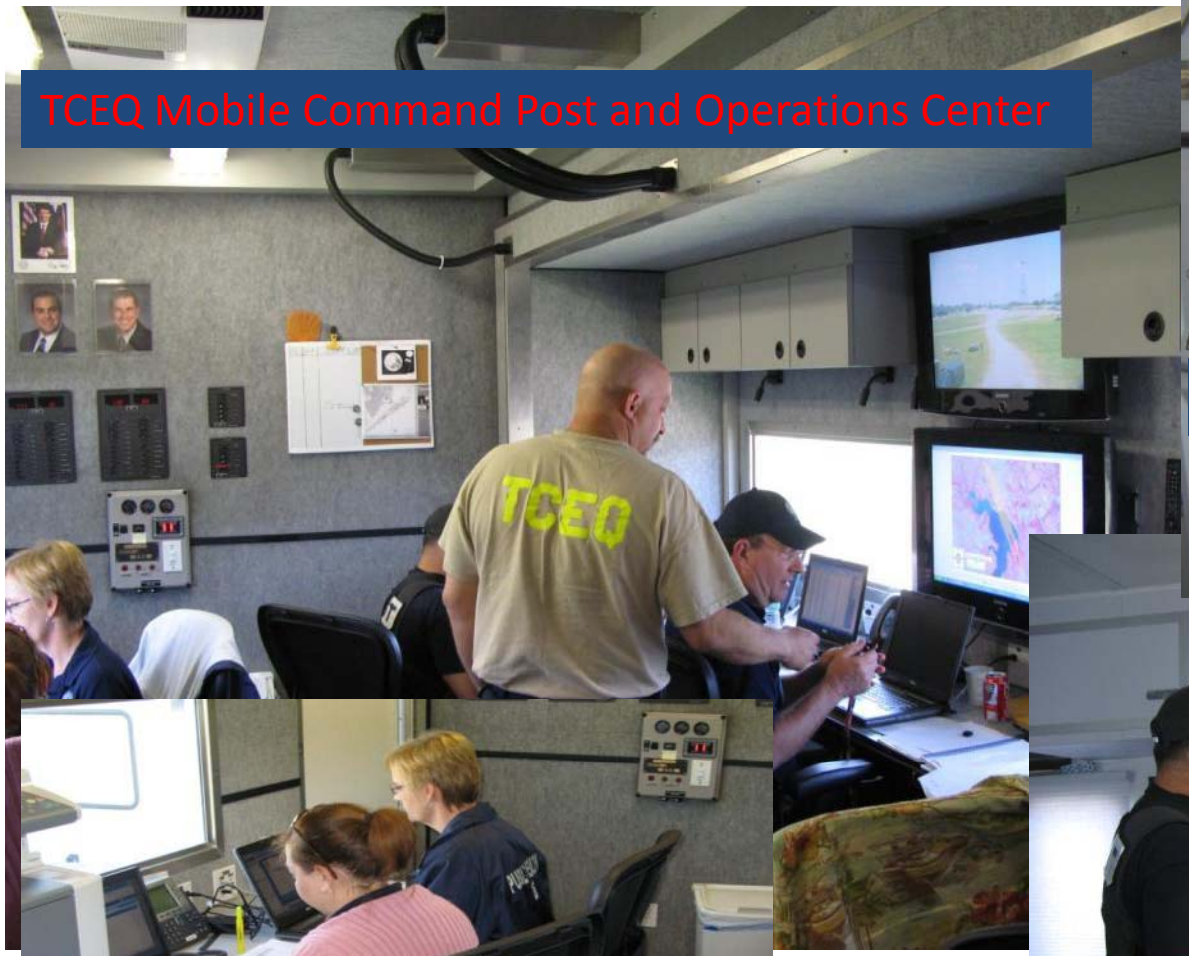
The TCEQ's Mobil Command Post



HURRICANE RESPONSE

TCEQ Homeland Security

TCEQ Mobile Command Post and Operations Center



Interoperable Communications

GIS Mobile Mapping

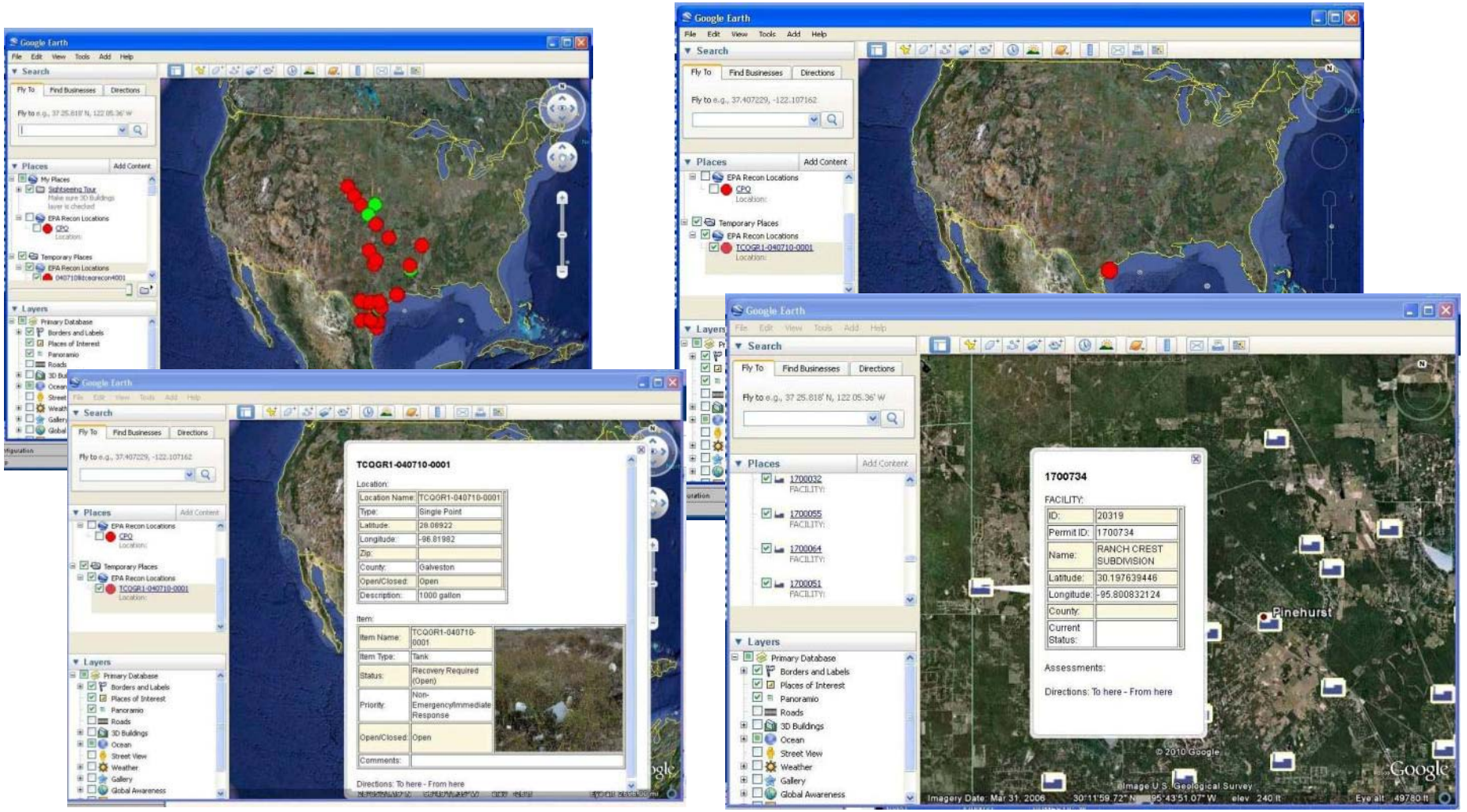
HURRICANE RESPONSE

5h. Response Manager Database

TCEQ Homeland Security

HURRICANE RESPONSE

Response Manager Software



5e. TDEM Rapid Response Task Force Teams

Team Texas (Heavy Team) San Antonio

Light Teams—names correspond with staging areas

Team Austin

Team Waco

Team Dallas

PROGRESS FOR HURRICANE PREPAREDNESS

***New* TDEM Rapid Response Force**

TDEM created a 4-pronged State Rapid Response Task Force to support multiple impacted areas. TCEQ is a participating state agency on all 4 teams.

The Rapid Response Task Force will include (1 “Heavy” and 3 “Light” Teams) to support different areas impacted. The teams are staged as follows:

<u>Heavy Team</u>

Team Texas: Largest Team, staged from San Antonio

<u>Light Teams</u>

Team Dallas: staged from Dallas/Fort Worth area

Team Waco: staged from Waco

Team Austin: staged from Austin

Team Texas (Heavy Team) San Antonio

- Chris Caudle
- Kelly Crunk
- Robert Eby
- Brian Fisher
- Colleen Fleming
- Manuel Gonzalez
- Jeff Lewellin (Leader)
- Kevin Parker
- Robert Reed

5f. TCEQ Regional Incident Support Teams (ISTs)

DFW (R4) IST
Michelle Havelka
Deanna Hetherington
Merissa Ludwig

TYLER (R5) IST
Craig Conner
Dale Rice
Dale Vodak

EL PASO (R6) IST
Jesus Chavez
Manuel Garcia
Jaime Nolasco
Jose Ojeda

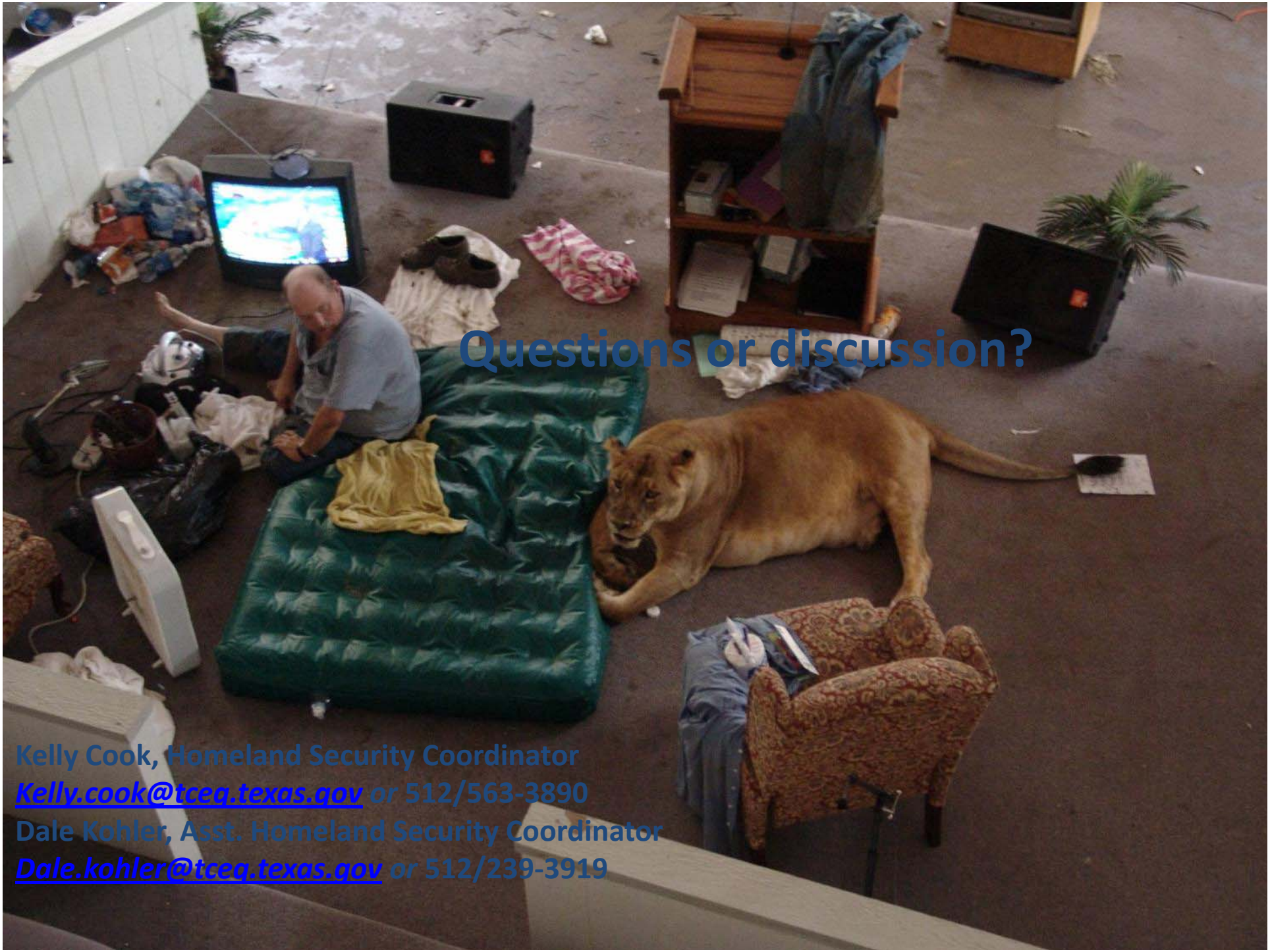
BEAUMONT (R10) IST
Charmaine Costner
Derek Eades
Ronnie Hebert
Pat Menke

HOUSTON (R12) IST
John Branom
Greg Goode
Jim Indest

SAN ANTONIO (R13) IST
Chris Dzuik
Lynn Lindsay
Cameron Lopez
Jorge Salazar

CORPUS CHRISTI (R14) IST
Roger Bennett
Daniel Escobar
Brad Genzer

LAREDO (R16) IST
James Archer
Arnaldo Lanese


Questions or discussion?
Kelly Cook, Homeland Security Coordinator
Kelly.cook@tceq.texas.gov or 512/563-3890
Dale Kohler, Asst. Homeland Security Coordinator
Dale.kohler@tceq.texas.gov or 512/239-3919

Bioremediation

June 14, 2011 ~ Little Rock, AR

William E Baird and Heather E Baird

1. Introduction: Who are we and why are we here? Our history with bioremediation
2. What Are Microbes? A Brief Primer
3. Bioremediation in Open Water: Explosion on the Tanker MegaBorg
4. Wetland Application: How microbes cleaned up Turkey Swamp following kerosene release
5. Deepwater Horizon: Where are we now?
6. Q&A

*Agenda

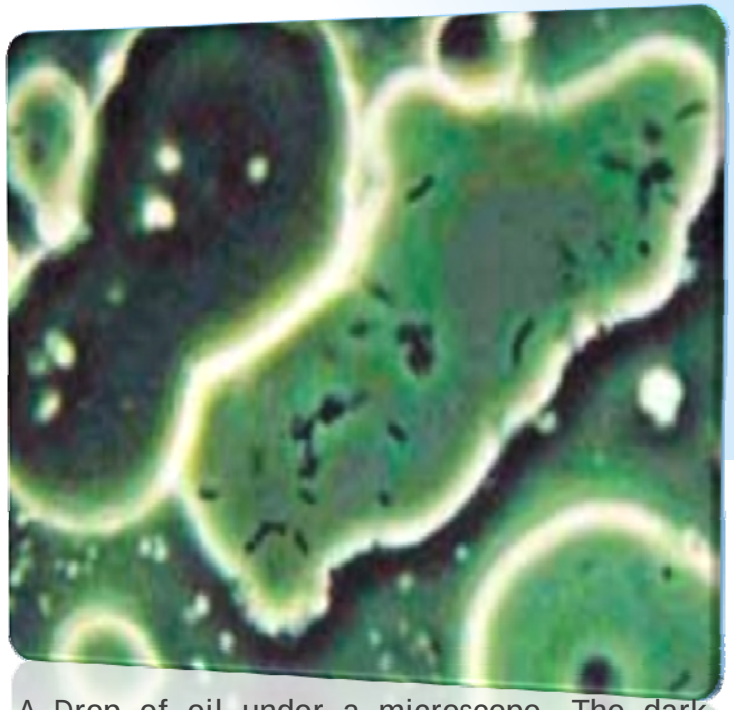
Who are we?

- **Bill Baird, PE, LSP, MBA**
  - President of MicroSorb Environmental Solutions
  - 30+ years of experience with environmental remediation worldwide
- **Heather Baird, MBA**
  - Vice President Corporate Communications of MicroSorb Environmental Solutions
  - 10 years of experience with environmental remediation
  - Testified before Congress in June 2010 about bioremediation

What Are Microbes: A Primer

* **Microbes** are the earth's most primitive single celled organisms. Their basic role in life is to recycle the components of living organisms, converting them to the nutrient chemicals used by plants in photosynthesis and chemosynthesis.

This photo shows a round droplet of oil and our microbes can be seen inside the drop eating and converting the oil.



A Drop of oil under a microscope. The dark areas are the oil, the rod shapes are the microbes and the light areas are where the microbes have eaten the oil

*Benefits of Bioremediation

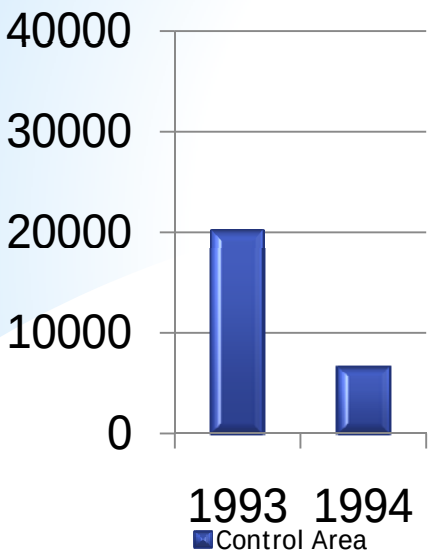
* (Our)Microbes are all-natural/non-pathogenic/non-genetically altered
* Contamination can be treated without disturbing sensitive indigenous areas by burning, excavating or other intrusive human intervention
* Bioremediation eliminates expensive disposals fees and complex liabilities associated with off-site disposal
* Microbial treatments leave nothing behind. No chemicals, nothing to pick up, scoop up or throw away like traditional cleanup methods
* Neither humans nor wildlife are adversely affected by the use of (our) microbes. Intensive studies have shown no toxic side effects.
* By-products produced by microbes are used as an energy source by other organisms. (Can even clean oyster beds and other aquatic species!)
* (Our) microbes have been listed on the EPA NCPPL since 1991 – first on list
* Microbes remediate oil and turn it into harmless by-products (water, CO2 and fatty acids)

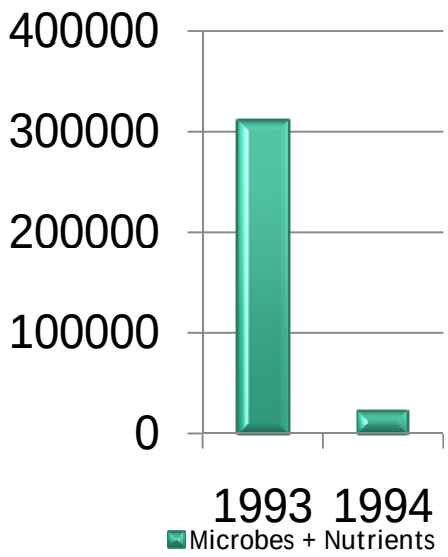
*The MegaBorg Explosion:

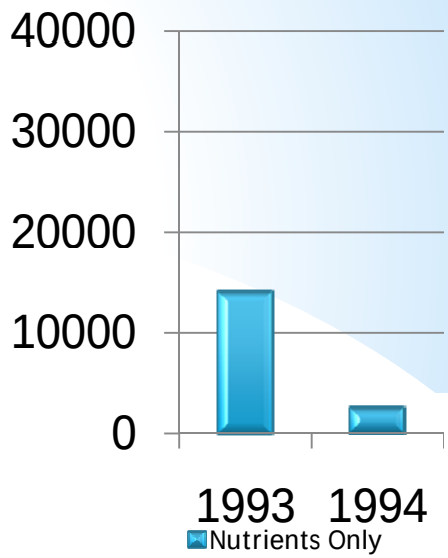
Open water bioremediation

Turkey Swamp 1991: Kerosene in wetlands

* Site:
  - Mobile home park in Halifax, MA
* Problem:
  - 50,000-100,000 gallons kerosene was released from an underground pipeline and migrated to wetlands
  - Kerosene was absorbed by organic wetland sediments
  - Wetland wells contained up to 1 ft of separate phase kerosene
  - Vegetation severely distressed
  - Kerosene odor permeated impacted wetland area
* Cause:
  - Underground storage tank connected to pipeline to heat mobile homes
* Solution:
  - Injected mixture of microbes, biocatalyst and nutrients into subsurface through select monitoring wells within the plume
  - DEP wanted to excavate! instead tried this first







*TPH Levels

* 24 Hours after inoculation the odor of kerosene was eliminated
* 45 days after inoculation:
  - All 3 areas contained exogenous microbes
  - All three areas revealed significant reductions in levels of petroleum hydrocarbons
* 1 year after inoculation:
  - Analysis of soil samples indicated microbe + nutrient area contained greatest biomass and highest concentration of microbes

1997 1997 1993

*Turkey Swamp 1993-1997

Present Wetland Conditions

- Independent wetland scientist conducted a study of the impacted area from 1995-1997
- Two grids set up including impacted area and non-impacted area as a control
- Impacted area exhibited continuous recovery during two year assessment
- Final report in October 1997 stated remedial actions at the site resulted in a full recovery of the wetland vegetation

2001

*Deepwater Horizon

* Per BioChem Strike Team Test Results (for MicroSorb – did not receive results for competitors):
  - Almost complete reduction in alkanes (99.9%)
  - 99.8% of weathered crude (both alkanes and PAHs) degraded by the end of 12 weeks
  - No need for excavation. Mix with Gulf water, spray and go

Water from Louisiana Marshland August 2010							
Sample Location	**Date Collected**	**TPH-GRO (mg/L)**	**TPH-DRO (mg/L)**	**TPH-ORO (mg/L)**	**Propylene Glycol (mg/L)**	**2-Butoxy Ethanol (mg/L)**	**Comment**
BPT-1W	8/25/10	< 13.0	80.4	129	< 0.251	< 0.615	Pretreatment
	9/1/10	< 13.0	0.082	0.109			Week 1
	9/15/10		0.179	0.160			Week 3
BPT-2W	8/25/10	< 13.0	38.0	71.4	< 0.251	< 0.615	Pretreatment
	9/1/10	< 13.0	0.300	0.416			Week 1
	9/15/10		0.184	0.119			Week 3

* Contamination in this LA marshland reduced 99% in one week after application of microbes

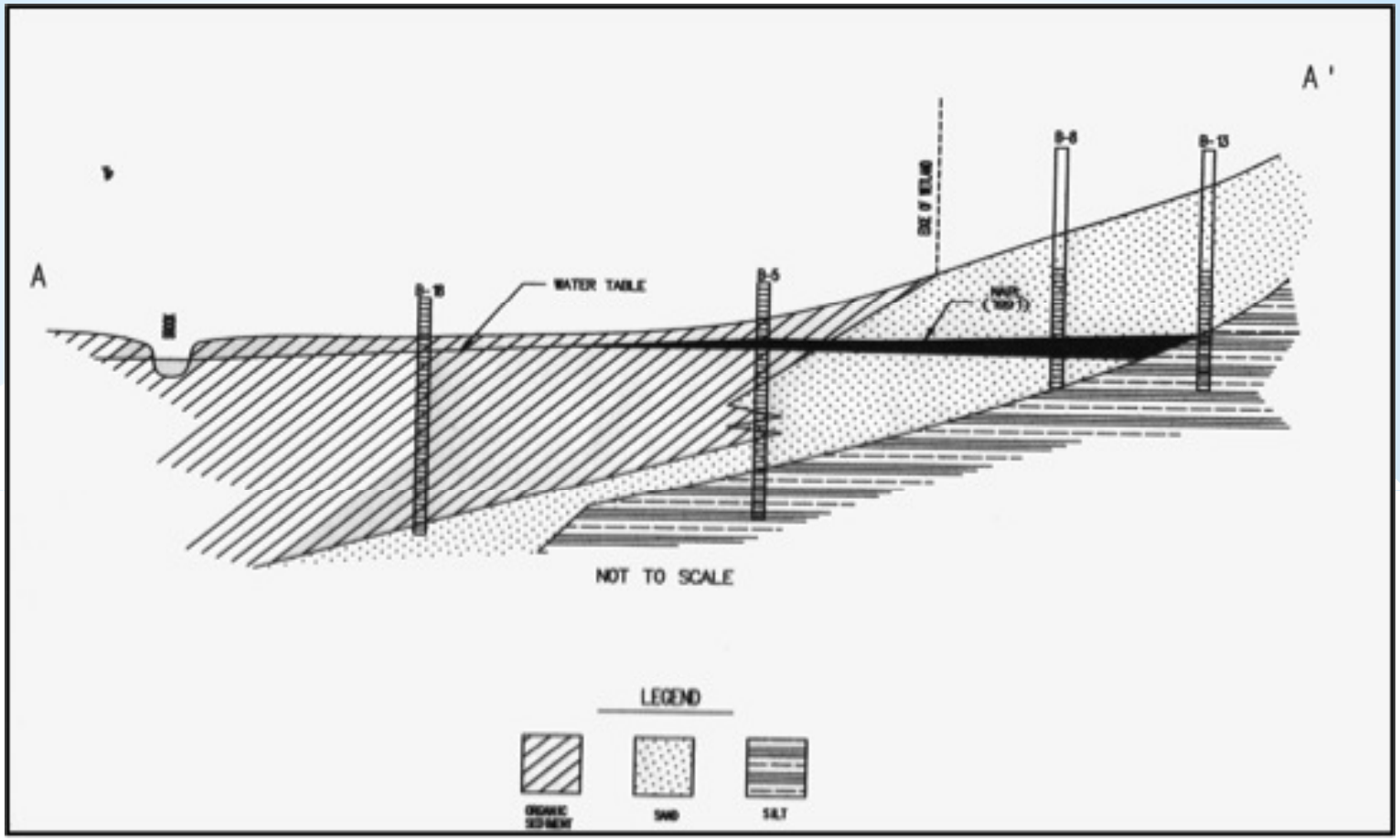
Samples of oil and seawater: Venice Louisiana May 2010					
Number	**Initial Oil Weight**	**Microbe Weight**	**Final Oil Weight**	**Percent Removal**	**Time**
1	3.230	0.054	0.480	85.14%	24 hrs
2	3.760	0.052	0.510	86.44%	24 hrs
3	3.510	0.059	0.790	77.49%	24 hrs
4	4.150	0.058	0.340	91.81%	48 hrs
5	3.870	0.052	0.280	92.76%	48 hrs
6	3.660	0.057	0.460	87.43%	48 hrs

* Samples of oil and seawater show almost 90% destruction in 24 hours

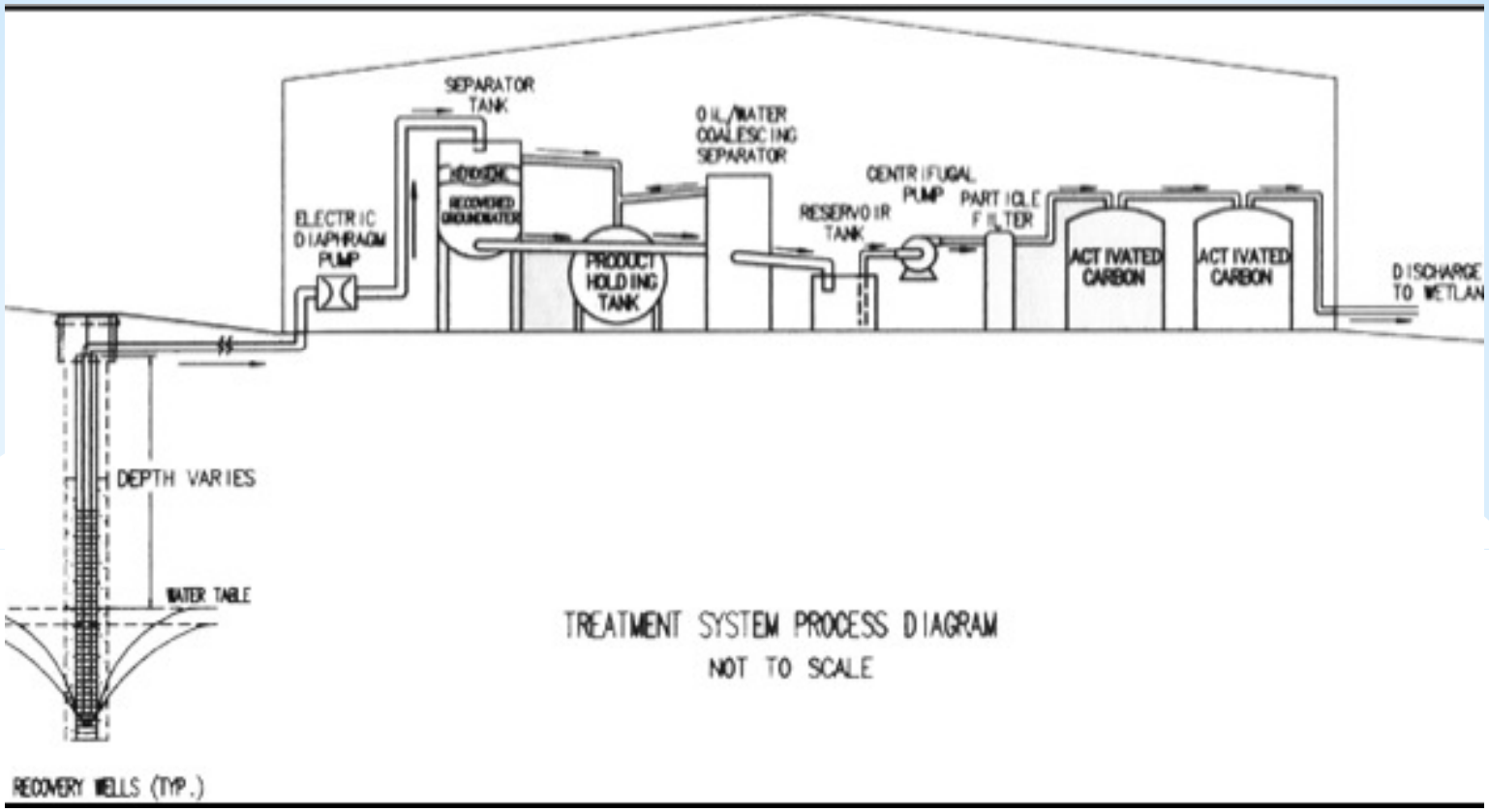
mg/L = milligrams per liter (water)
TPH = Total Petroleum Hydrocarbons
GRO = Gasoline Range Organics
DRO = Diesel Range Organics
ORO = Oil Range Organics
NA = Not Analyzed

* ANALYTICAL SUMMARY

*Appendix



*Cross Section of Subsurface Conditions, Turkey Swamp



*Treatment System Diagram - Turkey Swamp

Sector Corpus Christi

Captain of the Port Report

Regional Response Team Meeting

Summer 2011

Significant Events of 2011

- 81 pollution cases in CY11
  - 18 Letters of Warning issued
  - 05 Notices of Violation issued
  - 03 Civil Penalties
  - 04 Federal Projects
- Operation Oily Oyster
- Successful Fingerprinting Cases
- Matagorda Island Drum Run
- FOSCR College

Operation Oily Oyster

- USCG, TGLO, Aransas Co. Navigation District joint pollution response operation
- Two goals:
  - Determine source of “mystery” sheen
  - Deter future intentional discharges
- 71 samples gathered from 58 different oyster boats at the Fulton Harbor Marina
- MSL fingerprinting negative for match

Successful Fingerprinting Cases

- F/V SUNSHINE
- F/V WAYWARD LADY

Matagorda Island Drum Run

- CERCLA: $49,240.04
- 4 day operation
  - USCG (2 FOSCRs)
  - USFWS
  - TCEQ
- 101 containers removed





FOSCR College

- 40 USCG
  - Corpus Christi
  - Los Angeles/Long Beach
  - San Pedro
  - Houston/Galveston
  - Texas City
  - New Orleans
  - Panama City
  - Sault St. Marie
  - Baltimore
  - Guam
  - Charleston
- 3 TCEQ
- 3 TGLO

Questions?

Sector Corpus Christi “Duck Scrubbers”

Beef Tallow Spill

- Incident occurred on 04Jan11 at 1540
- Facility reports approx 250K gallons of "hydrogenated tallow fatty acid" released from a tank on shore via a manhole cover
- After the clean-up was completed, it was estimated that 79K gallons entered the water via storm drains
- 11 workboats, 5000ft of boom, 3 vacuum trucks, 43 personnel, 9 dumpsters, 1 backhoe, 1 "pig" for storm drains responded and worked for 6 days

Beef Tallow Spill

Beef Tallow Spill

Beef Tallow Spill

Beef Tallow Spill

Beef Tallow Spill

Beef Tallow Spill

Beef Tallow Spill

Beef Tallow Spill

Beef Tallow Spill

Beef Tallow Spill

Beef Tallow Spill

Beef Tallow Spill

Beef Tallow Spill

Sector Houston-Galveston
Incident Management Division

IMD Cases:

Notifications:	Incident Investigation:	Total NRC Reports: Jan – Mar 2011
136	46	182

IMD Enforcement Actions Taken

LOW's/NOV's/Class 1 Civil Penalties:	Fines issued from : Jan – Mar 2011
46	$39,000

Federalized Projects

OSLTF Projects:	CERCLA Projects:
3 totaling $10,024.70	0

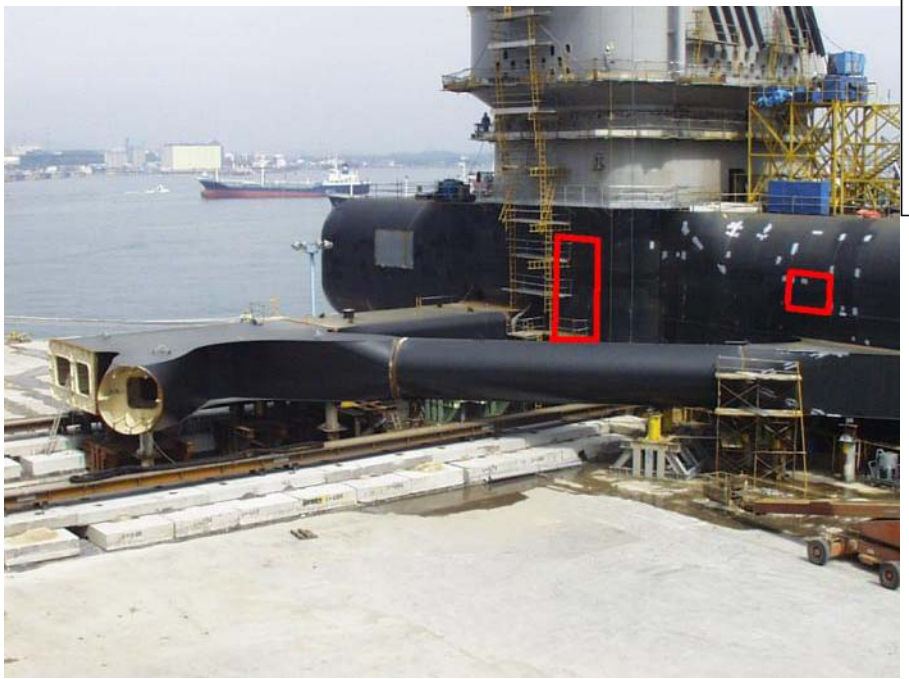
MSU MORGAN CITY FOSC ZONE

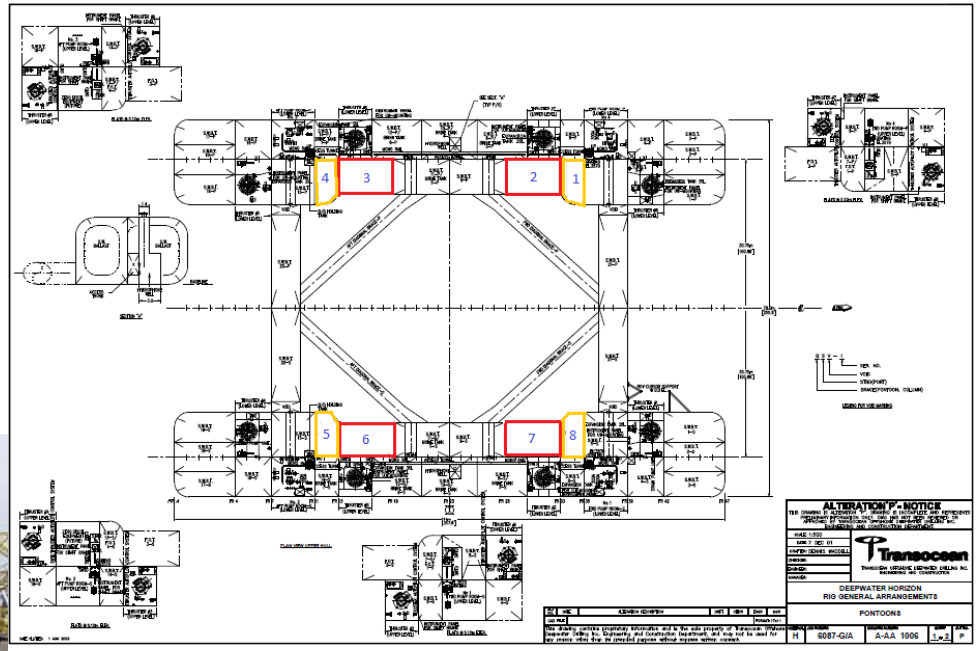
Deepwater Horizon
Fuel Salvage

Substantial Threat to Env.

Potential

- 1.2 Million Gallons
- 8 Tanks

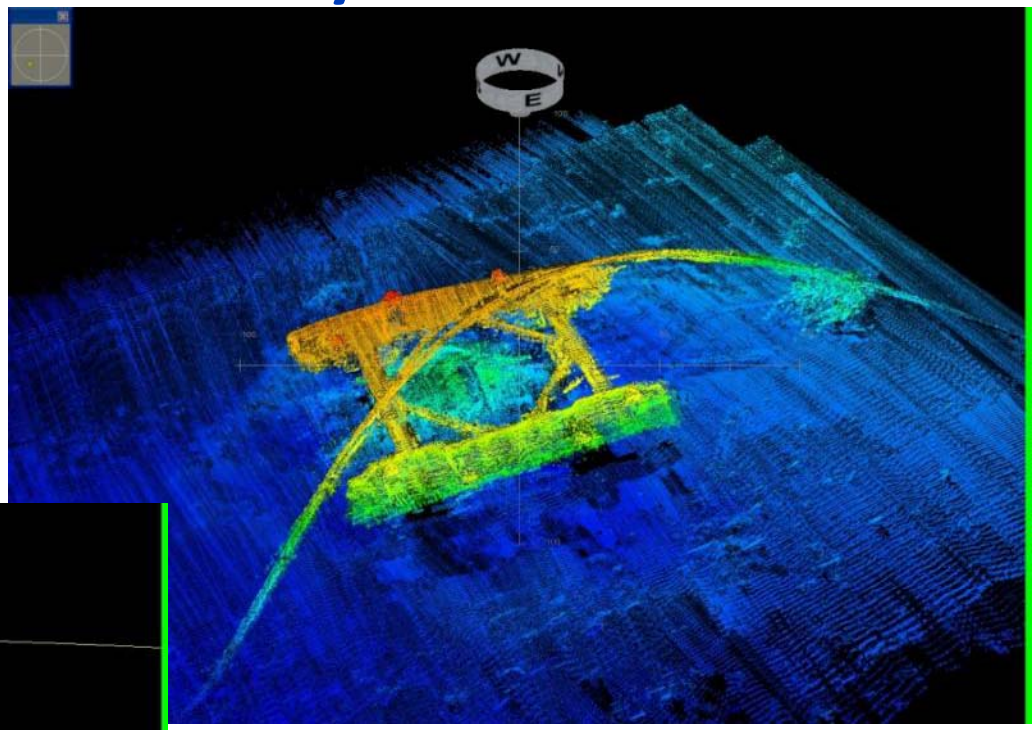


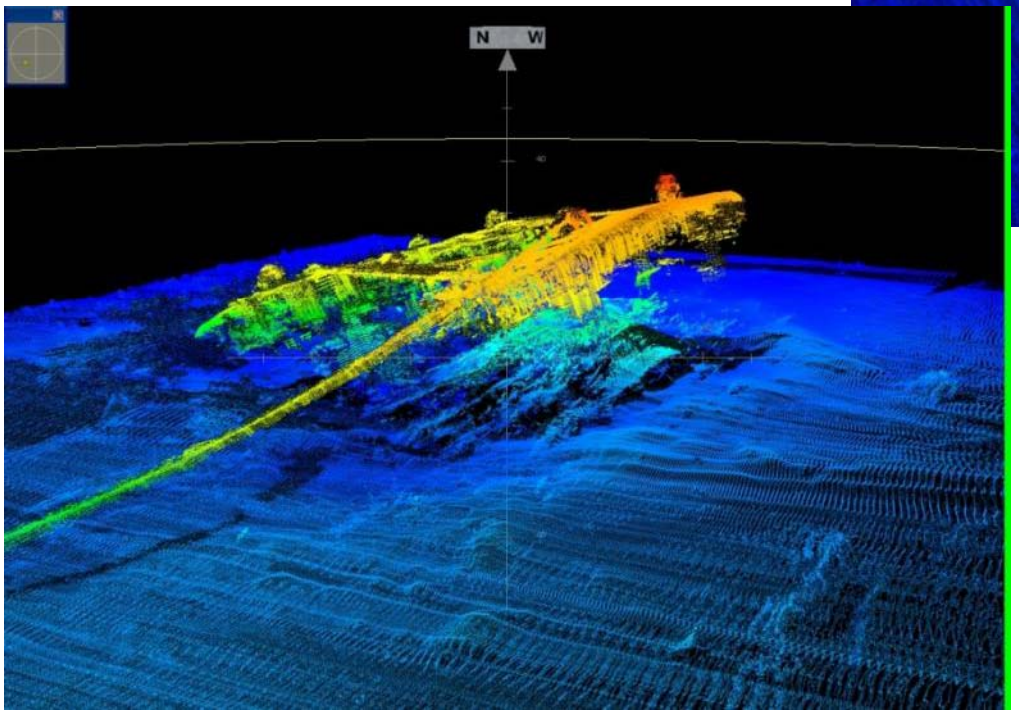


Concerns

- Gravesite
- Crime scene
- Depth of water
- Court allowed 10 days

Site Survey





ROV Visual Tank Inspection

4 large (193,526 gallon capacity) had large compromises.

ROV Visual Tank Inspection Cont.

- 4 Small tanks appeared intact
- New potential was 400,000 gallons

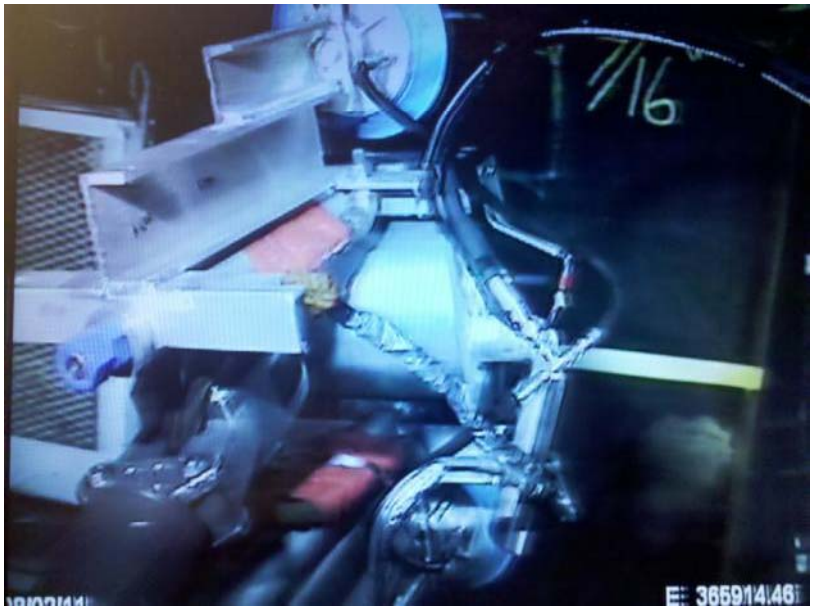
Nondestructive Testing

Due to water depth and evidentiary integrity destructive testing methods such as hot tapping were not feasible due to threat of further pollution.

A Neutron Backscatter Probe consisting of a source of high-energy neutrons and a detector were identified as a non-destructive means of tank content verification.

Test Readings

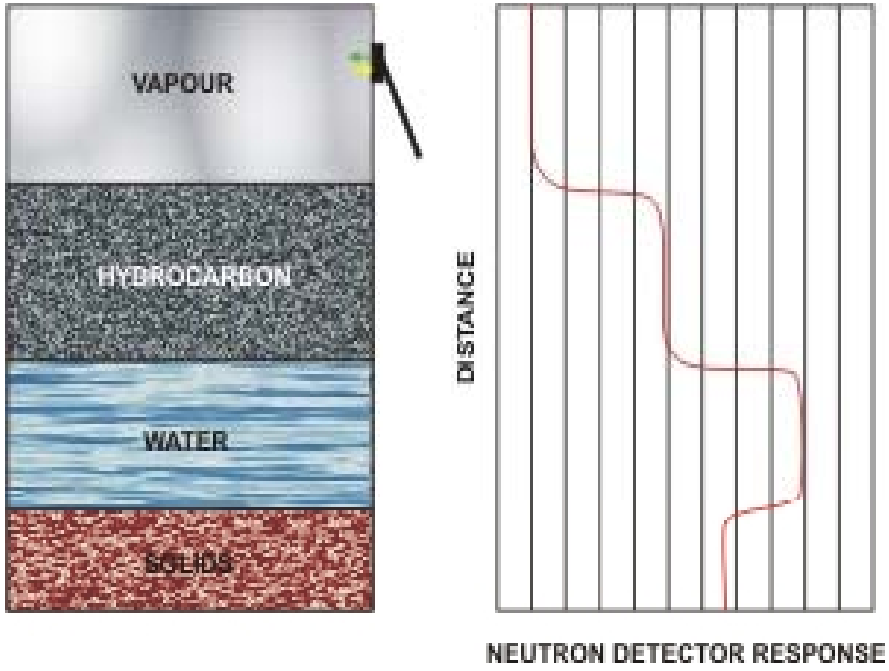
High-energy neutrons from the radiation source penetrate the hull and interact with the medium inside.



As the neutrons interact with the tank's contents energies are created by collisions with hydrogen nuclei.

Test Readings Cont.

- Signal counts vary by density of hydrogen.
- Readings taken high middle and low on each tank



Summary

This was the first deepwater application of neutron backscatter technology.

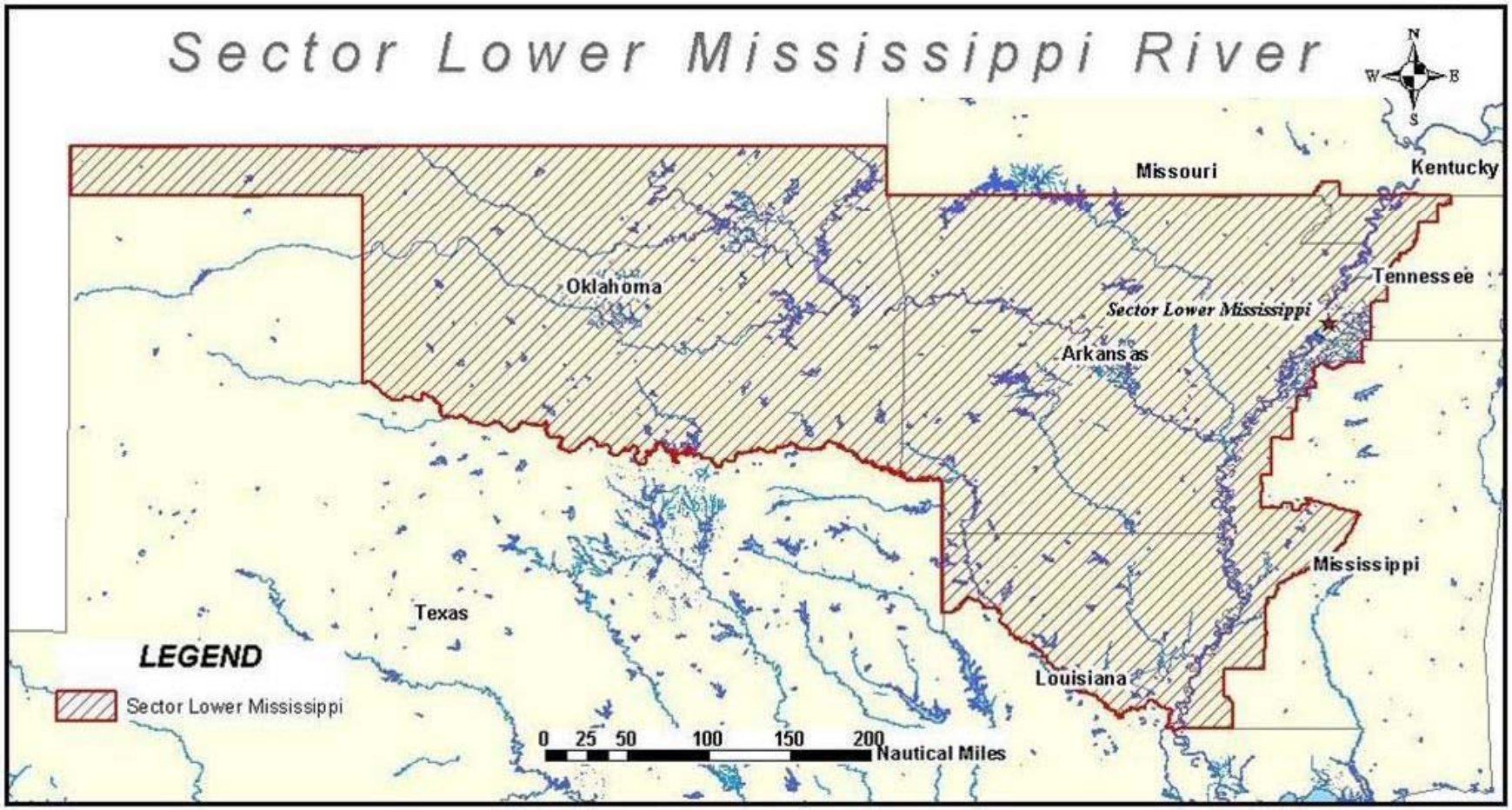
Utilizing this technology allowed for the non-destructive verification that the remaining fuel tanks contained seawater.

Sector Lower Mississippi River

LTJG Robert Gay

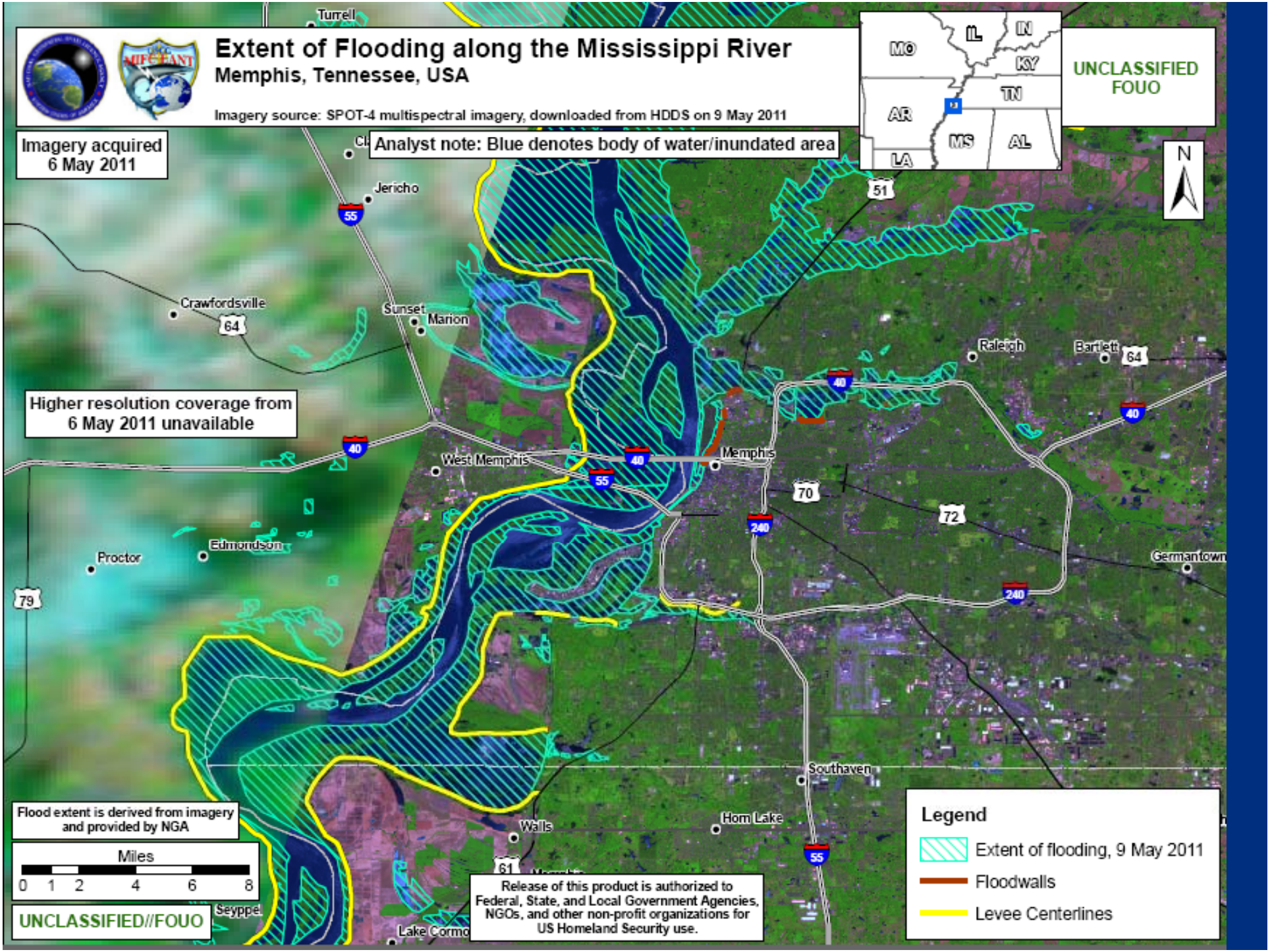
Homeland Security

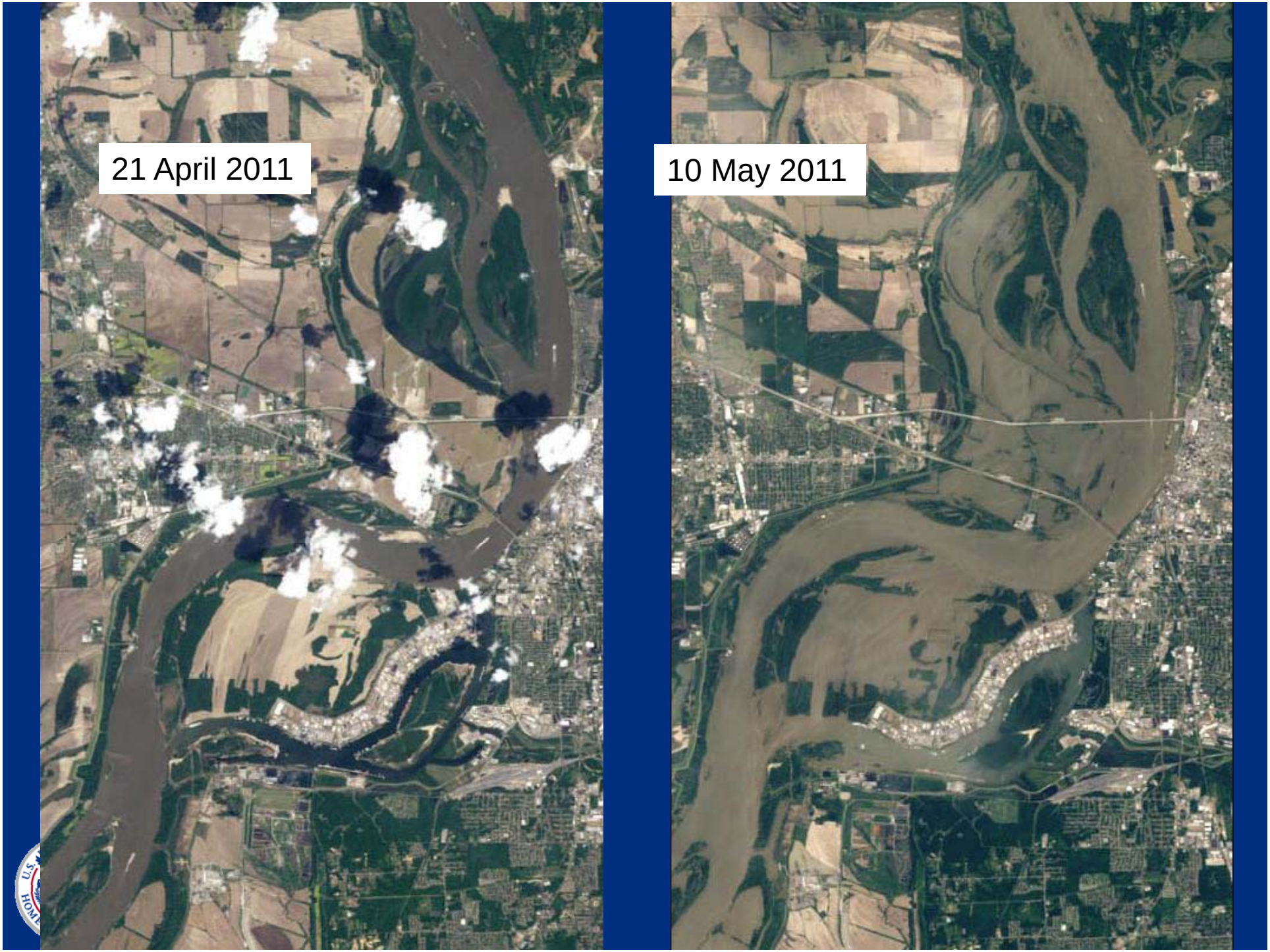
U.S. COAST GUARD



Homeland Security

U.S. COAST GUARD


Extent of Flooding along the Mississippi River
Memphis, Tennessee, USA
Imagery source: SPOT-4 multispectral imagery, downloaded from HDDS on 9 May 2011
UNCLASSIFIED
FOUO
Imagery acquired
6 May 2011
Analyst note: Blue denotes body of water/inundated area
MO
IL
IN
KY
TN
AR
MS
AL
LA
N
Higher resolution coverage from
6 May 2011 unavailable
Turrell
Jericho
Crawfordsville
Sunset
Marion
West Memphis
Memphis
Raleigh
Bartlett
Edmondson
Proctor
Germantown
Southaven
Walls
Horn Lake
Seyppel
Lake Cormo
Flood extent is derived from imagery
and provided by NGA
Miles
0 1 2 4 6 8
UNCLASSIFIED//FOUO
Release of this product is authorized to
Federal, State, and Local Government Agencies,
NGOs, and other non-profit organizations for
US Homeland Security use.
Legend
Extent of flooding, 9 May 2011
Floodwalls
Levee Centerlines


21 April 2011
10 May 2011

Waterfront Facilities

Homeland Security

U.S. COAST GUARD

Floating Tanks

Homeland Security

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PART 1: USGS FLOOD-WARNING INFORMATION SYSTEM HOT SPRINGS, ARKANSAS

PART 2: USGS TRAVELTIME EQUATIONS FOR STREAMS IN ARKANSAS

PART 2: USGS 2011 FLOOD RESPONSE IN ARKANSAS

Jaysson Funkhouser, PE
jefunkho@usgs.gov
http://ar.water.usgs.gov

June 15, 2011
Region 6 Regional Response Team Meeting

USGS science for a changing world

U.S. Department of the Interio
U.S. Geological Survey

Objectives

- Explain disciplines and mission within the USGS
- Streamgaging program in Arkansas
- Site location and background info of the flood warning information system
- Design, construction and data collection methods
- Flood warning information system thresholds
- Cooperative efforts involved with system

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USGS Organization

- Geographic Discipline
- Geology Discipline
- Biology Discipline
- **Water-Resources Discipline**

USGS Water Resources Discipline Mission

The Water Resources Discipline (WRD) of the U.S. Geological Survey provides reliable, timely information needed to understand the Nation's water resources.

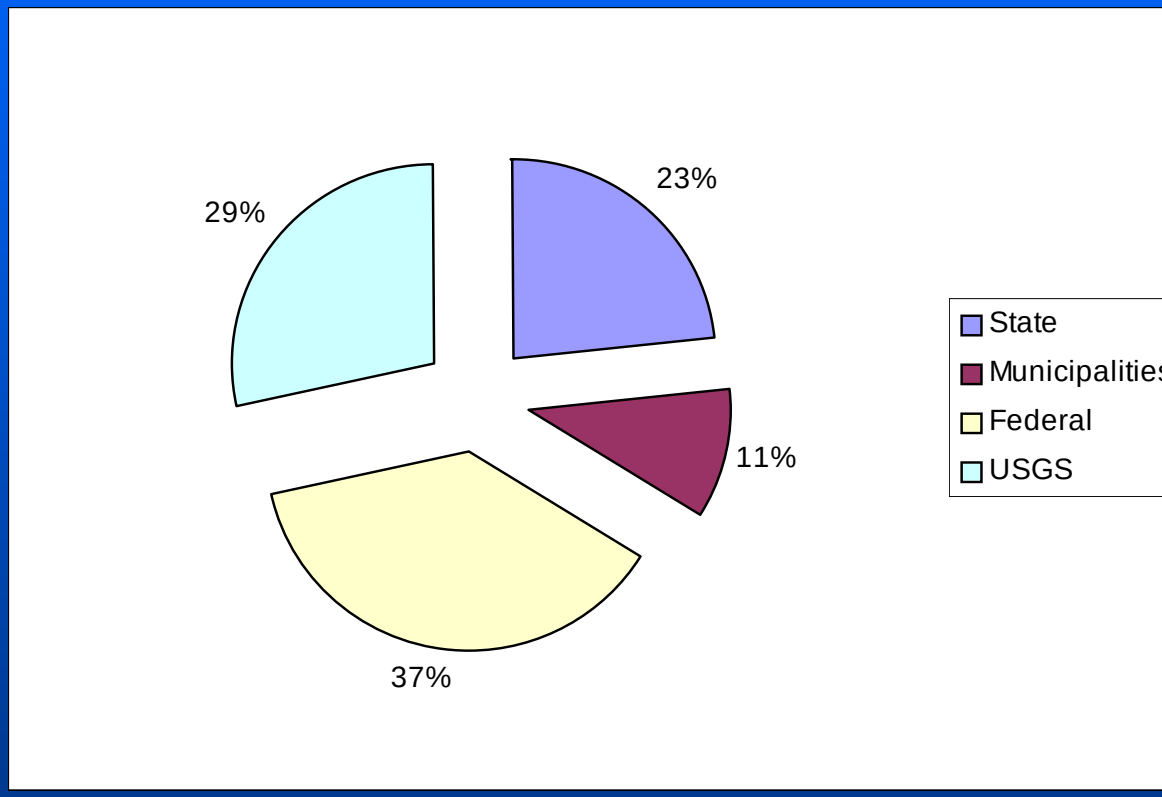
Streamgaging Program in Arkansas

- USGS was established in 1879
- First USGS streamgage in Arkansas was installed in 1903
- 150 streamgages in Arkansas (6/10/11)

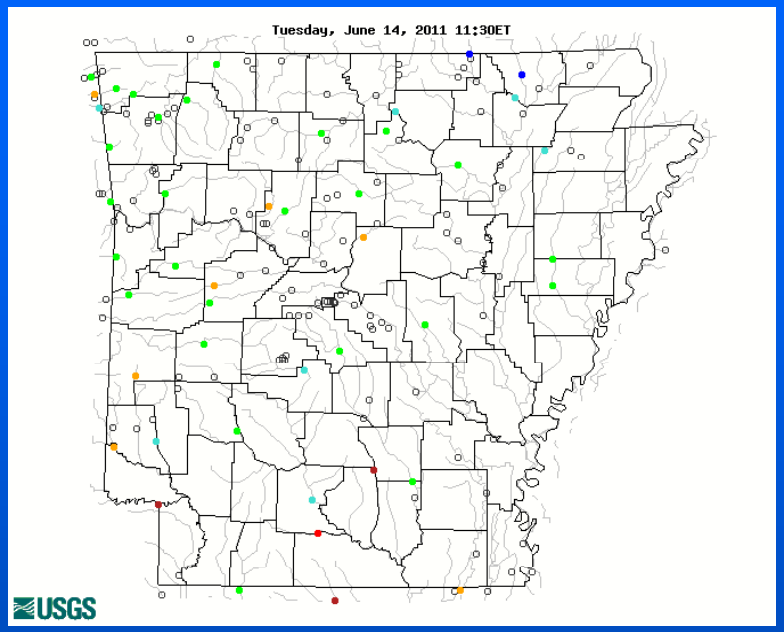
Ouachita River near Malvern

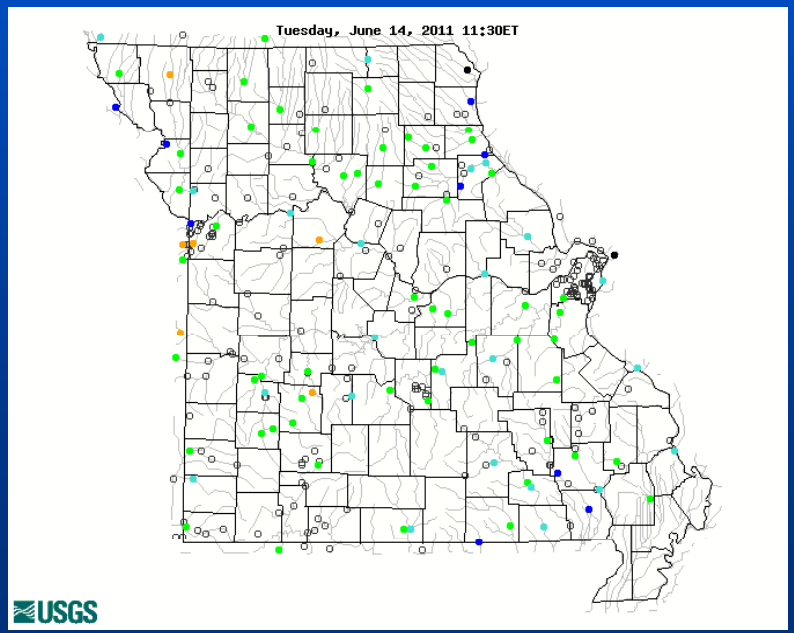
Streamgaging Program in Arkansas

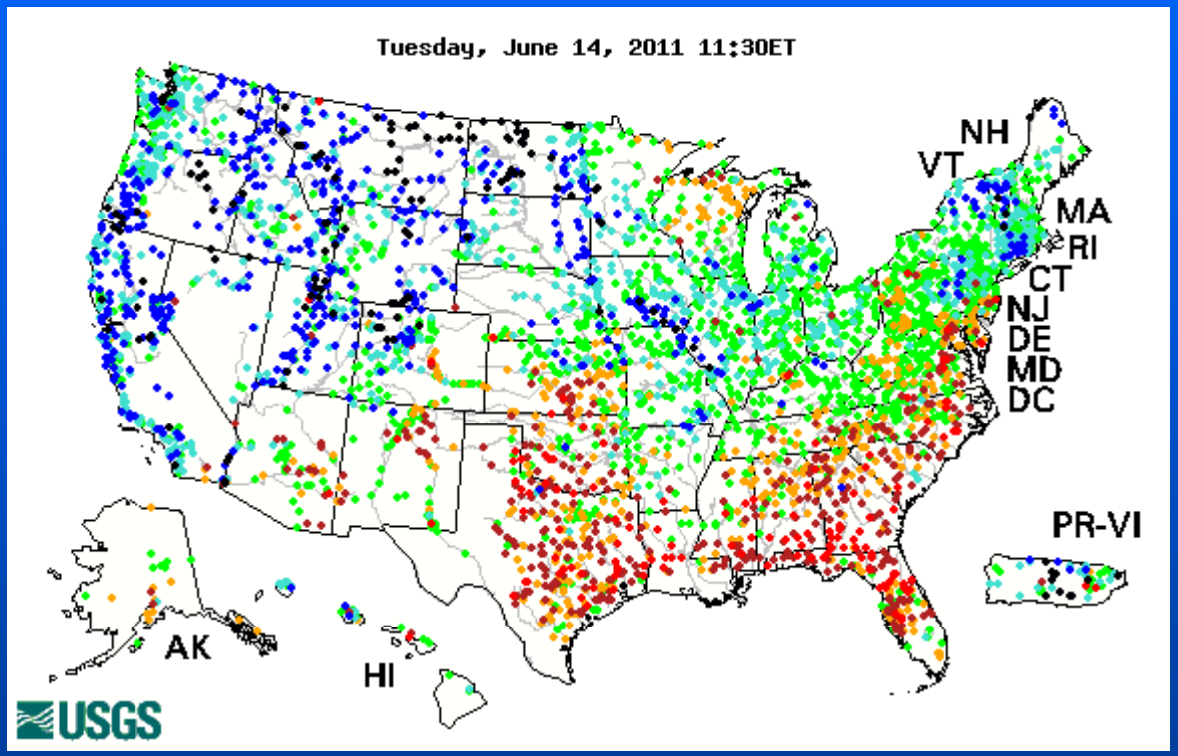
- 5 State agencies (23%)
- 6 Municipalities, 5 Water utility companies (11%)
- 8 Federal agencies (37%)
- USGS Funds(29%)
- 8 private agencies (1%)
- $2.2 million in FY 2011



http://water.usgs.gov/waterwatch/

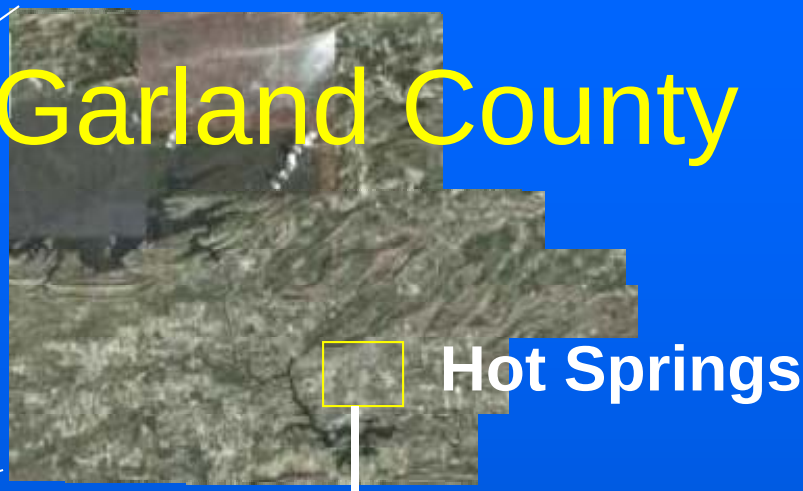


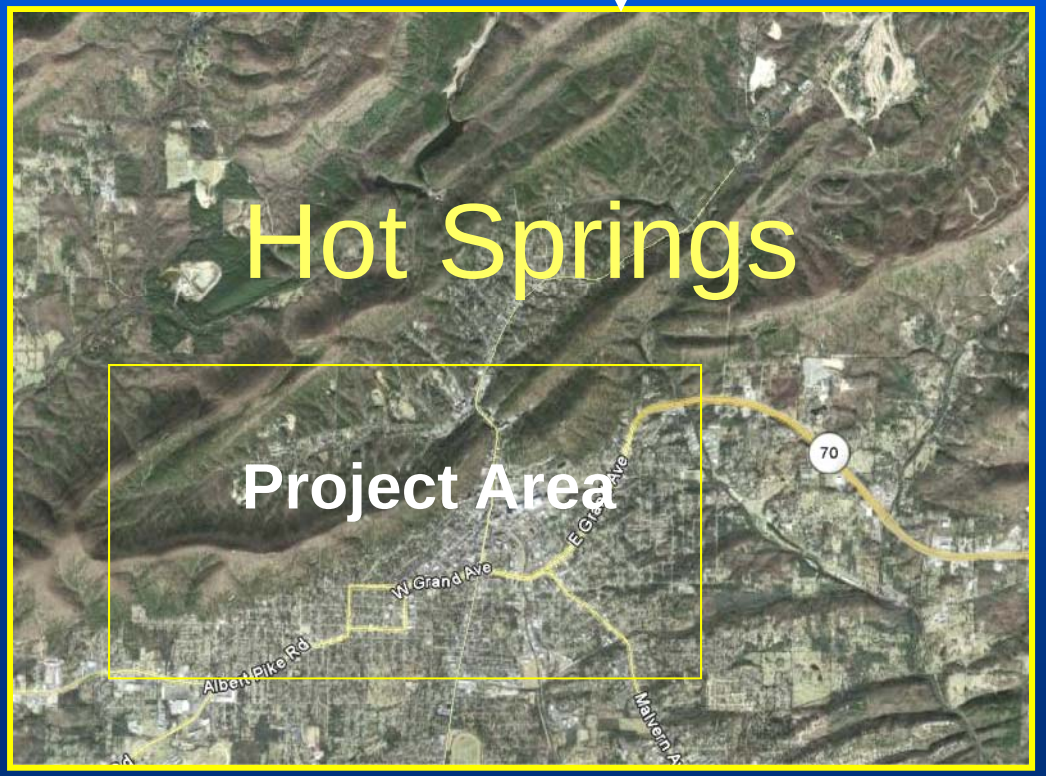




More than 7,500 USGS streamgages Nationwide are in operation today

Project Location





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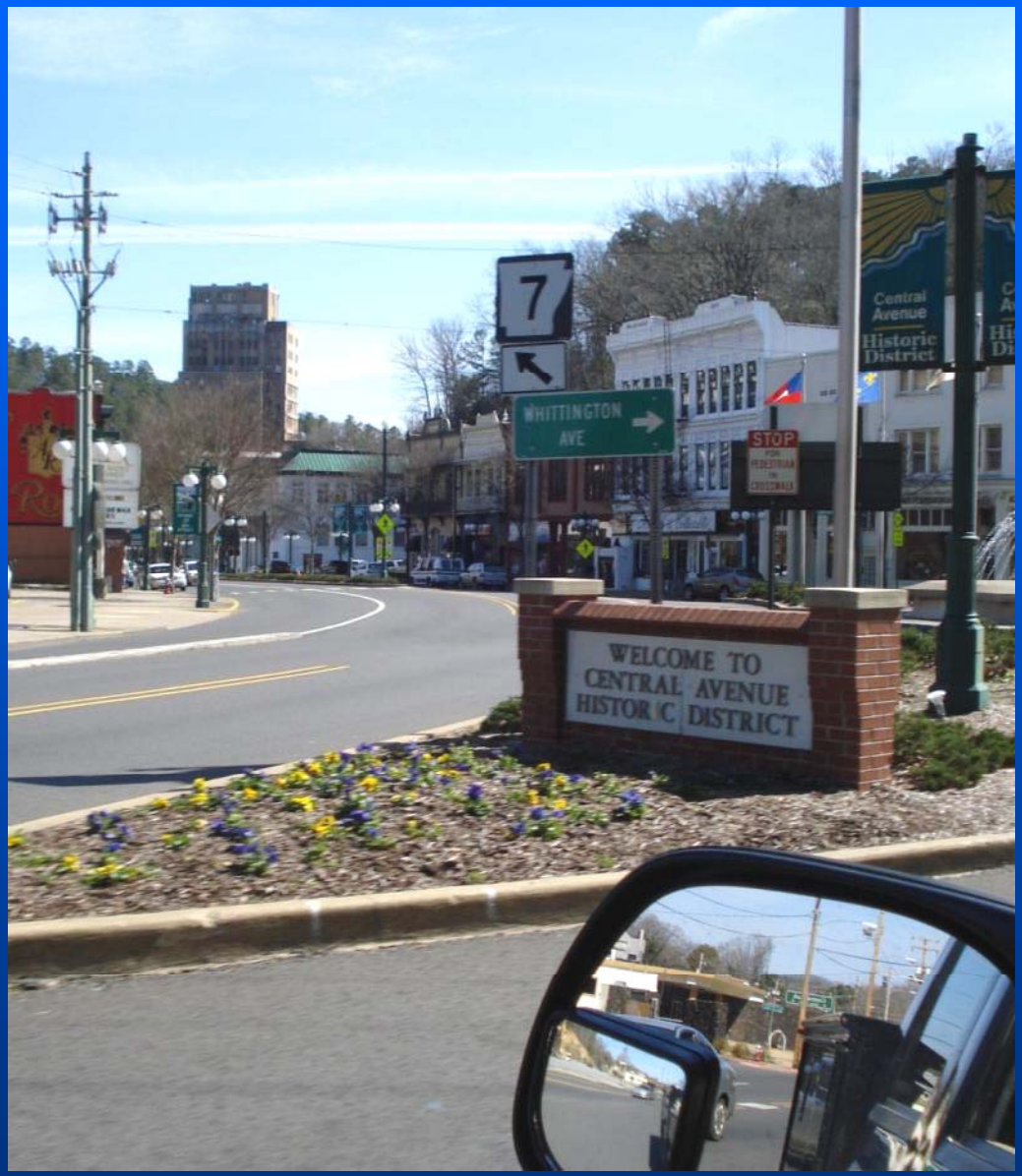
Historical Perspective

- The City of Hot Springs was founded in 1823.
- Whittington Creek joined Hot Springs Creek above the city. The combined flow was routed through the middle of town.
- In 1884 the federal government built the arch enclosing the creek.
- The creek arch (tunnel) forms the base for Central Avenue in the downtown area of Hot Springs.



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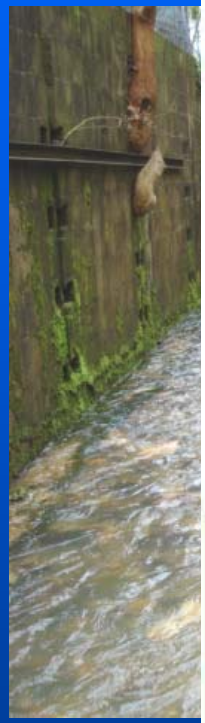
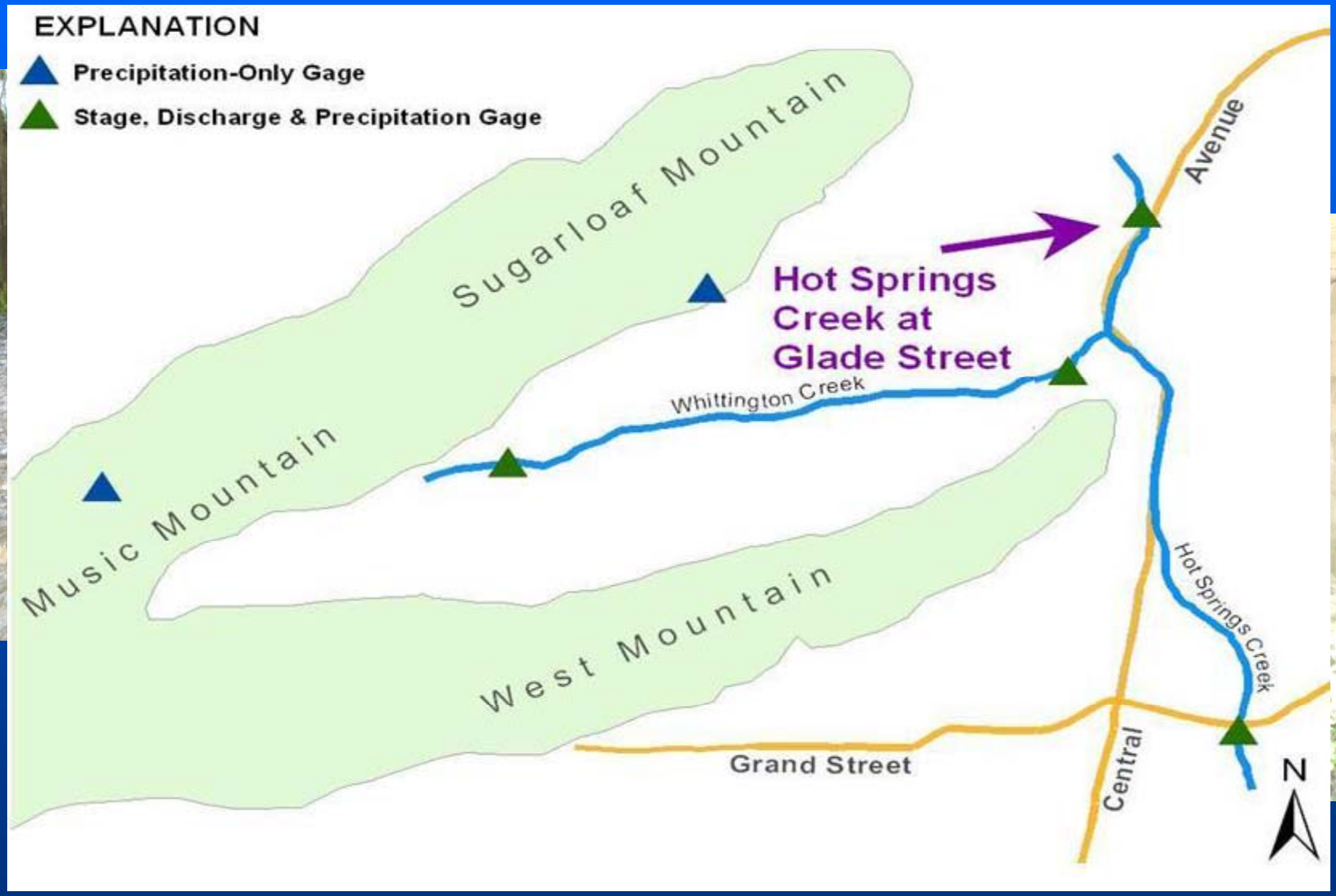
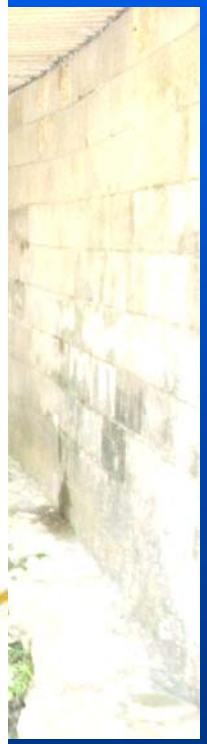
Creek Arch Entrance
Hot Springs Creek at Glade Street







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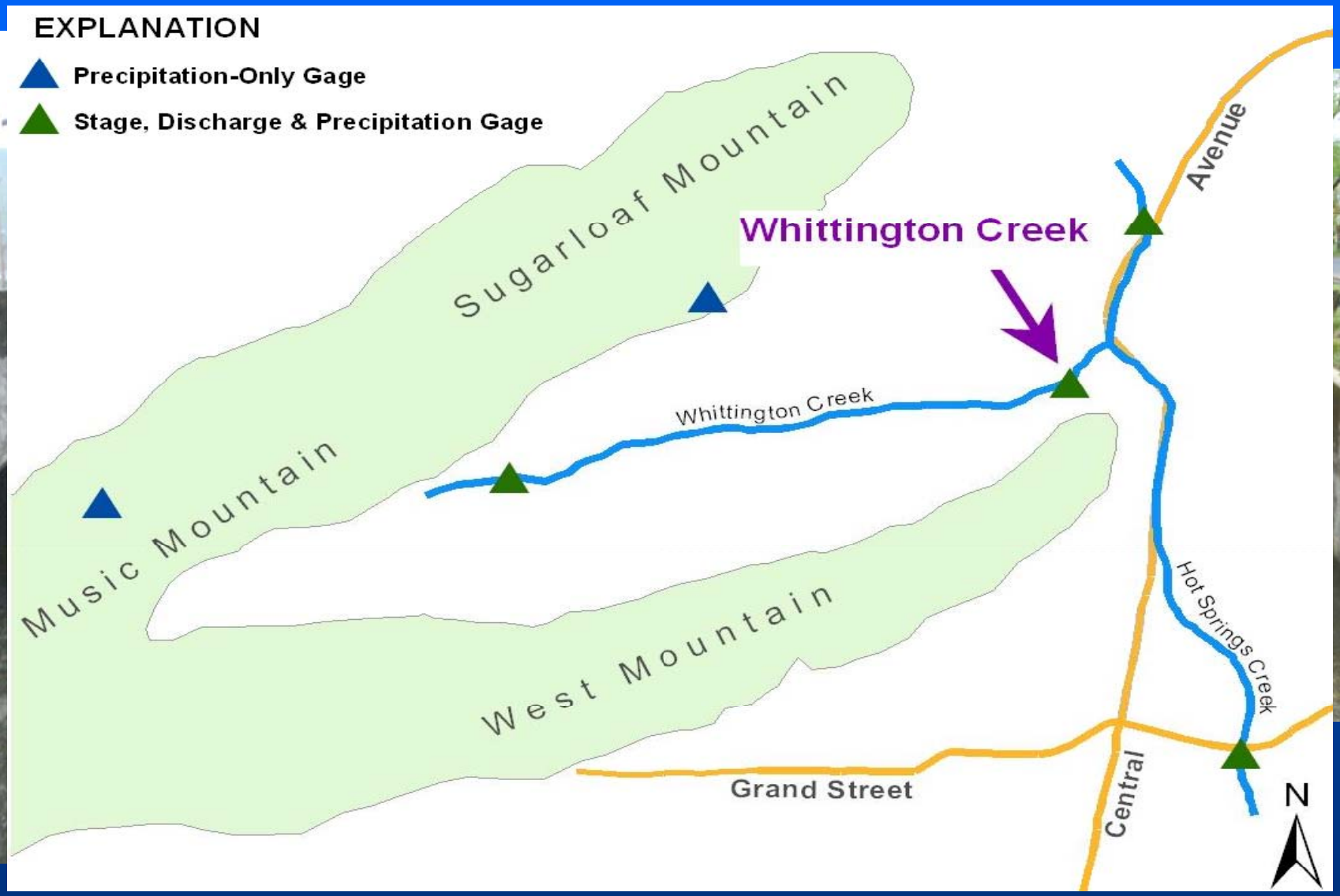
Creek Arch Entrance Whittington Creek



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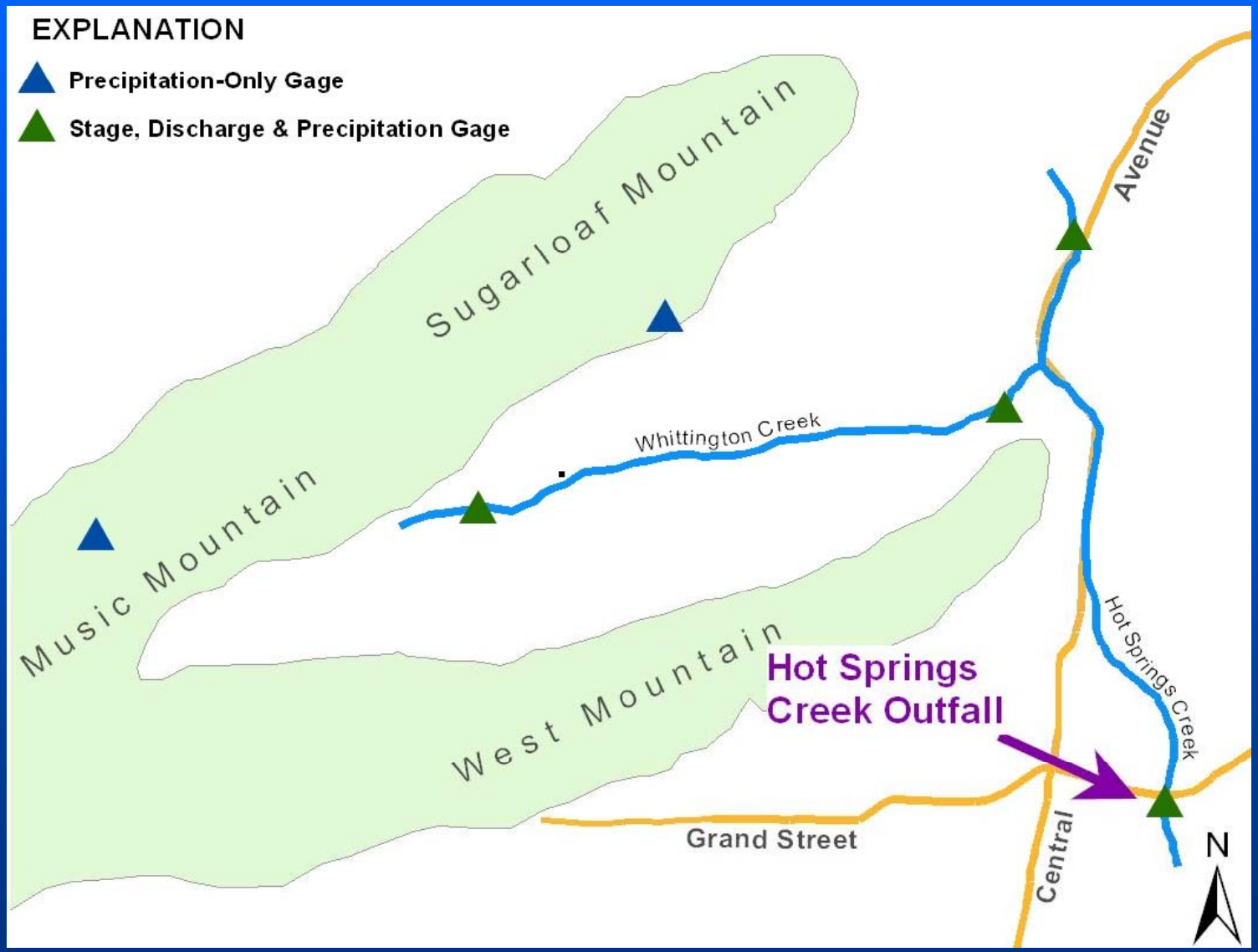
Hot Springs Creek at the Creek Arch Outfall



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Causes of flooding in the downtown area of Hot Springs.

- Steep Relief – average slope value is 20% or 11°
- Impervious ground
- Culvert capacity exceeded

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Documented floods in Hot Springs, 1905

(Photo courtesy of the Garland County Historical Society)

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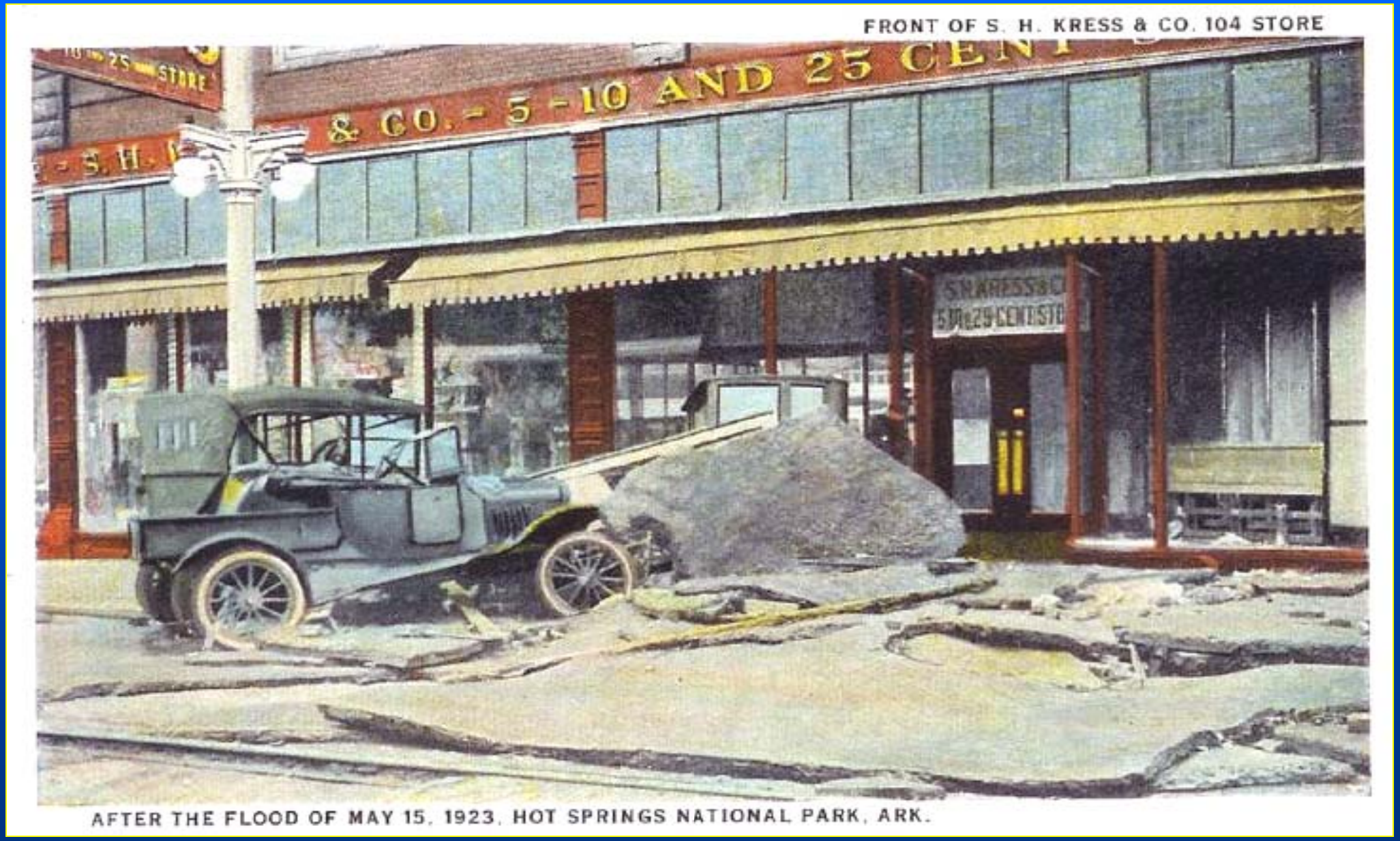
Documented floods in Hot Springs, 1923



(Photo courtesy of the Garland County Historical Society)

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Documented floods in Hot Springs, 1963

(Photo courtesy of the Garland County Historical Society)

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Documented floods in Hot Springs, 1990

(Photo courtesy of the Garland County Historical Society)

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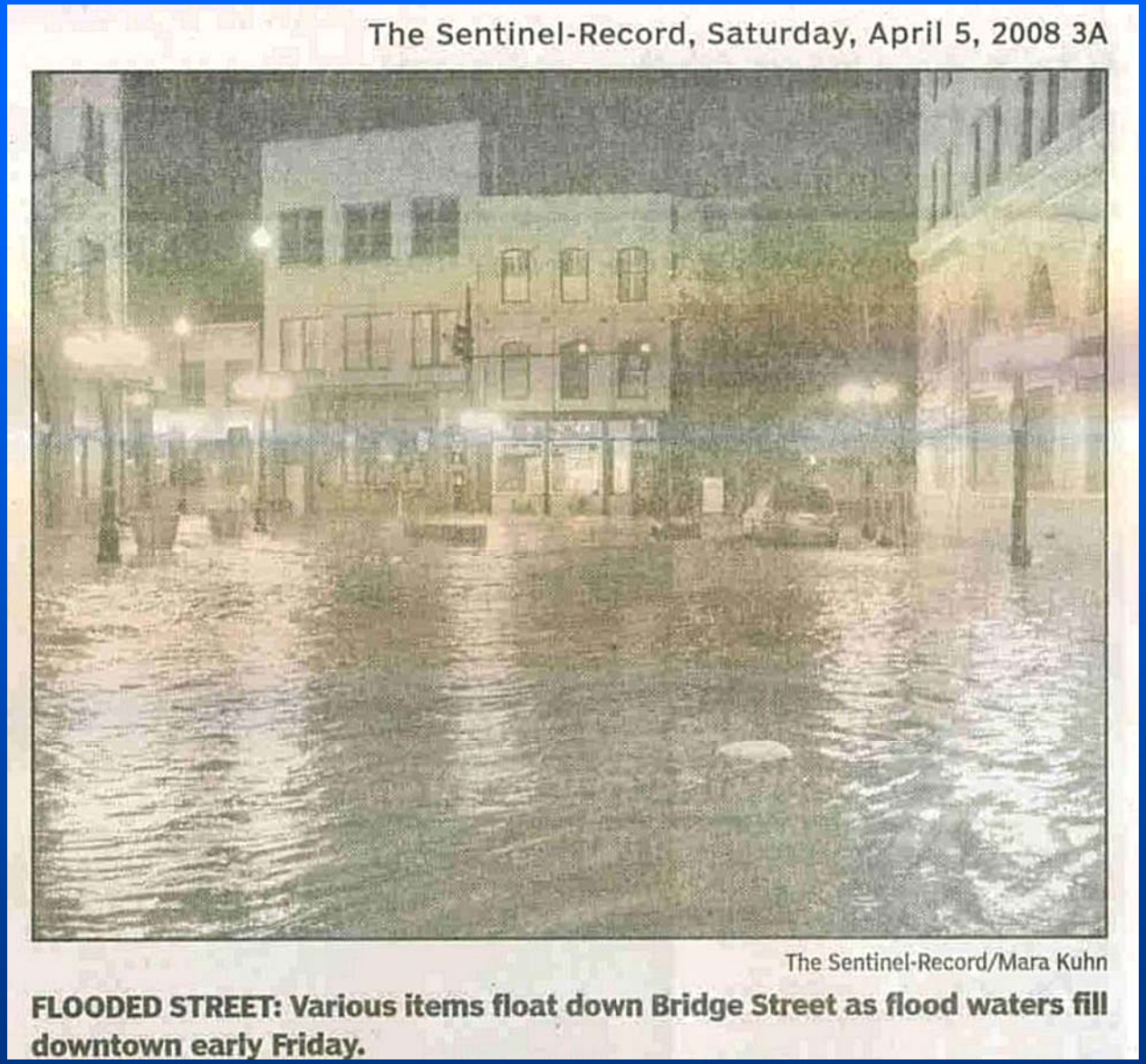
Documented floods in Hot Springs, 2008



The Sentinel-Record, Saturday, April 5, 2008 3A

The Sentinel-Record/Mara Kuhn

FLOODED STREET: Various items float down Bridge Street as flood waters fill downtown early Friday.

(Photo courtesy of the Sentinel-Record)

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Regular flooding prompted the need for a Flood Warning Information System.

- Installation of the Flood Warning Information System began in March 2008. Gages were operational by mid-June.
- The system was designed to provide reliable and timely flooding information to city officials and the National Weather Service.
- National Weather Service can use the data provided by the system to issue more accurate and timely warnings.

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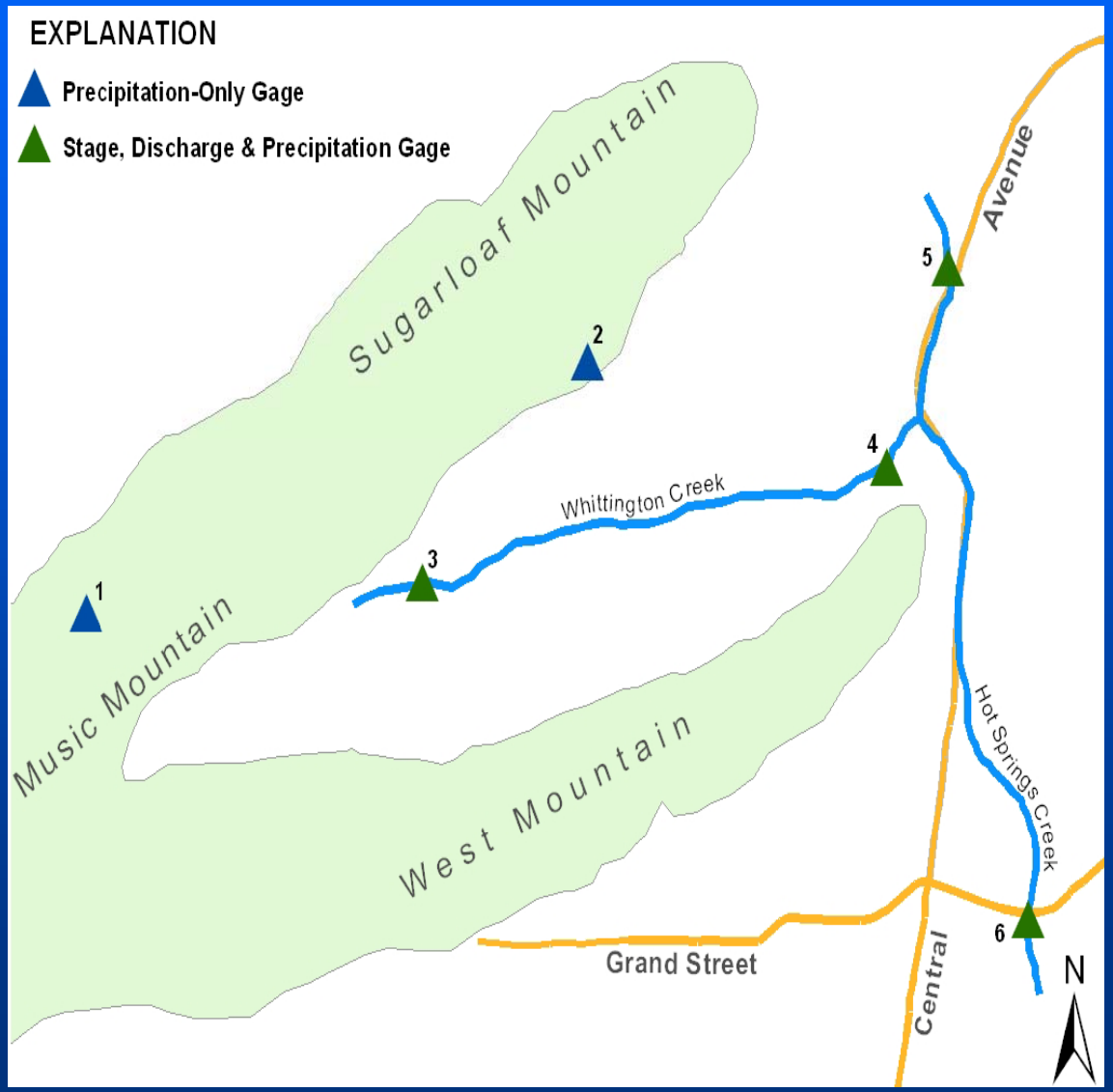
Design of the Flood Warning Information System

- Streamflow, stage and rainfall amounts are transmitted in real time from six gaging stations.
- Gaging station locations were selected to best represent the hydrologic conditions within the respective drainage basin.



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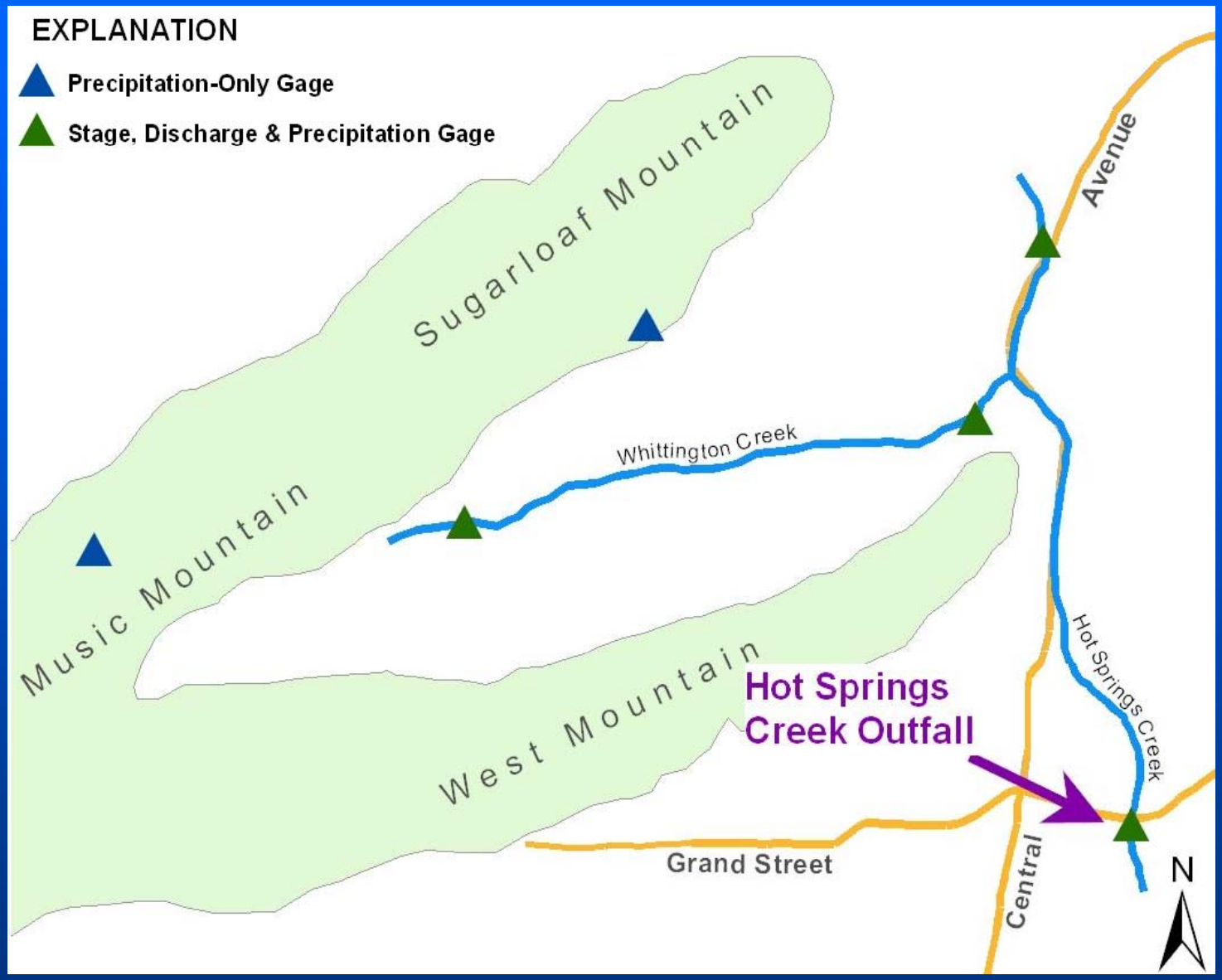
Design of the Flood Warning Information System



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Construction of the Flood Warning Information System

- Streamflow gaging stations were designed to measure water levels with a float-tape weight.

- All gaging stations are equipped with Data Collection Platforms and phone modems.

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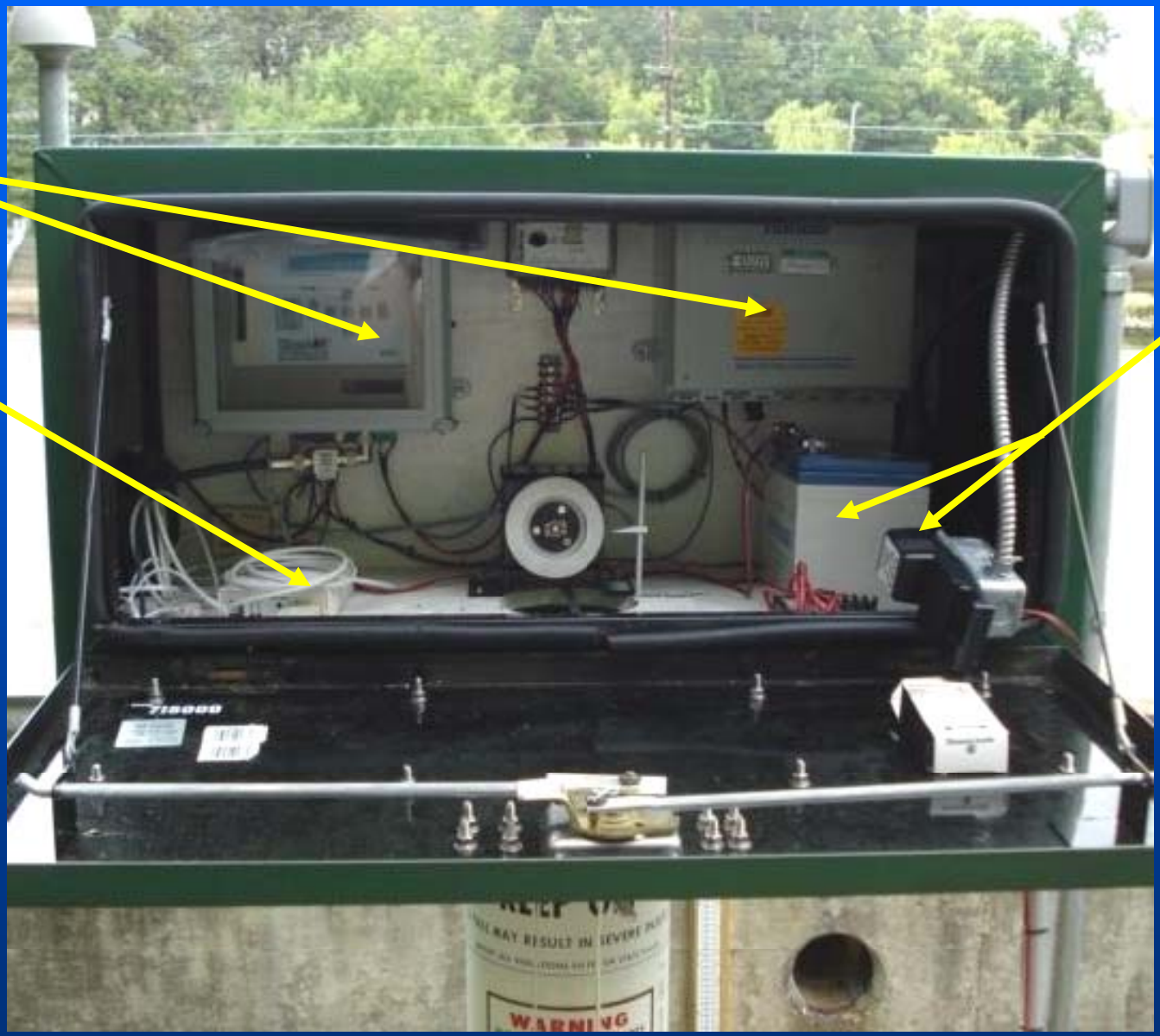
Construction of the Flood Warning Information System

Each streamflow gaging station is equipped with duplicate data loggers (DCP), two phone modems and AC power with battery backup.



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Data Collection

- Data is collected in 5 minute intervals and transmitted hourly.
- Site visits are every 3 to 4 weeks.
- Discharge measurements are made at time of site visits and during flood events to develop rating curve for computation of streamflow.

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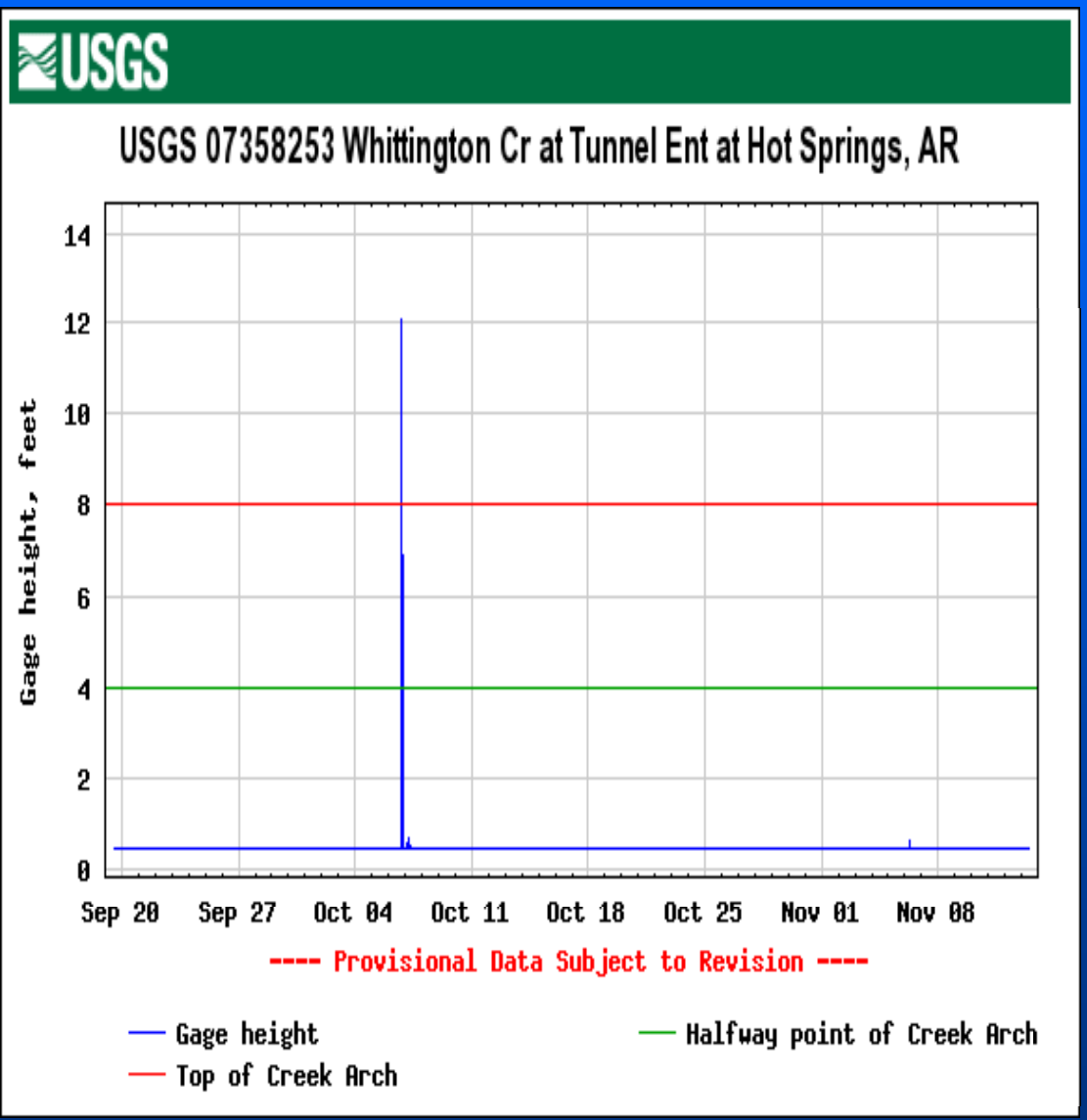
Threshold Levels

Threshold levels are determined by rate of rainfall or stage level.



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NATIONAL WEATHER SERVICE

Call In Procedures

- Select users can call DCPs at all gages.
- Streamflow gages have two phone numbers (one for each DCP).
- When user calls in live readings for stage and rainfall can be obtained.

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HOT SPRINGS
NATIONAL PARK
—ARKANSAS—

NATIONAL WEATHER SERVICE

Call Out Procedures

CALL OUT PHONE LIST FOR ALL GAGING STATIONS

1. Emergency 911
2. National Weather Service
3. Fire Emergency
4. Fire Chief (cell)
5. Emergency Management
6. National Park Service
7. USGS
8. USGS

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HOT SPRINGS™
NATIONAL PARK
—ARKANSAS—

NATIONAL WEATHER SERVICE

Highlights of Cooperative Agreement

- USGS, NWS and Hot Springs developed threshold values
- MOU signed by all agencies
- Funding for FWIS provided by City of Hot Springs and USGS ($115,000 for FY08)
- 2011 O&M for the 6 gages, $60K

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HOT SPRINGS
NATIONAL PARK
ARKANSAS

NATIONAL WEATHER SERVICE

Long term benefits of the Flood Warning Information System

- Allows city officials to alert businesses and residents of potential flooding.
- Assist engineers in the design for retention of floodwaters in upper portion of drainage basin.
- Collection of data can be used for flood frequency analysis.

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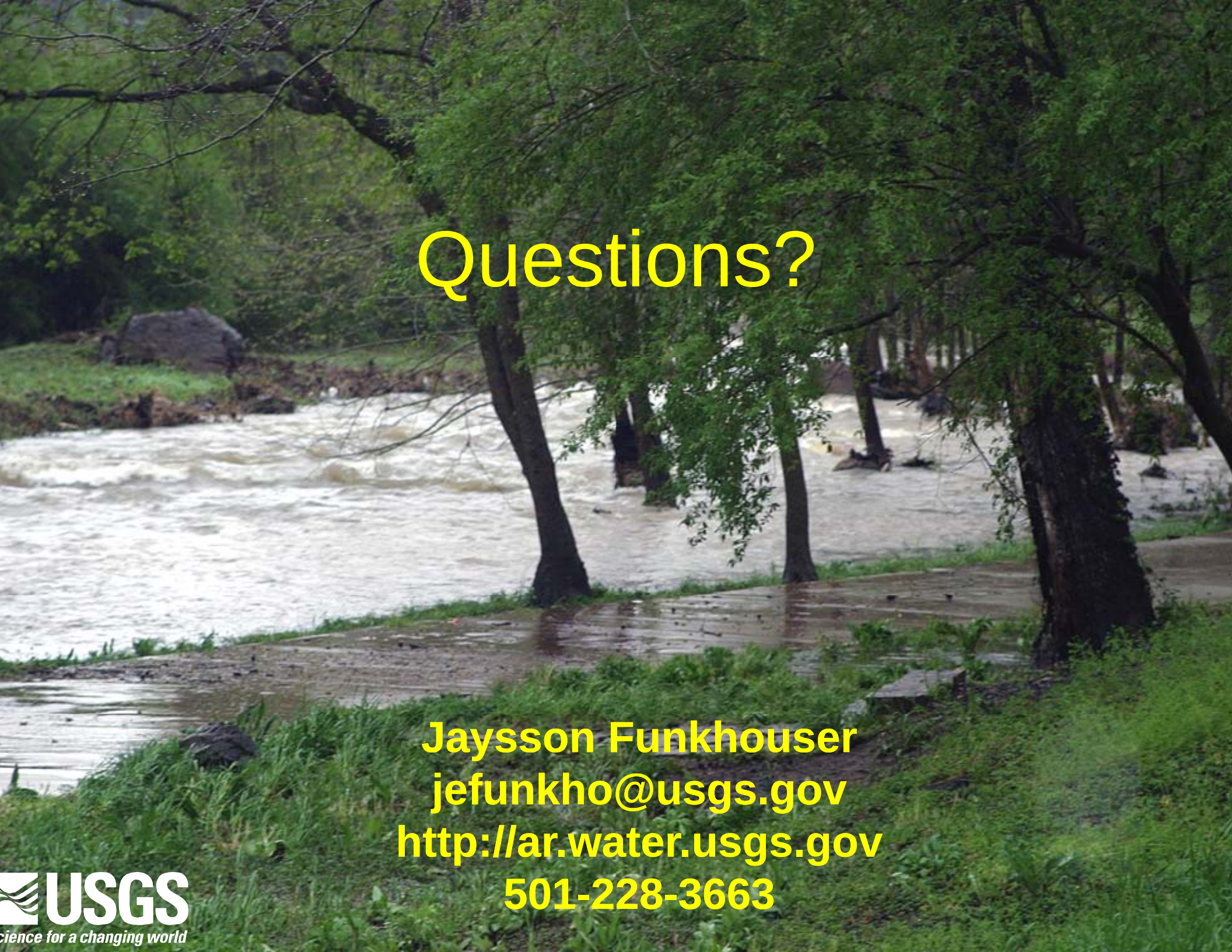
—ARKANSAS—

NATIONAL WEATHER SERVICE


Questions?
Jaysson Funkhouser
jefunkho@usgs.gov
http://ar.water.usgs.gov
501-228-3663
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PREDICTING TIME-OF-TRAVEL
ON ARKANSAS STREAMS
USGS
science for a changing world

Objectives

- Develop a traveltime prediction equation using hydrologic data from Arkansas

Approach

- Collect traveltime data (dye trace) at 33 reaches on 18 different streams in Arkansas to create an Arkansas site specific data set
- Perform a regression analysis on the Arkansas data set to develop an accurate traveltime prediction equation for use on Arkansas streams

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Site Locations

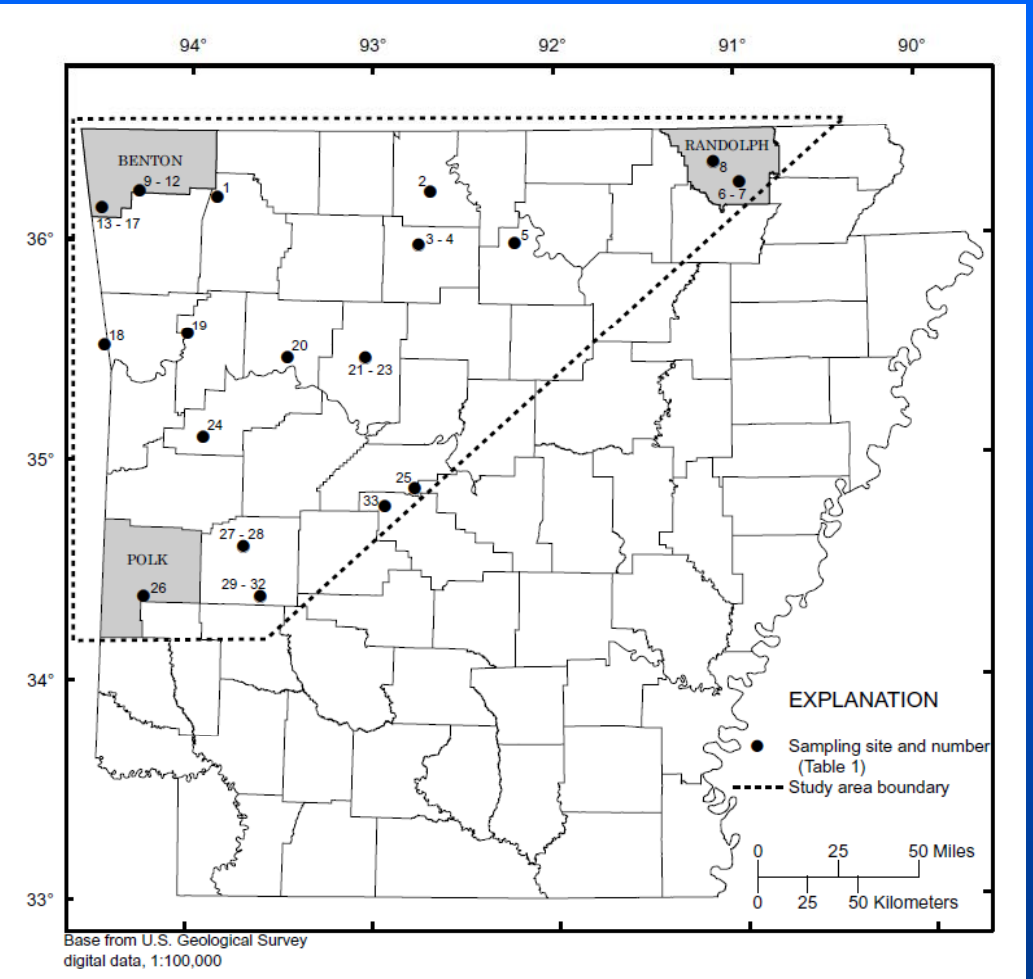

Figure 1. General location of sampling sites.

- Sites were picked based upon available hydrologic data (gaging station streamflow data)
- Little or no flow regulation
- Most have municipalities that rely on surface water as their primary source of drinking water

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Traveltime Equation Developed Using the Arkansas Data Set

$$Vp = 0.0639 \times Q/Da^{0.695} \times S^{-0.392} \times 1.06$$

where,

- Vp = velocity, in feet per second
- Q = discharge, in cubic feet per second
- Da = drainage area, in square miles
- S = slope, in foot per foot

USGS 2011 FLOOD RESPONSE IN ARKANSAS

A BRIEF PERSPECTIVE

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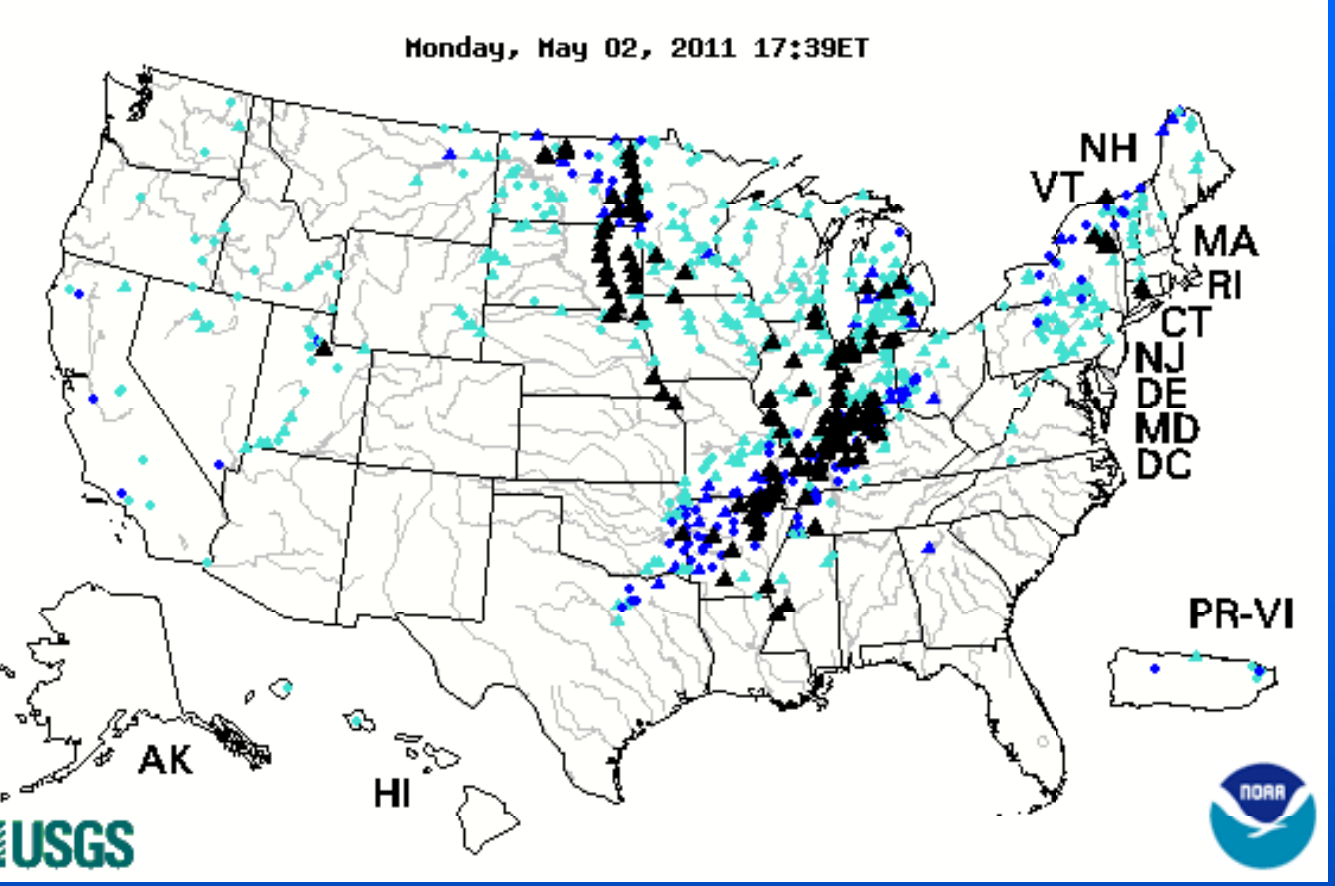
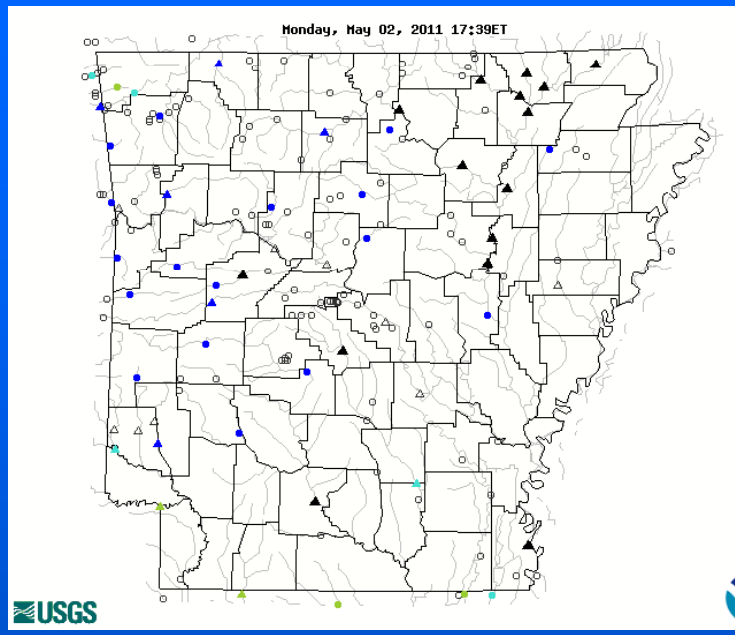
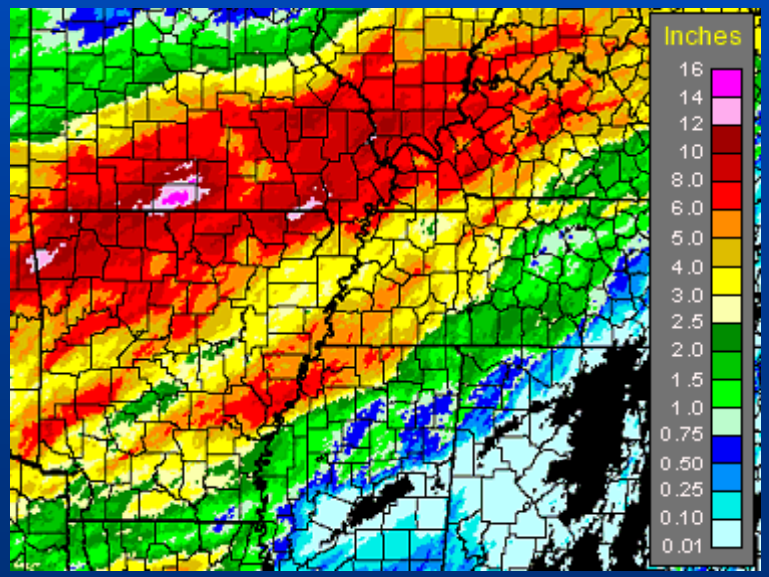
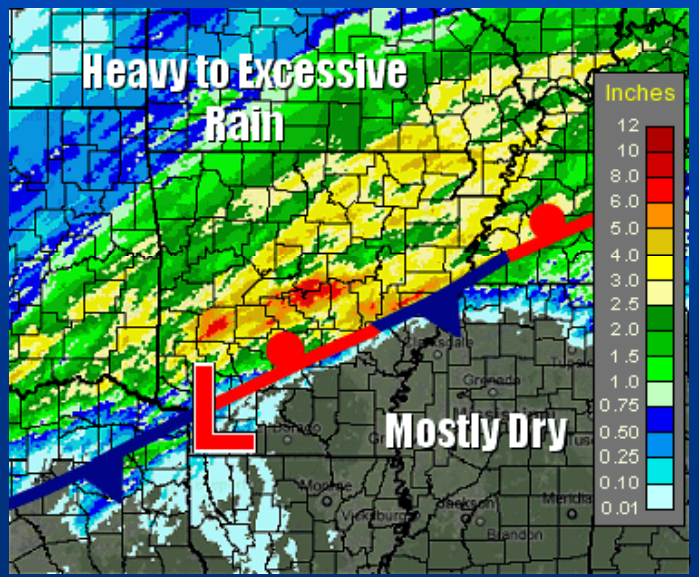






April 23 – 27, 2011



April 30 – May 2, 2011

USGS
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Monday, Apr 25, 2011

Governor Beebe Declares State of Emergency in Response to Severe Storms and Flooding

On May 5th, evacuations were ordered at Gregory, McClelland and Cotton Plant (all in Woodruff County) due to overtopping of the levee along the White River and a swollen Cache River.

USGS science for a changing world

How does continuous streamflow data help during floods?

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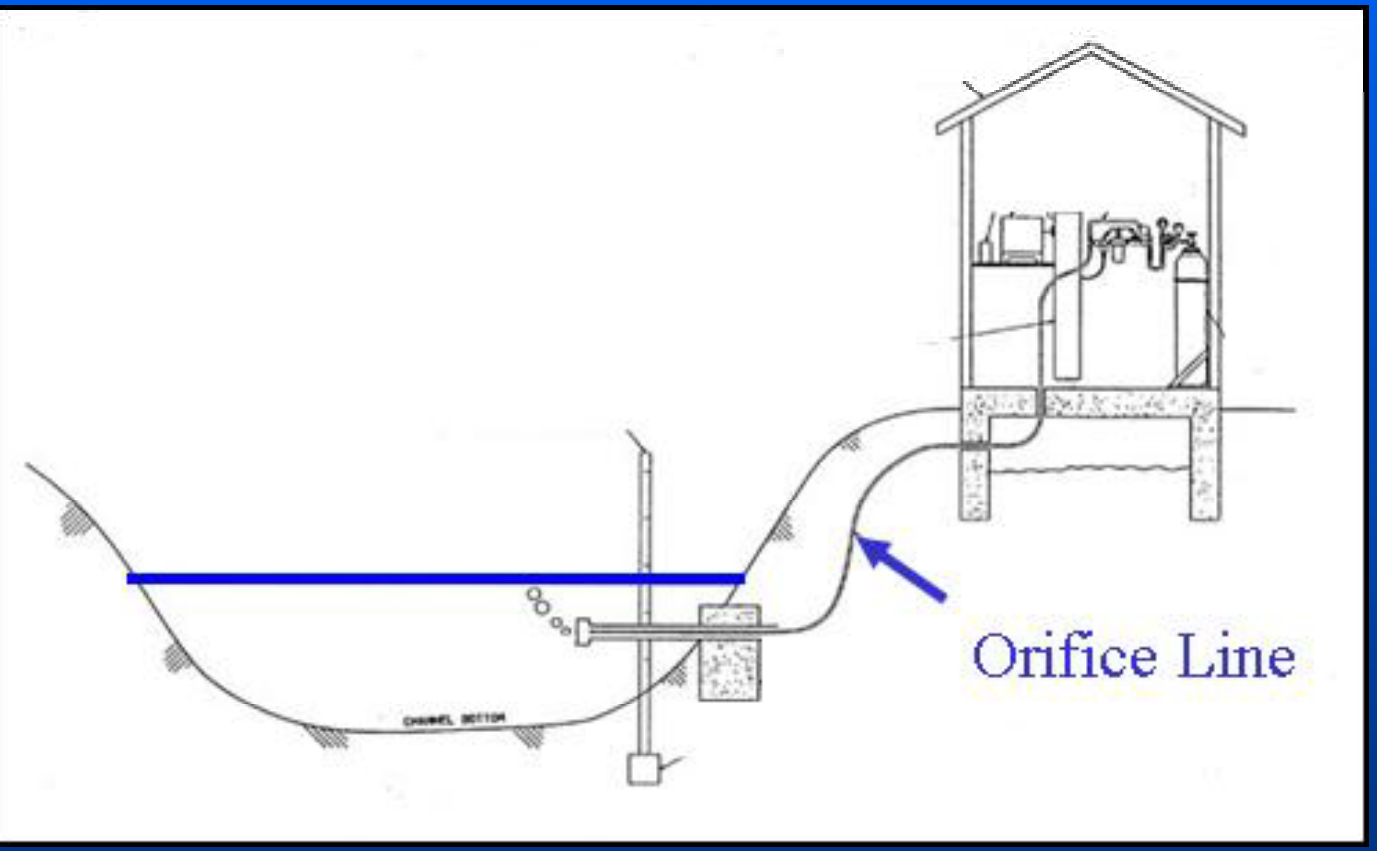
Collecting Streamflow Data



Cypress Creek

Near Birdtown, AR

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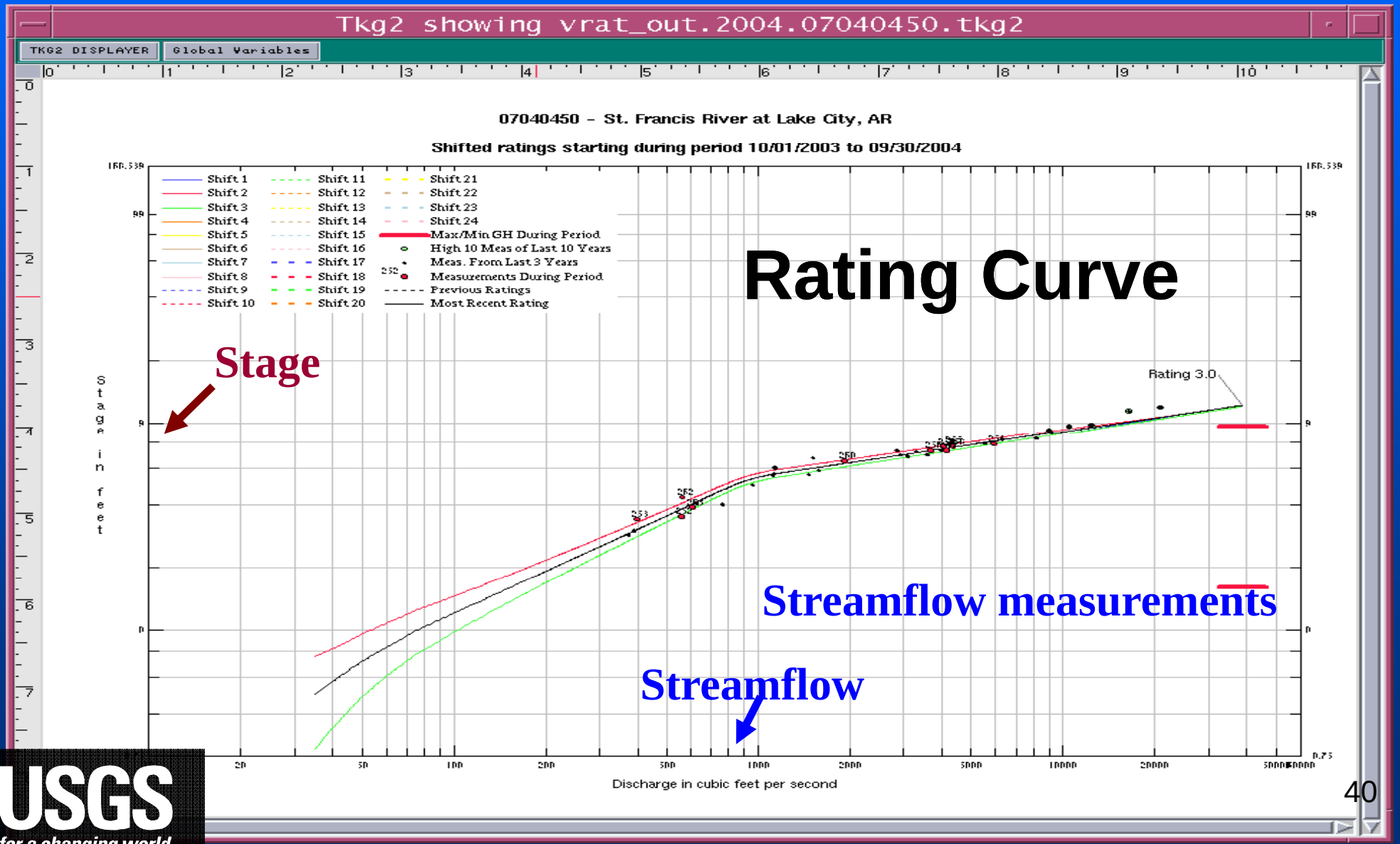
Collecting Streamflow Data



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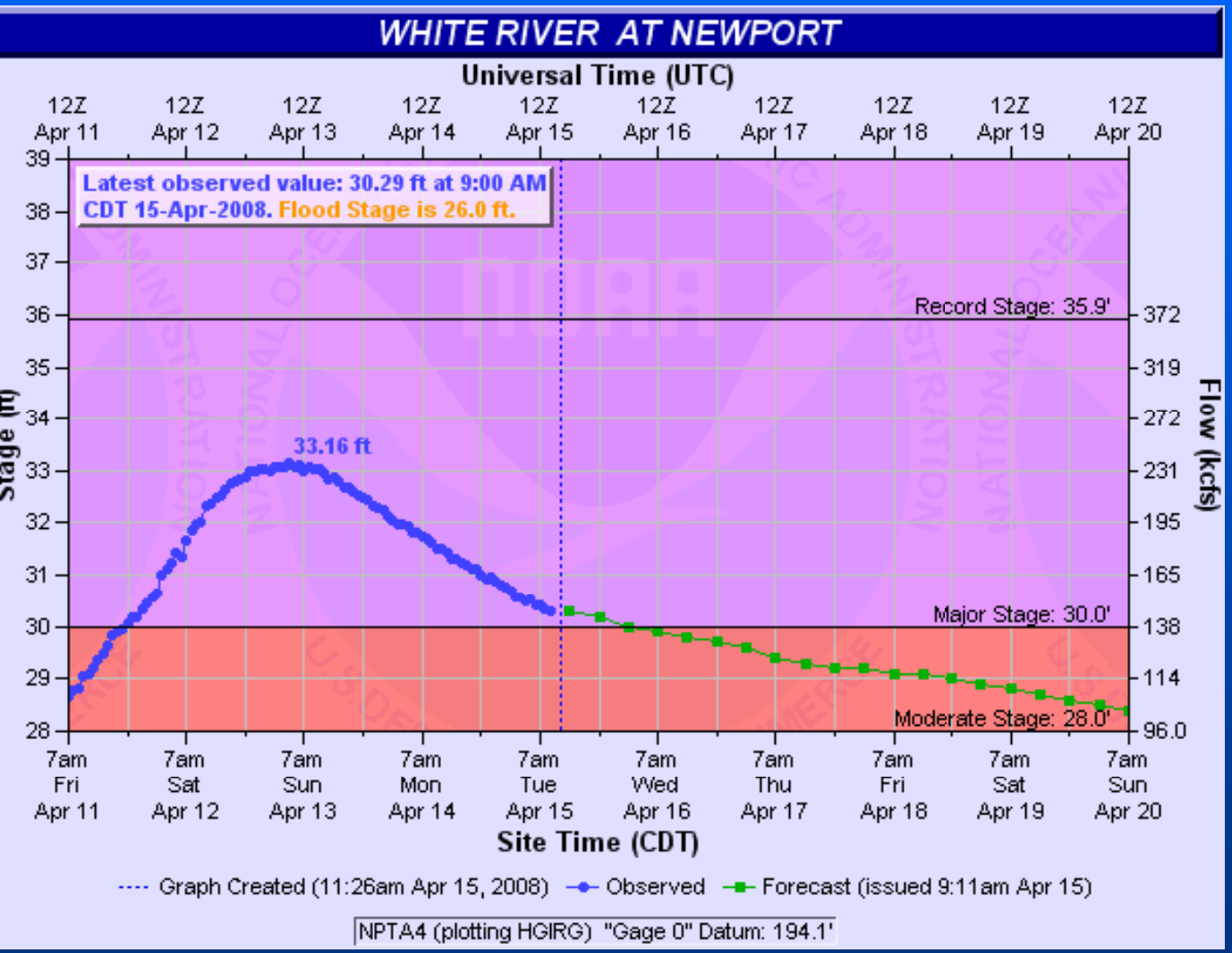
Continuous streamflow data provides information for NWS flood forecasts



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Continuous streamflow data provides information for flood control

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What was so unique about the 2011 floods?

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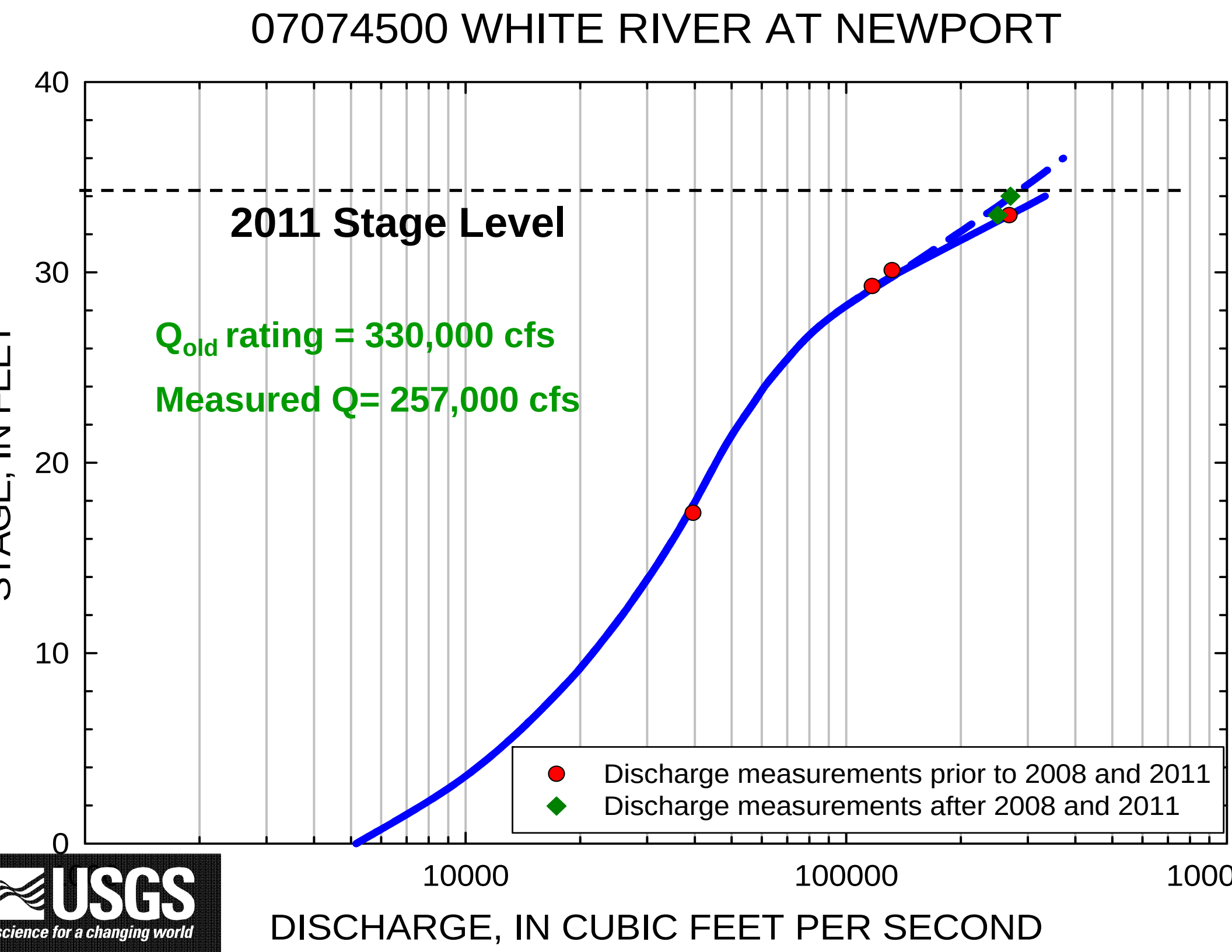
07074500 WHITE RIVER AT NEWPORT
40
30
20
10
0
2011 Stage Level
Q_{old} rating = 330,000 cfs
Measured Q= 257,000 cfs
Discharge measurements prior to 2008 and 2011
Discharge measurements after 2008 and 2011
10000
100000
1000
DISCHARGE, IN CUBIC FEET PER SECOND
USGS
science for a changing world

Photos courtesy of

Tabitha Clarke

USGS

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Photos courtesy of

Tabitha Clarke

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Salvage & Marine Firefighting Initiatives

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Homeland Security

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Recent Marine Fires

- M/V MEGA BORG—May 90
- M/V OMI CHARGER—Dec 93
- M/V KORNAT—Apr 97
- M/V ARCTIC HOPE—Aug 97
- M/V STOLT SPIRIT—Nov 97
- M/V ARTIC SPIRIT—Feb 98
- M/V KATANIA—Mar 98
- M/V ATLANTIC EXPLORER—Feb 99
- M/V VIOLETTA—Dec 99
- MODU TODDCO 252—May 05

Several smaller incidents not listed.

Mission Statement

- The Salvage & Marine Firefighting Working Group develops plans, conducts training, and implements procedures to assist Incident Command personnel minimize the impact of fires and related events to the Marine Transportation System.

S&MFF Supporting Agencies

- US Coast Guard
- Federal Bureau of Investigation
- Texas Forest Service
- Texas Engineering Extension Service
- Texas Fire Chiefs' Association
- Houston-Galveston Area Council (COG)
- Harris County Fire Marshal's Office
- Harris County Sheriff's Office
- Galveston County Office of Emergency Management
- Houston Fire Department / Houston Police Department
- Baytown Fire Department
- Galveston Fire Department
- Texas City Fire Department
- Freeport Fire Department
- Greater Houston Local Emergency Planning Committee
- Channel Industries Mutual Aid
- Texas City Industrial Mutual Aid System
- Brazosport Marine Advisory Team
- Williams Fire & Hazard Control
- Wild Well Control
- Garner Environmental Services
- Clean Harbors
- Eagle-SWS
- Response & Training Solutions
- Industrial Fire World / Fire Training Safety Associates
- NFPA 472 Technical Committee

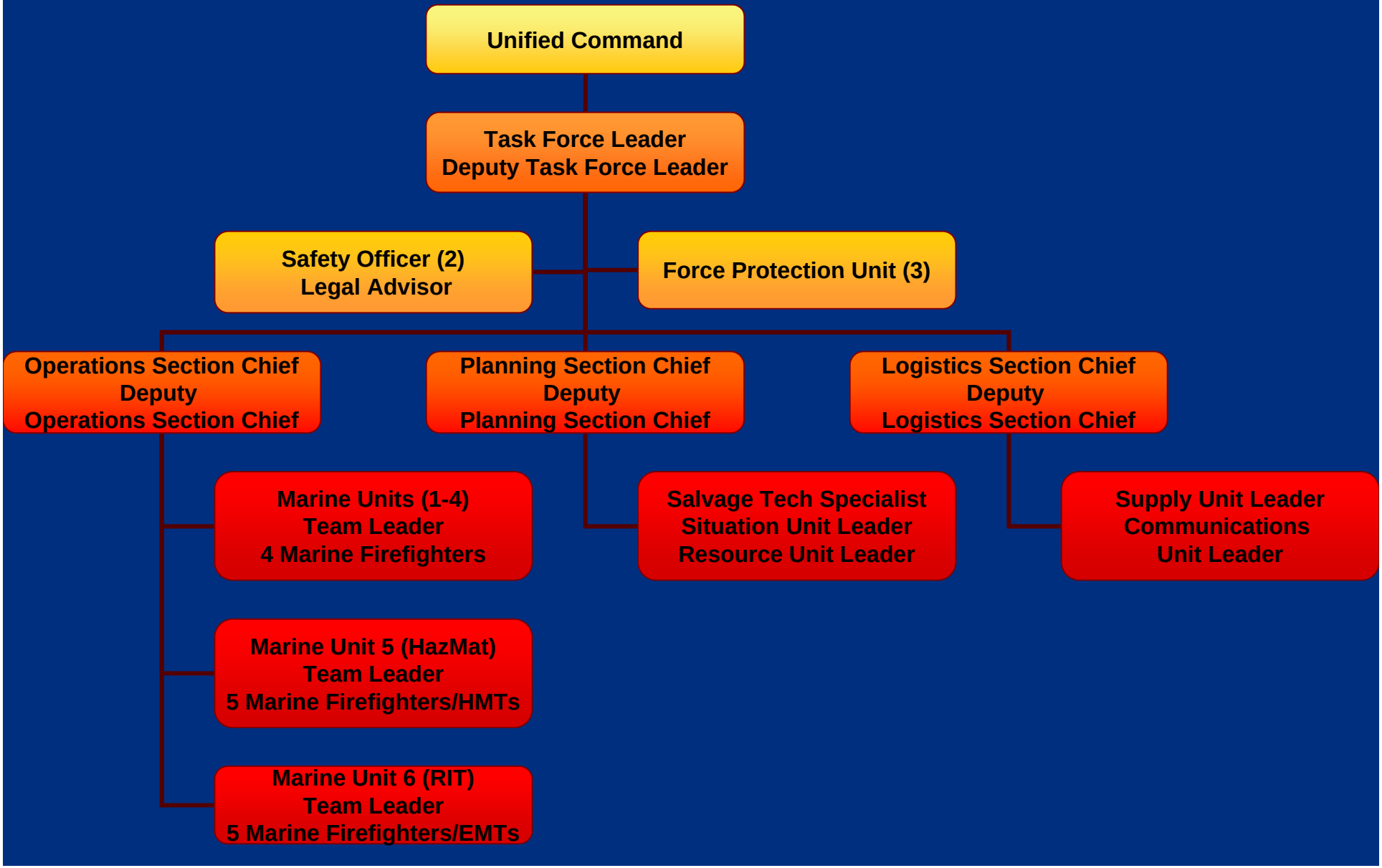
Marine Firefighting Task Force

- Multi-agency response task force developed to facilitate response operations to significant marine fires and other events.
- 51-person team, based on the US&R model (such as TX TF-1) capable of responding anywhere within the COTP Zone within 2 hours.
- Self-sustaining for up to 24 hours with potential deployment for 48-72 hours.

Marine Firefighting Task Force

- MFFTF will "bridge the gap" between the time that the on-scene firefighting resources need additional support and the arrival of contracted firefighting services.
- MFFTF will not take the place of or compete with contractor resources capable of performing similar services. Upon the arrival of these services, the MFFTF will begin demobilization activities.

MFFTF Organization



MFFTF Deployment

- **Type-5 Response** – Local agency response to a Marine incident with local resources only. MFFTF not expected to respond in any formal role. Individual members may be responding with their home organization.
- No MFFTF response required (notification only).
- *Example—Galveston Fire Department responds to a marine incident on board a vessel at Pelican Island.*

MFFTF Deployment

- **Type-4 Response** – Local agency with local mutual aid organization. MFFTF would be called to provide IMT/overhead support elements for the local agency Unified Command.
- Task Force Leader/Deputy, Safety Officer(s), Operation, Logistics, and Planning Section Chiefs/Deputies.
- *Example—Houston Fire Department requests CIMA assistance to a container ship fire at Manchester terminal and MFFTF is requested for IMT support.*

MFFTF Deployment

- **Type-3 Response** – Provide expanded IMT/overhead support element(s) for Unified Command. Begin to prepare for full MFFTF response if needed.
- Task Force Leader, Safety Officers, Operation, Logistics and Planning Section Chiefs, Deputy Task Force Leader, Deputy Section Chiefs & Resource Unit Leader & Situation Unit Leader. Force Protection Unit as needed.
- *Example – Shell Oil Company has a crude oil tanker engine room fire and requests CIMA assistance. CIMA requests MFFTF assistance for vessel fire at Shell-Deer Park.*

MFFTF Deployment

- **Type-2 Response** – Regional MFFTF support to a local agency under Unified Command (provides IMT support and Operations Section response). This may also include additional state resources and organizations.
- Entire MFFTF deployed.
- *Example—Entire MFFTF support of an incident in the Port of Freeport.*

MFFTF Deployment

- **Type-1 Response** – Catastrophic incident beyond Regional Team/ MFFTF capability which requires state or national resources working with Unified Command. This may include local agencies, MFFTF, state and national resources.
- Entire MFFTF deployed.
- *Example—State or national support to region in support of a catastrophic incident within the Port of Houston.*

MFFTF Employment

- Initial response by ship's crew, municipal fire department, or industrial fire brigade.
- Consultation between Incident Commander and USCG COTP may lead to activation of all or a portion of the MFFTF (based on Type 1-5 response).
- Team employed as appropriate.
- Team begins demobilization upon arrival of contracted firefighting services or upon incident termination.

S&MFF Training Opportunities

- **Marine Firefighting Training**

  Task Force Training during implementation phase
  Quarterly training after Task Force activation
  Exportable training to municipal/industrial fire services
  Regional Salvage & Marine Firefighting Seminars (annually)
  Stakeholder education

- **Ride-Along Programs**

  Houston Fire Department HMRT
  Harris County HMRT
  USCG Container Inspection Program

- **Joint Training / Operations**

  6th Civil Support Team
  Texas Task Force-1
  Channel Industries Mutual Aid

Activities

- Marine Firefighting Seminars
  --April 2011 in Galveston
  --September/October 2011 in Houston
- Annual update to Central Texas Coastal Area Contingency Plan
  --Salvage & Marine Firefighting Work Group
  --Detailed info on Salvage & Marine Firefighting Capabilities
  --Expanding work group to include more municipal responders
- Develop/Implement NFPA-472 Marine Specialist Training
  --Completed first delivery during IAFC HazMat Teams Conference
  --Follow-on course at Hot Zone Conference (Houston, TX in October)
- Review NFPA 1005 Guidelines w/ TEEX (ongoing)
- $250,000 UASI Funding—Initial Equipment (SFFPE-Radios)
- $500,000 UASI Funding—Equipment and Training

Notable Achievements

- Over 650 emergency responders trained in basic, intermediate, and advanced marine firefighting since 1998.
- MFFTF members worked with CTAC and NFPA 472 Technical Committee to develop Marine Tank Vessel Specialist standards—first course delivered in May 2011.
- Enhanced interest in marine firefighting activities noted in all port areas.
- Implementation of a regional Incident Management Assistance Team initiated by MFF Work Group.
- Statewide recognition through State Firemen's and Fire Marshal's Association.
- Salvage & Marine Firefighting Work Group members are nationally sought-after speakers at a variety of conferences.


U.S. DEPARTMENT OF HOMELAND SECURITY
FIREFIGHTING
MARINE
TASK FORCE
TEXAS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OSHA Exposure Assessment Onshore and Offshore in the Deepwater Horizon Oil Spill Response

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OSHA Occupational Safety and Health Administration

OSHA Activities

- Ensure that workers have safety and health training and protection necessary to avoid injuries and illnesses
  - Technical Assistance to UC and Agencies
  - Conduct Interventions
  - Develop and implement exposure assessment and sampling strategy

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OSHA Worker Exposure Assessment and Sampling Activities

- Information collected on employers, workers, and work tasks (standard form)
  - Hazards
  - PPE
  - Controls

- Sampling Strategy
  - Three (3) work zones
    - Onshore
    - Near shore
    - Offshore
  - Sixteen (16) specific work tasks

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Sampling Tasks

1. Manual scraping
2. Sump and pump/vacuum
3. Manual removal of oil materials
4. Low pressure flushing
5. Manual sorbent application
6. Manual cutting
7. In-situ burning
8. Vacuum truck, vacuum pumps, portable skimmers
9. Oil mop
10. Recovery of oil from groundwater
11. Marsh-non shore cleanup operations (SCAT)
12. Skimming
13. High pressure cleaning
14. Manual removal of solid tar balls
15. On shore support
16. Float support

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Developing the Sampling Strategy

- Data from previous incidents
  - Consultation with SLTC Laboratory
- Data from this incident
  - Crude Oil Vapors
  - Weathered Oil
  - Headspace Analysis of Bulk Samples
  - Air Chemistry (NOAA)

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Preliminary Sampling Data
Crude Oil Vapors

- SUMMA canister sampling of “fresh” crude oil vapors at spill site
- Samples taken directly above the oil surface and also on vessel surfaces
- Most substances were non-detectable
- Detected substances: 2-400 ppbv
- Concentrations were lower at vessel deck level compared to water surface
- Water soluble compounds go into solution (> 1 mile of seawater)
- Less soluble, smaller MW compounds rapidly volatilize into atmosphere

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Preliminary Sampling Data
Weathered Oil

- Samples analyzed by two separate laboratories
- Lower MW hydrocarbons were non-detectable (BTEX, etc.)
- Lowest MW hydrocarbon detected was C14
- Naphthalene was detected using more sensitive method at 0.1 mg/kg oil (just above the detection limit)

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Bulk Headspace Analysis

- Used qualitative mass spectrometry to evaluate volatiles in bulk samples of weathered oil
- At 80^{o}C (176^{o}F) no volatiles were detected in headspace
- Test re-run at 120^{o}C (248^{o}F)
  - C14 to C23 were major components of headspace
  - Minor components included C-6 to C-10 compounds
  - Demonstrated that volatile compounds were not expected to be released from weathered oil

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NOAA Air Chemistry Sampling

- OSHA partnership with NOAA to conduct air chemistry sampling
  - P3 aircraft
  - NOAA vessels
    - Air Canisters
- Confirmed OSHA sampling strategy (qualitative basis)

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Compounds Monitored

- Chemical Exposure Assessments
  - Oil
  - Dispersants
  - Cleaning agents
  - Combustion products
- Physical Hazard Assessments
  - Noise
  - Heat

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Sampling Methods

Sample	Method	Media	Comments
VOC-Diffusive (BTEX, etc.)	OSHA 1005	SKC 575-002 Diffusive Sampler	Crude oil
VOC-Active (BTEX, etc.)	OSHA 1005	SKC 226-01 Charcoal Tube	Crude oil
Petroleum Distillates	OSHA 48	SKC 226-01 Charcoal Tube	Crude oil
Heavy Aliphatics & Aromatics	Qualitative GC/MS	SKC 590-100 Ultra I Sampler	Crude oil
Propylene Glycol	OSHA PV2051	SKC 226-57 XAD-7 OVS Tube	Dispersant
2-Butoxyethanol	OSHA 83	SKC 575-002 Diffusive Sampler	Dispersant (prior to 5/2010)

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Sampling Methods
(continued)

Sample	Method	Media	Comments
Formaldehyde	OSHA 1007	Assay Tech ChemDisk	In-situ burning
Oil Mist	PC2121	PVC Filter	Decon/pressure washing (initial sampling)
Glycol Ethers (2-butoxyethanol)	OSHA 83	SKC 226-01 Charcoal Tube	Decon cleaning agent
Benzene Soluble Fraction	OSHA 58	Glass Fiber Filter	Decon/pressure washing

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Direct Reading Methods

- VOC: Photo-ionization detector (PID)
- 4-gas: CO, H2S, %LEL, %O2
- Benzene, Toluene, Xylene, TPH, NH3: CMS/Detector Tubes
- Noise: SLM, Dosimeter
- Heat Stress: WBGT Meter

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Coordinated IH Effort

- Tasked to perform 3rd party/verification sampling of spill response operations
  - OSHA Health Response Team
  - Regional and Area Office Staff
- Daily coordination meetings with IH Technical Leads
  - Resources are limited
  - NIOSH, USCG, OSHA, EPA, BP and Contractors
  - Response to complaints or incident reports
  - Excursions
  - Operations
- Did not necessarily use same sampling and analytical methods between Agencies

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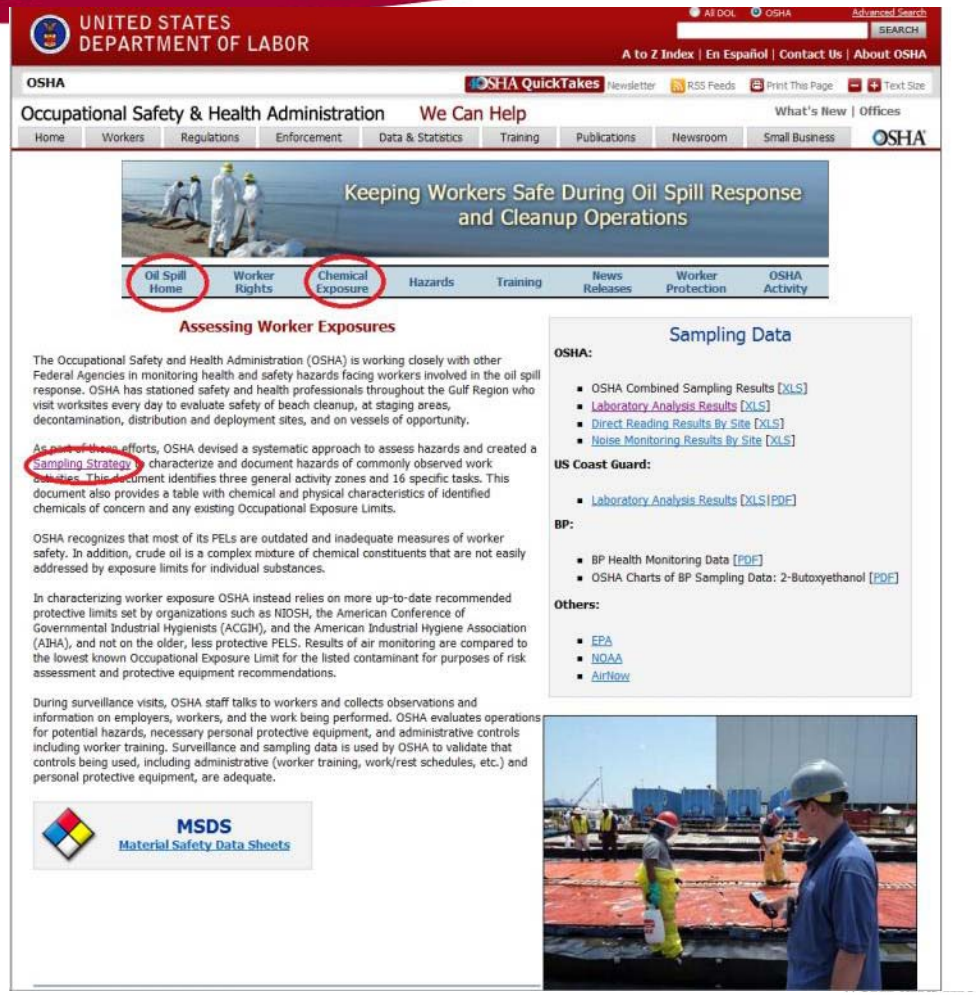
Where to Find the Data?

- OSHA and USCG Data
- Sample Types
  - Personal
  - Area
  - Direct Reading
  - Integrated (Laboratory Analysis)
- Compared to lowest OEL



OSHA Sampling Summary

Operation	Air Sample Results
Shore Cleanup	2032
Vessel Booming and Skimming	2490
In Situ Burn	95
Decon	3773
TOTAL	**8390**

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Reporting Limits (RL)

- Reporting limit is the mass of an analyte that the SLTC Lab can quantify.
- Reporting limits (RL_{mass})are determined by the laboratory.
- Reporting Limits were calculated for air sampling results
- $RL_{air} = RL_{mass} / V_{air}$

Example: RL_{mass} = 0.01 mg, V_{air} = 0.2 m^3

RL_{air} = 0.01 mg / 0.2 m^3 = 0.05 mg/m^3

- Reporting limits (RL_{mass}) are set by the laboratory.
- Air volume (V_{air}) is determined by field personnel.
  - Sample Time **x** Sample Flow rate

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Shore Cleanup

- Tar ball removal
- Oiled sediments, vegetation, and debris removal
- Manual sorbent application and removal
- Pollution investigation
- Sump & pump/ vacuum trucks

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Shore Cleanup Results

- 2032 Sample Results
  - 2027 (99.8%) of the samples were below the reporting limit
  - Samples detected
    - Coal tar pitch volatiles (benzene soluble fraction) (4), Oil mist (mineral) (1)
  - None of the chemical exposures exceeded any occupational exposure limit

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Vessel Booming & Skimming

- On-water operations
- Various skimming techniques
- Oil patrols
- Environmental sampling
- Boom application, removal, tending

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Vessel Booming & Skimming

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Vessel Booming and Skimming Results

- 2490 Sample Results
  - 2469 (99.2%) of the samples were below the reporting limit
  - Samples detected
    - Benzene (1), Xylene (2), Ethyl benzene (1), Toluene (2), Trimethyl benzene (1), Coal tar pitch volatiles (benzene soluble fraction) (2), Oil mist (mineral) (3)
    - Propylene glycol (9)
  - None of the chemical exposures exceeded any occupational exposure limit

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In-Situ Burning

- On-water destruction of “fresh” oil
- Upwind end of contaminated area ignited and allowed to burn to down-wind end

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In-Situ Burning

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In Situ Burning Results

- 95 Sample Results
  - 95 (100%) of the samples were below the reporting limit
  - None of the chemical exposures exceeded any occupational exposure limit
  - Elevated CO (peak) concentrations measured on igniter boats equipped with gasoline powered engines

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Decontamination

- Vessel decon
- Boom decon
- Equipment decon
- Wildlife decon
- High and low-pressure washing

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Decon

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Decon

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Decontamination Results

- 3773 Sample Results
  - 3600 (95.4%) of the samples were below the reporting limit Samples detected
    - Xylene (6), Ethyl benzene (1), Toluene (4), Petroleum distillates (1) (Coal tar pitch volatiles (benzene soluble fraction) (61), Limonene (49), Oil mist (mineral) (48)
    - Sodium hydroxide (2)
    - Sodium chloride (1)
  - One of the chemical exposures exceeded an occupational exposure limit
    - 1177 ppm Toluene exposure to worker conducting boom repair

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Personal Protective Equipment

- PPE programs were reviewed and guidance provided
- Respirators not required, with the exception of:
  - Operations at the source (respirators used according to direct reading measurements)
  - In-situ burning (escape respirators available if necessary, rec. by NIOSH)
- PPE used mainly for skin protection
- Necessary to balance PPE requirements with heat stress issues

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Lessons Learned

- Improved coordination between laboratory and field personnel
  - Ensure sampling times (i.e. volumes) are adequate to ensure reporting limits are below appropriate OEL
- Use diffusive samplers whenever possible
  - Less manpower needed to collect samples
  - Less disruptive to workers
- Improve coordination between field personnel and data management personnel
  - Quicker feedback of sampling reports to field planners

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