Spill Response on the Upper Mississippi River: Tools, Techniques, and Lessons Learned

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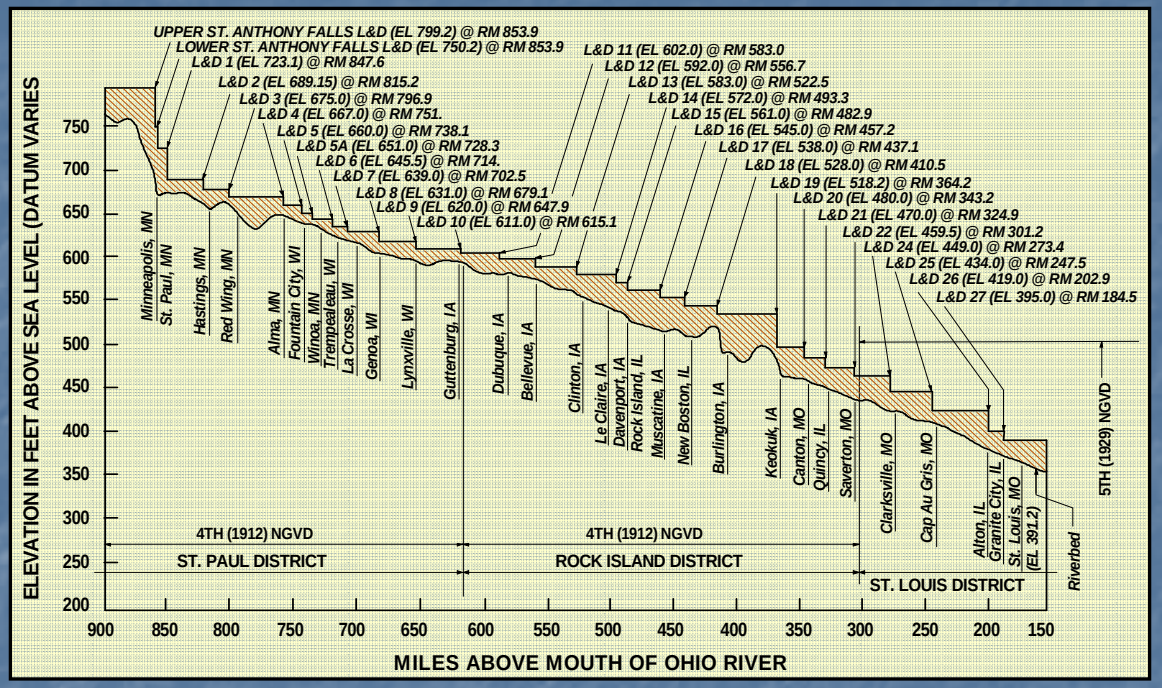
Overview

- Considerations and Constraints for Spill Response on the Upper Mississippi River
- Response Techniques: Opportunities, Limitations, and What's Known So Far
- What's Next and What Do We Still Need to Learn?

Considerations and Constraints



Context and Scale

850 Miles, Minneapolis-St. Paul to the Ohio River.

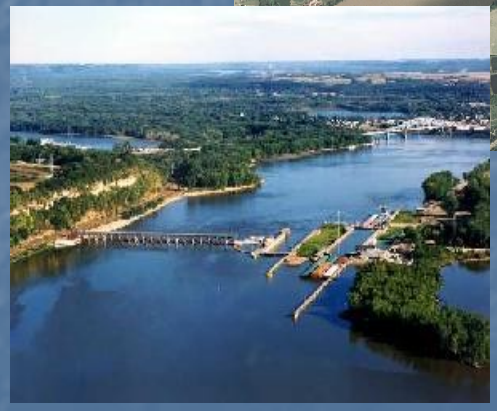
Controlled by 29 Locks and Dams through St. Louis, then unimpounded.

The average annual discharge on the Upper Mississippi River increases from 9,180 cubic feet per second (cfs) near St. Paul, Minnesota to 204,800 cfs at Thebes, Illinois.

Considerations and Constraints

Complex Physical System

- High flows, fast currents, seasonal variability
- Locks and dams, main channel, side channel, backwaters
- Flows/spill trajectories variable and hard to predict



Considerations and Constraints

High Value Natural Resources

- Seasonal concentrations of migratory waterfowl
- Threatened and endangered species. Some are not mobile (mussels).
- Diverse habitats, refuges and other protected areas.
- 3 national refuges totaling over 285,000 acres: Upper Mississippi River, Trempealeau, and Mark Twain

Considerations and Constraints

Water Supply

- Drinking Water
- Industrial Processes
- Cooling

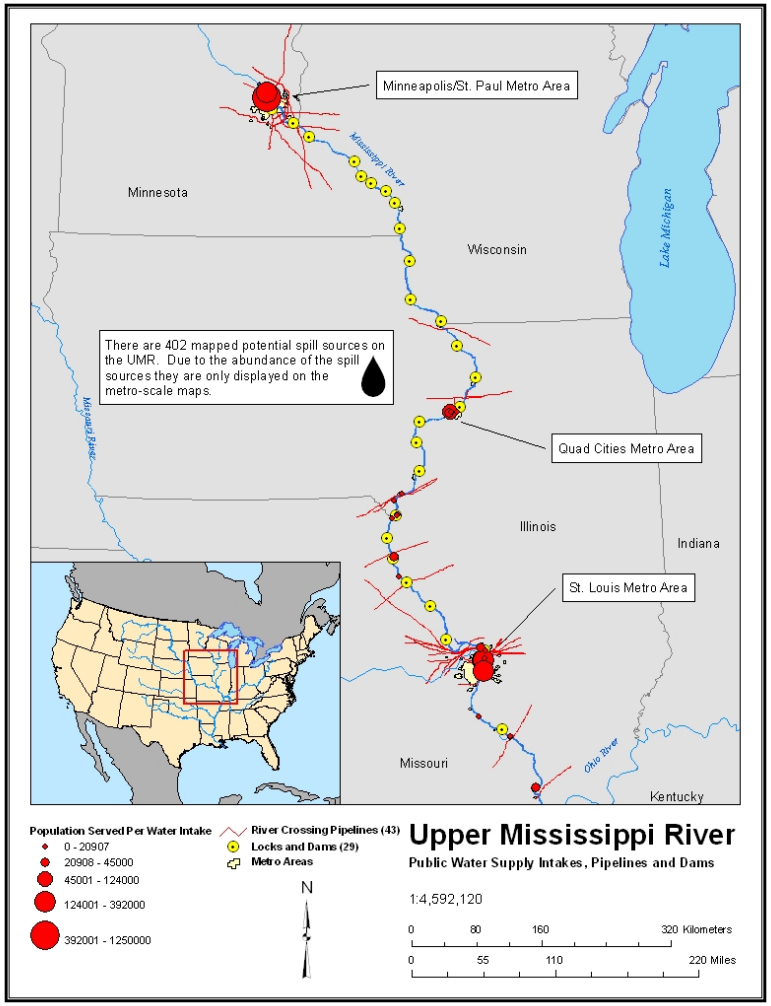
Commercial and Recreational Vessels

- Safety considerations
- Navigation considerations
- Interference or assistance with response efforts
- Potential spill source

Considerations and Constraints

Diverse Potential Pollution Sources

- Vessels
- Pipelines
- Railroads
- Highway crossings
- Industrial discharge



Considerations and Constraints

Institutional Considerations

- Multiple jurisdictions and Agencies
- Public and private sector coordination
- Downstream impacts

Considerations and Constraints

Equipment Availability

- Limited amount of equipment pre-positioned & readily available (at facilities/caches)
- Most equipment is in St. Louis or Twin Cities, but risk spread along river
- For size of resource and spill vulnerability, limited availability of boom and other response equipment
- Response time can be long, spill travel time fast

Considerations and Constraints

Limited Efficacy of "Traditional" Boom

- Fast currents in main channel
- Debris issues
- Difficult to deploy and maintain
- Even under best case, limited percentage of product capture

Considerations and Constraints

Overall

- Consider similarities and differences to other large rivers
- Now look and tactics & techniques
- A discussion, more than a presentation…

Response Tactics and Options

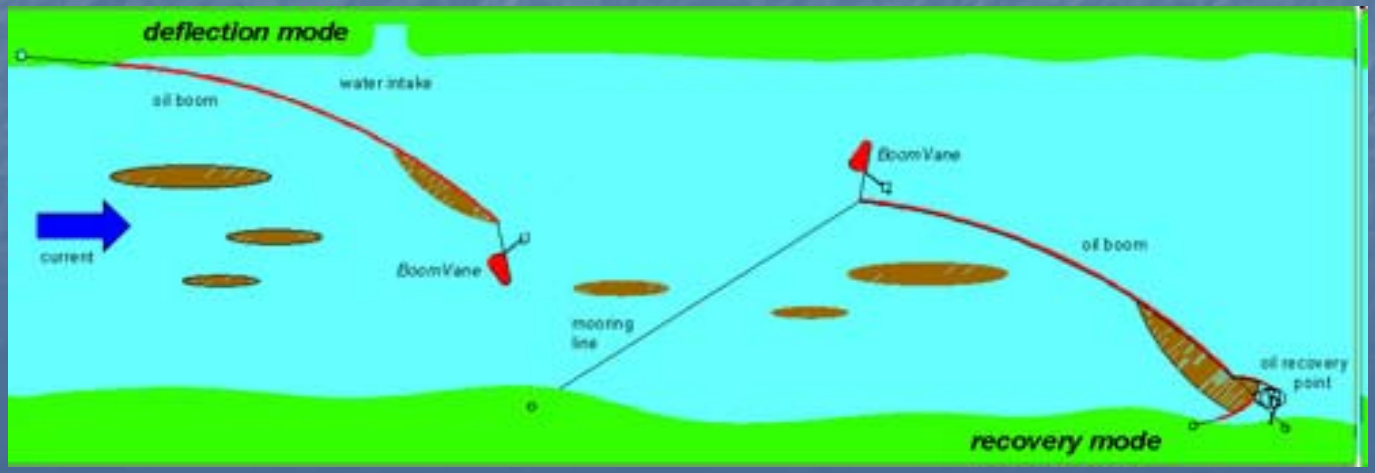
Optimize "Traditional" Booming

- Size
  - 6" for fast water/channel
  - 12" for shoreline/off channel
- Angle
  - Adjust to swift current
- Other Deployment Considerations
- Look for most opportune locations
  - "Natural" collection area/slack water areas

Response Tactics and Options

Boom Vane

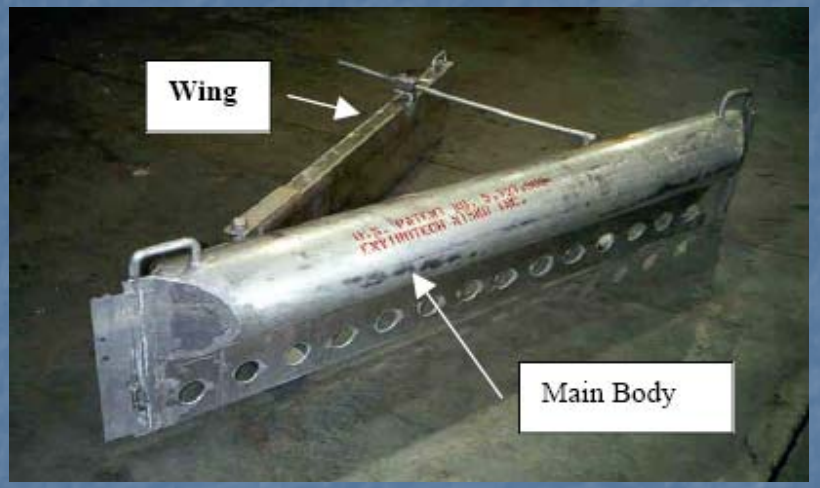
- Tested in 2001 on UMR
- Deployed successfully in tow grounding and spill in 2008 on Missouri River
- Anchoring important
- Expensive/Effective



Response Tactics and Options

Boom Deflector

- Tested in 2001 on UMR and used successfully in a number of applications
- Allows for adjustment of boom angle and aids in rapid current



Response Tactics and Options

Vessel of Opportunity Skimming System (VOSS)

- Tested successfully in 2001 on Illinois River
- May be best suited to situations where release is ongoing

Response Tactics and Options

Skimmers

- Concerns with debris on large rivers
- May be effective in off channel/ backwater areas, if access available

Response Tactics and Options

Use of Barges/Moored Vessels as Boom and Work Platforms

- Plentiful on UMR – may allow faster response and larger, more stable structure than boom, could load equipment to barge
- Has been incidental use/impact in recent responses

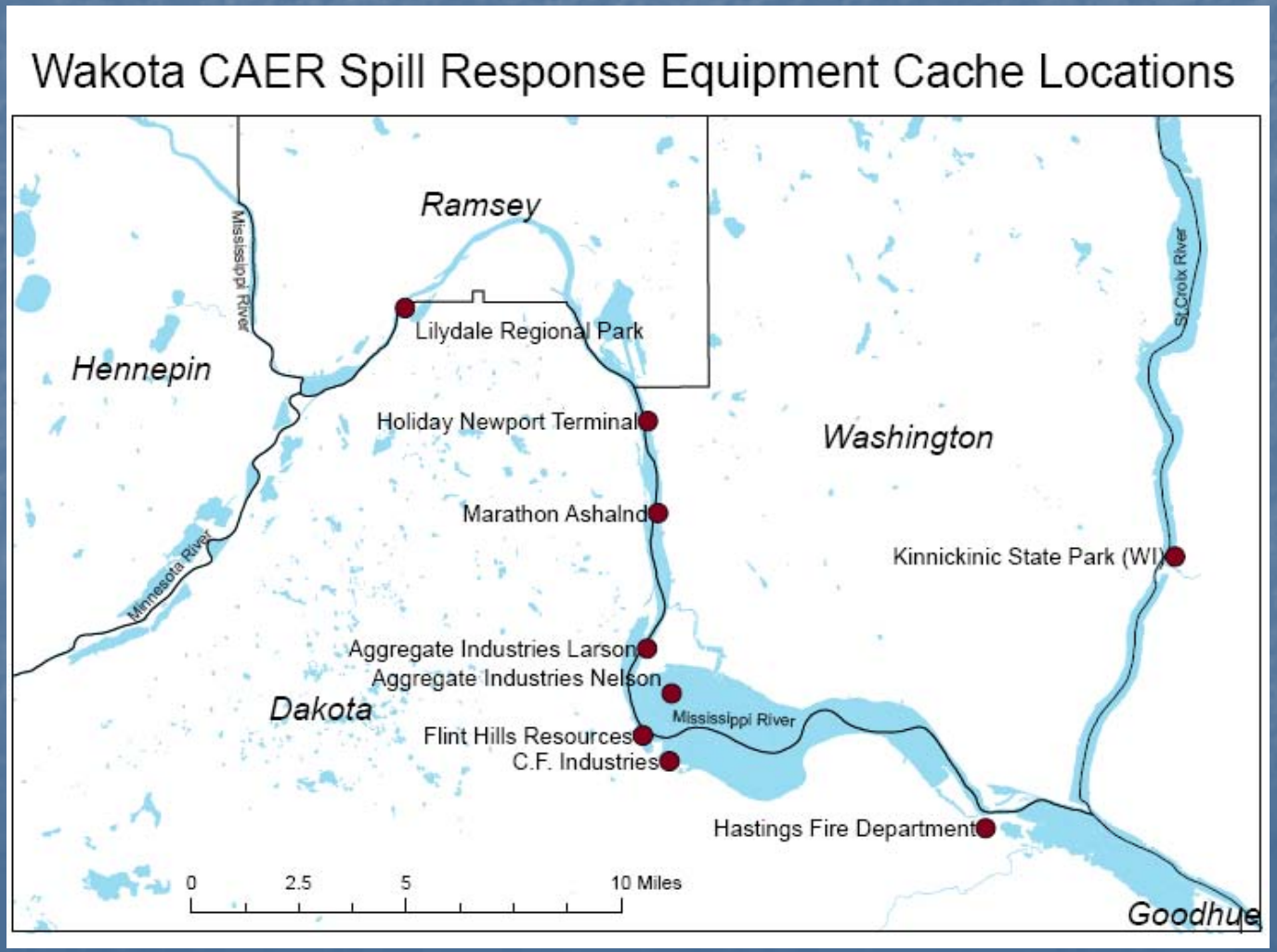
Response Tactics and Options

Lock and Dam Operations

- Dams not designed to hold back water and don't want oil going over dam, so limited utility, but…
- Lock chambers may be useful collection point
- Some limited ability to modulate and direct flow

Response Tactics and Options

- Pre-deployment (Wakota CAER example)



Other Options and Approaches

Notification

- Particularly important for water suppliers – may be able to modify operations to limit impact
- Others that would benefit from targeted notification

Wildlife Hazing

- Move sensitive species out of harms way
- Need to develop hazing plans

Improving Sensitive Species' Survival

- Identify particularly vulnerable populations/species
- Make populations more robust in order to survive incidents

Other Ideas?

What's Next/ What Do We Need to Learn?

- Improve Equipment Availability
- Encourage CAER/Cooperative Groups
- Continue to Develop Response Area Response Strategies
- Test, Acquire, and Use New Technologies
- Investigate and Implement Alternative Approaches

Discussion/Questions?

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