

Moving Petroleum Release Sites to Closure

Battelle 2024 Chlorinated Conference

Session: D9. LNAPL Sites: Understanding and Managing Risks

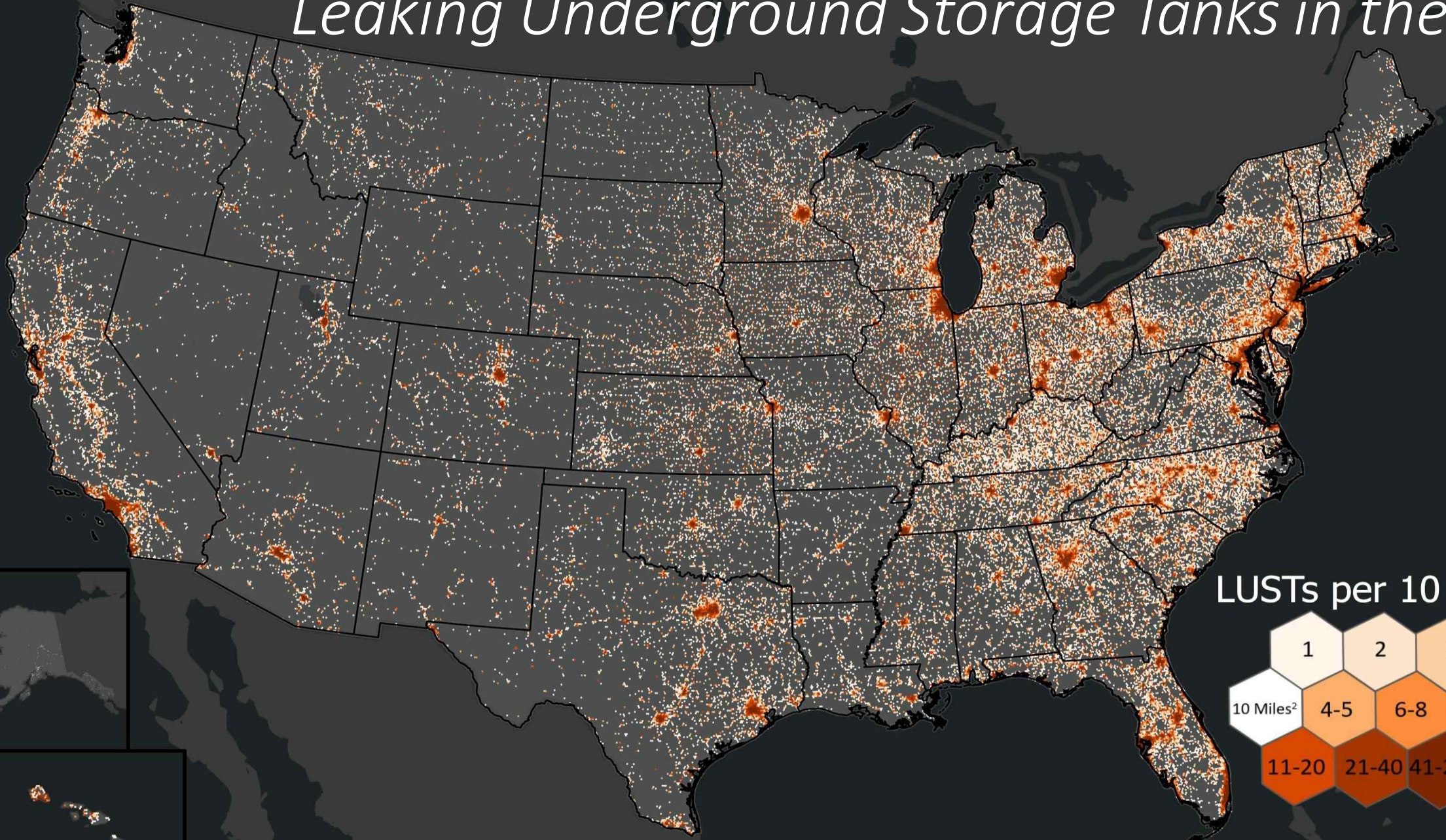
June 6, 2024

Tom Schruben, US EPA Office of Underground Storage Tanks

Goals for this Presentation

- Evolution of petroleum cleanup science
- Introduce Draft ASTM Moving Petroleum Release Sites to Closure (MStC) standard
 - ❑ Basics of the draft standard
 - ❑ Invite you to participate

Leaking Underground Storage Tanks in the US



LUSTs per 10 miles²

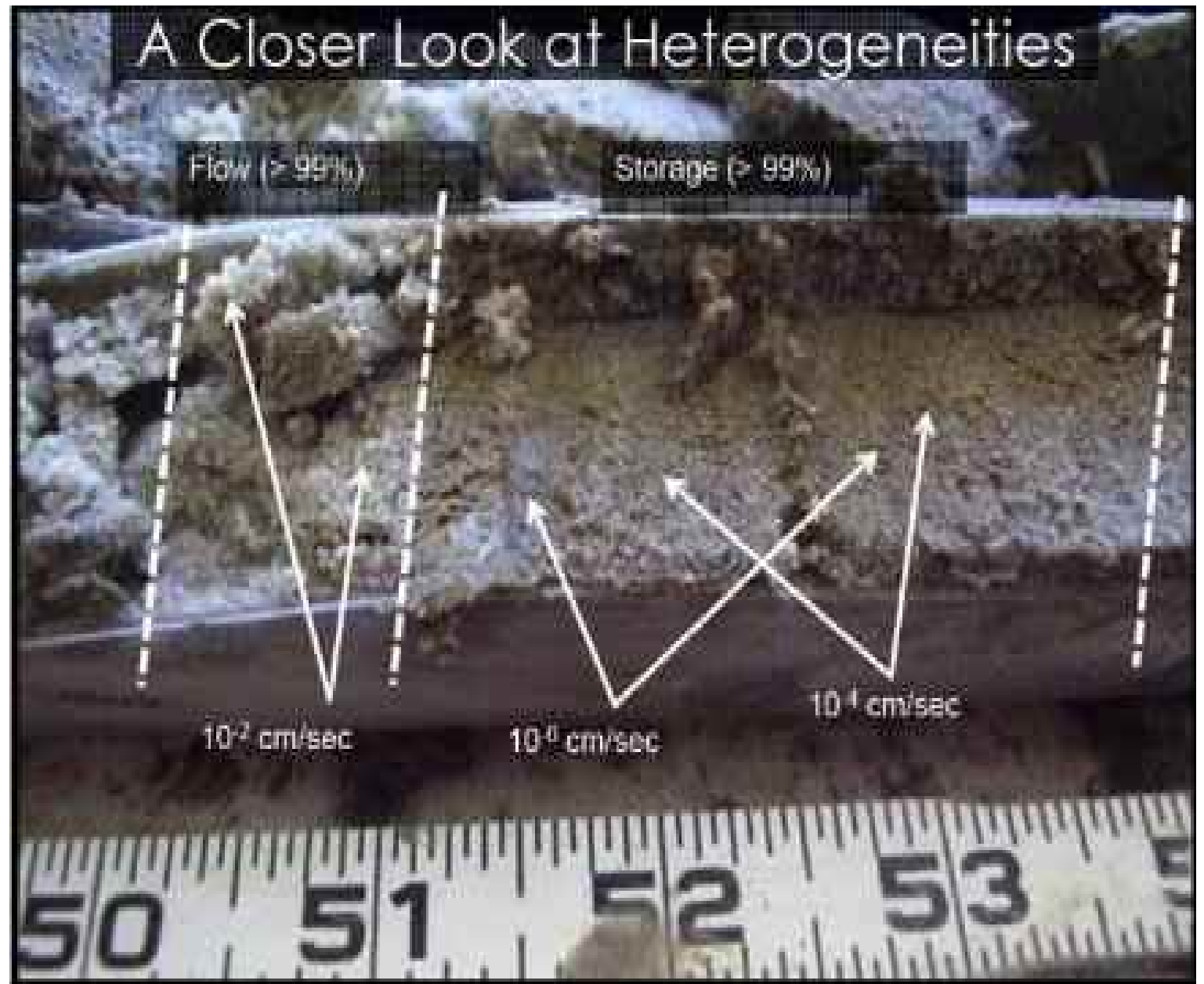


From Alex Hall, EPA ORD.

Evolution of Petroleum UST Corrective Action

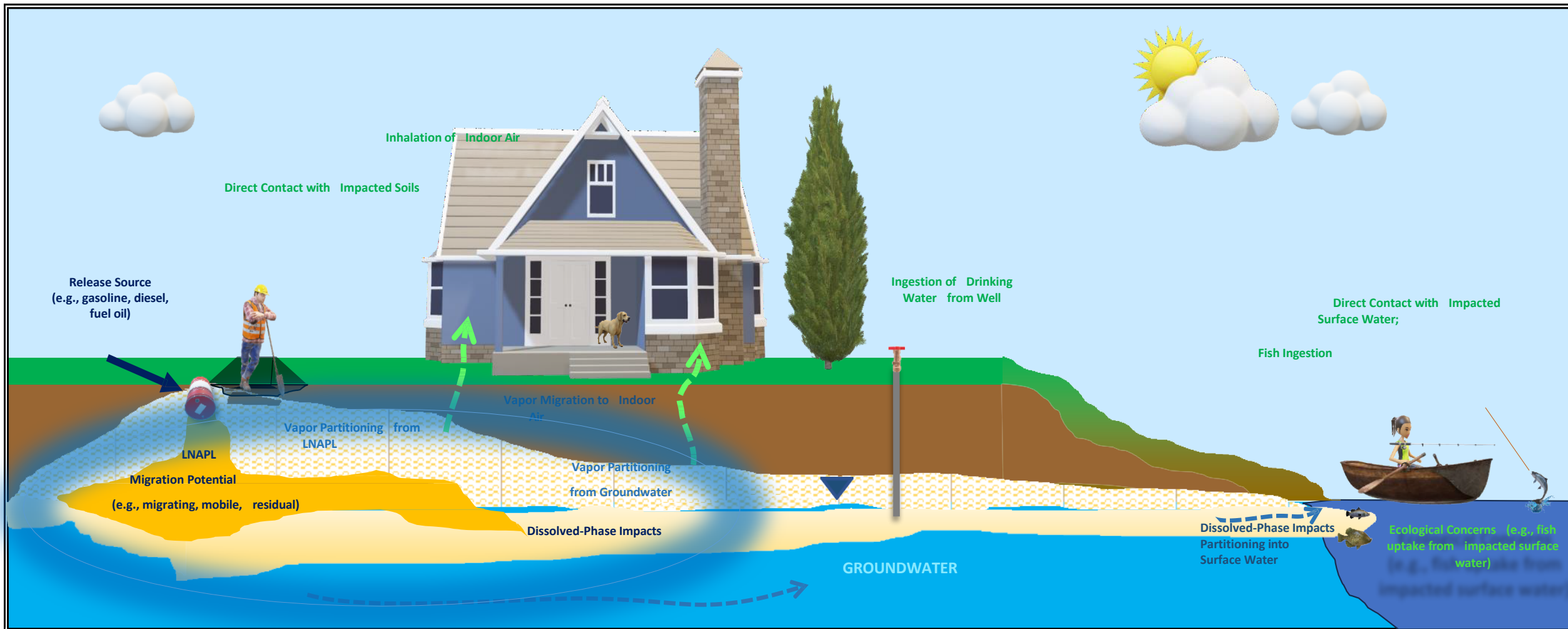
	1980s	1990s	Current Best Practice
Cleanup goals	Universal Worst case exposure	Source, pathway, receptor Site-specific target concentrations	Screening distances Stability Alternative end points
Assessment	Homogenous subsurface	More complete	HRSC for complex sites Measure surrogates
Remedial Methods	Physical extraction	<i>in-situ</i> methods	Recoverability NSZD Enhanced biodegradation
Natural Degradation	A mystery	Some understanding	Rely on biodegradation Calculate rate

Soil Properties Can Change Over Short Distances



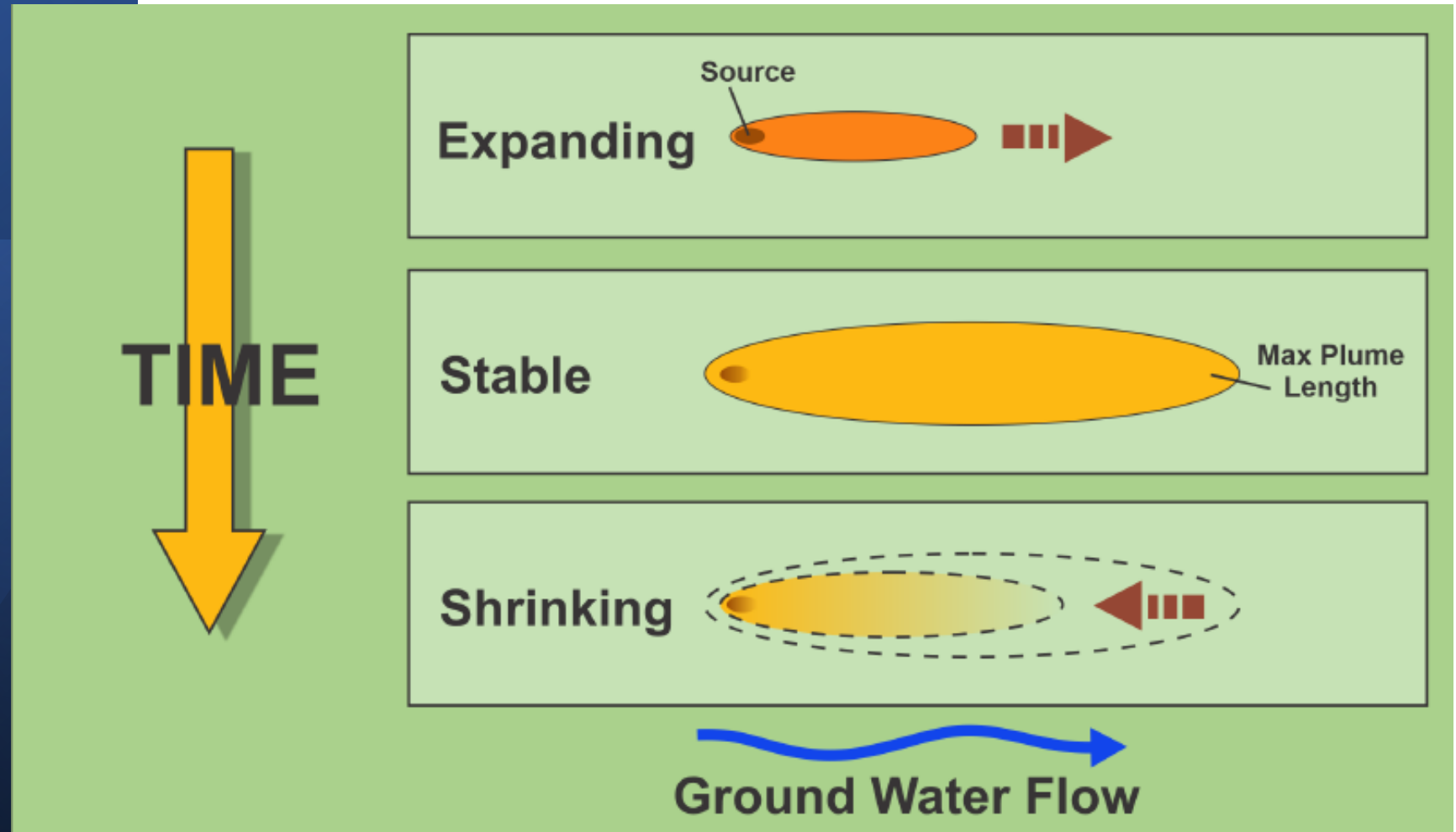
From: Newell and Adamson "Teaching Assistant for Transition Assessment ", (2024)

A CSM Conceptualizing Source, Pathways, and Receptors for a LNAPL Release to the Subsurface



What Have We Learned?

Stability



From: New Jersey “Monitored Natural Attenuation Technical Guidance”, (2022)

Moving Sites to Closure (MStC) Task Group

ASTM Committee - E50.04

83 members incorporating the latest science to develop sustainable solutions for stalled remediations

Regulator	36%
Owner	14%
Insurer/Fund	5%
Consultant	48%
Academic	4%

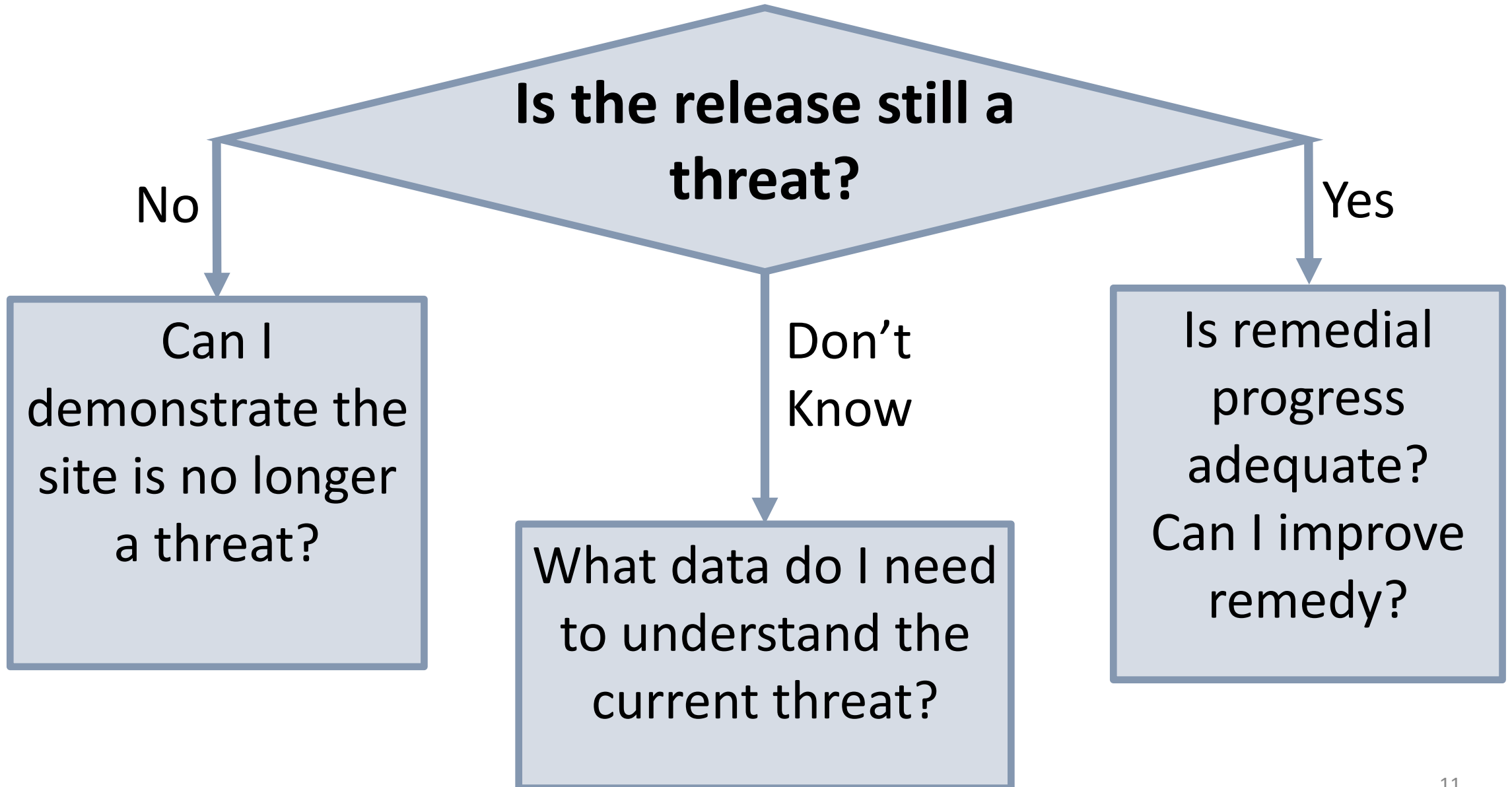
Take Aways from the ASTSWMO State Survey

- Over 40% of the States have flexibility to close sites that do not meet initial remedial goals
- Many states have limitations on free product in monitoring wells
- Regulations focus on numeric concentrations in soil and groundwater
- Institutional and engineering controls are widely accepted
- Non-technical barriers to closure are rampant

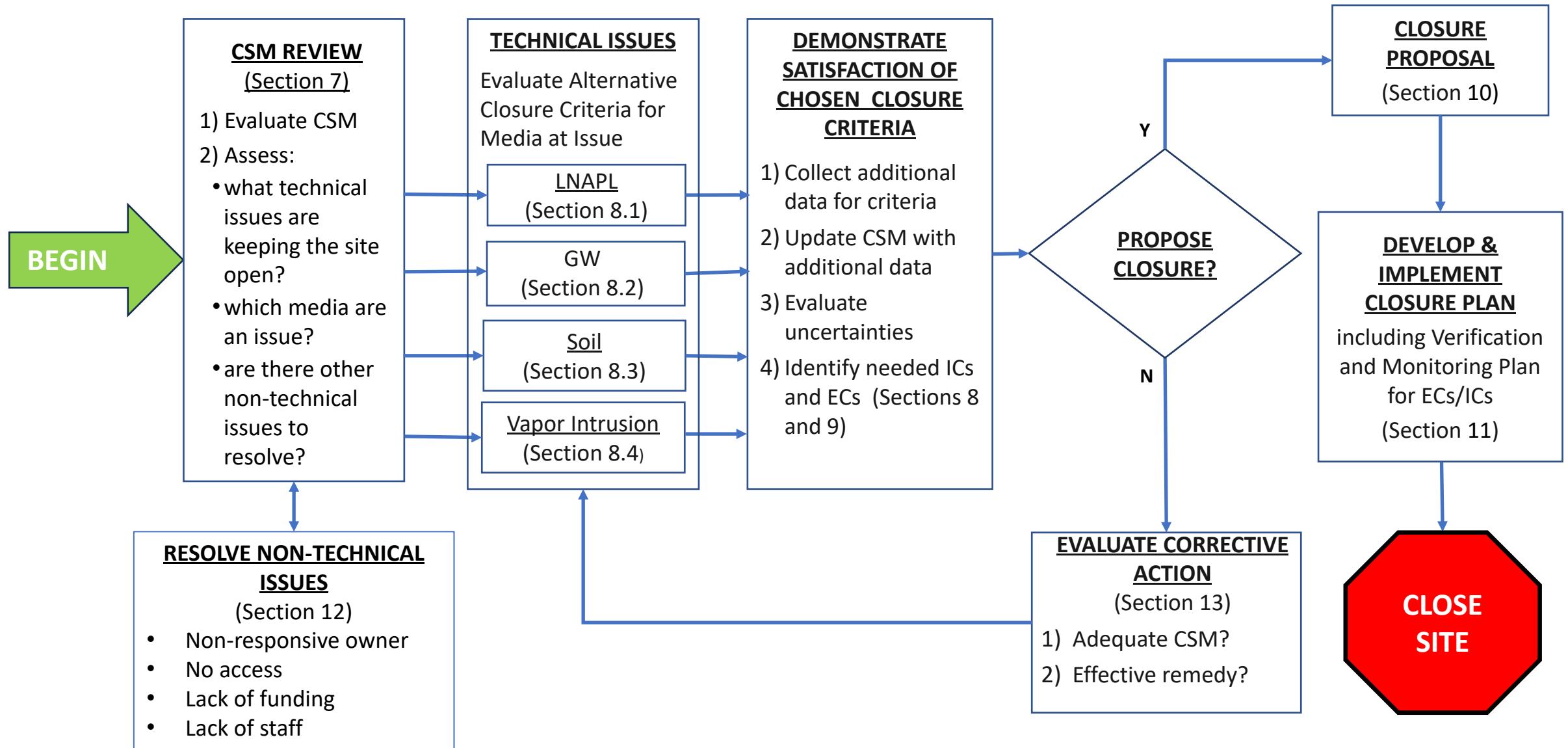
Survey Results: What elements to include in an ASTM Standard?

- 75% wanted criteria for closure decisions
- 72% asked for best practices for managing orphaned sites
- 72% wanted examples or success stories
- 69% asked for outreach and training on best practices
- 69% wanted more on periodic review of remedial effectiveness

Questions to Ask



MStC Process



Minimums Conditions

- The release has stopped
- No current impacts to receptors
- No migrating LNAPL
- Basic CSM

Alternative Demonstrations of LNAPL Stability

- Decreasing LNAPL
- Stable groundwater plume
- Residual footprint > mobile LNAPL footprint
- LNAPL transmissivity
- Residual LNAPL in the soil vs gauged LNAPL thickness

Alternative Criteria for Closure for GW, Soil, and VI

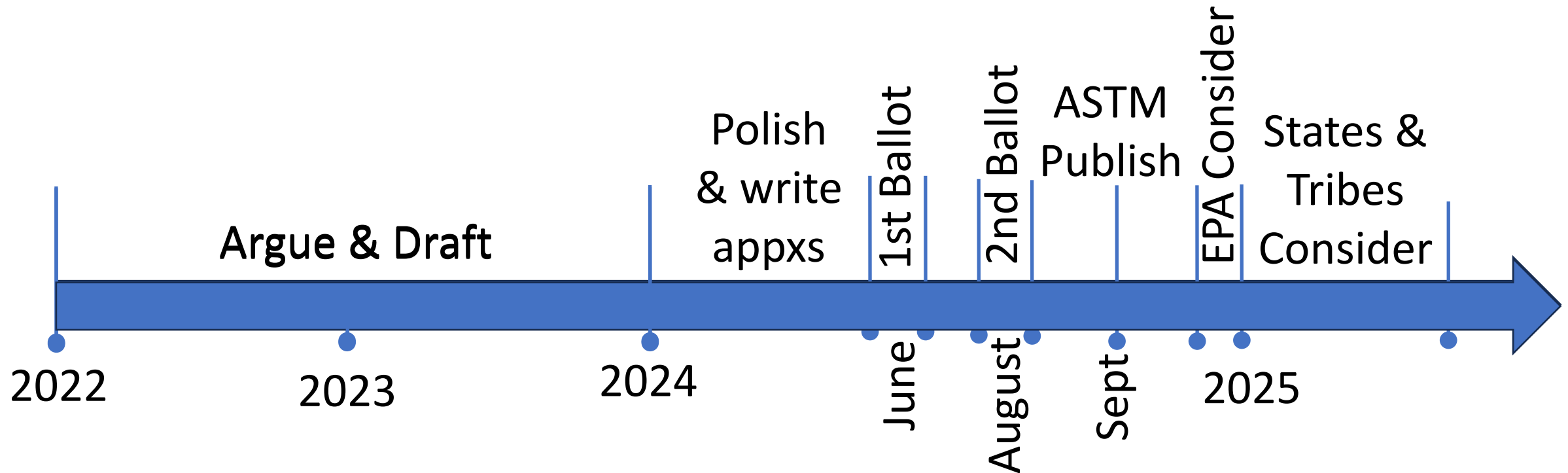
Demonstrate low threat based on:

- Distance screening
- Contaminant concentrations
- Modeling – future movement or mass limited

Major Changes

- Low threat closure is consistent with groundwater non-degradation goals
- NAPL in monitoring wells may be OK if not migrating
- Descriptive rationale for closure
- Groundwater stability by trends or retraction
- Either close or remediate 
- Review remediation effectiveness
- Periodic review of many ECs, all ICs

MStC Timeline



Comment on MStC?
Participate in MStC Task Group?

Contact: Tom Schruben
Chair of ASTM MStC Task Group
Schruben.Thomas@epa.gov