Building Resilience Into the Superfund Program

FRTR Fall Meeting

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EPA

Key Concepts Driving Superfund Climate Resilience

Basic Question for the Agency

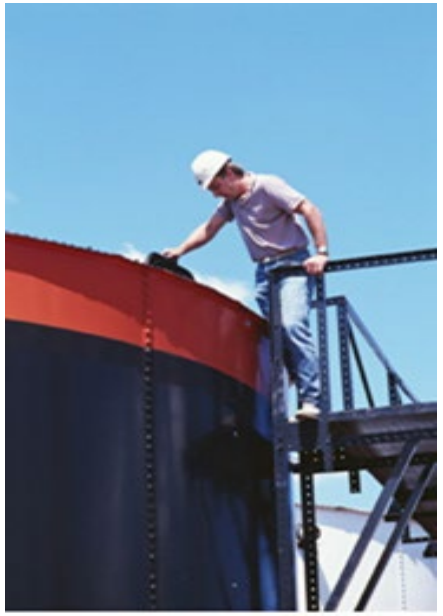
"How is climate change likely to affect the ability of your office to achieve its mission and strategic goals?"

Basic Question for the RPM

"How is climate change likely to affect the protectiveness of your remedy, and what should you do about it?"

Considerations During Superfund Remedial Process

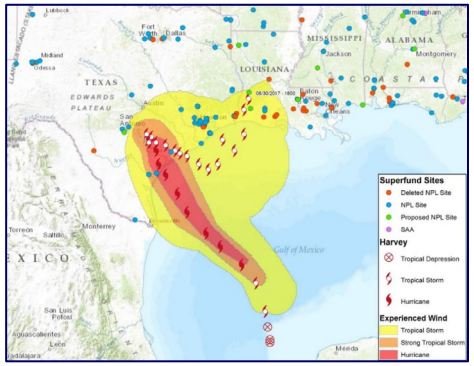
- CERCLA and the NCP provide the foundational basis for consideration of potential extreme weather/climate impacts at Superfund sites (long-term and short-term protectiveness)
- It's never too early or too late to assess vulnerabilities and mitigate effects
- Remedial investigation/feasibility study
  - » Nature and extent of contamination
  - » Human and ecological risks
  - » Remedial alternatives development and screening
- Remedy selection
- Remedy design
- Remedy action
- Post construction



The existing Superfund framework for community involvement is a valuable channel to address environmental justice at sites vulnerable to weather/climate impacts

2017 Hurricane Season: Overview of Findings in EPA's Remedy Resiliency Report

- Analysis of remedies affected by Hurricanes Harvey, Irma and Maria
  - 445 sites located in EPA Regions 2, 4 and 6 were affected
  - 251 sites were exposed to tropical force (TF) winds or higher
  - 63 sites experienced flooding (of which 62 saw TF or + winds)
  - 17 sites reported minor damage; none currently indicate impairment to remedy protectiveness
  - Of 42 impacted sites, 31 reported resiliency design measures or preparedness actions
  - Loss of grid power was a widespread issue



- Key finding: The state of the remedies is "resilient" under current climate conditions
- Challenge for Superfund (and the U.S.): Staying resilient as climate changes continue

Climate Change Adaptation Management Strategy

From EPA 2019 "Climate Resilience Technical Fact Sheet" series

Preliminary Assessment Screening Tools

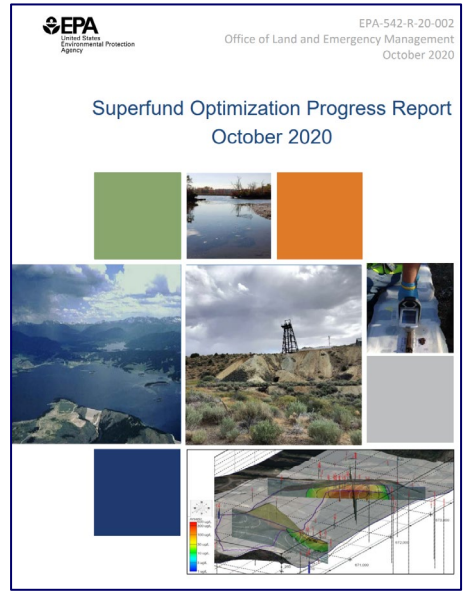
- *Temperature:* The Climate Explorer (https://crt-climate-explorer.nemac.org/)
- *Precipitation:* The Climate Explorer (https://crt-climate-explorer.nemac.org/)
- *Inland Flooding:* Flood Factor Hazard Layers (https://floodfactor.com/)
- *Sea Level Rise:* NOAA Sea Level Rise Viewer (https://coast.noaa.gov/slr/)
- *Hurricane Storm Surges:* NOAA SLOSH Model (https://www.nhc.noaa.gov/surge/slosh.php)
- *Drought:* The Climate Explorer (https://crt-climate-explorer.nemac.org/)
- *Wildfire:* USFS Wildfire Hazard Potential Map (https://www.firelab.org/project/wildfire-hazard-potential)
- *Landslides:* USGS National Landslide Inventory (https://www.usgs.gov/natural-hazards/landslide-hazards/maps)

Early Lessons Learned from Climate Vulnerability Screening Assessments

- Climate is already factored in our decision-making process; the questions are:
  - » What does a forward-looking climate analysis tell us about conditions at our site, and what is the “delta” over current conditions?
  - » How does that delta affect remedy decision, site operations, etc.?
- Screening assessments should be conducted at a site level rather than a regional level
- The level of detail involved in a preliminary assessment will vary based on site complexity and nature of the decision it is informing
- Expertise is needed in climate analysis, mapping/GIS and contaminated site science and engineering

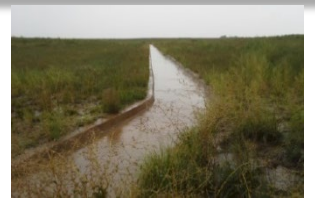
Superfund OD Memo to the Regions

- Memo addressed to EPA regional division directors from OSRTI office director on June 30, 2021
- Content of the memo:
  - » Reiterates key authorities covering climate resilience efforts
  - » Outlines approaches ensuring resilience
  - » Identifies tools and support available for RPMs
  - » Defines technical support available to Superfund RPMs seeking to conduct climate vulnerability assessments of cleanup projects
- HQ is expanding its existing optimization/tech support to include climate assessment tech support



Resilience Measures: Examples of What Is in Place at Superfund Sites

- **Rocky Mountain Arsenal, Commerce City, CO:**
  - **Stormwater channel** protecting an onsite hazardous waste landfill cover designed to withstand a 1,000-year storm event
- **Pine Street Canal NPL Site, Burlington, VT:**
  - **Weir** at the canal outlet to Lake Champlain, to maintain water depth protecting a remedial sand cap from scour, wave action and erosion damage
- **American Cyanamid, Bridgewater, NJ :**
  - **Elevation of critical electrical instrumentation** 5’ higher than Hurricane Irene flood waters
- **Van Dale Junkyard, Marietta, OH:**
  - **Earth and crushed rock buttress** along a waste cap to stabilize its steep slope and prevent landslides found to correspond with rainfall events
- **Summitville Mine Superfund Site, Summitville, CO:**
  - **Predictive snow water equivalent model** to estimate onsite water requiring management each spring due to snowmelt, and associated flow in the nearby Alamosa River during early summers





Synergies in Climate Mitigation and Adaptation Actions

*Examples of green remediation practices that reduce GHG emissions **and** provide climate resilience*

- Renewable energy: Supplying continuous power while reducing GHG emissions
- Carbon sequestration through revegetation: Removing atmospheric carbon while immobilizing contaminated media in a resilient manner with deeper O and A soil horizons
- Stormwater control through green infrastructure: Protecting remedy performance while using natural (low/no energy) processes to treat and conserve surface water

Re-Solve, Inc., MA

Solvents Recovery Service of New England, CN

Bunker Hill Complex – Gray's Meadow, ID

Links to More Information

Green Remediation:

https://www.epa.gov/greenercleanups

https://www.epa.gov/superfund/superfund-green-remediation

https://clu-in.org/greenremediation/

Climate Resilience:

https://www.epa.gov/superfund/superfund-climate-resilience

Ecosystem Services:

https://www.epa.gov/eco-research/national-ecosystem-services-classification-system-nescs-plus

https://www.epa.gov/sites/production/files/2017-09/documents/ecosystem_services_at_contaminated_site_cleanups_ef_issue_paper.pdf

https://www.serdp-estcp.org/Program-Areas/Resource-Conservation-and-Resiliency/Infrastructure-Resiliency/Vulnerability-and-Impact-Assessment/RC18-1605/RC18-1605

Green Infrastructure:

https://www.epa.gov/green-infrastructure

Renewable Energy:

https://www.epa.gov/re-powering

Superfund Remedy Report:

https://www.epa.gov/remedytech/superfund-remedy-report

Brownfields:

https://www.epa.gov/brownfields/brownfields-program-environmental-and-economic-benefits

https://www.epa.gov/land-revitalization/climate-smart-brownfields-manual