

Protocol for Climate Vulnerability Screenings at Contaminated Sites

FRTR Fall Meeting
November 15, 2021

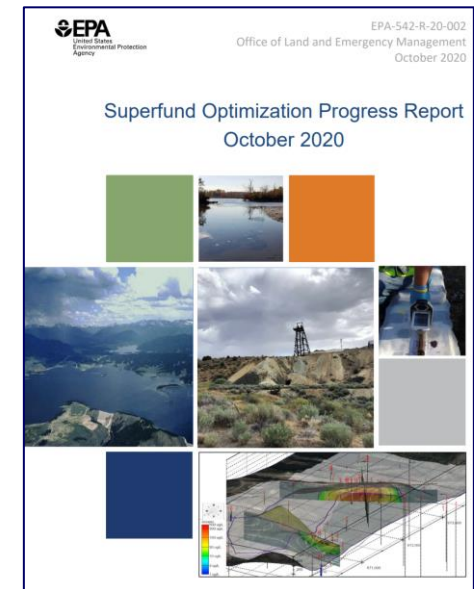
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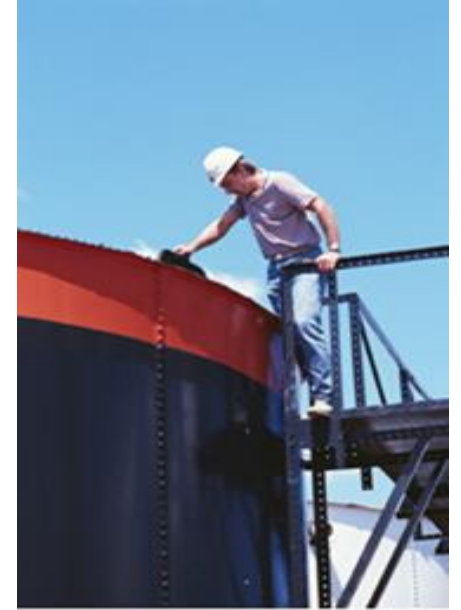
Superfund OD Memo to the Regions

- ◆ 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 through the Optimization Program for Superfund RPMs seeking to conduct climate vulnerability assessments of cleanup projects



Climate Vulnerability Assessment Overview

- ◆ 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)
- ◆ Focus areas by remedy phase include:
 - » **Up through RI:** Integration of current and projected climate impacts into risk assessments and the CSM
 - » **Feasibility Study:** Analysis of adaptive measures for each remedial alternative based on current and projected climate impacts
 - » **Remedial Design:** Incorporation of engineered adaptive measures to the remedy design
 - » **RA, LTRA, O&M:** Evaluation of remedy performance under current and future climate and any necessary modifications
- ◆ HQ providing climate vulnerability assessment tech support

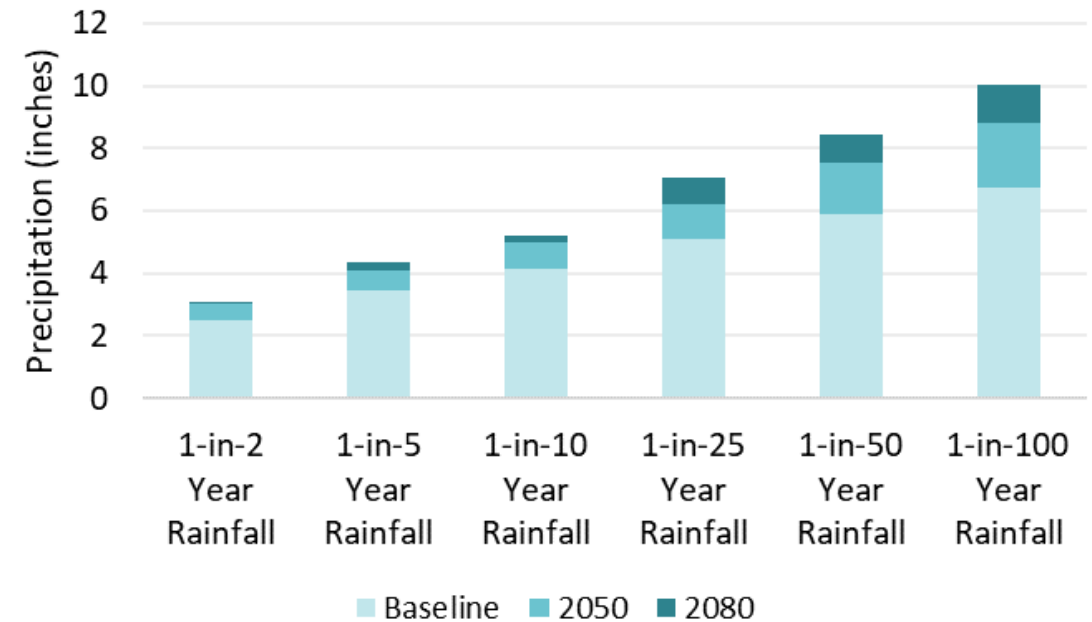


Climate Vulnerability Assessment Overview

◆ 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.?

◆ Expertise is needed in climate analysis, mapping/GIS and contaminated site science and engineering



Climate Vulnerability Assessment Process



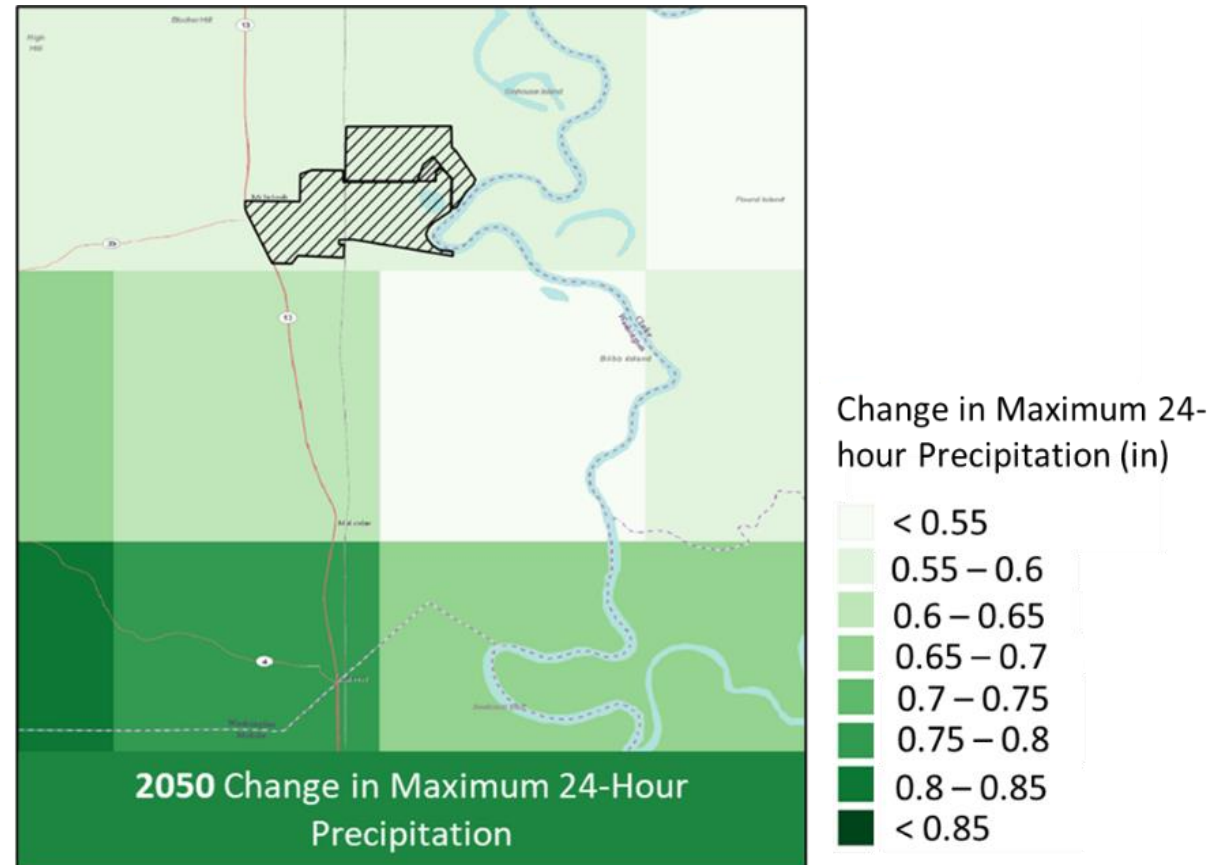
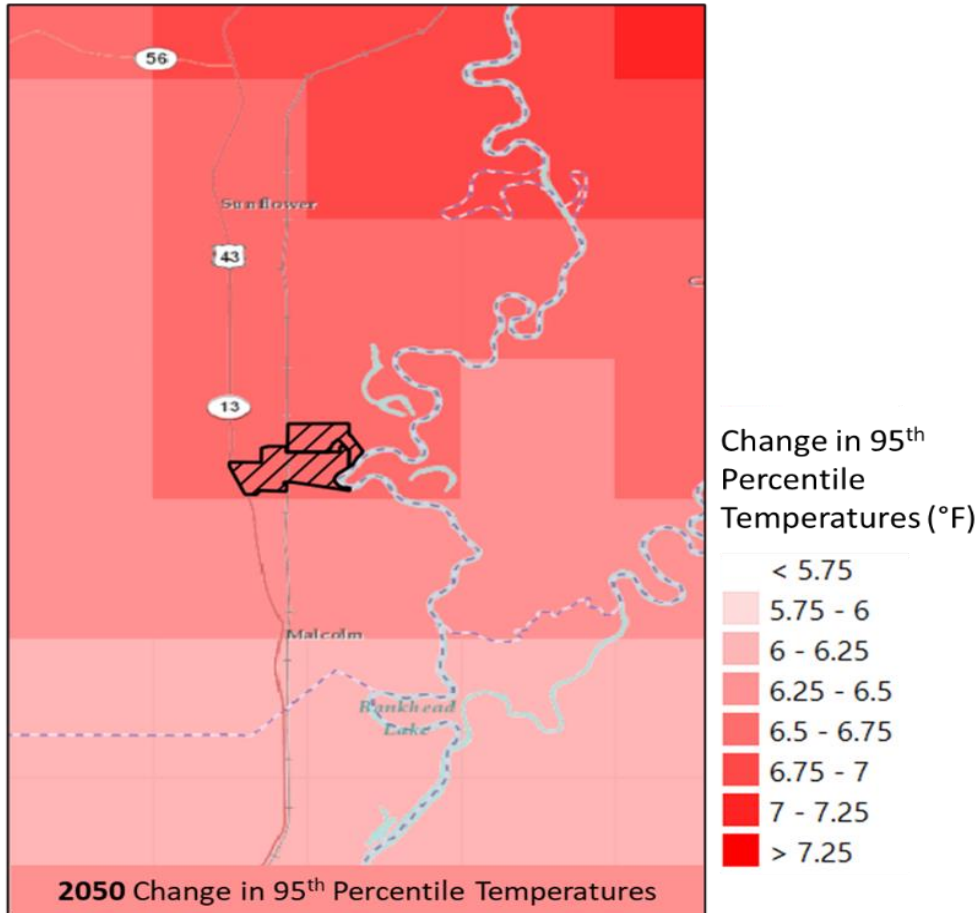
From EPA 2019 "Climate Resilience Technical Fact Sheet" series

Climate Exposure

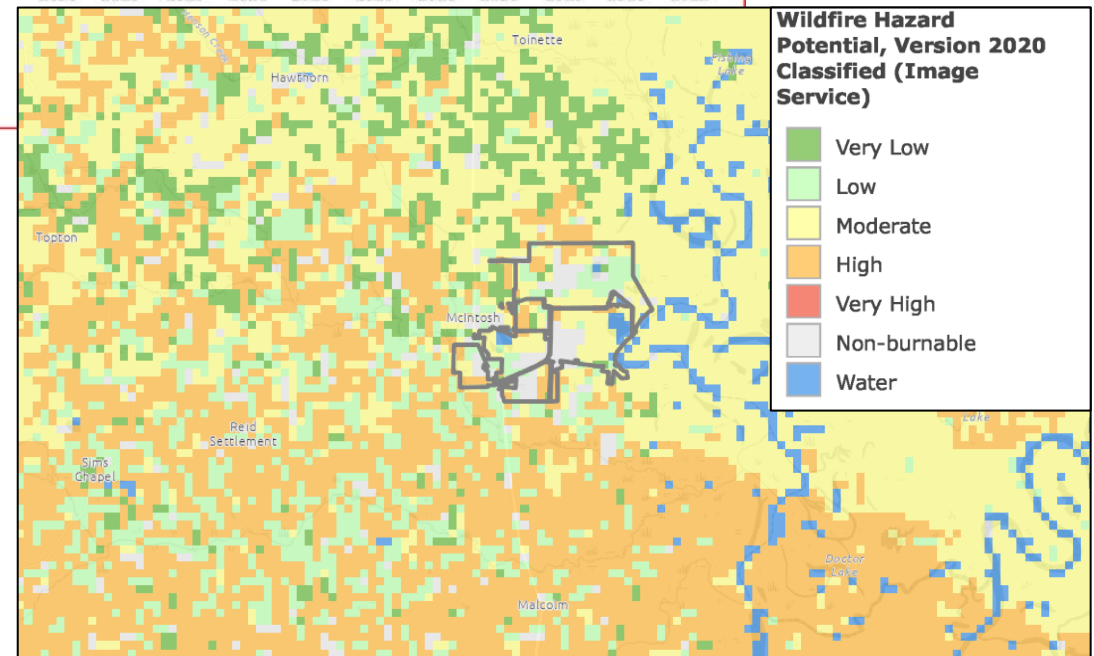
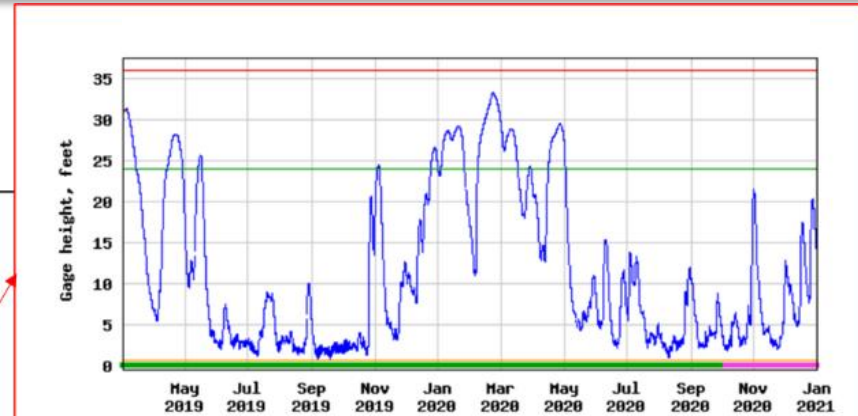
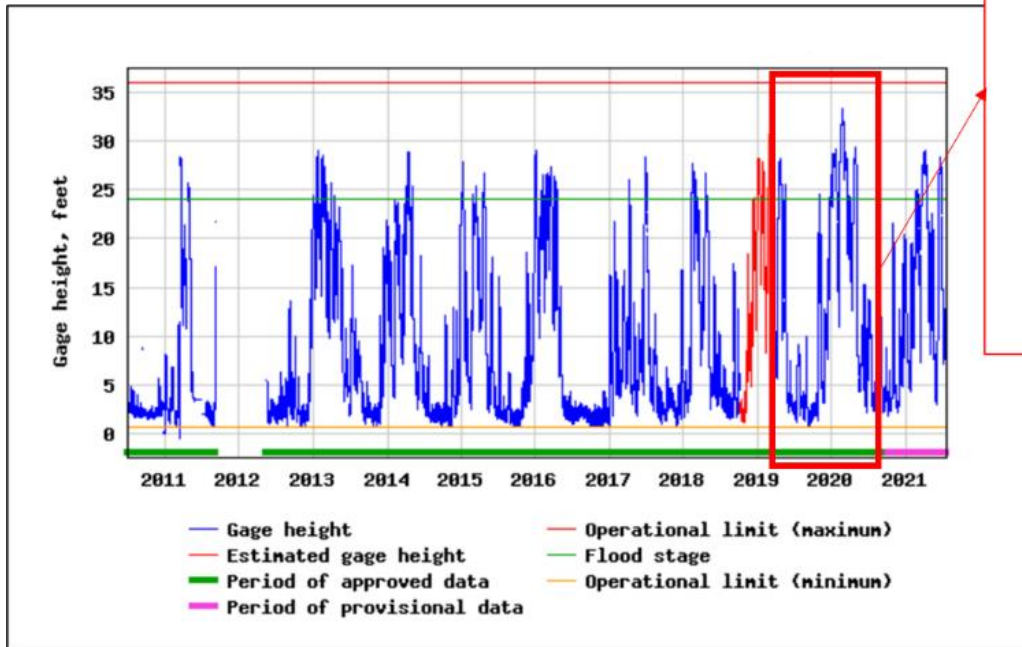
- ◆ Consider the climate hazards of concern at the site
- ◆ How would a change in frequency or intensity affect the site?
- ◆ Previous instances of natural disasters and climate events
- ◆ Site specific climate modeling and screening tools



Climate Exposure



Climate Exposure



Remedy Sensitivity

◆ Determine the remedy sensitivities

» How may climate hazards reduce remedy effectiveness?

◆ Considerations

» Remedy design parameters

» Previous extreme weather

» Impact of long-term climate events

» When reviewing historic events, consider impact if severity increased



Remedy Sensitivity

◆ Groundwater Pump and Treat System

» Power interruption; change in hydrogeologic conditions

◆ Landfill Covers

» Erosion of vegetative cover

◆ Sediment Cap in Floodplain

» Scouring of sand cap; water level fluctuations

◆ Former Waste Channels

» Channel erosion from runoff



Assess System Vulnerability

Remedy Component	Temperature				Precipitation / Flooding				Drought						
Groundwater Treatment System Infrastructure	Climate Exposure	High	Yellow	Orange (X)	Red	Climate Exposure	High	Yellow	Orange	Red	Climate Exposure	High	Yellow	Orange	Red
		Med	Light Green	Yellow	Orange		Med	Light Green	Yellow	Orange		Med	Light Green (X)	Yellow	Orange
		Low	Green	Light Green	Yellow		Low	Green	Light Green	Yellow (X)		Low	Green	Light Green	Yellow
		Low	Med	High		Low	Med	High		Low	Med	High			
	<i>Remedy Sensitivity</i>					<i>Remedy Sensitivity</i>					<i>Remedy Sensitivity</i>				
Landfill Covers	Climate Exposure	High	Yellow	Orange (X)	Red	Climate Exposure	High	Yellow	Orange	Red	Climate Exposure	High	Yellow	Orange	Red
		Med	Light Green	Yellow	Orange		Med	Light Green	Yellow	Orange (X)		Med	Light Green	Yellow	Orange (X)
		Low	Green	Light Green	Yellow		Low	Green	Light Green	Yellow		Low	Green	Light Green	Yellow
		Low	Med	High		Low	Med	High		Low	Med	High			
	<i>Remedy Sensitivity</i>					<i>Remedy Sensitivity</i>					<i>Remedy Sensitivity</i>				
Former Waste Channels	Climate Exposure	High	Yellow (X)	Orange	Red	Climate Exposure	High	Yellow	Orange	Red (X)	Climate Exposure	High	Yellow	Orange	Red
		Med	Light Green	Yellow	Orange		Med	Light Green	Yellow	Orange		Med	Light Green (X)	Yellow	Orange
		Low	Green	Light Green	Yellow		Low	Green	Light Green	Yellow		Low	Green	Light Green	Yellow
		Low	Med	High		Low	Med	High		Low	Med	High			
	<i>Remedy Sensitivity</i>					<i>Remedy Sensitivity</i>					<i>Remedy Sensitivity</i>				

Evaluate Measures to Increase Resilience

◆ Identify, prioritize and implement resilience measures that address known vulnerabilities at the site

1. Resilience Measures for Former Waste Channels

- » New runoff channels
- » Erosion-resistant lining

2. Resilience Measures for Landfill Covers

- » Drought-resistant plants

3. Resilience Measures for Groundwater Treatment System Infrastructure

- » Backup power supply