



# Newtown Creek Superfund Site Queens and Brooklyn, New York City May 15, 2019

# MULTIPLE LINES OF EVIDENCE AND MODELING

What do these terms mean and how are they used?

# Brief Review

- EPA is completing a Remedial Investigation/ Feasibility Study for Newtown Creek
  - This includes both the Human Health and Ecological Risk assessment, as well as modeling
- Goals of the RI/FS include determining:
  - What is the nature and extent of contamination?
  - What is the fate and transport of the contamination?
  - What are the risks posed by the site to human health and the environment?
  - How should the risks be addressed? In other words, how should the site be cleaned up?

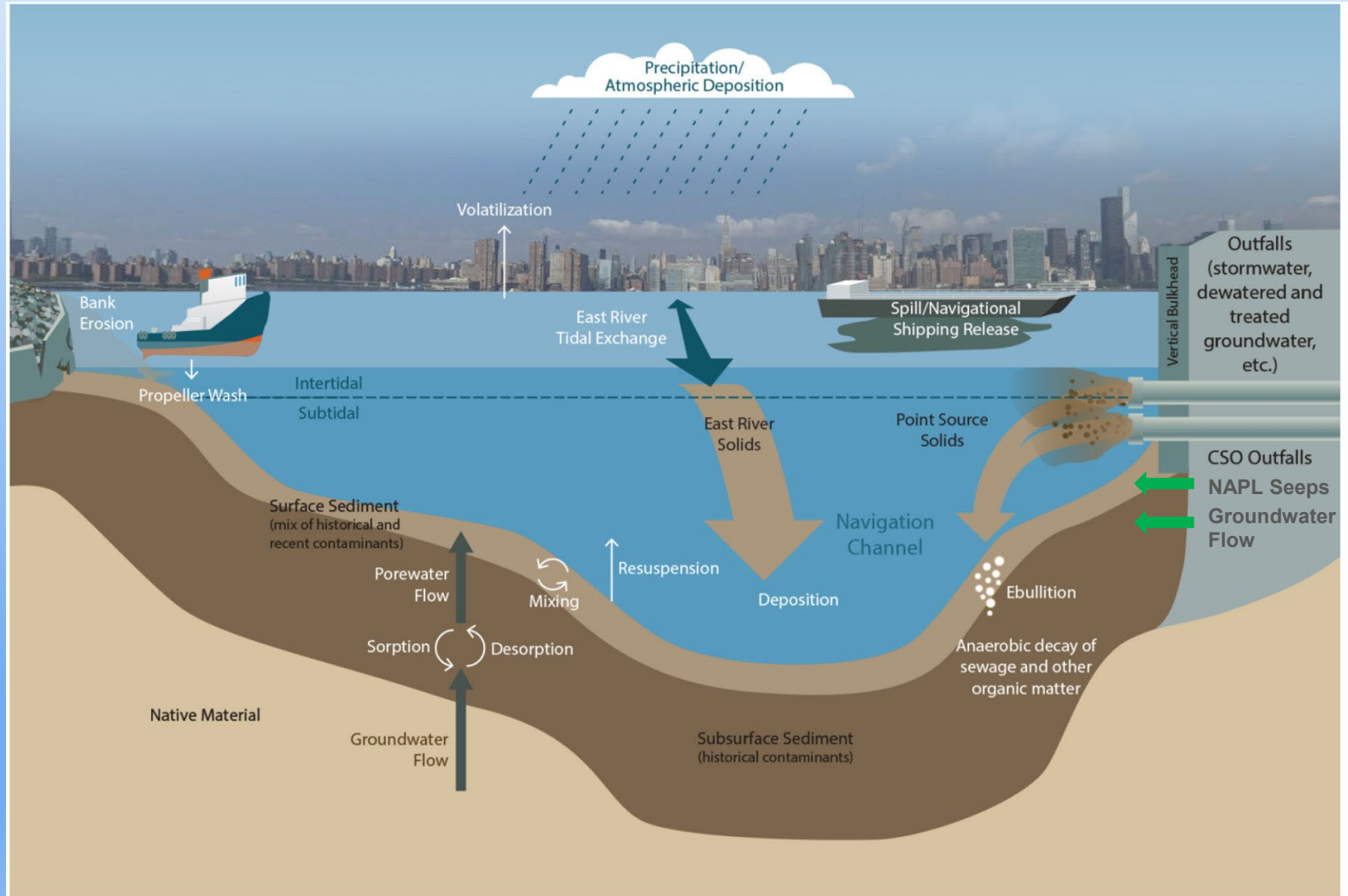
# Two Preliminary Examples

- ◆ Example 1: Cause and Effect – a simple illustration
- ◆ Example 2: A hypothetical site with fewer fate and transport mechanisms

# Newtown Creek Example

- ◆ Newtown Creek is a highly complex, non-static environment
  - Data is great
    - Represents a point in time and space
    - Static
    - However, takes time to collect and interpret
  - Models are great
    - Can predict what will happen over time
    - Dynamic
    - However, our ability to model environmental systems is imperfect and highly resource intensive
- ◆ Solution: Use both data and modeling to make informed decisions

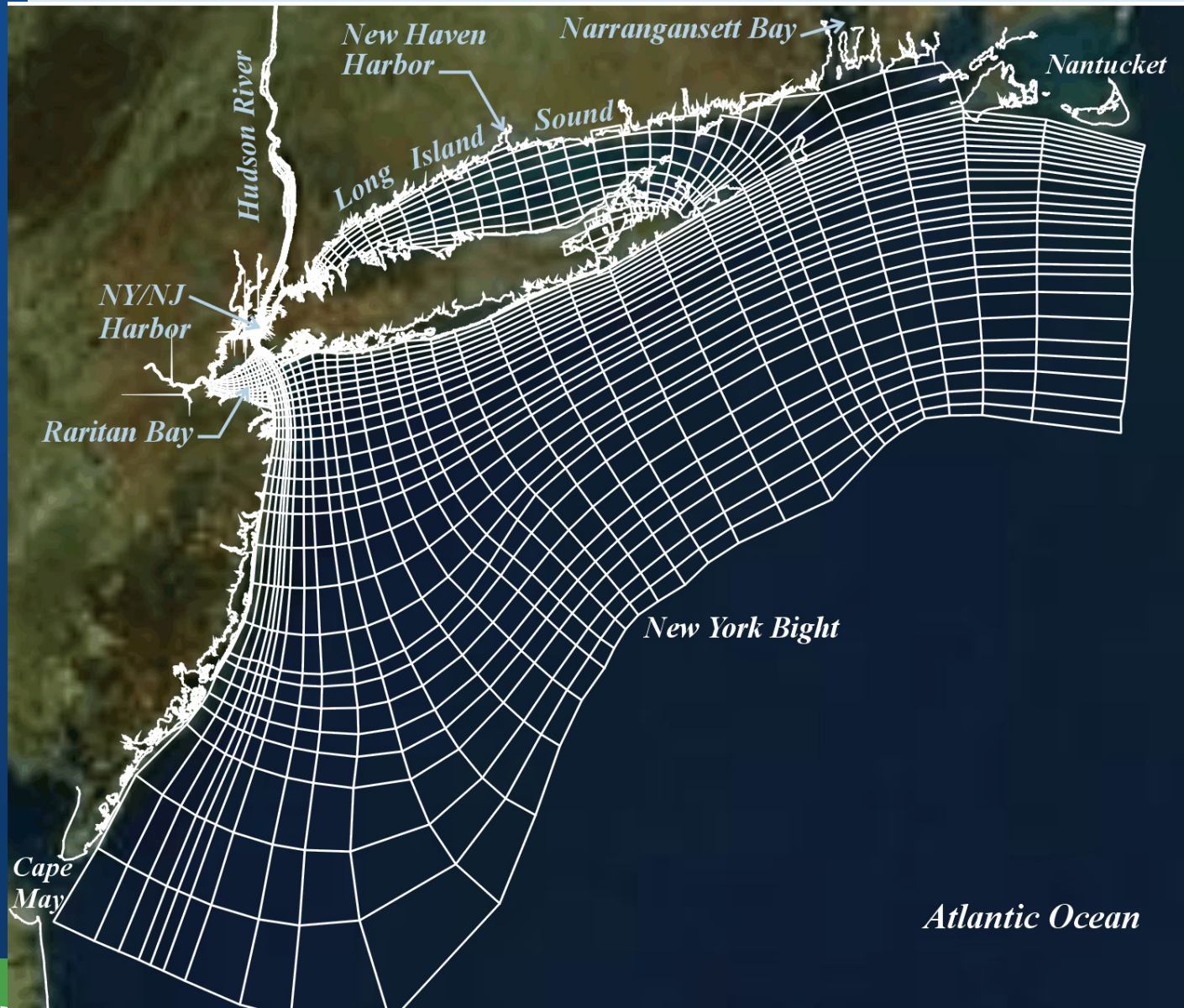
# Conceptual Site Model for Newtown Creek



# What are the multiple lines?

- ◆ Data include
  - Sediment
  - Groundwater
  - Surface Water
  - Seeps
  - Shoreline erosion
  - Point and non-point sources
  - Bathymetry
  - Community surveys
  - Ebullition
  - Non-Aqueous Phase Liquid
  - And more....
- ◆ Location
- ◆ Modeling...just one of many lines of evidence!

# A model is a schematic



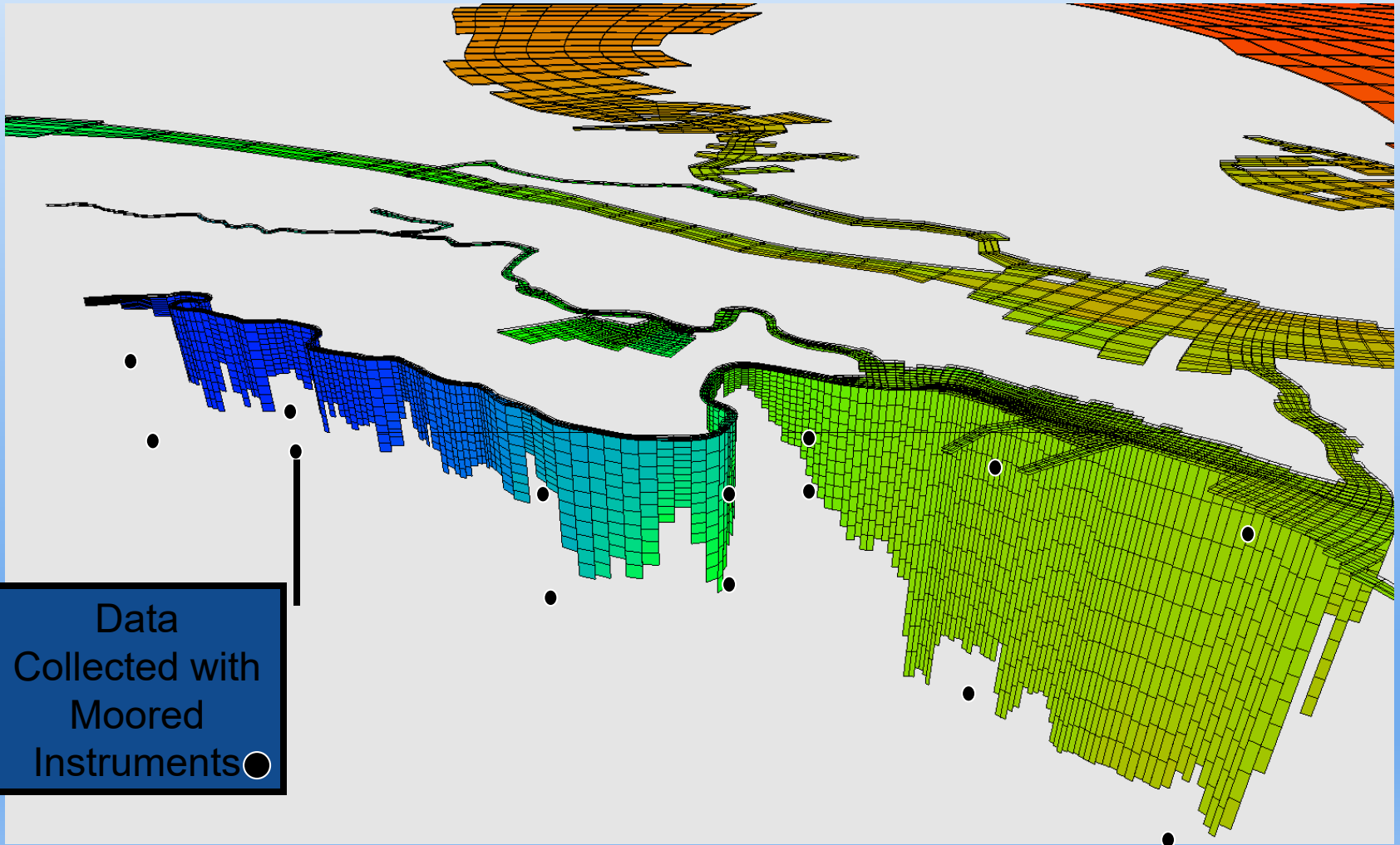
## CARP Model Grid

16,000 water  
column  
and 16,000  
sediment cells



# Sampling Locations vs Model

It's not possible to measure everything...  
and even if we could, it would change over time



# With a model we can:

## PREDICT

- Future Conditions
- Impact of storms and extreme events

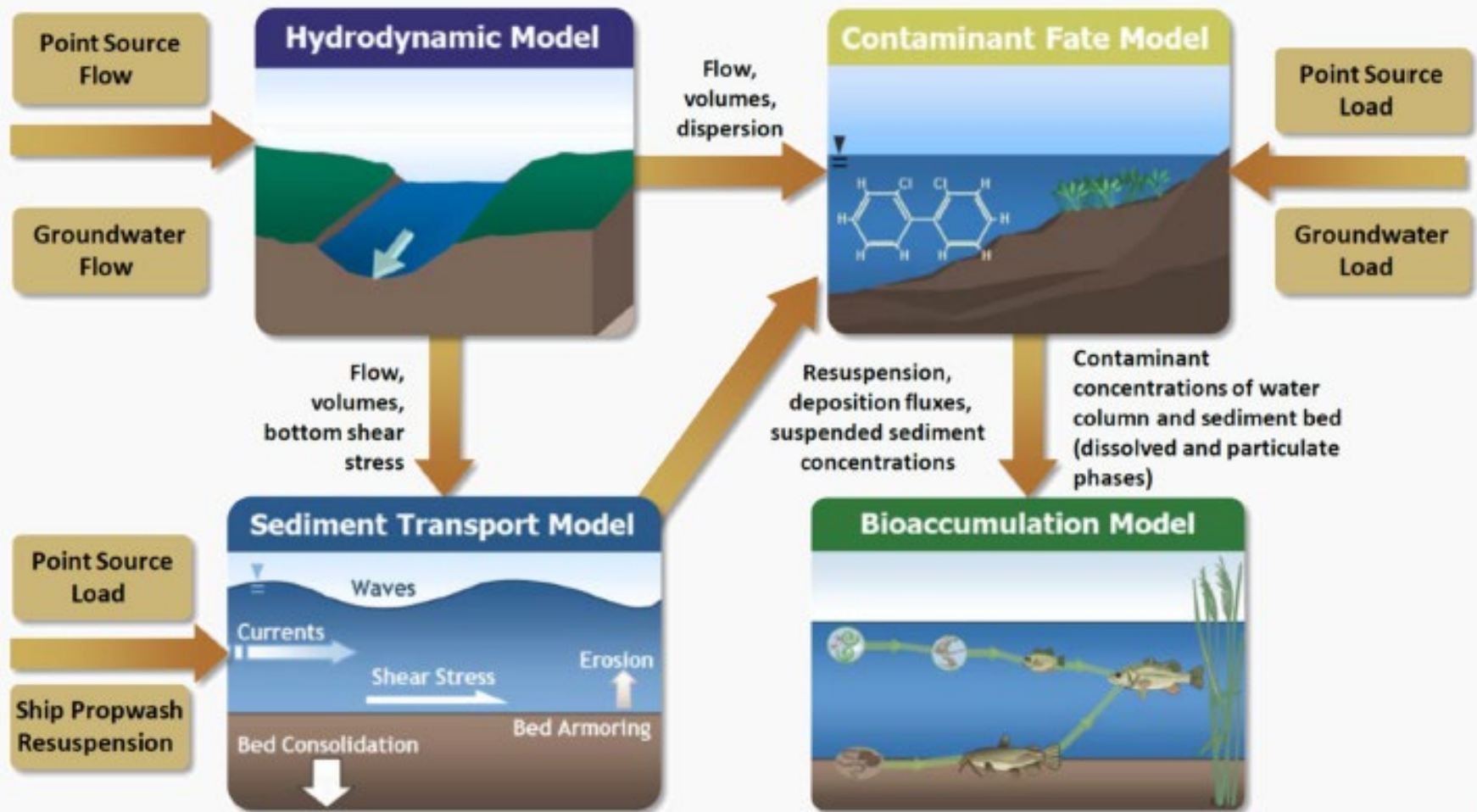
## EVALUATE & ASSESS

- Effectiveness of various alternatives
- Timeframes
- Design of remedy
- Potential impacts of remedy

# Newtown Creek Example

- ◆ The data tell us
  - Where is contamination present now?
  - What kinds of contamination are present?
  - At what concentrations?
- ◆ Some big questions include
  - Is it stable or will it move?
  - What will happen if you clean it up?
  - How long will it take to achieve cleanup goals?
- ◆ There are no straightforward answers....

# Newtown Creek Modeling Framework



Anchor QEA, 2016b

# Example: Final Summary Result of a Similar Modeling Effort

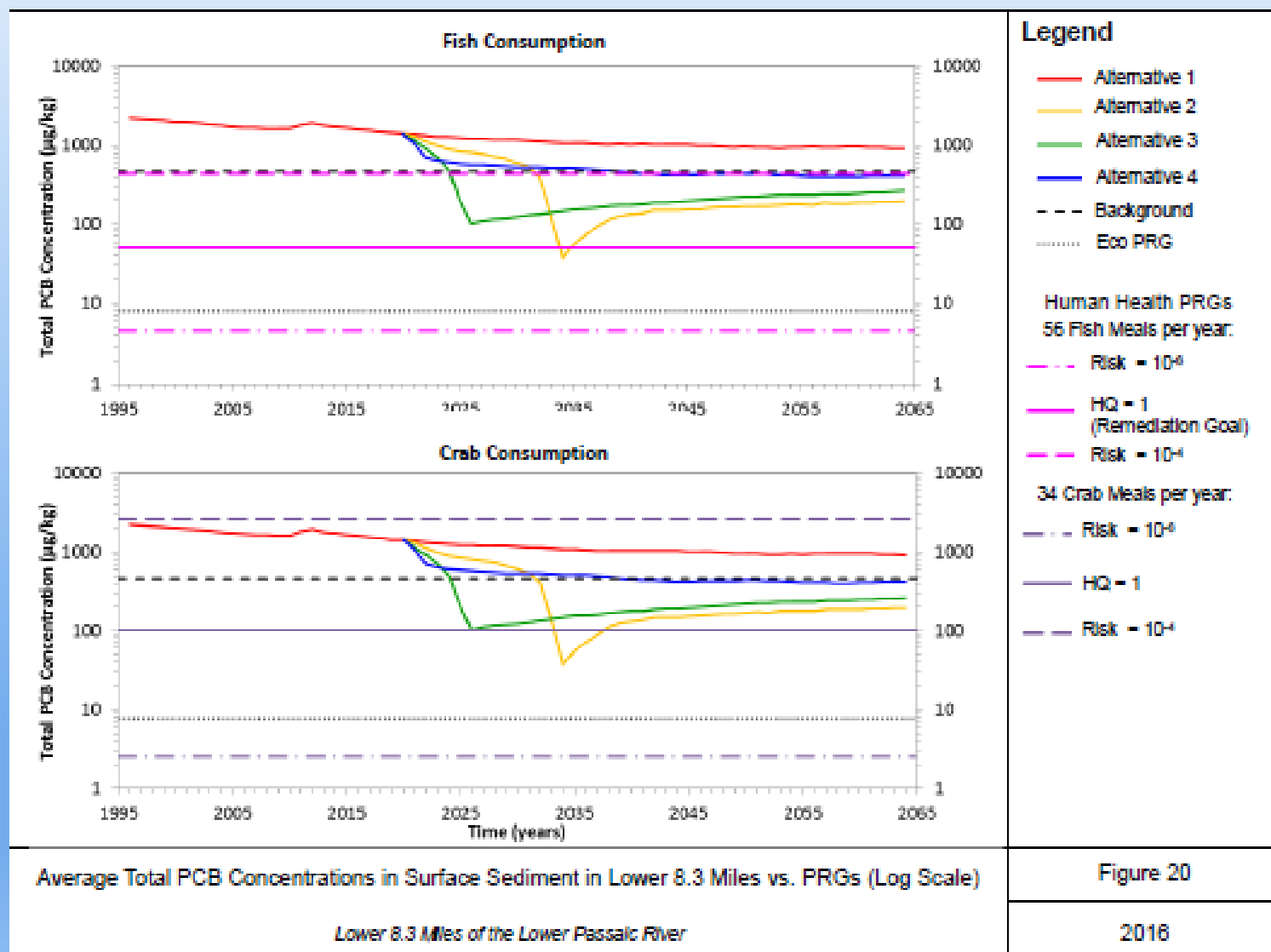


Figure 20

2016

## What if we do not use a model?

- We would not be able to show what may be achieved after cleanup
- We would not be able to predict what would happen to the environment if we do nothing
- We would not be able to compare the effectiveness of various options over time

Questions?

