



A Review of Allocation Methods and Rationale for Method Selection

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Introduction

- At large sediment Superfund sites, multiple parties are often expected to receive a share of cleanup costs through allocation
- Often, allocation proceeds in a dispute resolution setting

NEGOTIATION



MEDIATION



ARBITRATION



LITIGATION



Introduction

- Within these settings, there is no prescribed method for allocating cleanup costs
- The allocation method must be developed specific to the Superfund site and must account for:
 - Commonly accepted factors (Gore and Torres)
 - Area(s) requiring cleanup
 - Contaminant(s) requiring cleanup
 - Hydrodynamics of the waterbody where the site exists
 - Number of participating potentially responsible parties (PRPs)
 - Nature and extent of PRP contributions to the areas requiring cleanup

Introduction

- Two different approaches (quantitative or qualitative) can be used to perform the assessment of PRP contributions
- Fact record (all available evidence) drives selection of the appropriate approach
- When debating approaches for selection, evaluate the following questions:
 - Is the fact record robust – are multiple lines of evidence available to be evaluated for all PRPs?
 - Is the fact record comparable – is the same level and type of evidence available to be evaluated for all PRPs?
 - Are the methods used to evaluate multiple lines of comparable evidence logical, consistent, and scalable – can the methods be applied to all PRPs?

What Are Quantitative or Formulaic Approaches to Allocation?

- Use quantitative data to develop a numerical score associated with the relative contribution from a PRP
- Inputs
 - Measured data to estimate loading contributions, if available
 - Loading contributions can be used to calculate the percentage of cleanup costs assigned to the PRP

Measured Data Example

Party: Public entity with jurisdiction over roads discharging into a Superfund site

Measured data:

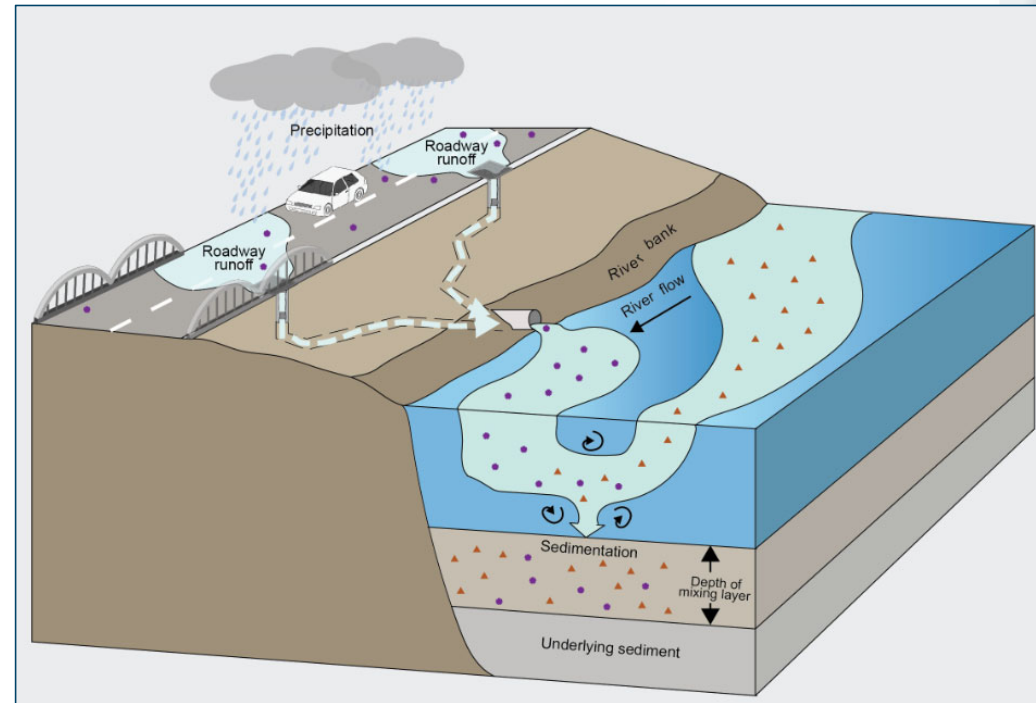
- Stormwater and annual precipitation data

Method:

- Combine measured data with sedimentation modeling
- Estimate contaminant concentrations in deposited sediment in an area of the Superfund site
- Compare estimated to actual measured contaminant concentrations in the deposition area

Results:

- Calculate PRP share based on ratio of estimated and actual concentrations and cost to clean up each contaminant



What If Measured Data Are Not Available?

Distill available evidence into numerical representations of typically considered factors:

Examination of contaminant of concern (COC) use within site processes (i.e., amount used)	Gore Factors: The amount of hazardous substances involved, and the degree of toxicity of the hazardous substances involved
The potential for and magnitude of COC release from site processes	Gore Factor: The degree of involvement by the parties in the generation, transportation, treatment, storage, or disposal of the hazardous substances
Examination of COC release pathways from site processes	Gore Factor: The ability of the parties to demonstrate that their contribution to a discharge, release, or disposal of a hazardous waste can be distinguished
The likelihood COC releases along each pathway reached and impacted waterway sediments	Torres Factor: The extent to which cleanup costs are attributable to wastes for which a party is responsible
The duration of potential COC release from site processes	Gore Factor: The amount of hazardous substances involved
Evidence towards standard of care through the analysis of production processes or treatment changes over time, and the potential resulting impacts of those changes	Gore Factor: The degree of care exercised by the parties with respect to the hazardous substances concerned, taking into account the characteristics of such hazardous substances Gore Factor: The degree of cooperation by the parties with the federal, state, or local officials to prevent any harm to the public health or the environment

Numerical Representation Example

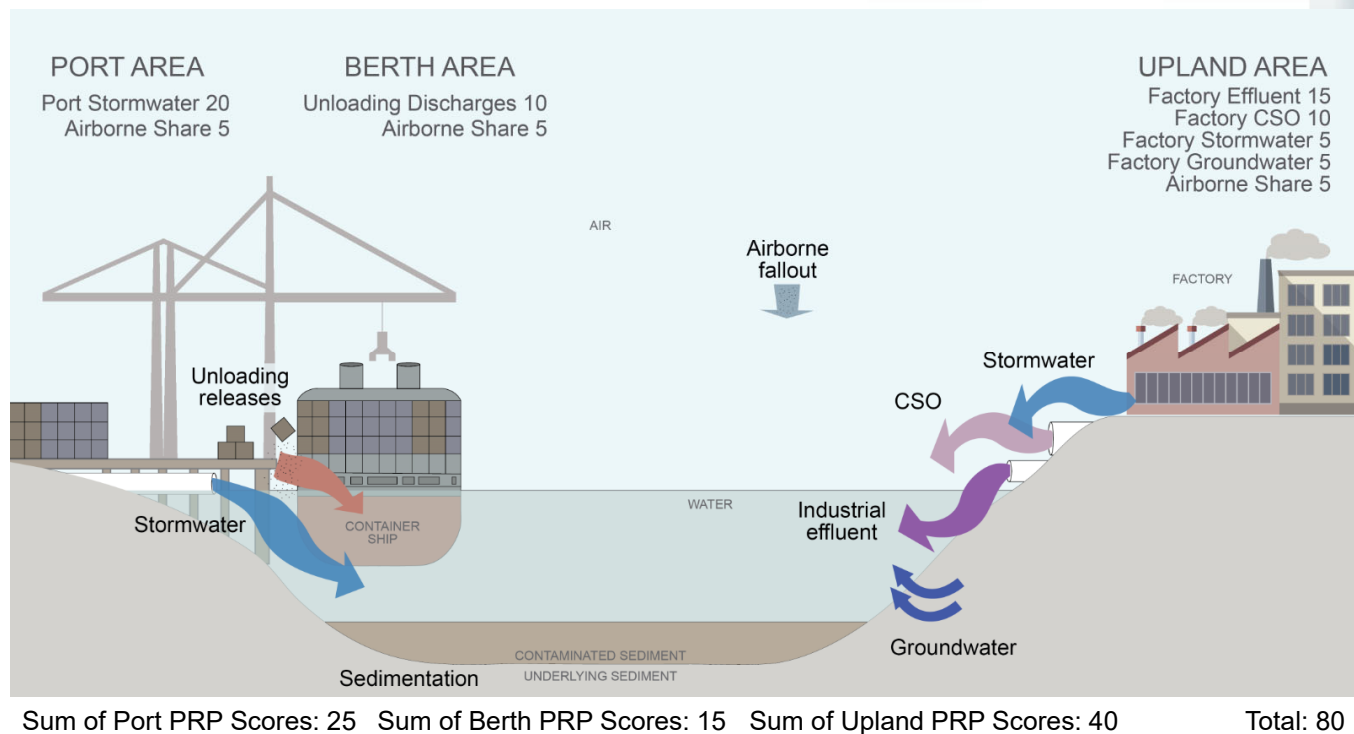
Parties: Owners/operators of upland and identified sources

Method:

- For each PRP source, evaluate COC associations, pathways, and likelihood, magnitude, and duration of release
- Assign numerical scores to approximate source contributions, and sum source scores
- Compare each PRP score to sum of all scores

Results:

- Develop PRP shares based on ratio of PRP score to total score



What If Measured Data Are Not Available and Sources Can't Be Easily Evaluated?

- Limited evidence exists to evaluate PRP sources (COC associations and pathways, and release likelihood, magnitude, and duration)
- Approximate PRP contributions using surrogate data instead of measured data or numerical representations of typically considered factors

Surrogate Example

Parties: Owner/operator PRPs at an upland site

Surrogate data examples:

- Site area, number of active and inactive outfalls, duration of total site operations, or duration of PRP operations

Method:

- Evaluate surrogate data for each PRP

Results:

- Compare surrogate data for each PRP to assign a PRP share

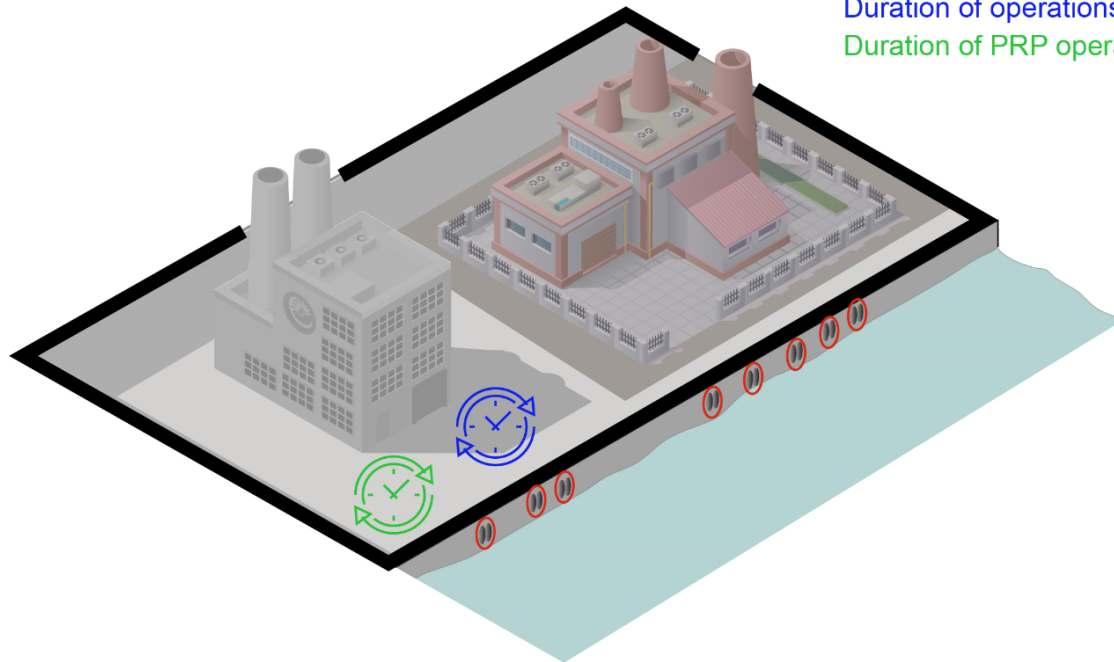
Site Area = 4 acres

Number of active outfalls = 7

Number of historical outfalls = 1

Duration of operations = 100 years

Duration of PRP operations = 50 years

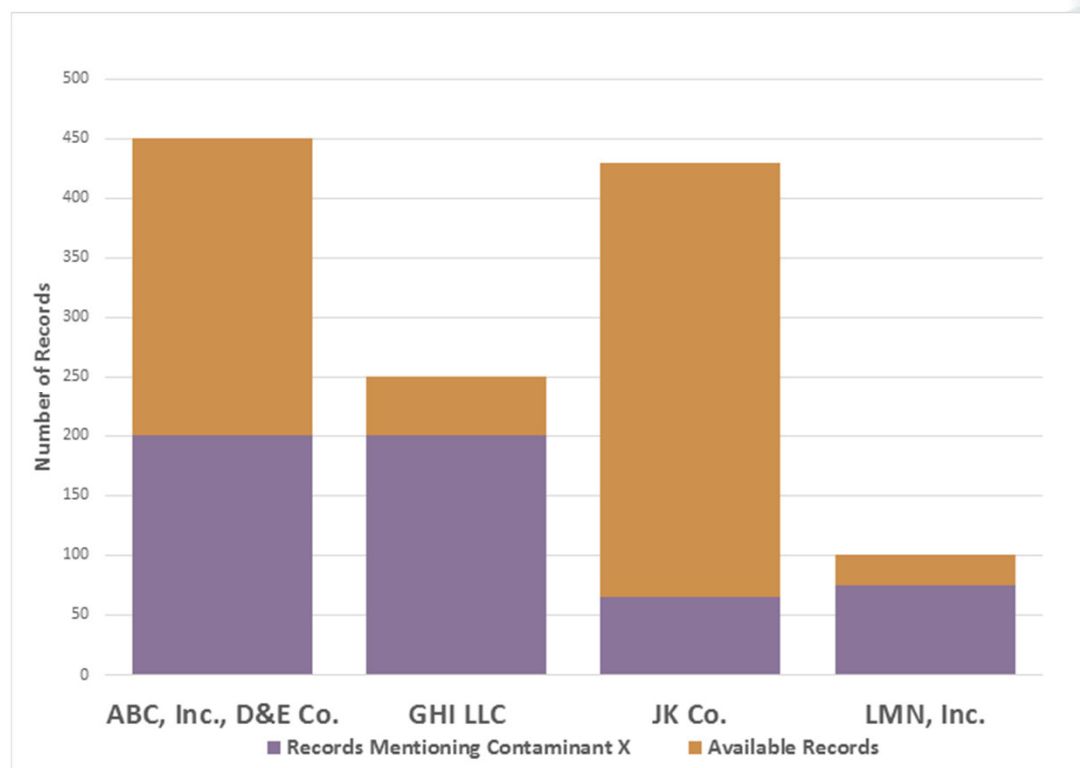


When Could We Consider Quantitative or Formulaic Approaches?

Considerations	Criterion for all PRPs	
Robust fact record	Multiple lines of evidence available for all PRPs	✓
Comparable fact record	Same level and type of evidence available for all PRPs	✓
Methods to evaluate evidence and develop assumptions are logical, consistent, scalable	Methods applicable for all PRPs	✓

Why is a Robust Fact Record Important?

- A robust fact record provides multiple lines of evidence relevant to each factor considered in the allocation
- A single line of evidence represents a single data point
- This may not be enough information to:
 - Evaluate measured data
 - Develop a numerical representation of a factor to be considered in the allocation



Why Is Comparable Evidence for All Parties Important?

- “Apples to apples” comparison
- Evidence must be comparable in terms of:
 - **Type (the class of evidence that exists)**
 Example: A sample of effluent discharged to a publicly operated treatment works (POTW) may not be comparable to a sample from an on-site pond that collected process waste discharges and stormwater
 - **Quality (relative value of evidence that exists)**
 Example: The effluent sample discharged to a POTW collected in 2000 may not be comparable to effluent collected in 1975

	ABC, Inc. D&E Co.	GHI LLC	JK Co.	LMN, Inc.
Is duration of Contaminant X use known?	✓	✓	✗	✓
Contaminant X sampled in stormwater?	✓	✗	✓	✓
Contaminant X sampled in process effluent?	✓	✗	✗	✓

Why Do We Need a Method for Developing Assumptions?

- Even with a robust fact record, the same lines of evidence may not be available for all PRPs
- Unknowns (or data gaps) will exist
 - The number of evaluated unknowns should be small; otherwise, the formula does not evaluate comparable evidence for all PRP Sites
- The absence of evidence evaluated differently from negative evidence
 - Examples:
 - Absence of evidence: Site media was not analyzed for a particular COC
 - Negative evidence: Site media was analyzed for the COC and the results were non-detects

What If the Evidence Doesn't Support a Quantitative Approach?

Evidence Considerations	Criterion for all PRPs	
Robust fact record	Multiple lines of evidence available for all PRPs	x
Comparable fact record	Same level and type of evidence available for all PRPs	x
Methods to evaluate evidence and develop assumptions are logical, consistent, scalable	Methods applicable for all PRPs	x

- The fact record may not be sufficiently robust for all involved PRPs
- The available evidence may not be comparable for sites or parties
- The fact record is characterized by data gaps that cannot be resolved through gathering additional evidence
- The methods to evaluate unknowns can't be applied to all PRPs

What Are Qualitative Approaches?

Rely on interpreting disparate evidence related to typically considered factors:

Examination of COC use within site processes (i.e., amount used)	Gore Factors: The amount of hazardous substances involved, and The degree of toxicity of the hazardous substances involved
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What Are Qualitative Approaches?

- Characterize all available evidence according to specific factors to be considered in the allocation
- Identify similarities in the fact record based on that characterization
- Group PRPs with similar evidence together
- Rank or tier groups of PRPs to evaluate relative contributions

Qualitative Approach Example: Tiering

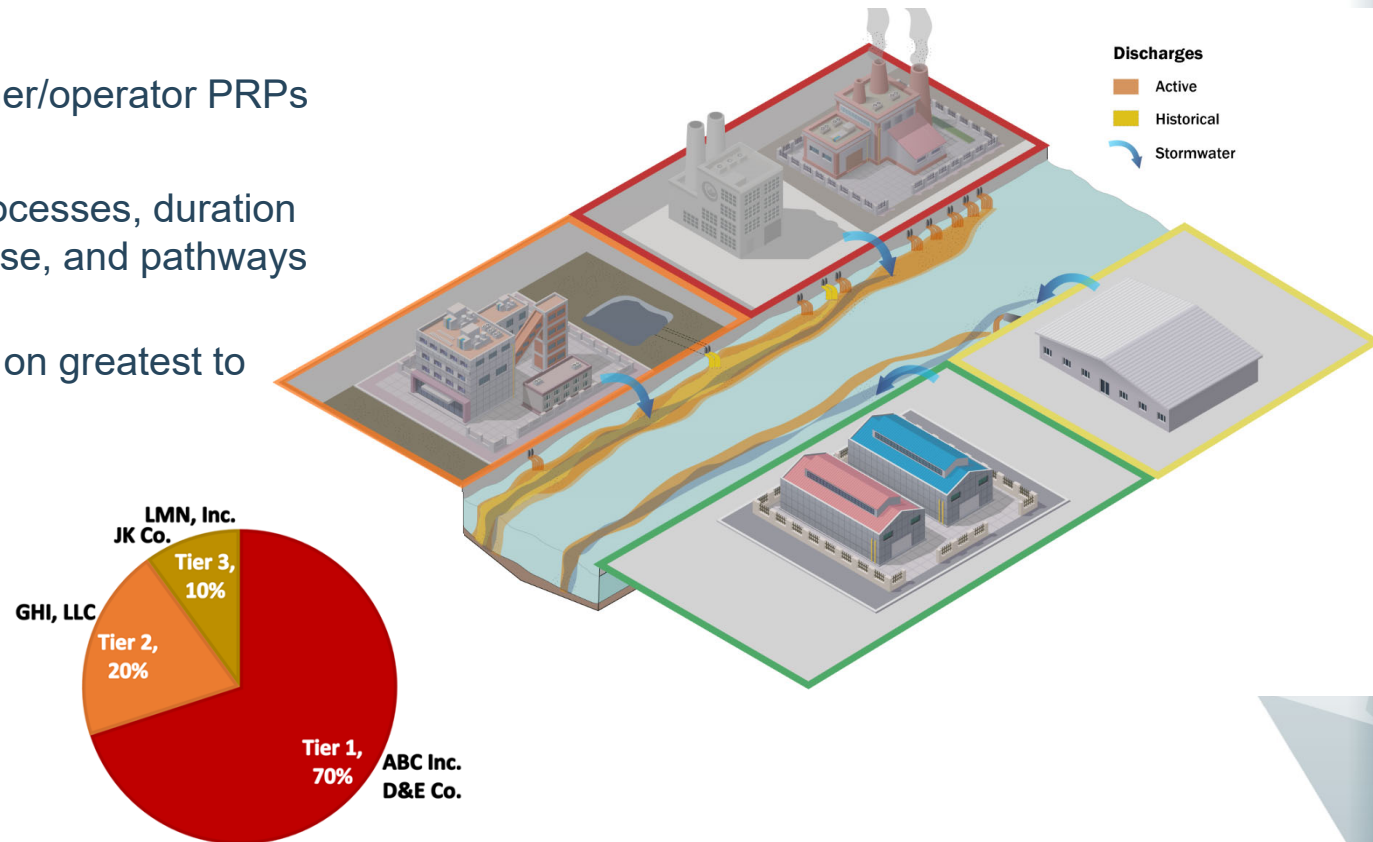
Parties: Current and historical site owner/operator PRPs

Method:

- Evaluate contaminant use in processes, duration of operations, potential for release, and pathways for each site and each PRP
- Rank each site and PRP based on greatest to smallest relative contributions

Results:

- Assign a share to each tier
- Assign PRP shares based on tier percentage and ranking



When Could We Consider Qualitative Approaches Like Tiering?

Evidence Considerations	Criterion for all PRPs	
Robust fact record	Multiple lines of evidence available for all PRPs	x
Comparable fact record	Same level and type of evidence available for all PRPs	x
Methods to interpret evidence and unknowns are logical, consistent, scalable	Methods applicable for all PRPs	✓

- The fact record may not be sufficiently robust for all involved PRPs
- The available evidence may not be comparable for sites or parties
- The methods to characterize available evidence according to specific factors, identify similarities in the fact record, and group similar PRPs together are logical, consistent, and scalable

What Is the Difference Between the Two Approaches?

- A quantitative approach
 - Typically requires a robust and comparable fact record, containing multiple lines of comparable evidence for all PRPs
 - Typically requires a consistent method for evaluating unknowns (data gaps)
 - Allows numerical comparisons between PRPs, providing mathematical results
- A qualitative approach
 - Evaluates the fact record that is available
 - Allows interpretation of disparate evidence along with unknowns (data gaps)
 - Allows for relative comparisons between PRPs, but comparisons are not based on numerical results

Why Does Evidence Matter So Much in the Selection Process?

- When multiple lines of comparable evidence are not available for all PRPs and multiple, unresolvable data gaps exist, a quantitative approach (i.e., a formula) can run the risk of being developed primarily from assumptions
- Although a formula can give the impression of precise results, a formula developed primarily from assumptions may not be an accurate reflection of available evidence
- The results of a formula developed entirely from assumptions may not be an accurate reflection of site or PRP contributions


Wrap-up and Discussion

- In the absence of one prescribed allocation method, multiple approaches exist:
 - Quantitative or formulaic approaches
 - Qualitative approaches such as tiering
- Allocation method selection should be driven by an evaluation of the fact record:
 - Assessment of the amount, class, and quality of evidence
 - Assessment and identification of data gaps
- Bypassing the evidence evaluation may result in:
 - Selection of an allocation method that may assign PRP shares that are not an accurate reflection of contributions
 - Protracted disputes between PRPs and/or with the allocator regarding results
 - Breakdown of the dispute resolution process

Thank You

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