Upland Disposal
Problem Formulation and Conceptual Model Development

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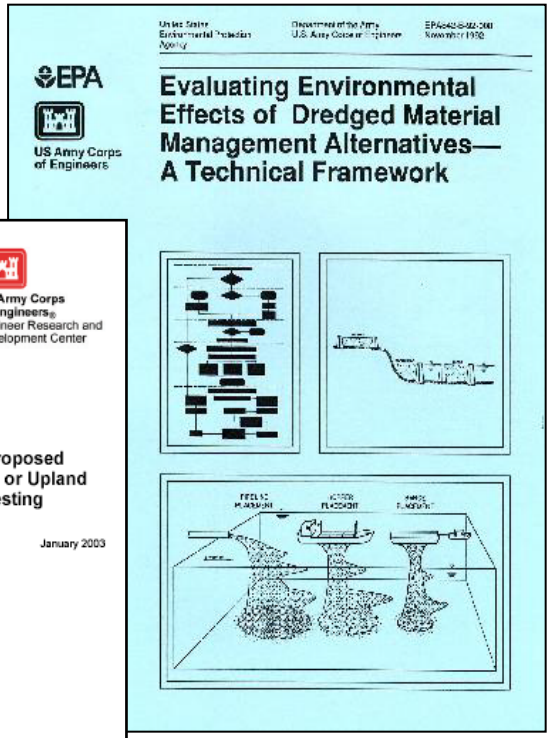
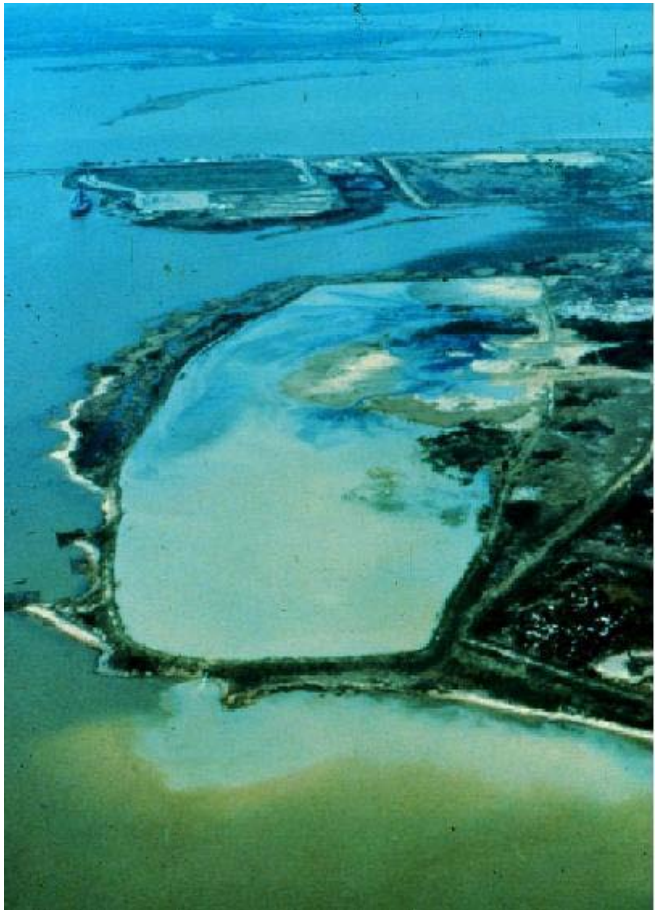
Governing Framework

- **Regulatory**
  - **Clean Water Act (CWA)**
- **Technical**
  - **USACE/EPA Technical Framework**
  - **Upland Testing Manual (UTM)**



Clean Water Act

- Regulatory (Section 404)
- Requires return flow
  - Trigger for RCRA Subtitle C Exclusion[1]
  - BUT states can still choose to regulate DM as solid waste



1 Palermo and Wilson 2000

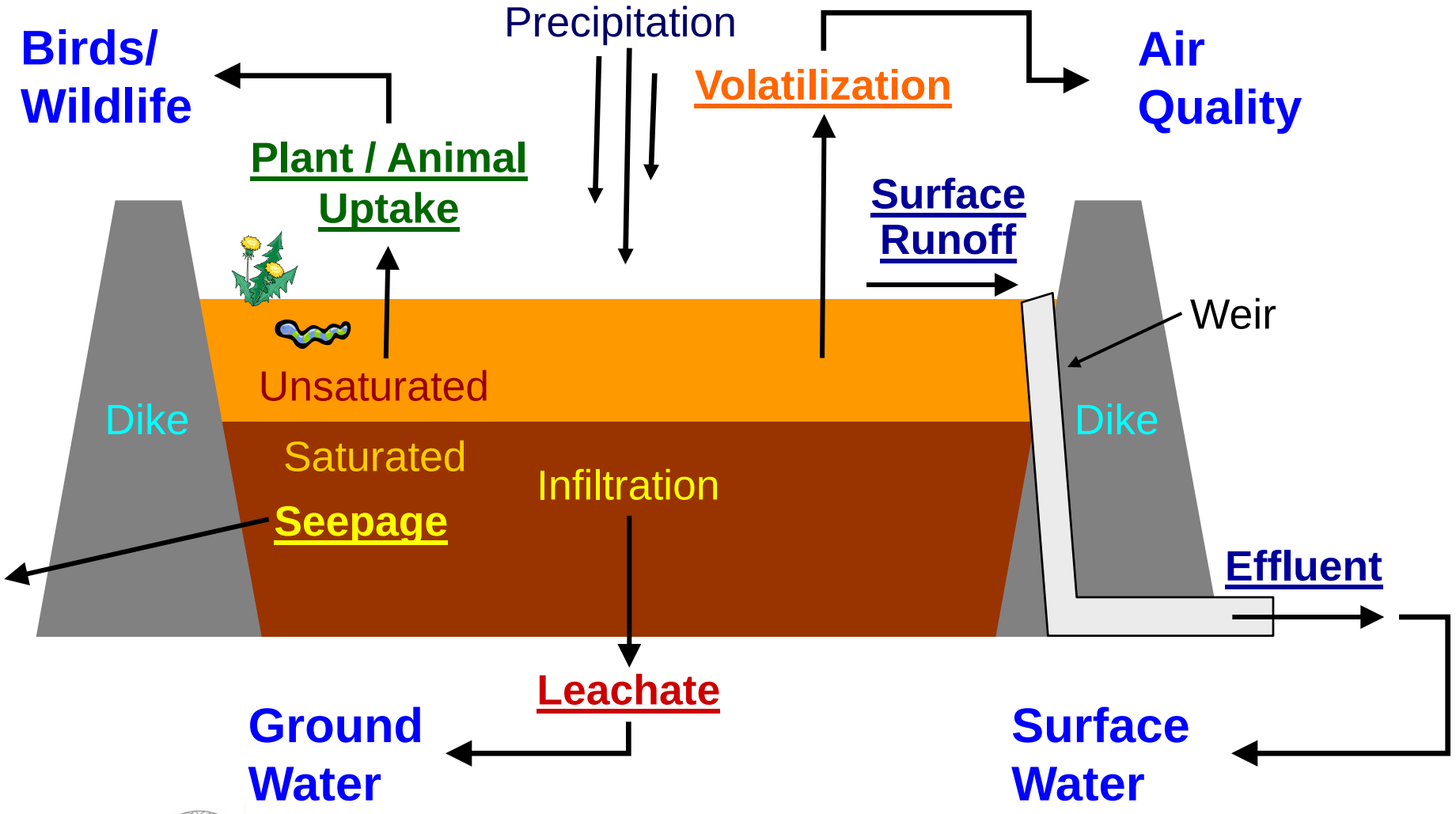
USEPA/USACE Technical Framework

- Guidance (not regulatory)
- Articulates NEPA, CWA, MPRSA requirements
- Alternatives screening
  - http://el.erdc.usace.army.mil/dots/pdfs/epa/tech-frame-rev04.pdf
  - Open water
  - Confined disposal
  - Beneficial use
- Environmental suitability

Upland Testing Manual

- **Guidance (not regulatory)**
  - **http://el.erdc.usace.army.mil/dots/pdfs/trel03-1.pdf**
- **Concerned with contaminant exposures associated with CDFs**
- **Develop lines of evidence to support decision making**
  - **Management requirements**
  - **Need for controls**
  - **Alternatives analysis**
  - **Evaluation of risk, inform risk management**

Conceptual Model - Contaminant Pathways

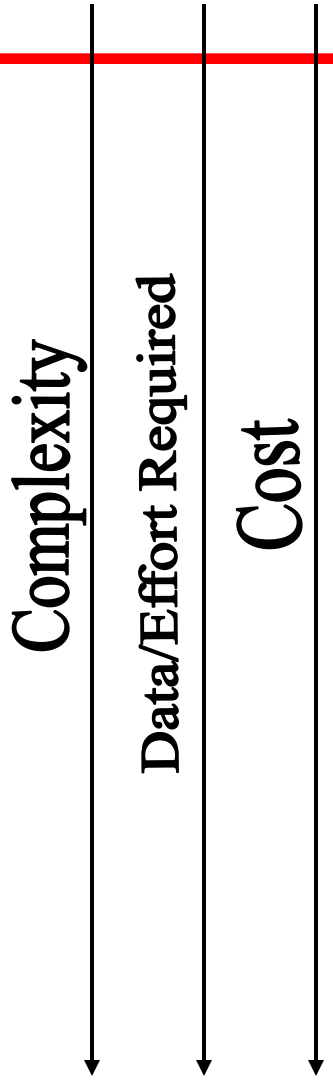


CDF Pathway End Points

- **Effluent and Runoff**
  - **WQ Standards and/ or WC Toxicity after Mixing**
- **Leachate**
  - **Applicable WQ Standards after Attenuation (groundwater or surface water)**
- **Volatiles**
  - **OSHA Human Exposure Standards after Dispersion**
  - **Health Based Air Concentration for Acceptable Risk**
- **Plant and Animal Uptake**
  - **Comparison of uptake to Reference Soil**
  - **Comparison to EcoSSL's**

UTM – A Tiered Approach for Evaluations

Tier I	Existing Info
Tier II	Screening Evaluations
Tier III	Effects-Based Testing and Evaluations
Tier IV	Case Specific Studies/ Risk Assessment

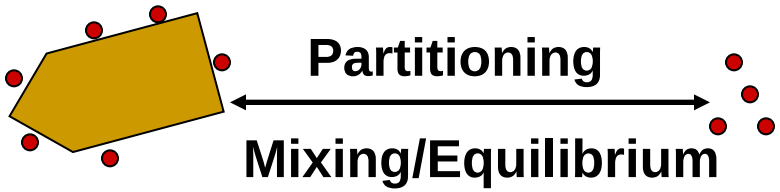


Tier I – Existing Information

- **"Reason to believe"**
  - **Need for Pathway Evaluations**
- **Compile**
  - **Available sediment and water chemistry**
  - **Sediment physical characterization**
  - **Municipal, industrial, surface water inputs**
  - **Project info (maintenance vs. new work)**
  - **Available data from other agencies – diversity studies, tissue sampling**
- **Establish Relevant Pathways and Contaminants of Concern**

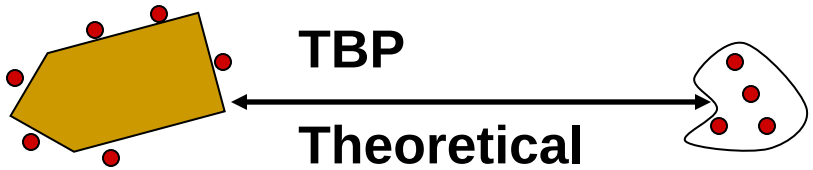
Proceed to Tier II for relevant pathways

Tier II - Screening

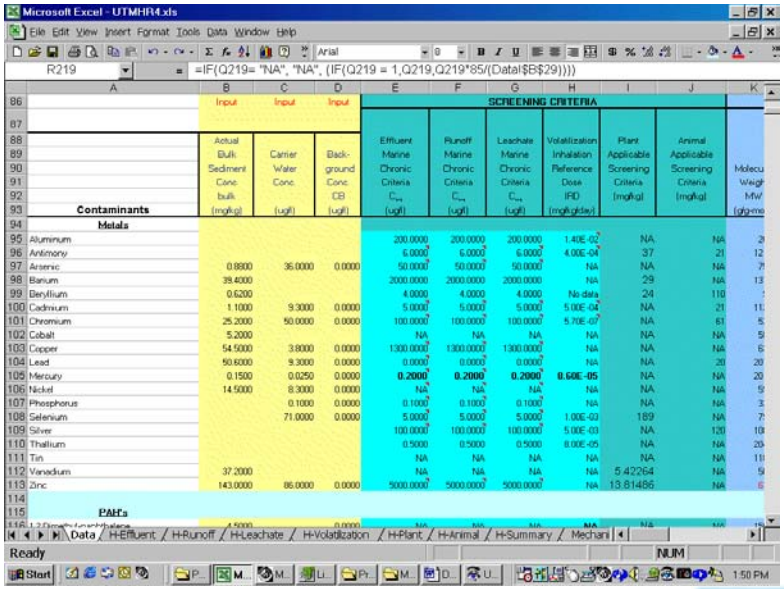


Effluent; Runoff; Leachate;

Volatiles (Henry's Law)



Animal Uptake



Plant Uptake - PUP

Diethylenetriamine-pentaacetic acid (DTPA) Extract

Tier II Outcomes

- **Definitive**
  - **WQC met with attainable dilutions/attenuation**
  - **Volatilization exposures acceptable**
  - **Plant and animal uptake levels acceptable**
- **Not definitive**
  - **Contaminants present have no WQC**
  - **Predicted dilution requirements high**
  - **Predicted exposures potentially unacceptable**
  - **Data or model inconsistency**

Resolve specific issues with Tier III Testing and Evaluations

Tier III Testing

- **Effects Based Testing and Evaluations**
  - **Physical modeling of contaminant exposure effects**
  - **Chemical and Biological Tests**
- **Models for Mixing, Attenuation, Dispersion**

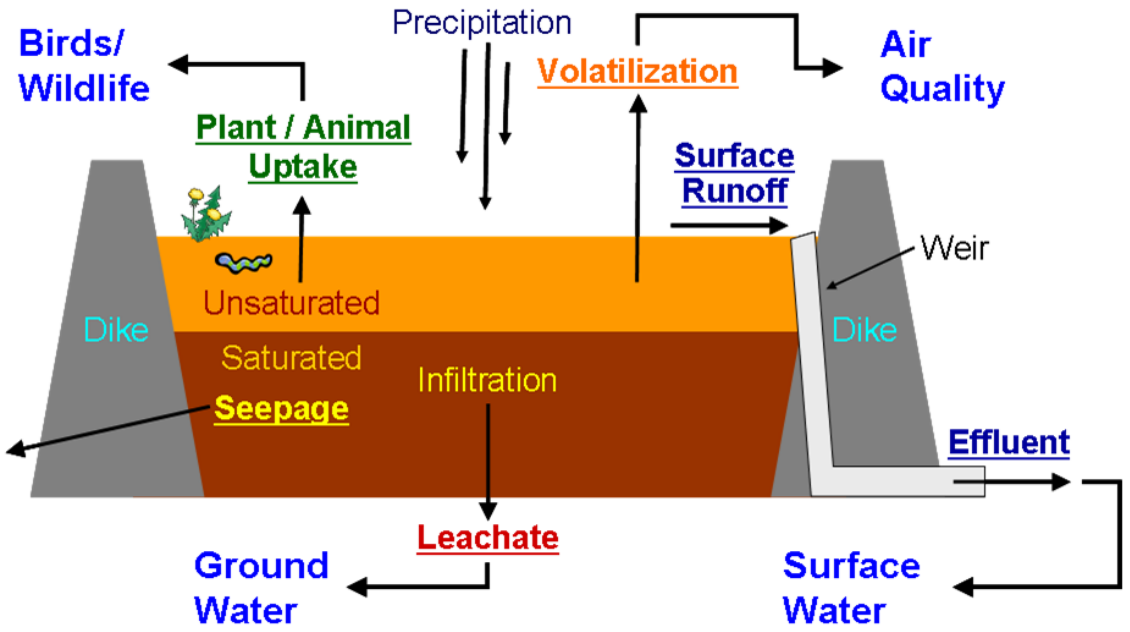
Tier III test results provide data for Tier IV Risk Assessments

Tier IV Case Specific Studies

- Formal quantitative risk assessment
- Addresses specific, well-defined questions
- Rarely necessary for navigation dredging
- Useful if
  - Contamination is substantial
  - Decision-making information not otherwise available
  - The evaluation will provide essential information
- Unnecessary use of resources when
  - Merely a refinement of Tier III
  - Definitive determination unchanged

Up Next

- **Pathway Evaluations**
  - **Effluent**
  - **Runoff**
  - **Volatilization**
  - **Leachate**
  - **Biological**



References

- **USEPA/USACE 2004. "Evaluating Environmental Effects of Dredged Material Management Alternatives – A Technical Framework", EPA842-B-92-008 Revised May 2004, U.S. Environmental Protection Agency, Washington, D.C.**
- **US Army Corps of Engineers 2003. "Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, or Upland Confined Disposal Facilities — Testing Manual", ERDC/EL TR-03-1, Engineer Research and Development Center, Vicksburg, MS.**
- **Palermo and Wilson 2000. "Corps Of Engineers Role In Contaminated Sediment Management And Remediation", proceedings of *Contaminated Sediments: Science, Law and Politics*, the 8th Section Fall Meeting, American Bar Associate, Section of Environment, Energy, and Resources, New Orleans, Louisiana, September 20-24, 2000, U.S. Army Engineer**

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