



**2011 Hawai'i Build & Buy Green +
Brownfields Redevelopment +
Green Workforce Development Conference & Expo**



Environmental Due Diligence

Site Assessment & Hazard Evaluation Overview



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Environmental Due Diligence Triggers

- **Property transactions**
- **Planned redevelopment**
- **Lease initiation**
- **Refinancing**
- **Evidence of environmental impairment**



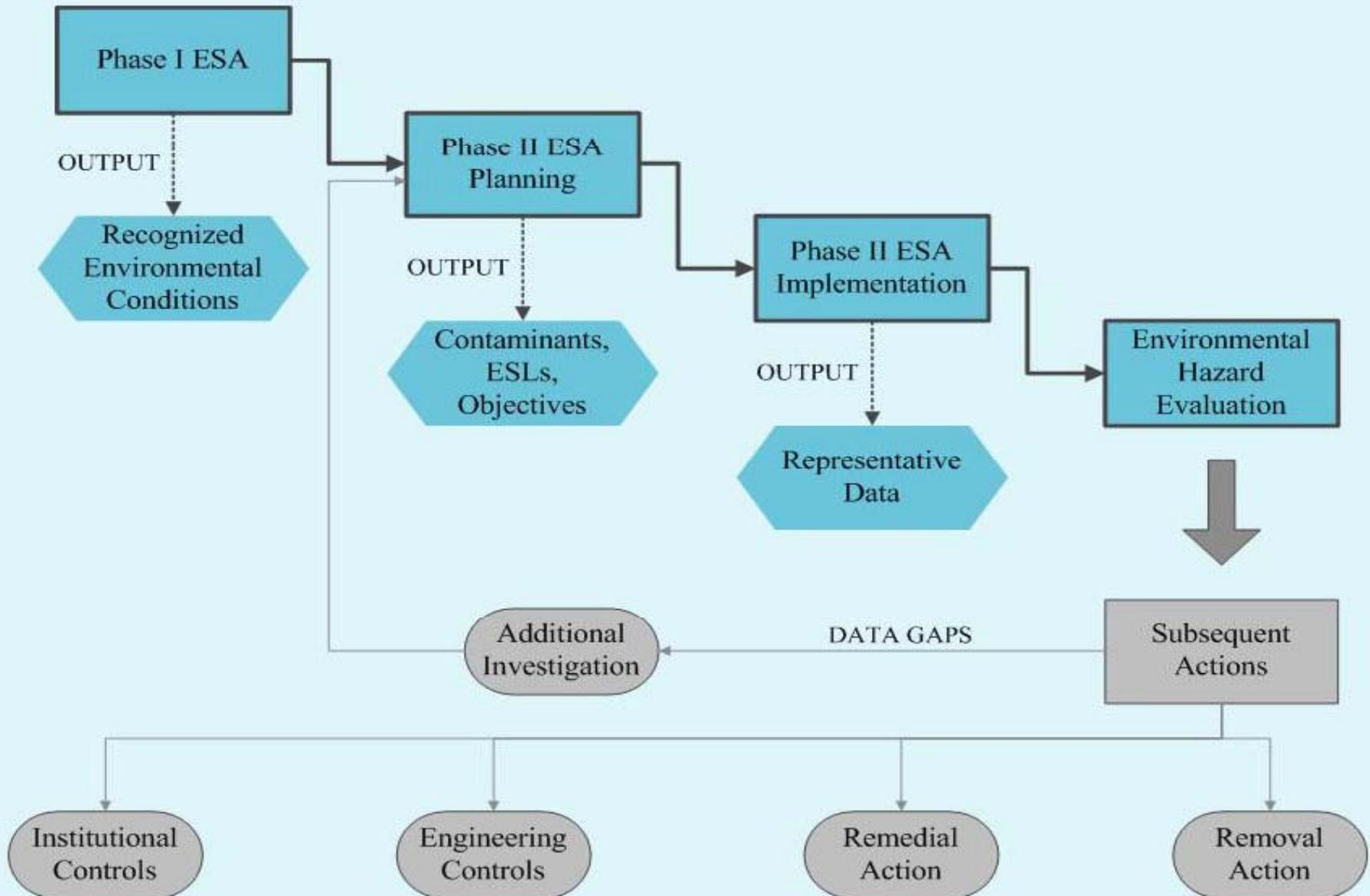


Why Environmental Due Diligence?

- **Environmental concerns**
- **Feasibility of planned property use**
- **CERCLA liability protection**
- **Actions to address environmental concerns (cost/time)**



Environmental Due Diligence Summary





Key Considerations

- **Experienced environmental consultant**
- **Proposed or desired future use**
- **Hawaii DOH involvement**
- **Data needed to provide estimates**
- **Cost and time frames**



Phase I Environmental Site Assessment

- **First step in identifying environmental risk**
- **Satisfy requirements for CERCLA liability protection**
- **Review historical and current use records – no sampling**
- **ASTM Standard E1527-05 fulfills EPA's All Appropriate Inquiry final rule (40 CFR Part 312)**
- **Identify Recognized Environmental Conditions (RECs)**
- **\$5,000 +/-**



Components of a Phase I ESA

- **User-provided information**
- **Records review**
- **Site reconnaissance**
- **Interviews**

The Phase I ESA must provide:

- **Opinion regarding release or potential release**
- **Identification of data gaps**
- **Qualifications and signature of environmental professional**
- **Opinion regarding additional appropriate investigation**



Recognized Environmental Conditions

The goal of the Phase I ESA is to identify whether RECs exist at the property. RECs are defined by ASTM as:

“The presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include *de minimis* conditions that generally do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate government agencies. Conditions determined to be *de minimis* are not recognized environmental conditions.”



Example RECs



Corroded, leaking drums



Leaking transformers



Example RECs



In-ground hydraulic lift



UST vent piping and fill pipe

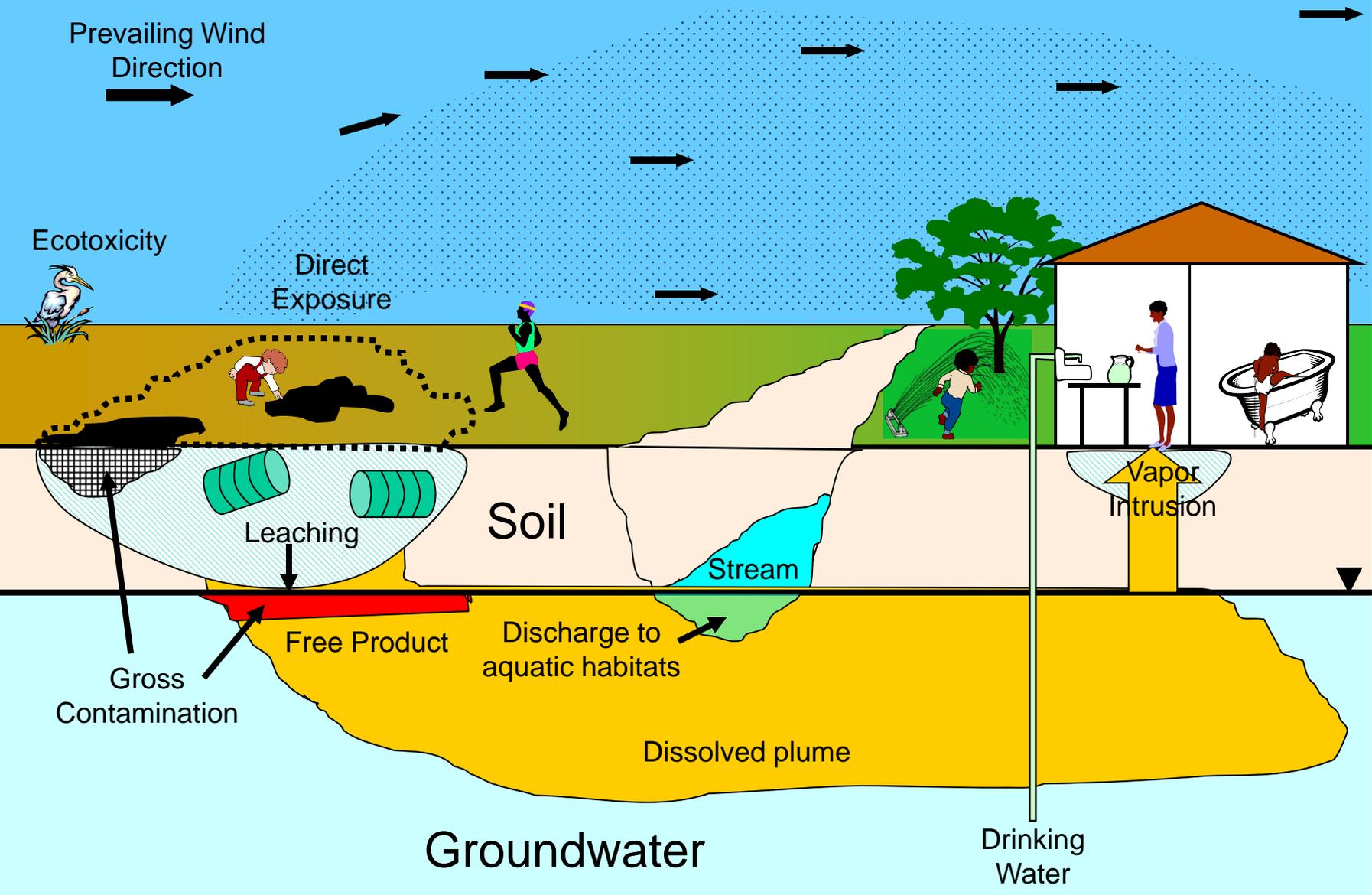


Phase II ESA Planning

- RECs from Phase I ESA drive Phase II ESA
- Data collection from environmental media
- Subjective and site-specific
- Goal of obtaining sufficient data to make defensible decisions
- Conceptual site model to identify potential contaminants, receptors, and exposure pathways
- See DOH's Interim Final *Technical Guidance Manual for the Implementation of the Hawaii State Contingency Plan*



Default Conceptual Site Model of Potential Environmental Hazards

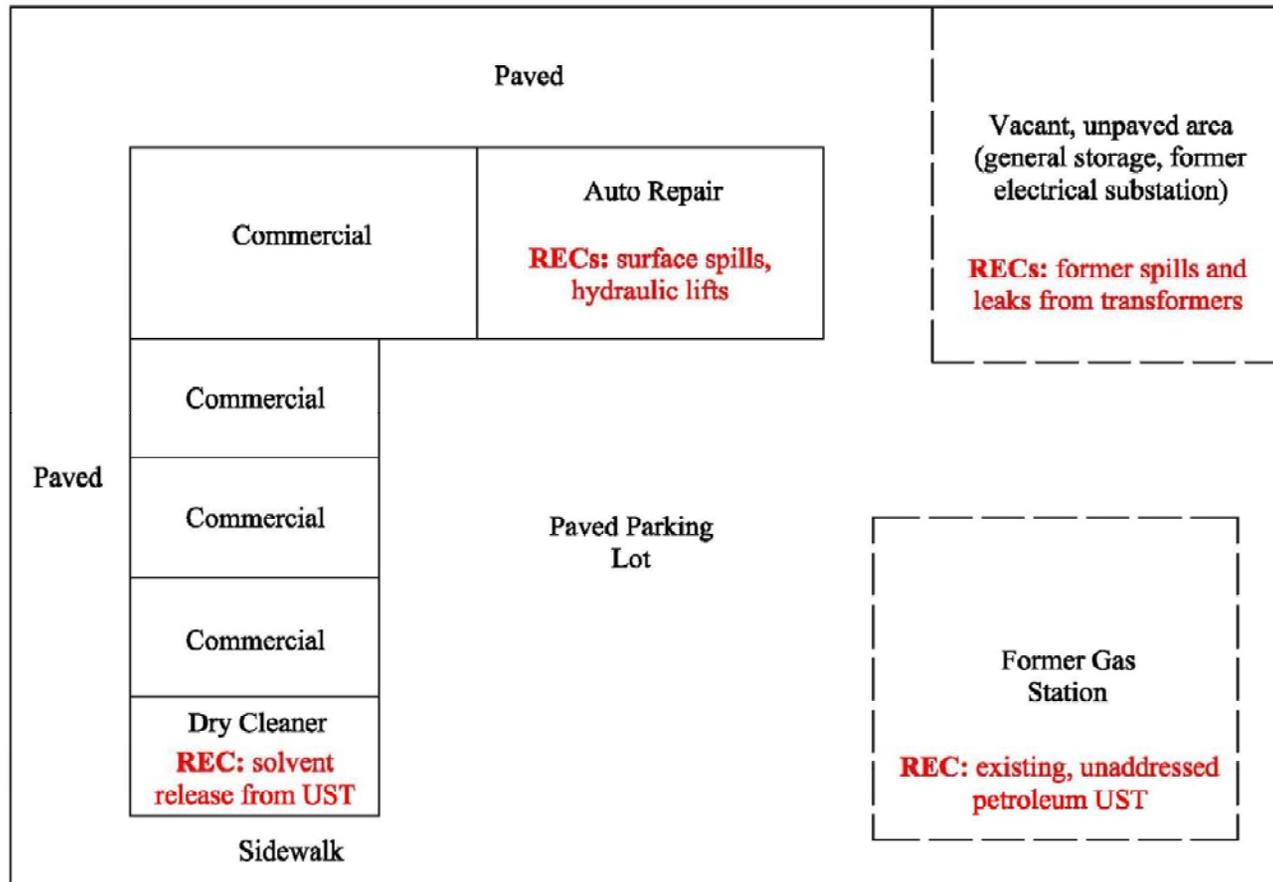


Key Questions

- **Environmental issues based on RECs? Potential receptors? Potential exposure pathways?**
- **Data gaps? Contaminants of potential concern? Media of concern? Appropriate Environmental Screening Levels?**
- **Areas requiring decisions (referred to as “decision units”)? Data types needed? Practical constraints?**
- **Decision statements (i.e., “if..then..”) for data evaluation?**



Fictitious Case Study Site



Decision Units (DUs)

- An area (volume) where samples are to be collected and decisions made based on the resulting data.
- Variability *within* the DU needs to be “captured” in data but not specifically determined.

Spill Areas



Exposure Areas



Planning Considerations

- **Flexible development plan?**
- **Land use restrictions OK?**
- **Cost-benefit:**
Screening Level vs. Comprehensive Study?

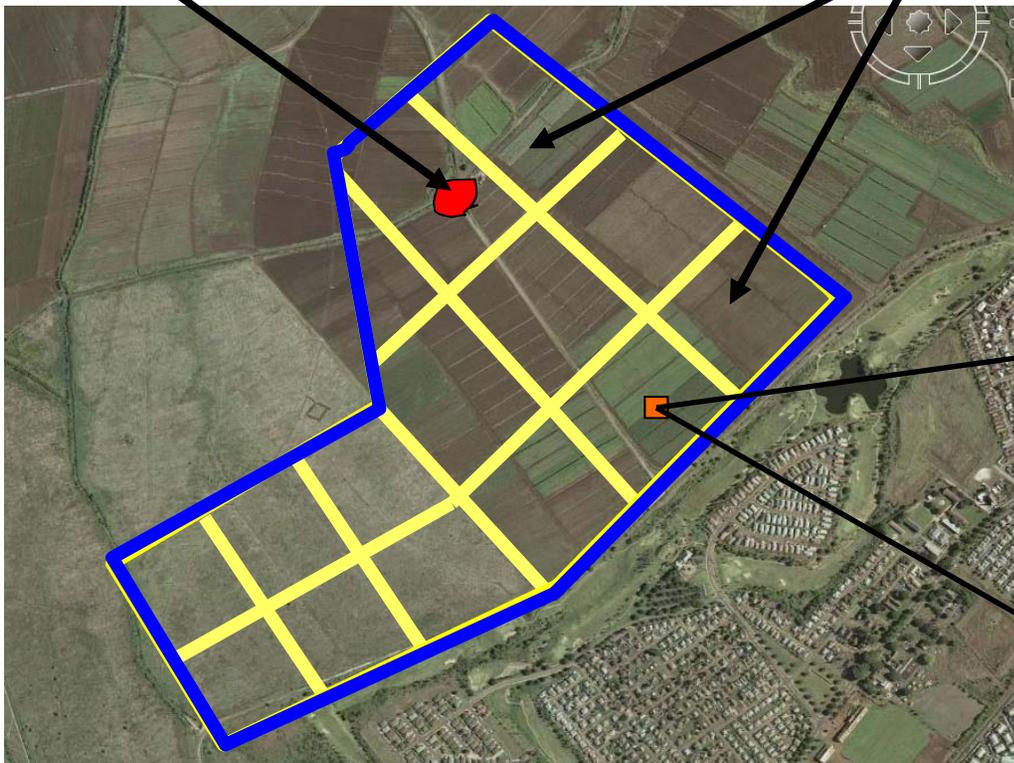


Really Big Decision Units! (400-acre former sugarcane field)

Separate Spill Area
decision unit
(investigated
separately)

Initial Screening Decision Units (15)

- Residual pesticide levels?
- Should I buy this land?



Final Lot-Scale DUs (59)

- Hypothetical lots
- 5,000 sf Exposure Area



Did you test my yard? No, but we tested your neighborhood and random lots.

Sampling and Analysis Plan

- **Conceptual Site Model - potential receptors and exposure pathways**
- **Quality Assurance Project Plan**
- **Field Sampling Plan**
- **Data Quality Objectives**
- **Environmental Screening Levels**
 - evaluate site data
- **Sampling design (type, location, frequency, etc.)**



Phase II ESA Report

- **Documentation of the field sampling effort**
- **Deviations from the planned activities and justification for the deviations**
- **Field observations/measurements and lab. data**
- **Laboratory data validation**
- **Comparison of laboratory data with Environmental Screening Levels (typically DOH Environmental Action Levels)**
- **Findings and conclusions of the investigation**

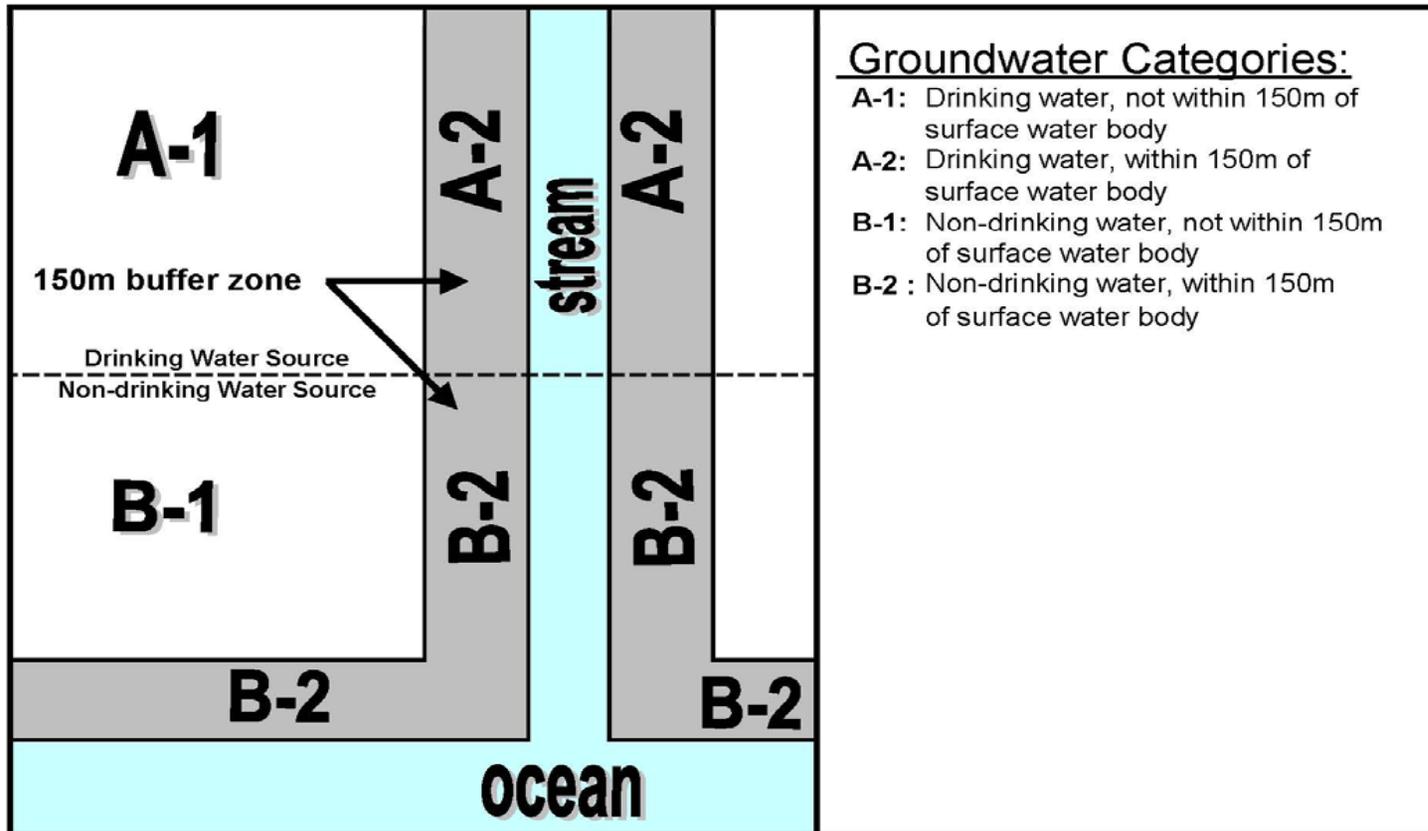


Environmental Hazard Evaluation

- Phase II ESA ↔ EHE ↔ Response Actions
- ESLs → DOH Environmental Action Levels (risk-based action levels associated with various environmental hazards)
- Exposure scenarios → related to surface water bodies, groundwater utility, and current/future land use
- Default environmental hazards
- Environmental hazards determine the response actions



Default Site Scenarios



Default Environmental Hazards

INDOOR AIR

Gross Contamination

Human Health

Vapor Intrusion

Direct Exposure

Terrestrial Habitats

SOIL

SOIL GAS

Leaching

Aquatic Habitats

GROUNDWATER

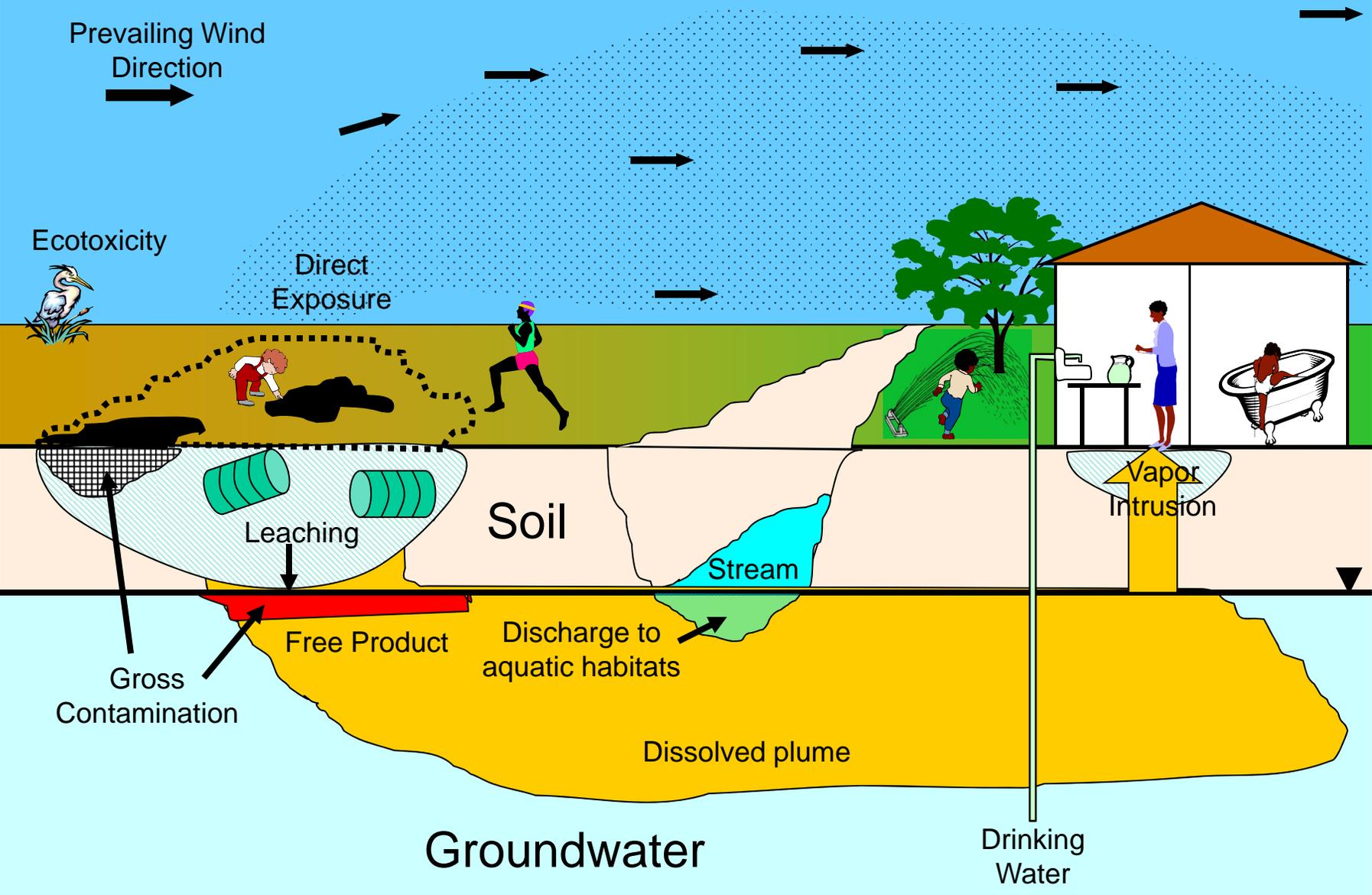
Vapor Intrusion

Gross Contamination

Human Health

Drinking Water (toxicity)

Default Conceptual Site Model of Potential Environmental Hazards



Gross Contamination Hazards

- **Odors & nuisance**
- **Explosive vapors**
- **Potentially mobile free product**
- **Interference with future development**
- **General resource degradation**



Groundwater Discharges to Surface Water

**Freshwater Springs
Along Shoreline**



Subsequent Actions

- **Further assessment (additional investigation, site specific risk assessment, etc.)**
- **Institutional controls (land use restrictions, long-term management of hazards, etc.)**
- **Engineering controls (isolation of contaminated media, exposure mitigation, etc.)**
- **Site remediation or removal action**

