
Contaminated Sites Policy

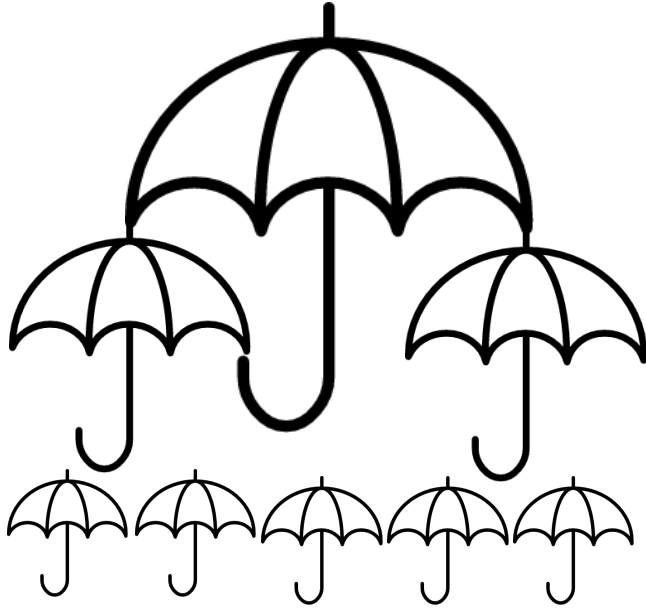
*Supplemental Guidance for Site-specific Risk Assessments
in Alberta*

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Outline

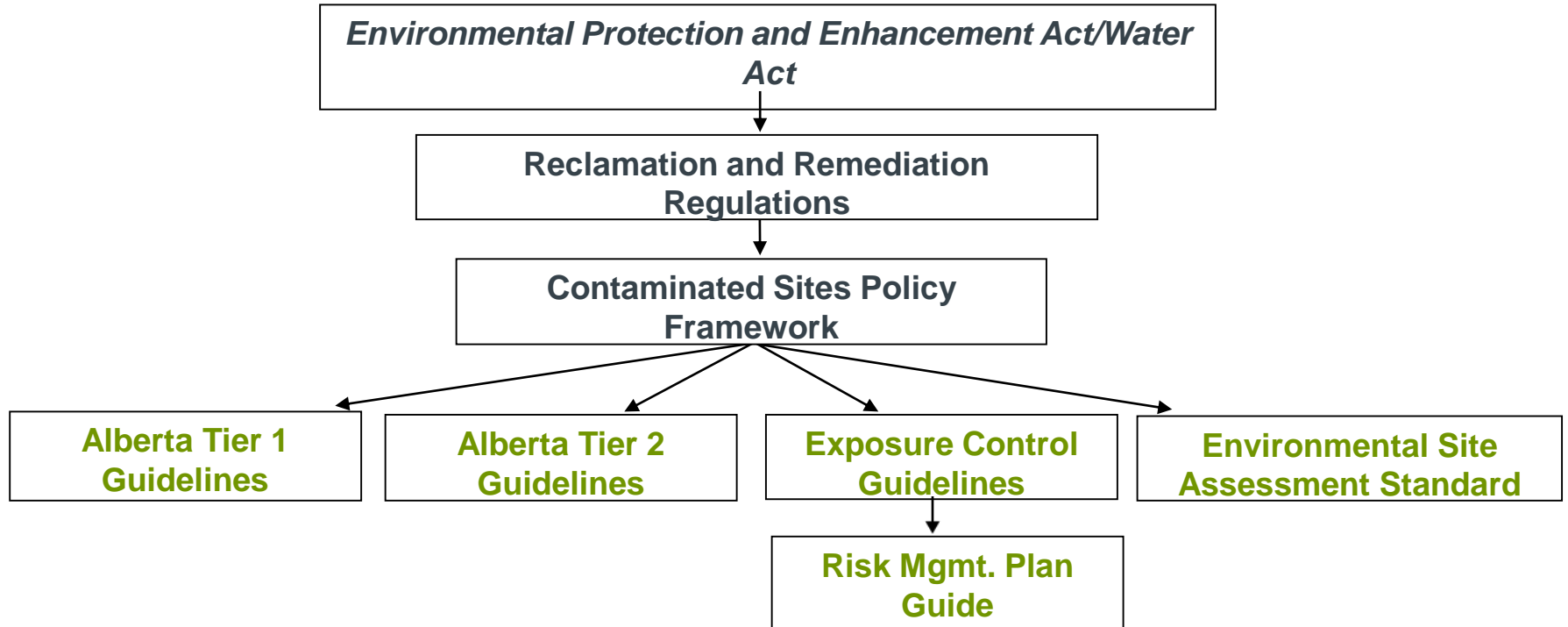
- What is the Guide
 - Relationship to the Contaminated Sites Policy Framework
- Where and When would the Guide apply
- How to Use the Guide
 - Primary Reference Sources
 - Scoping a Site-Specific Risk Assessment (SSRA)
 - Risk Assessment Methods

Relation to CSPF: Umbrella and Child Policies

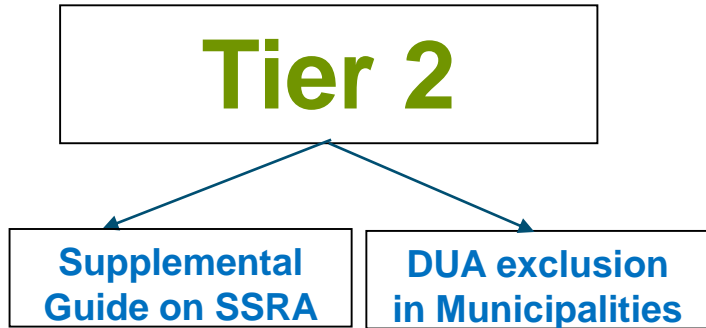


- Main umbrella: states objectives, main goals, strategies, and general principles.
- Child policies are used to define specifics.

Policy Structure for Contaminated Sites



SSRA in the Contaminated Sites Policy Hierarchy



- Tier 2 allows pathway exclusion, guideline adjustment and SSRA
- SSRA Guide builds on general principles for SSRA, as described in Tier 2 in 2007
- Anticipated result: clearer expectations for staff and responsible parties and standardized SSRA reports submitted to regulators

Where and When to Use the Guide

- Regulatory context
 - Land must be remediated to Tier 1 Soil and Groundwater Guidelines (section 2.3, Remediation Regulation)
 - Land may be remediated to Tier 2 Soil and Groundwater Guidelines instead (section 2.4)
 - SSRA is one of three options at Tier 2
- Regulatory closure is available if there are no land or water use restrictions
- Guide provides information on elements of an acceptable SSRA
- Guide points to other guidance documents that provide more info

SSRA vs Exposure Control Revisited

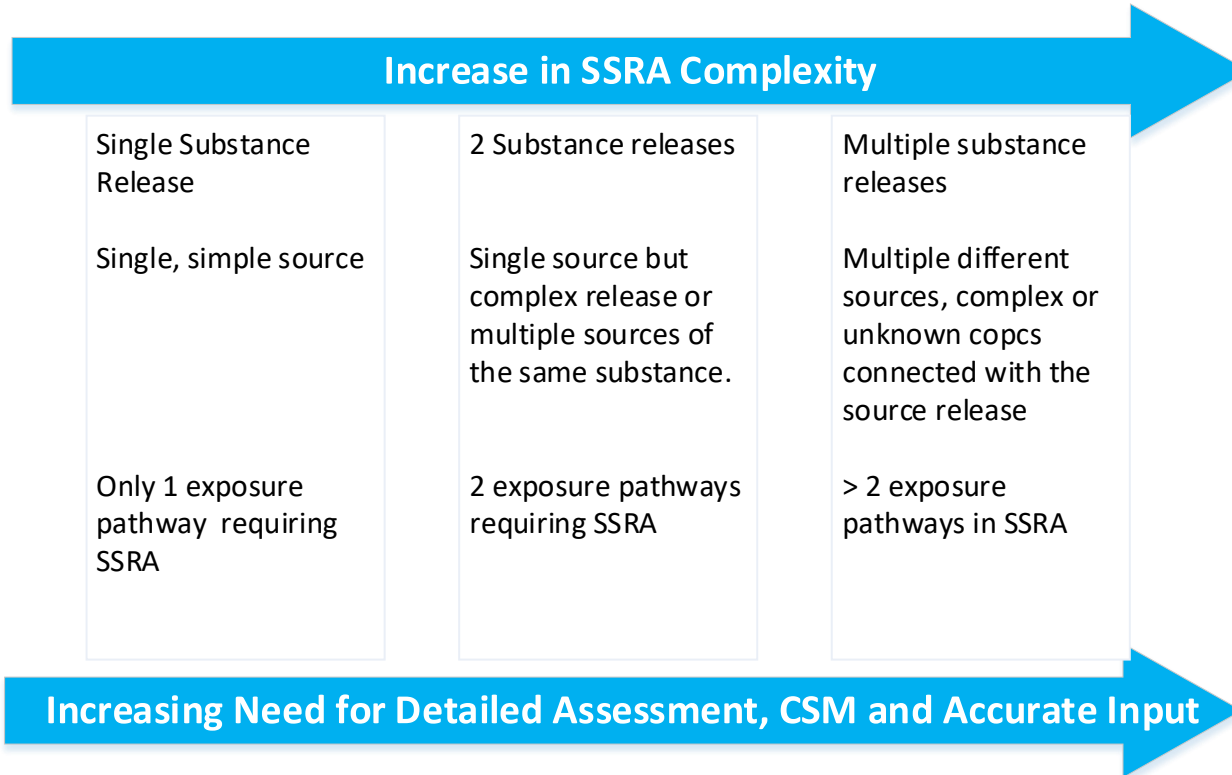
- Any assumptions that require ongoing management or controls to ensure they remain valid considered Exposure Control, not eligible for regulatory closure.
- Examples:
 - Site access restrictions
 - Site that is paved or capped
 - Groundwater plume management
 - Building-specific assumptions
 - Receptor-specific exposure factors (unless they are more conservative than Tier 1)

How to Use the Site-specific Risk Assessment Guide

Primary Reference Sources for Alberta

- Follows the hierarchy as describes in Alberta's Toxicity Reference Value (TRV) Guide
 - Alberta-specific regulatory guidance
 - Alberta Tier 1 and Tier 2 Soil and Groundwater Guidelines
 - Environmental Quality Guidelines for Alberta Surface Waters (for surface water and sediment guidelines)
 - Other Alberta regulatory documents
 - Canadian Council of Ministers of the Environment (CCME)
 - Health Canada (for human health-based endpoints)
 - Environment Canada (for ecological based endpoints)
 - United States Environmental Protection Agency (US EPA)

Scoping a Site Specific Risk Assessment

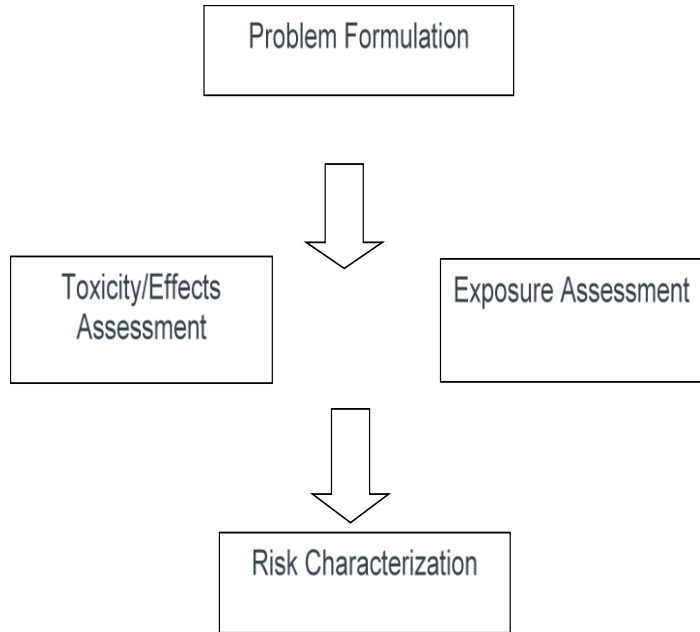


Scoping a Site Specific Risk Assessment

Table 1. Exposure Pathways and Receptors for Each Land Use

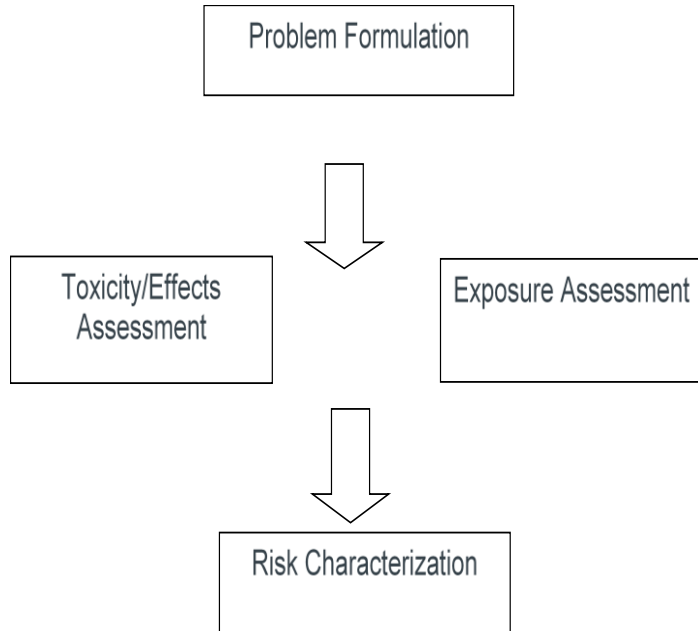
Pathway	Natural area	Agricultural	Residential/ Parkland	Commercial	Industrial
Direct Contact with Soil ^h	Humans (all ages) ^b Soil Nutrient and Energy Cycling Processes, Soil Invertebrates, Plants, Wildlife,	Humans (all ages) ^d , Soil Nutrient and Energy Cycling Processes, Soil Invertebrates, Crops/Plants, Livestock, Wildlife	Humans (all ages) ^d , Soil Nutrient and Energy Cycling Processes, Soil Invertebrates, Plants, Wildlife	Humans (all ages) ^d , Soil Nutrient and Energy Cycling Processes, Soil Invertebrates, Plants, Wildlife	Humans (all ages) ^d , Soil Nutrient and Energy Cycling Processes, Soil Invertebrates, Plants, Wildlife
Direct Contact with Water	Aquatic Life, Plants, Soil Invertebrates, Humans (all ages) ^f	Aquatic Life, Plants, Soil Invertebrates, Humans (all ages) ^f	Aquatic Life, Plants, Soil Invertebrates, Humans (all ages) ^f	Aquatic Life, Plants, Soil Invertebrates, Humans (all applicable ages) ^f	Aquatic Life, Plants, Soil Invertebrates, Humans (all applicable ages) ^f
Vapour Inhalation ^{e,h}	Humans (all ages) ^e , Wildlife ^e	Humans (all ages), Wildlife ^e	Humans (all ages), Wildlife ^e	Humans (all ages), Wildlife ^e	Humans (all ages), Wildlife ^e
Ingestion of Water ^g	Humans (all ages), Wildlife	Humans (all ages), Livestock, Wildlife	Humans (all ages), Wildlife	Humans (all ages), Wildlife	Humans (all ages), Wildlife
Soil and Food Ingestion ^h	Wildlife ^a Humans ^b	Wildlife ^a , Humans (all ages), Livestock	Wildlife ^a Humans (all ages)	Wildlife ^{a, c} Humans (all ages) ^b	Wildlife ^{a, c} Humans (all ages) ^b

Risk Assessment Methods



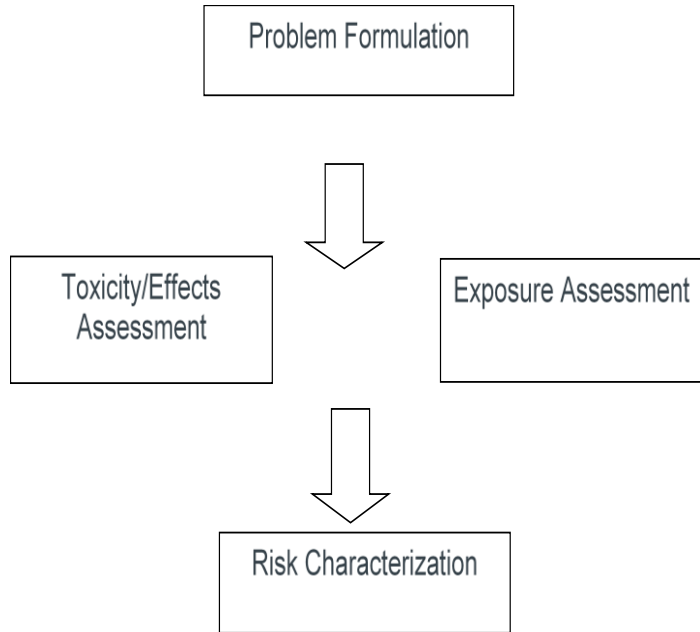
- Problem formulation must consider all potential contaminant sources, exposure pathways and receptors applicable to the site
- Toxicity assessment follows Alberta's TRV Guide
- Exposure assessment may use other models
- Refers to guidance from Alberta, CCME, HC, and EC for further information

Problem Formulation



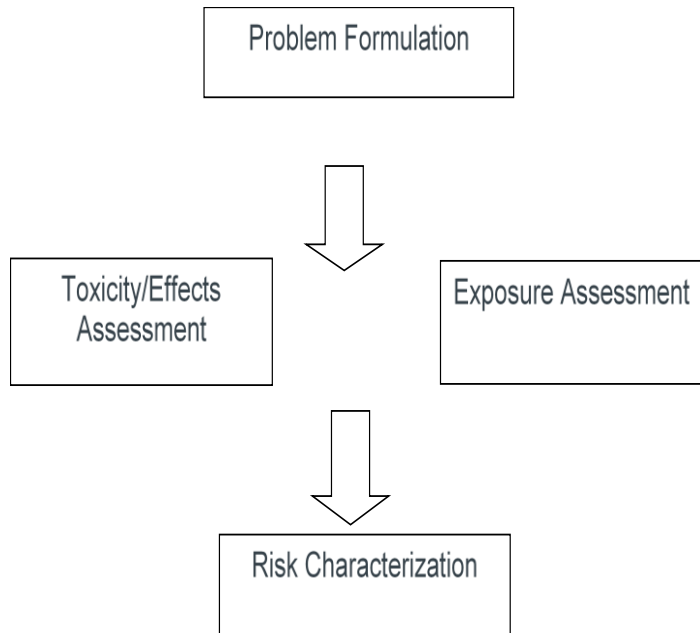
- Site characterization
- Identification and screening of contaminants of concern
- Identification of receptors and exposure pathways
 - Low probability \neq no probability
 - Return to broader interpretation of receptors
- Development of conceptual model

Exposure Assessment



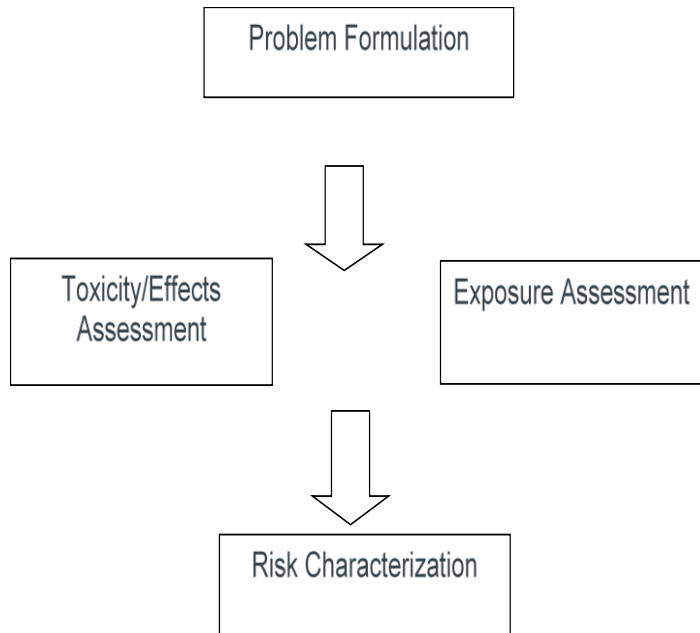
- Estimate exposure concentrations experienced by identified receptors.
- Involves exposure modelling that may differ from Tier 1 but consider:
 - applicability and relevance;
 - public availability;
 - acceptance by regulator;
 - complexity and model limitations as related to program needs, and
 - available data.

Toxicity/Effects Assessment



- Potential toxic effects on humans or ecological species, defined in Tier 1 as toxicological reference values (TRVs).
- If defined in Tier 1, then not readily available for modification through SSRA.
 - Where no information in Tier 1, follow TRV Guide
 - Tier 1 only addresses chronic exposure and effect, risk assessment may require investigation of acute, subchronic exposure and effect

Risk Characterization



- Integration of toxicity assessment and exposure assessment to assess risk and compare against acceptable levels.
- Often expressed as HQ (for single substance) or HI (for multiple substances or pathways with similar toxic effects).
- Remember to:
 - Track and assess assumptions, uncertainties;
 - Use appropriate sources for model parameters;
 - Ensure data gathering is sufficient for modelling;
 - Include all relevant receptors and COPCs; and
 - Apply HI when needed.

Questions?

