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Approaching Assessment and Remediation with an Understanding of Guideline Derivation

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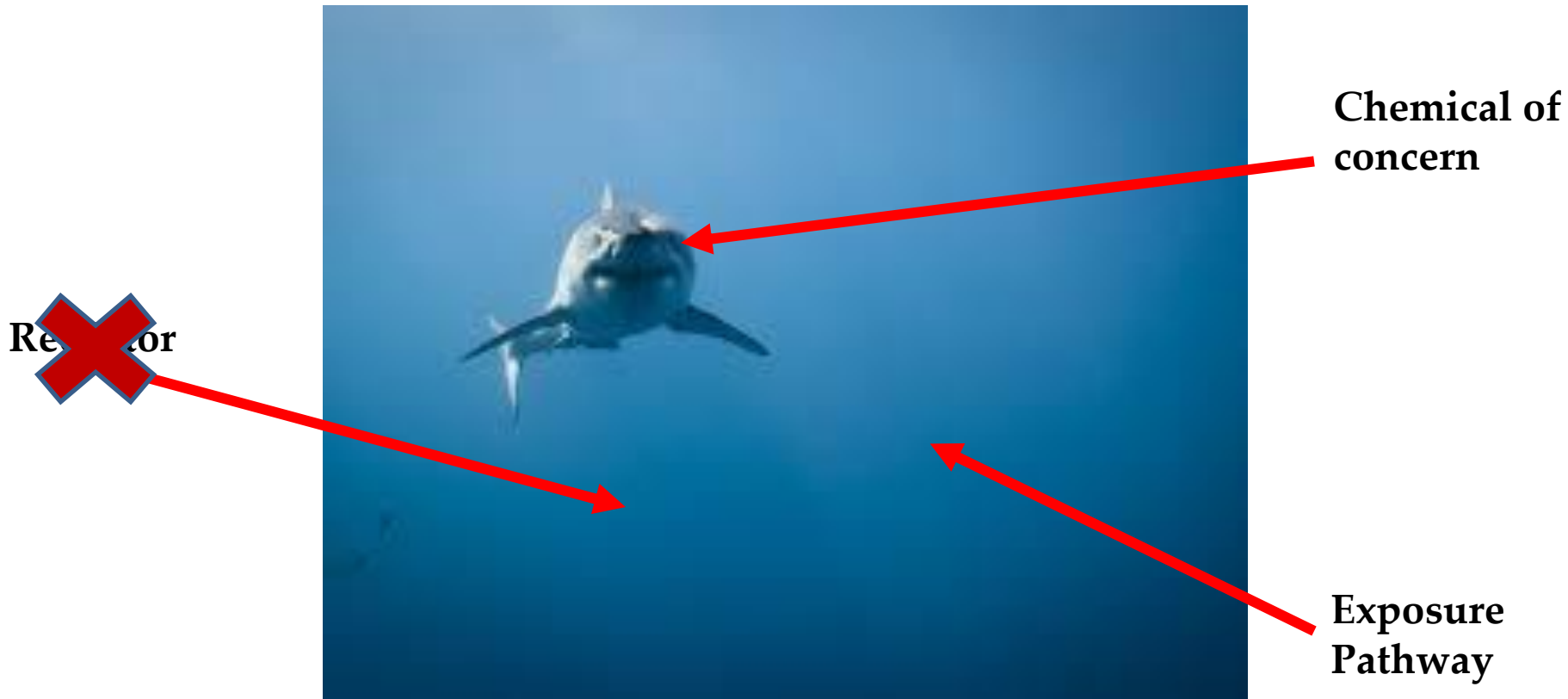
CLRA 2020

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What Tier 1 assumes...



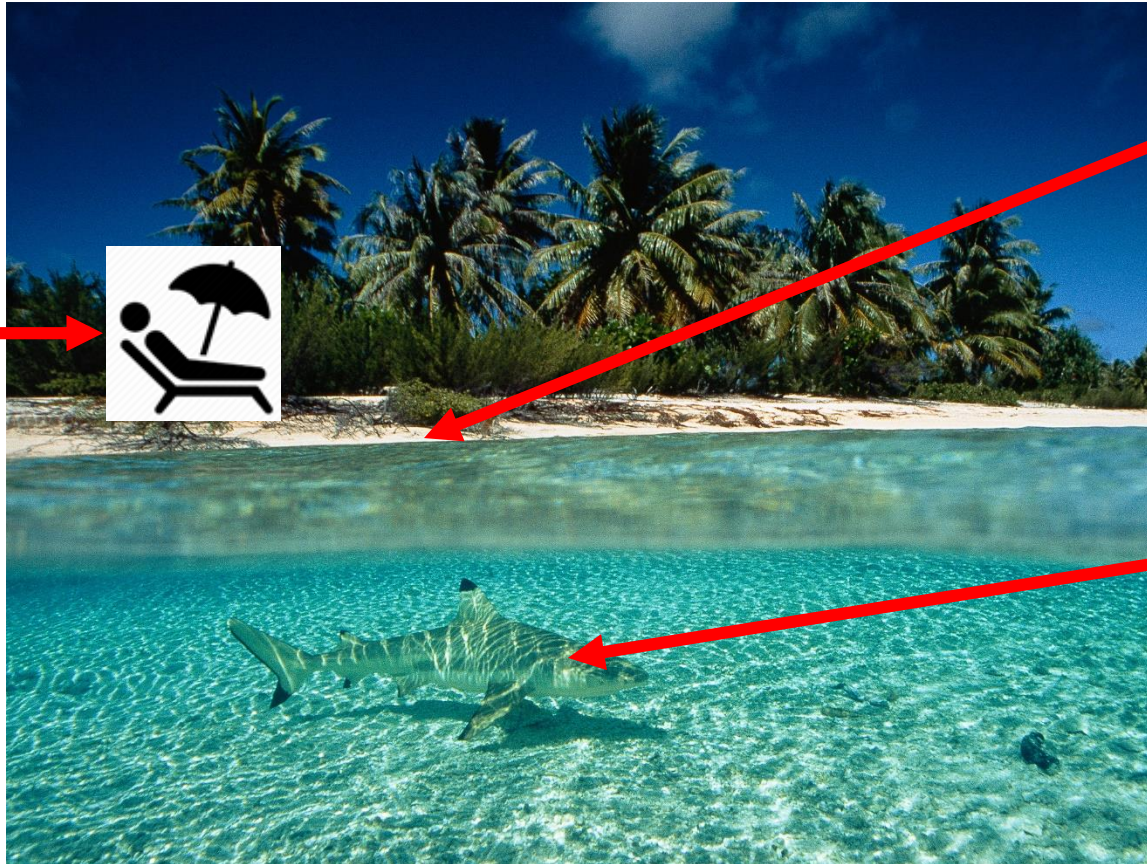
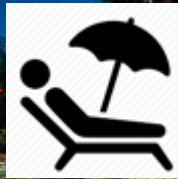
...but what if?



Is there risk?

...Or...?

Receptor



Exposure
Pathway

Chemical of
concern

Is there risk?

Objectives

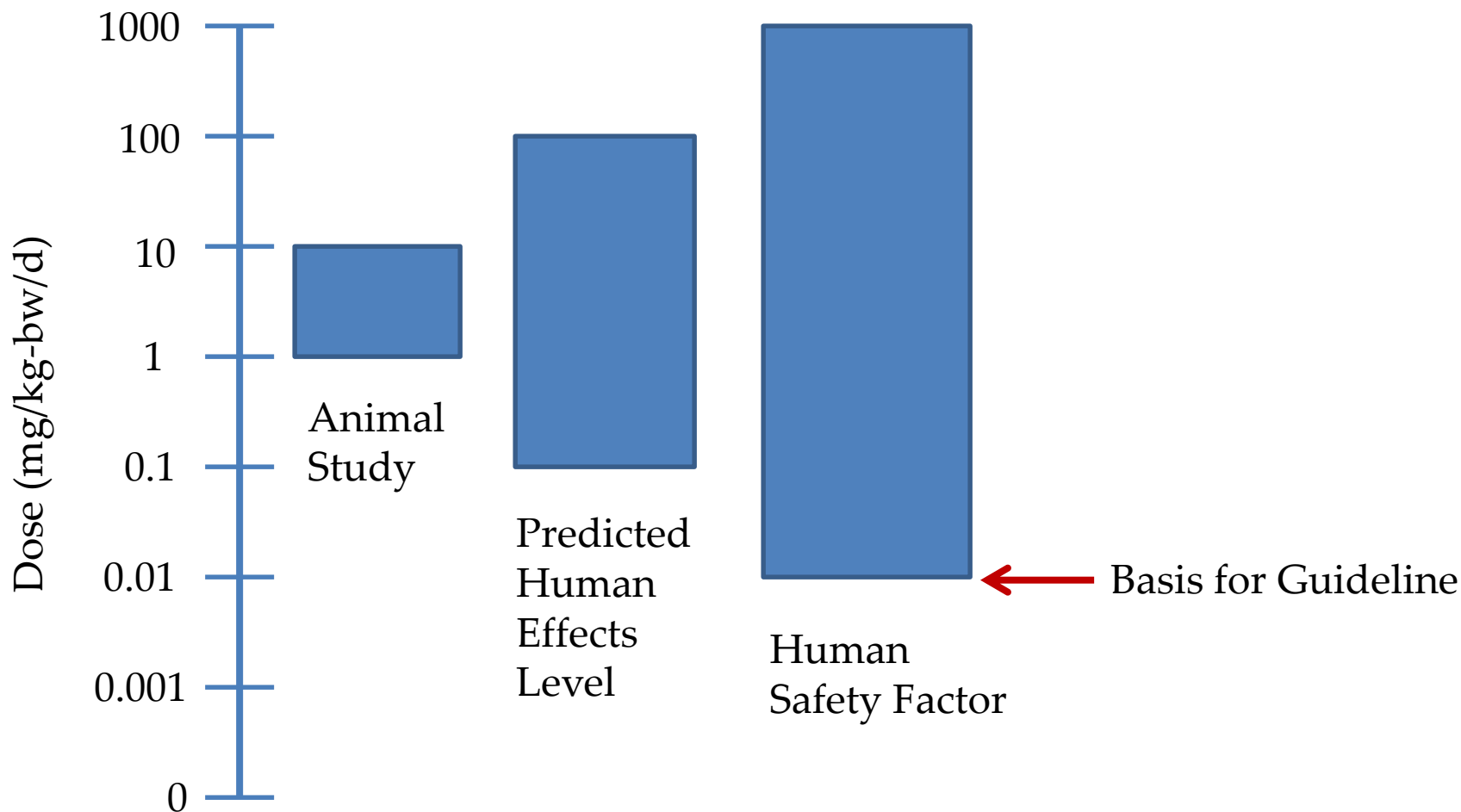
- General overview of Tier 1 guideline derivation
- Conservative assumptions in Tier 1 guidelines
- Considering alternative end points to Tier 1
- Case studies

Tier 1 Guideline Derivation

- Two major components go into developing Tier 1 guidelines:
 - 1) Toxicity – at what concentration/dose is the chemical harmful to a human or ecological receptor?

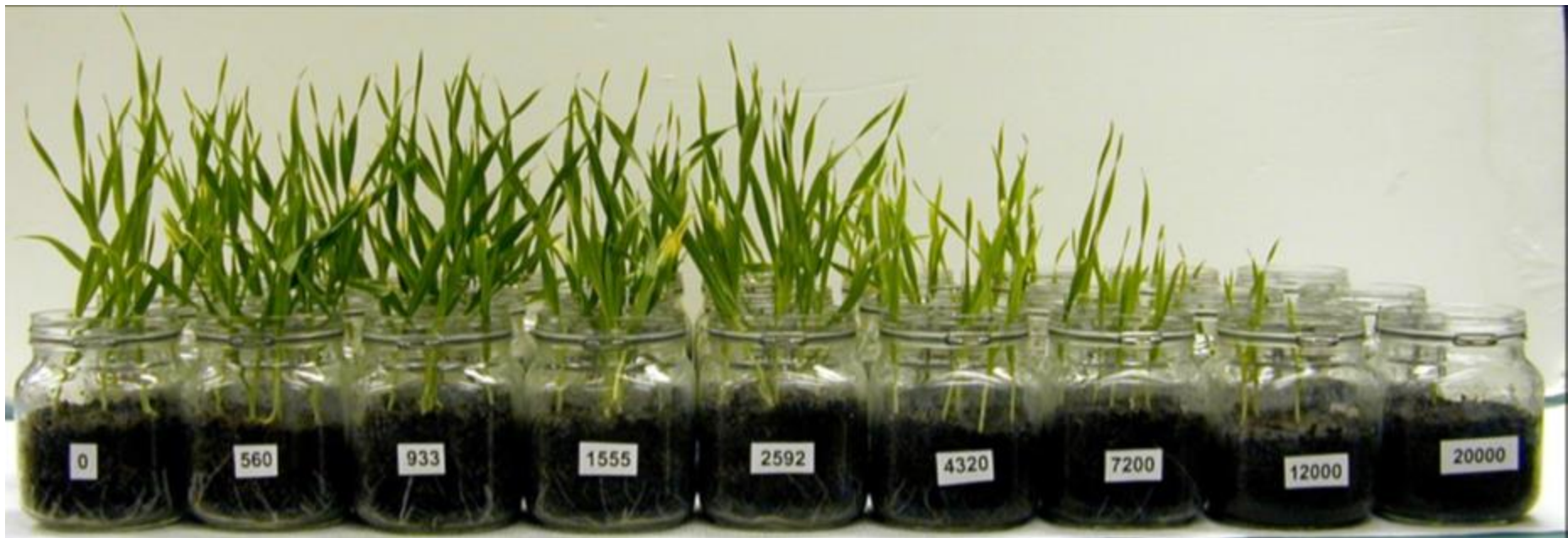


How much can humans be exposed to?



Tier 1 Guideline Derivation

How much can ecological receptors be exposed to with negligible effect? Minor effect?

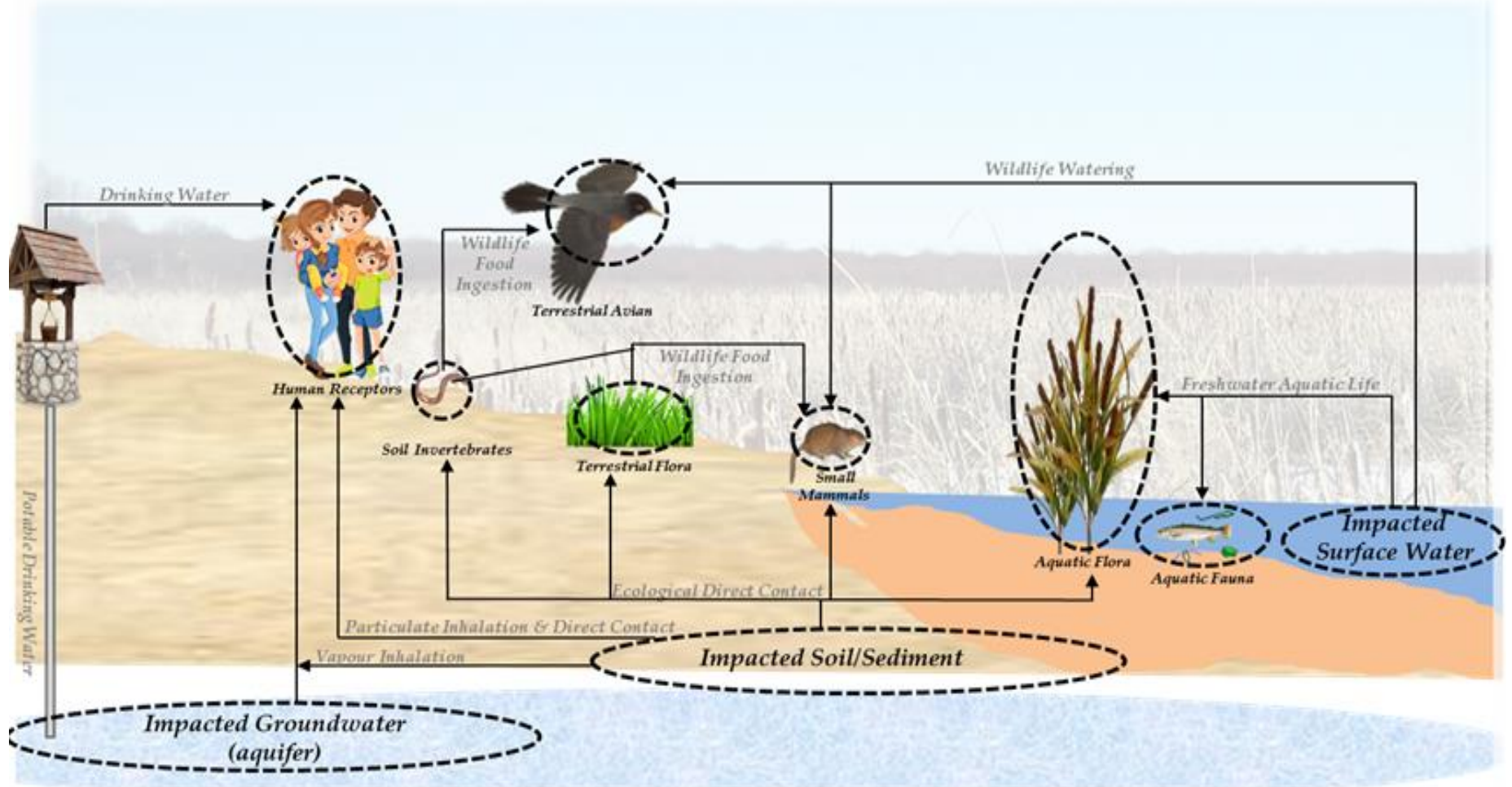


Tier 1 Guideline Derivation

- Two major components go into developing Tier 1 guidelines:
 - 1) Toxicity – at what concentration/dose is the chemical harmful to a human or ecological receptor?
 - 2) Exposure - what are the routes and rate of exposure to a chemical by a receptor?

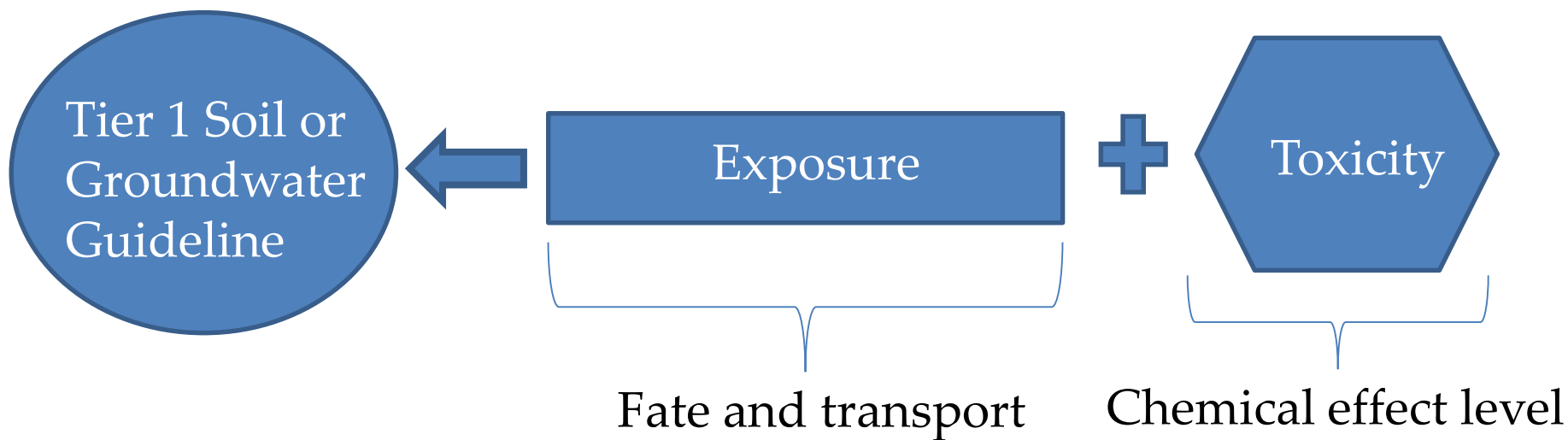


Tier 1 Guideline Derivation

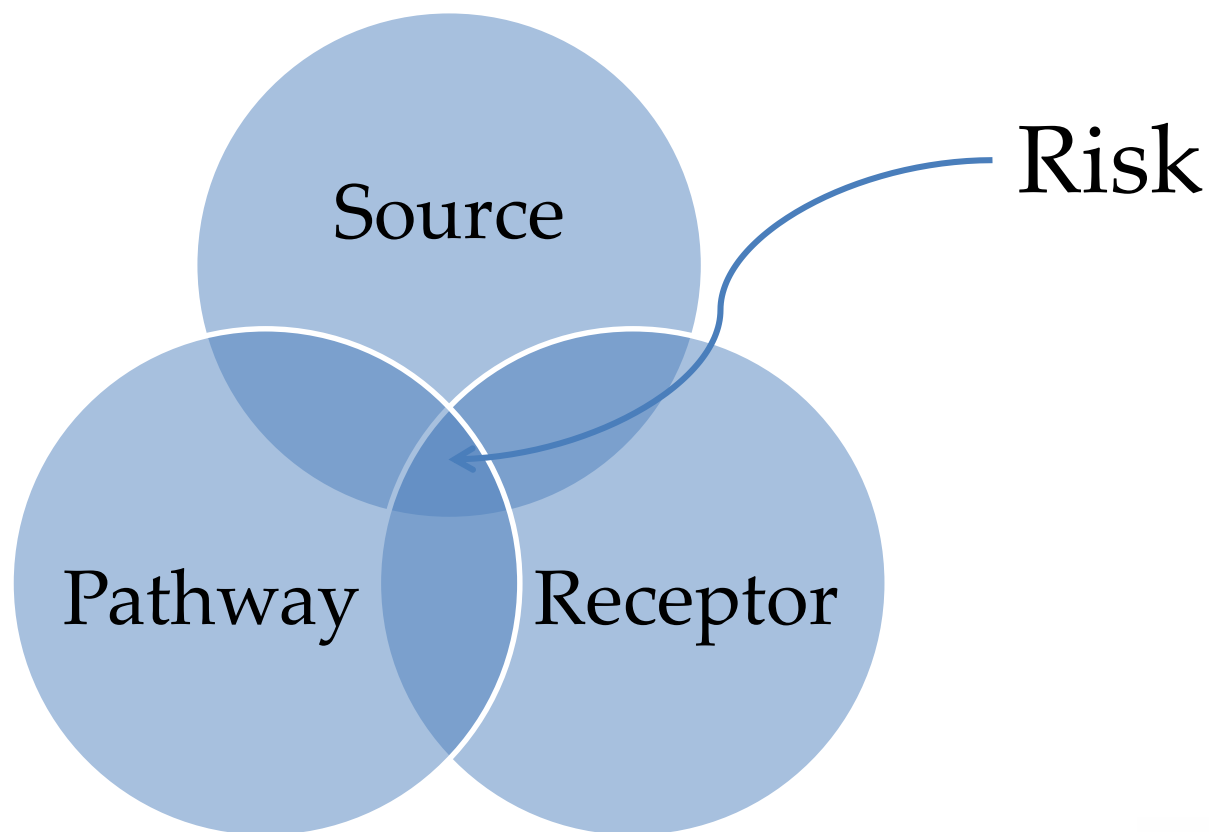


Tier 1 Guideline Derivation

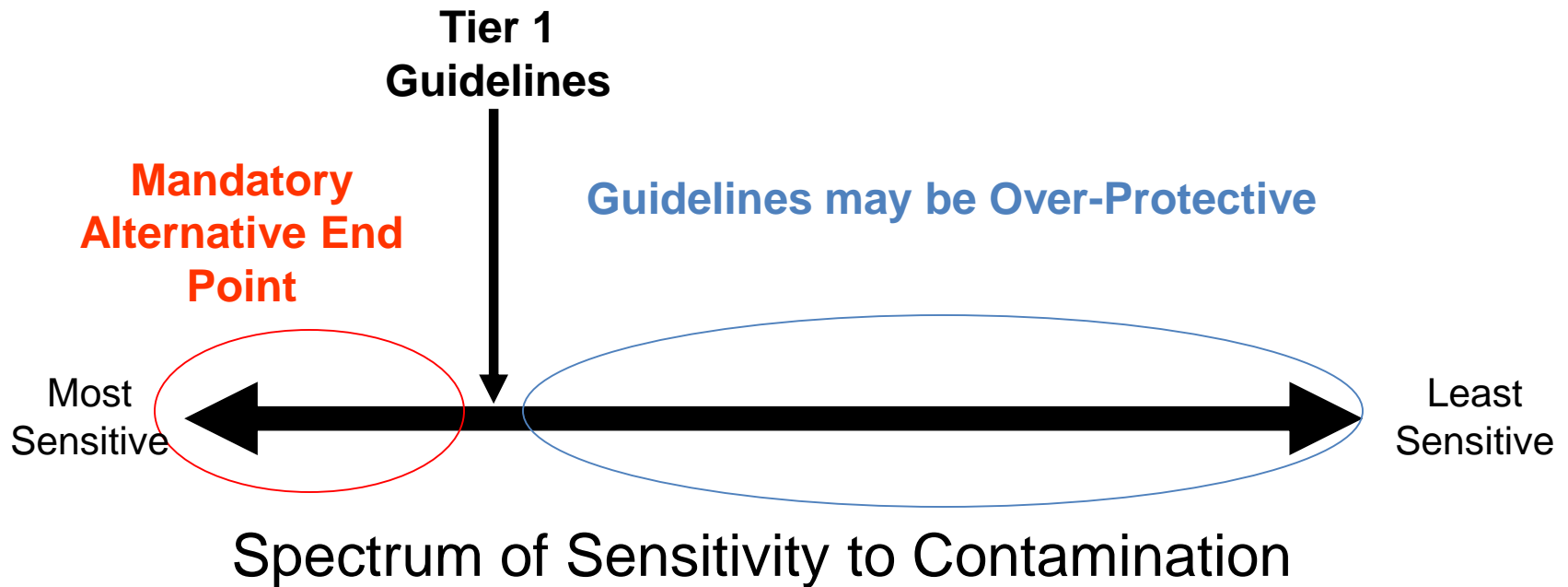
- Guideline development process
 - use toxicity and exposure to back-calculate screening guideline



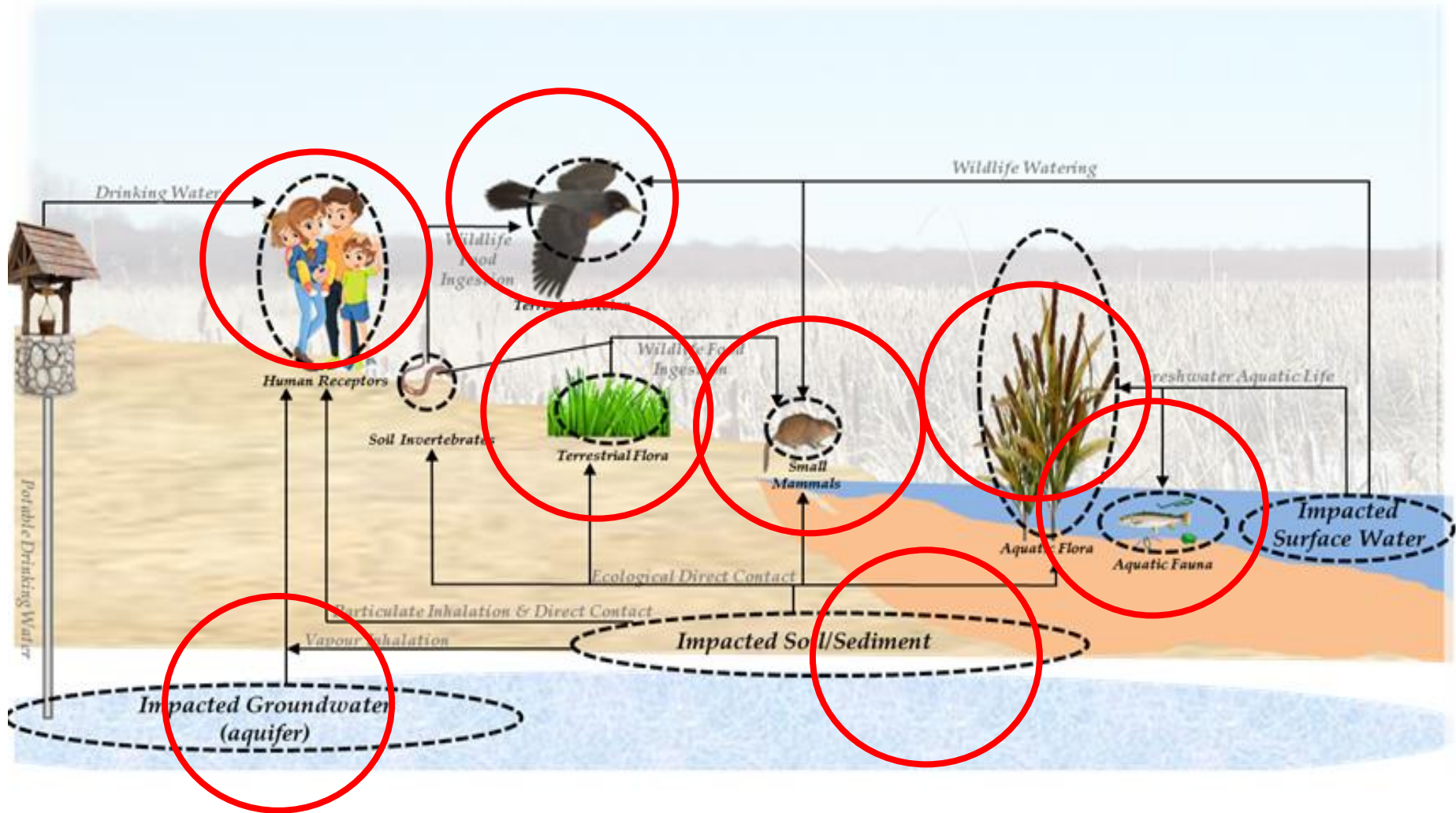
Tier 1 Guideline Conservative Assumptions



Tier 1 Conservative Assumptions



Tier 1 Conservative Assumptions



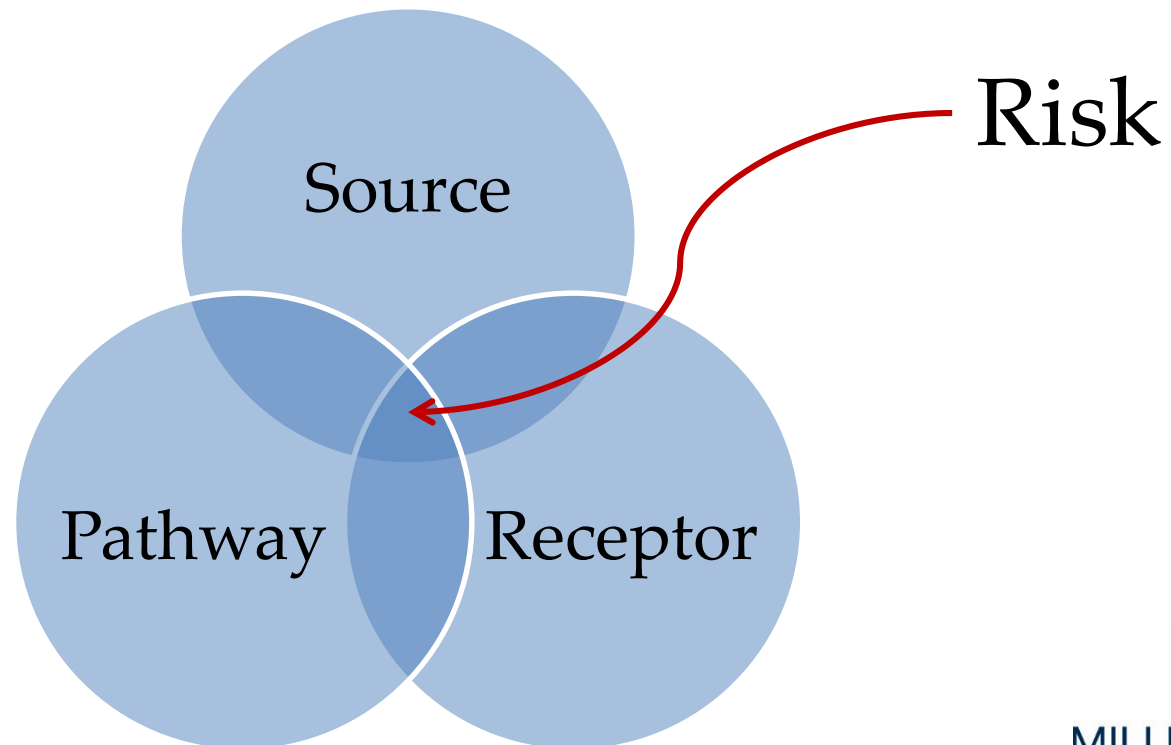
Considering Alternative Endpoints to Tier 1

- Tier 1 guidelines are good as an initial screening value
- But prior to application as a remedial end point...
 - Be aware of limitations and conservative assumptions
 - Be aware of the tools available to develop alternative end points
 - What is best for my Site?



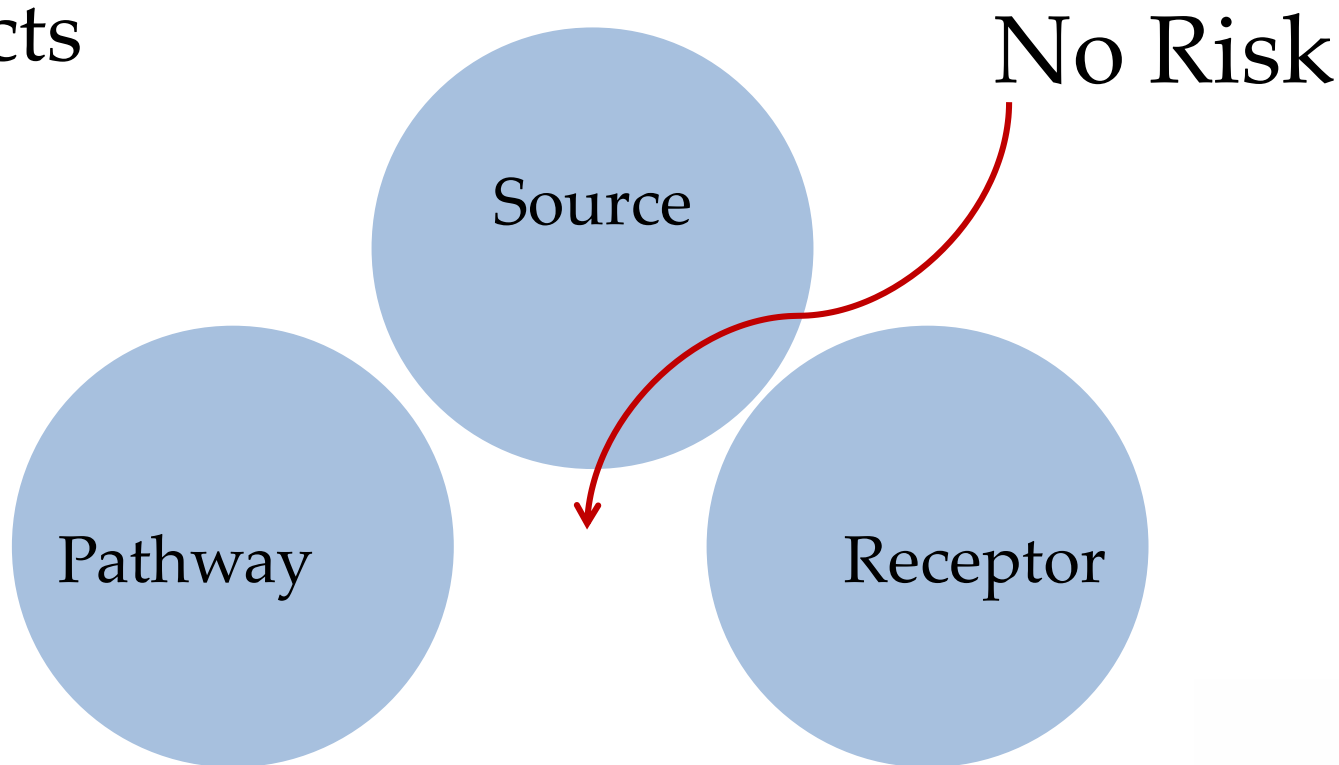
Considering Alternative Endpoints to Tier 1

- Concentrations of chemicals > Tier 1 guidelines **sometimes** have adverse effects

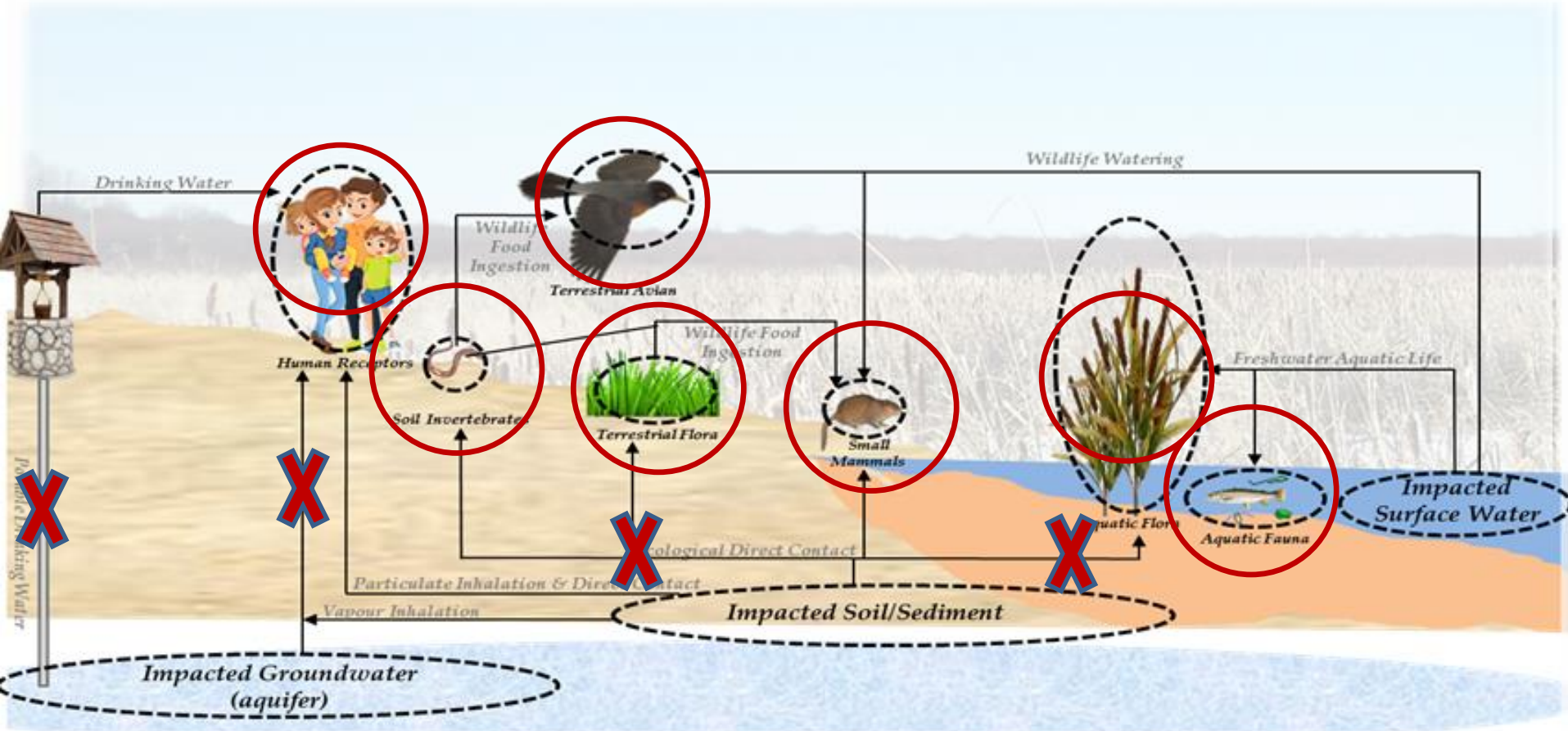


Considering Alternative Endpoints to Tier 1

- Concentrations of chemicals > Tier 1 guidelines **sometimes** have adverse effects



Considering Alternative Endpoints to Tier 1



Understand the Conceptual Site Model

Considering Alternative Endpoints to Tier 1

Consider the Site setting itself and what is the overall net benefit, remembering regulatory closure to either Tier 1 or an alternative end point will achieve the same level of receptor protection



Case Study – Native Prairie



Case Study – Peatland/Boreal Forest



Conclusions

- Tier 1 guidelines need to be protective of the vast majority of sites → conservative assumptions
- Understand the conceptual site model at your Site
- The goal for a remedial endpoint should be a positive environmental net benefit

