

# The role of risk assessment in sustainable remediation

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ERM

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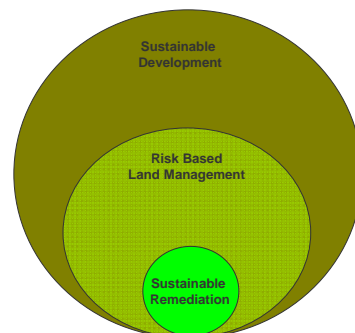
## Why is this important?

Risk Based  
Land Management

Sustainable  
Development

?

Sustainable  
Remediation



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## A question of definition

### Risk Assessment

### Sustainable Remediation

Policy

Tool

Social context



SuRF US

SuRF UK

NICOLE

Green Remediation

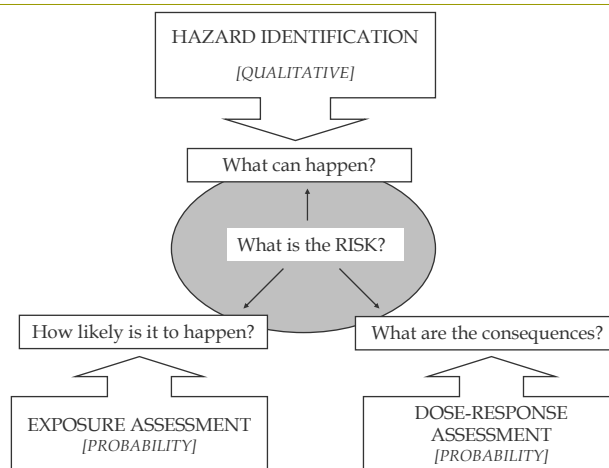
***Sustainable remediation is a framework in order to embed balanced decision making in the selection of the strategy to address land [and/or water contamination] as an integral part of sustainable land use.***

(NICOLE)

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## Quantitative risk assessment

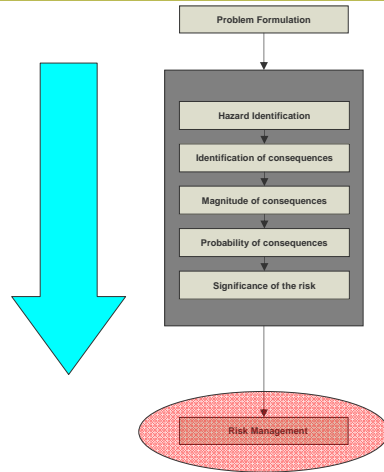


Definition of risk (Lapland and Garrick, 1981)

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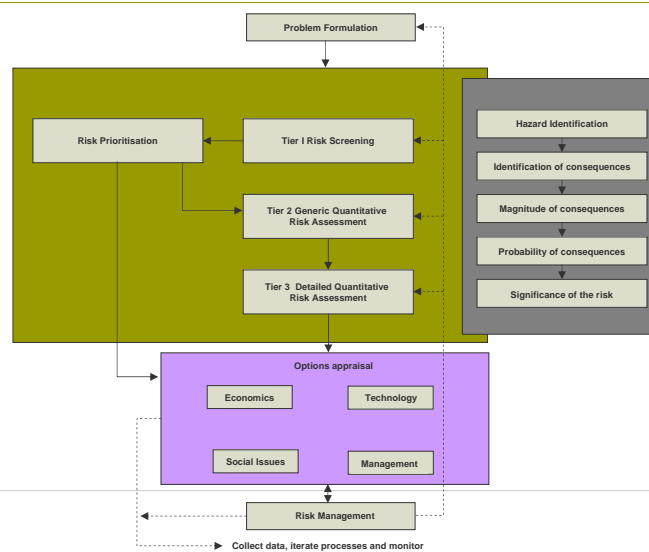
## Interface between risk and sustainable remediation



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## Why a Tiered Assessment?

	"Safe" concentration level	Data collection	Risk Assessment	Remediation cost
Tier 1	1 mg/kg	Low	Low	High
Tier 2	10 mg/kg	Medium	Medium	Medium
Tier 3	100 mg/kg	High	High	Low

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## Examples of use

### • Illinois EPA Bureau of Land

Perform Tier 2 Analysis,  
Soil and Groundwater

Perform Tier 3 Analysis,  
Soil and Groundwater

**SITE-SPECIFIC REMEDIATION OBJECTIVES**

(Illinois EPA – Bureau of Land)

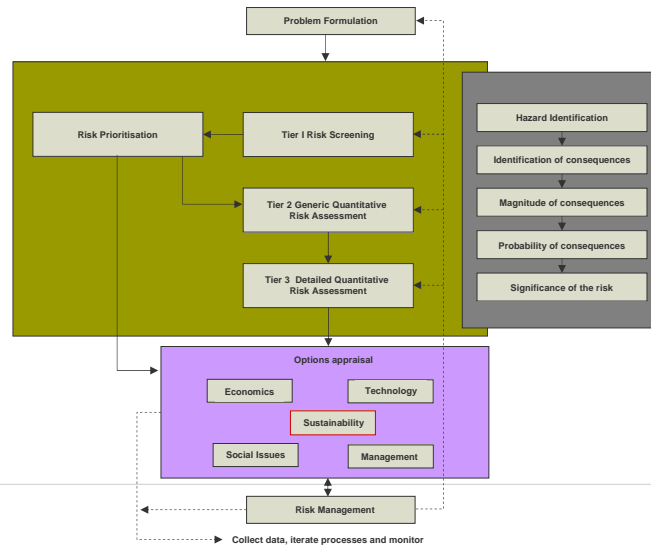
Greener Cleanup Strategies  
for Sites in the Bureau of Land



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## Interface between risk and sustainable remediation



(Defra, 2002)

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## Interface between risk and remediation

- A third perspective...

the risks associated with many sites are relatively small, pertain to a small population, and/or are speculative to hypothetical in nature.... a far greater risk of significant injury and even fatality exists for remediation workers and impacted community (e.g., truck accidents on the open road). These risks are not given proper consideration in remediation decisions.

(SuRF US white paper, 2009)

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## What is an acceptable level of risk? JOW5



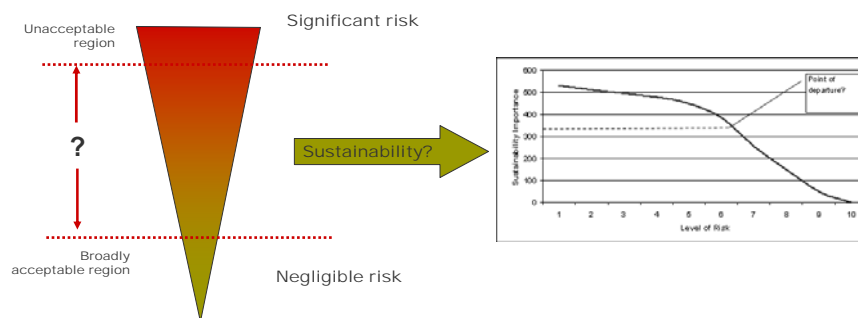
- **PCB contaminated soil**
- **Remedial Options analysis – excavation to 65 feet or permeable cover**
- **Excavation and off site disposal over 114 months**
- **Remediation by excavation 1:100 chance of fatality by road accident v 1:1,000,000 chance of contracting cancer**

(Rebecca Wallace, NICOLE Leuven workshop 2009)

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There is a trade-off between the cost of sustainability and the level of risk we are likely to be protective against



(Steve Wallace, NICOLE Leuven workshop 2009)

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## Dias nummer 11

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**JOW5**    There was no title here, so I offer this as a possible.  
John Waters; 03-11-2009

## Policy implications

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- **Policy decisions – set level of acceptable risk**
  - ♦ Is this overly conservative?
  - ♦ Why should risks from contaminated land outweigh risks from remediation or impacts?
  - ♦ Should we move towards more holistic decision making?
- **Will sustainable remediation challenge current practice of QRA?**

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## Conclusions

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- **The relationship between the practice of risk assessment and sustainable remediation is going to be very different according to the risk assessment framework in place**
- **Site specific quantitative risk assessment coupled with options appraisal offers opportunity to integrate sustainable decision making in parallel with risk process rather than as a follow on and does not comprise the risk assessment**
- **Incorporation of sustainability may lead to questioning of fundamental QRA assumptions & hence difficult choices, but also may encourage more holistic decision making**
- **Challenges**
  - ♦ seen as selling out / do nothing / risking away?
  - ♦ may also be seen as the end of punitive penalties for historical contamination incidents

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## Acknowledgements

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- **NICOLE sustainable remediation group**
- **NICOLE sustainable remediation & risk assessment sub group**