RISK ASSESSMENT: THE CONTEXT

- the poison-related-to-dose concept)

Prospective approaches
- The regulation of potentially toxic chemicals: objective is protection of all forms of life from damage.
- Some common terms that appear in the regulatory literature:
  - Objectives – the "ideal" as for pristine systems;
  - Criteria – concentrations that are desirable, in that they are "no effect" levels and should not be exceeded;
  - Standards – enforceable concentrations.
- Guidelines (not yet entrenched in law but can be used in legal context)
- Risk-based criteria and guidelines.
- The assessment of risk incorporates:
  - The inherent toxicity of a substance or family of substances
  - AND
  - The probability of exposure to a particular substance or family of substances
- Risk assessment is concerned with estimating the probability of undesired events.

Retrospective (after-the-fact) information.
- Examples of case studies:
  - DDT and predatory birds;
  - Minamata disease – methylmercury poisoning;
  - Various marine oil spills, e.g., Torrey Canyon; Exxon Valdez;
  - Eutrophication of Lake e.g., L. Erie (not strictly toxicological, but exemplifies the poison-related-to-dose concept)
- Introduction of non-indigenous species

THE DISTINCTION BETWEEN HAZARD AND RISK
- Hazard: The ability to cause an adverse response
- Risk: The probability that a dose of sufficient size will be delivered to cause the hazard to be realized
- Risk = (Hazard) x (Probability, size of exposure)
- Risk = Degree of safety

Ecological Risk Assessment should:
- Be quantitative or semi-quantitative;
- Incorporate provisions for uncertainty (safety or uncertainty factors)
- It may also:
  - be site-specific (SSRA)
THE PRESCRIPTION FOR RISK ASSESSMENT, BRIEFLY, FOLLOWS A SERIES OF STEPS.

1. The Problem Formulation stage
2. Analysis Stage
3. The Risk Characterization.

Figure – schematic of the framework for ecological risk assessment, modified from US EPA 1992a

UNCERTAINTY

• Gaps in information and the need to extrapolate leads to degrees of uncertainty.

RISK MANAGEMENT

The Risk Manager has to consider the socio-economic and political aspects of the issue as well as the scientific.

GUIDELINE FOR USE AT CONTAMINATED SITES IN ONTARIO 1997
• BROWNFIELDS

• CASE STUDIES
  – Belle Island Landfill (Cataraqui Park) Kingston
  – The Davis Tannery site, Kingston