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Environmental  
Strategies**

Thirty Years of Experience in  
Environmental Services

# When Only Zero Risk is Acceptable – Bridging the Gap Between Public and Scientific Understanding of Risk

[www.swansonenviro.ca](http://www.swansonenviro.ca)

# Outline

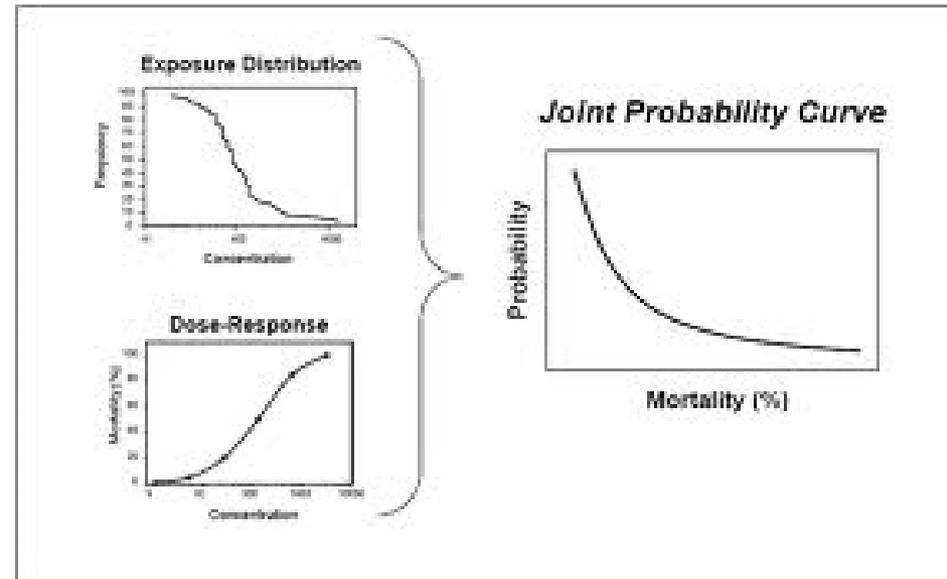
1. Perspectives on Risk
2. Understanding why some risks are intolerable:  
the outrage factor
3. The role of public engagement



# The Science Perspective

*Risk = Likelihood x Consequence*

Likelihood ↑	Very likely	Medium 2	High 3	Extreme 5
	Likely	Low 1	Medium 2	High 3
	Unlikely	Low 1	Low 1	Medium 2
What is the chance it will happen?		Minor	Moderate	Major
		Impact →		



**So why don't people believe us?**



# The Public Perspective

*Risk = Hazard x Outrage\**

\*Peter Sandman

“I don’t believe you scientists have a clue about what really goes on out there.”

“ I always look for fairness, due process and fundamental justice and that’s where this whole process is lacking”

“ How can you say that there will never be a serious accident?”

“ How can you stand there and tell me you understand the risks – this is not your home.”

“We will never accept a project which threatens our sacred lands.”

# Why are Some Risks Intolerable?

## The Outrage Factor

- Perceived or real fairness and equity issues
- Triple Threats:
  - high uncertainty, high dread, low public control
  - wide temporal/spatial scales, persistent and irreversible effects, delayed effects
- Violation of social or cultural interests and values





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**The violation of social or cultural interests and values is the most fundamental cause of outrage.**

**Outrage creates low or zero risk tolerance.**



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# Outrage and Complex Risk

**Using risk tools designed for simpler risks (e.g. the risks of one chemical along 1 or 2 pathways) contributes to outrage.**

**The public intuitively understands that the risk assessment has not addressed the complexity of the situation.**



# Simple Vs. Complex Risk

## Simple

- **Well known causes with obvious consequences**
- **Low uncertainty**
- **Low ambiguity** re: interpretation of risk
- Recurrent and not affected by major changes
- Statistics available and can be applied meaningfully

## Complex

- **Complex** interactions among many ecological, economic and social relationships
- **Uncertain** due to limited understanding of, and the natural variability in, natural and human systems
- **Ambiguous** because of different legitimate viewpoints regarding whether risks are acceptable or tolerable

Renn *et al.* 2011



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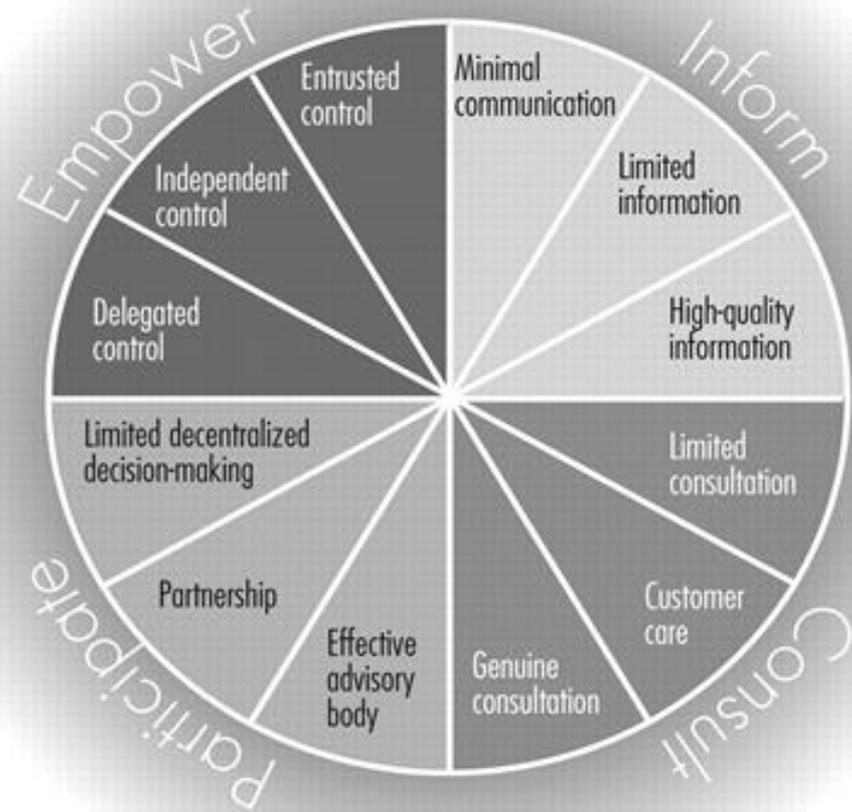
# Good Science Is Not Enough

- There must be meaningful engagement with Indigenous peoples and the public
- The engagement must begin early and occur often
- Collaboration regarding risk tolerance and acceptability is an important goal of engagement



# The Wheel of Engagement

- True engagement requires going beyond the usual inform and consult mode
- Tolerance of risk is related to trust and control
- The foundation is shared values





# Definition of Tolerable Risk

- Tolerable risk is not zero risk
- Tolerable risks are those which can be moved into a “normal” area of risk through proven risk management
  - The likelihood and consequences are sufficiently low and the consequences of being wrong are acceptable
  - Social and cultural values are maintained at levels acceptable to communities
  - Trust and control issues are recognized and dealt with
  - Costs for risk management do not outweigh the benefits of the activity
  - Benefits are equitably distributed

# Requirements for Broad Consensus Regarding Tolerable Risk

- *Inclusive discussion*
- *Accessible science*
- *Tangible benefits*
- *Open dialogue about how to deal with uncertainty*
- *Credible adaptive management plans*
- *Clarity regarding who is accountable*
- *Consistent application of government policy*



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Some risks may never move to the “normal” area because of a strong consensus that society will not be able to achieve the balance that would produce tolerable risk.

It is important to recognize these risks and move on to alternatives.



# Examples of Consensus About Tolerable Risk

- First Nation Forestry Program
  - Capacity building and equitable distribution of benefits
  - Incorporation of traditional knowledge in forest management
  - Empowerment and participation in decision-making
- Many (but not all) hydroelectric dams
  - Widely distributed benefits (affordable power, very low contributions to climate change)
  - Local or regional risks (elevated mercury in fish, downstream flow changes with ecological and social effects)



When there is outrage, science is not enough.

Considerable effort should be devoted to engagement on tolerable risk; this engagement must occur early and often.

Consensus does not mean unanimity. Outspoken opponents usually remain.

