

Toward a Risk Based approach for Nutrient Management

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Precautionary Regulation

- A trend to prevention of pollution as an approach to management rather than mitigation through reducing risk
- Shifts the burden of proof to the proponent
- The objective is to change management behaviors to reduce risk
- Enforcement is based on activities not outcomes
- The role of government is to both facilitate change and enforce compliance
- It requires greater interaction and involvement of both the regulated and regulator in the process

Risk Assessment

(Three Questions x 2)

- Things we need to ask if we have the data.
 - 1) What can happen?
 - 2) How likely is it?
 - 3) If it does happen, what are the consequences?
- Things we need to ask if we don't have the data
 - 1) What are the sources, the specific contaminants and how large are they?
 - 2) What are the pathways and how vulnerable are they?
 - 3) What are the consequences if the reaches source?

The Process

- Definition of acceptable Risk for the resource
- Identification of potential threats based on size, toxicity,
- Assessment of pathways (potential connections between the source and the resource)
- Assessment of the vulnerability of the resource to potential contamination
- Assessment of management of the threat
- Determination of appropriate management requirements required to manage the risk to an acceptable level

Issues Related To Threats

Threats represent the inherent characteristics of a source that result in the potential for adverse effects on human health. (magnitude and significance of an effect)

- Past Present and Future threats
- Threats to water quality and quantity
- Cumulative threats
- Threats to surface and ground water
- Point and non point
- Transient (mobile sources/spills) and stationary (fixed location and continuous discharge)
- Focus on Human Health as a direct threat

Types of Threats of Provincial Concern

- O'Connor identified threats
 - sewerage treatment plants
 - Septic systems
 - Bio-solids application
 - ***Farms in areas of recharge and intensive livestock farms****
 - Road salt, mining, forestry. Urban development, industrial plants
 - underground fuel storage
- Provincial White Paper
 - Hazardous land fills
 - known under ground contamination by industry
 - brownfields
 - industrial discharges to surface waters
 - storm water discharges and infiltration lagoons
 - septic fields and cemeteries
 - exposed storage of road salt and snow dumps

Risk

- **Definition:** A significant risk is one that has a high likelihood of rendering a source of drinking water impaired, unusable or unsustainable resulting in adverse effects on human health.
- **Vulnerability:** The ease with which a contaminant can migrate to a well from the source of a threat and produce a concentration in excess of a specific level.

Categories of Risks

- Significant or High Risk
 - requires risk reduction
 - Existing or imminent risk to human health, or sustainability of the water supply
- Moderate Risk
 - requires management to mitigate the risk
 - prevention from becoming a significant or high risk
 - trends monitored in the environment indicate continued elevation of the risk
- Low Risk
 - to be monitored
 - risk do not show trends to become elevated in the future but require monitoring to ensure early action in the event of an upward trend

Practical Approaches for Agricultural Threats

- 1) For Ag sources in the vulnerable (Time of Travel) areas assess the in-depth assessment of threats should be carried out as part of the source water protection plan
- 2) For identified threats a farm threats and risk assessment should be carried out including the management of the threat to reduce risk
- 3) Long term water quality monitoring for both ground water and surface water should be carried out to determine if there is an impact and if management is effective

Assessment Framework for Farms in Vulnerable areas

Source Water Plan Assessment

Farm Water Protection assessment

	Low Area Vulnerability	Moderate Area Vulnerability	High Area Vulnerability	
Low Farm Activity Threat	L,L,L	L,L,M	L,L,H	Low Contamination Level
Moderate Farm Activity Threat	M,L,M	M,M,M	M,M,H	Moderate Contamination Level
High Farm Activity Threat	L,H,H	M,H,H	H,H,H	High Contamination Level

Environmental Monitoring Assessment

Focus on Planning and adaptive Management

- The plan will consider both activities and the inherent characteristics of the environment
- Development of the assessment will require an inventory of threats and an assessment of pathways. Not dissimilar to EFP)
- The plan development will require a rating of the risks and subsequent identification of a set of priority actions based on the risk assessment
- The implementation plan will begin with the “highest risk first” and as part of the normal business plan lesser risks will be dealt with

Risk Based Approaches to Nutrient Management

- 1) Containment and control of storage and handling spills(reduces the risk of an adverse event happening)
- 2) Emergency Planning for spills (reduces risk of an adverse event impacting the environment)
- 3) Application of Nutrient at the agronomic rate e.g. to meet crop demand (reduces risks due to loading and cumulative impacts)
- 4) Application rates and procedures that limit the escape of nutrients (reduces the risk of applied nutrients reaching the environment outside of the plant root zone)

Risk Based Approaches to Nutrient Management

- Adoption of setbacks and management protocols around wells (reduces risk of contamination via well tubes)
- Adoption of 3 m buffer to reduce the erosion of banks and stabilizes soils in the area of streams (reduces the risk of nutrient movement via erosion)
- Restriction of farm animal access from streams (reduces the direct deposition manure and nutrient in surface water)

Next Steps

- Agreement to shift from the rigid formulaic approach to nutrient management
- Development of a transitional strategy
- Development of the risk assessment framework and planning workbook
- Development of an approval process and funding support for change
- Development of an inspection and auditing process that focuses on risk mitigation outcomes