

Contaminated Land  
and  
Waste  
Draft research topics

# CONTEXT

## IMPLEMENTATION TOOLS:

- Regulations : NPS, NES, RMA, Waste Act
- Guidelines and strategies
- Best industry practices
- Regional policies and plans
- Product stewardship schemes
- Priority contaminants and waste

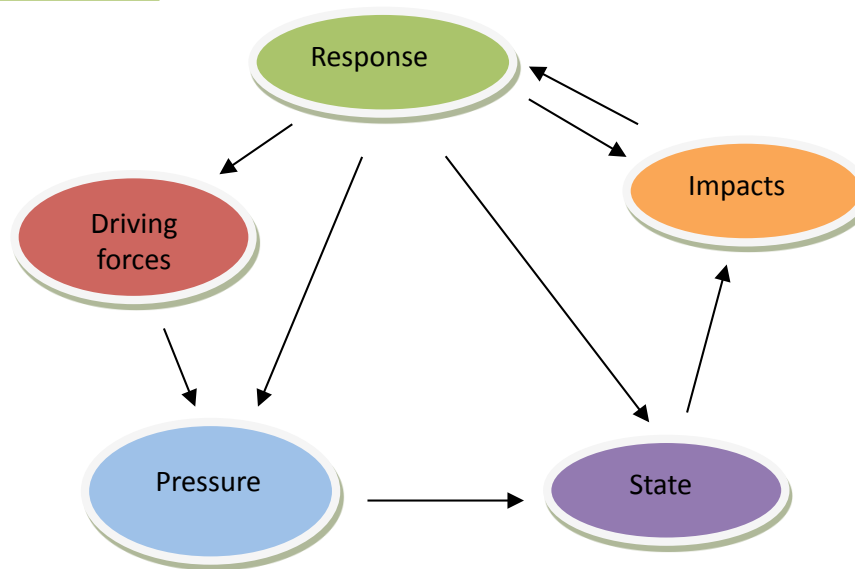
## MANAGEMENT STRATEGY

- Prevention of contamination
- Reuse & recycle of waste
- Protection of soil, water and air
- Remediation of high risk sites
- Risk-based management

## RISK MANAGEMENT

- Control on land use
- Control on discharges
- Pollution response (accidental and natural events)
- Information management and sharing
- Communication and advocacy
- Ethics

- Climate change
- Waste as a resource
- Landfills not sustainable
- Agriculture – pesticides, fertilisers
- Sewage sludge & biosolids
- Industrial processes
- Military
- Mining
- Petrol and gas extraction
- Legacy
- Households
- NZ geology
- Surface Water/Groundwater



- Threat to human health
  - Contaminated drinking water
  - Direct contact with contaminants
  - Uptake of contaminants through food chain
- Threats to ecosystems
- Pollution of surface and ground water
- Threats to soil
- Impacts on current and future land use
- Impact on land/property values
- Social impact
- Economic impact
- Cultural impact
- Public perception
- Understanding New Zealand's own context and conditions

- Release of hazardous substances
- Greenhouse gases emissions
- Hazardous substance discharges to surface and groundwater
- Deposition from air pollution
- Land application (biosolids, pesticides etc)
- Mining waste
- Hazardous waste
- Natural mineralisation
- HAIL activities

- Soil contaminated with organic and inorganic compounds and ?
- Contaminated sediments (estuaries, mudflats, bottom of rivers and lakes etc)
- Soil acidification
- Pollution of surface and ground water
- Land not fit for purpose in urban and peri urban areas
- Inadequate information (incomplete, inaccurate, not shared etc)

# Key research priorities

## Science underpinning:

- Risk assessment to support the management of waste and contaminated land
  - Monitoring and predicting environmental concentrations and effects. fate and transport of hazardous substances - Behaviour of contaminants in NZ soils / under NZ conditions – conceptual models – passive sampling etc
  - Review and assessment of emerging developments in *in-situ* analysis and laboratory analysis of contaminants i.e. more affordable investigation and monitoring methods.
  - Understanding legal, social, economic and ethical issues related to waste and contaminated land – environmental stewardship – dealing with uncertainty – property rights and values vs conservation and public interest/good (for example human health – right to know etc)
- Cost effective innovative technologies
  - Controlling organic/inorganic and hazardous waste, site characterisation and remediation (from hot spots to large sites) – bioremediation, *in-situ* remediation, natural attenuation – life cycle assessment
  - Reducing impact and need of landfills – support product stewardship schemes and waste-based businesses – new business opportunities (economic feasibility of new technology)
  - Reducing impact and need of land application of waste products – energy conversion from organic waste?
  - Reducing impact of spills (e.g. Rena?)
  - Information sharing and reporting – indicators, national database

# Key research priorities

Research organisations providing:

- **Technical assistance and expert advice (innovative approaches and best current knowledge)**
  - applied to central and regional policy development and effectiveness review, guidelines and best practices for site assessment, characterisation and remediation
- **Sufficient capabilities in areas of importance to the management of contaminated land and waste**
  - including environmental chemistry, earth science, soil science, ecotoxicology, microbiology, toxicology, environmental health/ public health, epidemiology, social science, geographical science, geo-statistics, environmental economics, RMA law, communication