**Evolution of the CSM**

**1989-1990 – initial CSM:**
- 'Stage 1' investigations by EPA and ICI (now Orica)
- Initial understanding of groundwater / surface water impacts

- **Objective:** Gave direction to ‘Stage 2’ detailed investigations

**1996 – Stage 2’ CSM:**
- Detailed / technical CSM
- Developed fundamental understanding of hydrogeology, plumes and exposure pathways.

- **Objective:** Gave direction to subsequent source investigations and initial remediation strategies (administrative controls, containment, mitigate impacts to Springvale Drain)

**2000s – updated CSMs:**
- Technical ‘source-pathway-receptor’ model
- **Objective:** Consolidation of site information:
  - Source zone characterisation
  - Quarterly monitoring (air, groundwater, surface water)
  - Modelling, remedial trials and risk assessments
  - Supported stakeholder engagement (Strategy Workshops)

**2017 – ‘17-Compartment’ CSM:**
- Adapted ‘14-Compartment Model” (Vanderkooy et al 2014)* – focus on phase/zone transfer pathways
- Added “Receiving Environment” - processes within Penrhyn Estuary and Springvale Drain
- Site setting (sand aquifer with low-K zones) and contaminant characteristics suited to model (4 to 6 OoM range of COPC migration potential / concentrations / mass transfer)

- **Objective:** Better explain the more significant reductions in plume mass/conc. since GTP operation commenced in 2004.
- **Objective:** Aimed at a broader audience and support development of long-term management strategies

**Lessons Learned:**
1. Compartment model is appropriate for complex ‘mega-sites’ under similar natural settings
2. Simplifies complex phase interactions → has helped prioritise future investigations and development of long-term management strategies
3. Incorporation of degradation terms requires consideration.
4. Add ‘Receiving Environment’
5. Fit-for-purpose CSM – focus on objective

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**‘17-Compartment’ CSM**

**Key aspects:**

- **CHC mass balance:**
- Interrogation of 10 years’ GTP abstraction and monitoring data:
- Modelling and 1st-order decay calculations:
  - Source zone evolution

- Model of historical flow regime and plume evolution – 1 OoM decrease in 1,2-DCA estimated plume mass/concentrations between 2004 - 2015

- Monitoring of receiving environments


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