

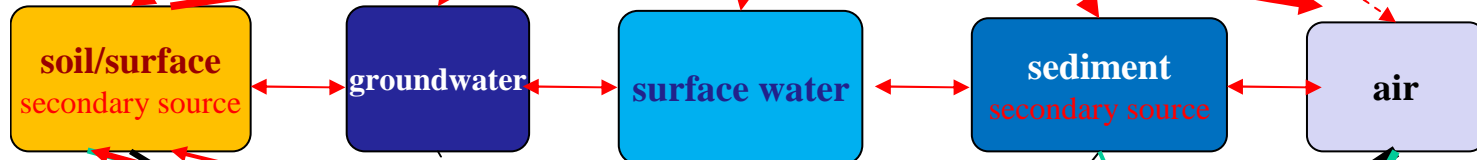
CONCEPTUAL RISK MODEL OF THE RED MUD SPILL

Main pollution pathways:

From the pond to surface water
 From the pond to sediment
 From the pond to soil, surface
 From the soil by wind to the air
 From the soil to surface water, sediment



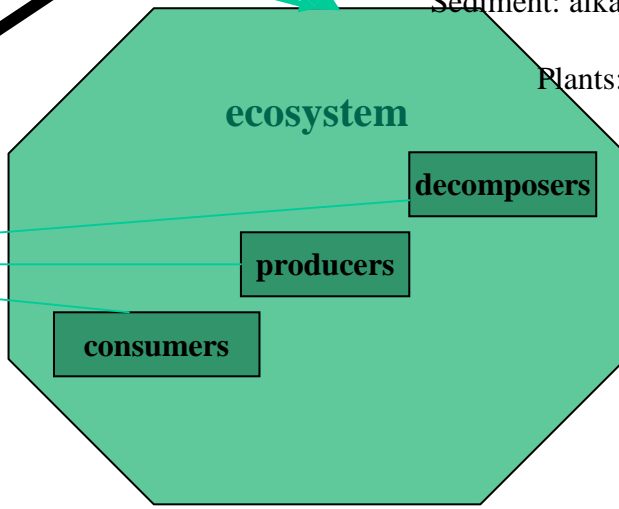
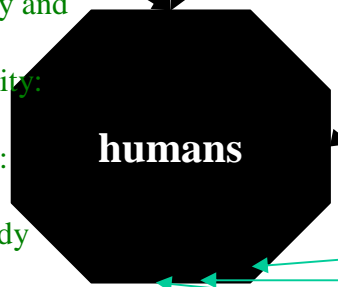
SOURCE:
 Hazard 1. statical
 Hazard 2. chemical: alkalinity
 Hazard 3. burning effect
 Hazard 4. dust particles
 Hazard 5. toxic metal content



Environmental elements:
 Water alkalinity: suspended solids
 Air: alkaline dust
 Sediment: red mud, additives
 Soil: alkalinity, red mud

Exposure:

Fish: effect of alkalinity, suspended solids deposition on whole body and gill
 Freshwater zoobenthos: alkalinity: whole body, habitat loss
 Aquatic biota: toxic substances: whole body and nutrition
 Soil biota: alkalinity: whole body
 Plants: limited nutrient uptake
 Total soil: toxic substances: whole soil and nutrition
 Humans:
 Inhalation: burning effect, dust effect, toxic substances
 Skin: irritation, corrosion
 Eyes: irritation, corrosion



Receptors

Humans: burning effect on the skin and lungs
 Water ecosystem: alkalinity, suspended solids
 Sediment: alkalinity, contaminated sediment
 Soil microflora: alkalinity
 Plants: direct and indirect alkalinity