

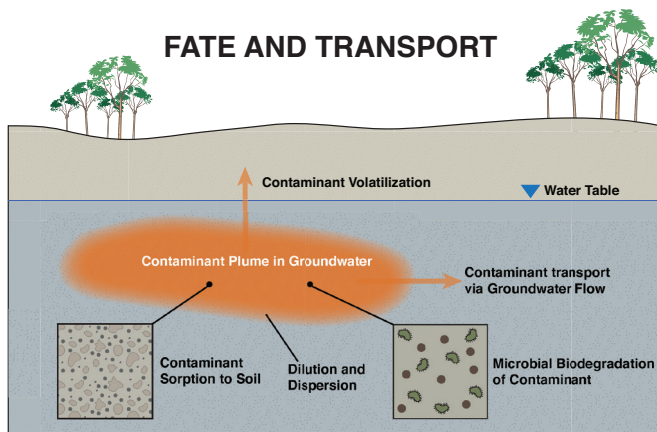
CONTAMINANT FATE AND TRANSPORT

WHAT IS CONTAMINANT FATE AND TRANSPORT?

Fate and transport analysis is the study of how chemicals degrade, transform, and travel through soil, water, and air. Knowledge of the fate and transport of contaminants is key to making decisions regarding investigation and remediation.

Examples of factors that affect a chemical's fate and transport in the environment include:

- Physical properties of the contaminant such as how readily it dissolves into water and how readily it evaporates into the air.
- Characteristics of the site that can affect how a chemical can move in that environment, such as soil properties or the depth of the water table below ground.
- Natural processes that may be occurring and decreasing contaminant concentrations over time, such as microorganisms breaking down contamination



How are fate and transport studied and incorporated into remediation planning?

- Remedial investigations (testing and field sampling) are performed to understand site-specific conditions such as what contaminants are present and where they are located, the site geology, the groundwater flow direction, and other conditions.
- Published data on contaminant properties are used to understand how contaminants are likely to behave in the environment
- A groundwater flow model and fate and transport model can be developed and used to estimate and predict both existing conditions as well as potential remediation scenarios. This can be used to evaluate how effective different remediation methods may be prior to selecting which remediation method to use.
- An example of how a fate and transport model can be used is predicting how the concentration of multiple contaminant in groundwater are anticipated to be reduced over time if groundwater is pumped out of the ground and treated at a treatment system.
- Modeling can include climate change considerations such as higher average river stage due to sea level rise or an increased groundwater recharge rate due to increased annual precipitation.

DEFINITIONS

Conceptual site model

an understanding of the physical, chemical, and biological processes and site conditions that control the transport, migration, and impacts of contamination to human health and/or the environment

Volatilization

transfer of contamination from groundwater or soil into the air

Sorption

attachment of contamination to soil and sediment

Biodegradation

the biological process of microorganisms breaking down contamination

Dilution and dispersion

the process of groundwater contamination spreading out and mixing with other groundwater



WHAT STAGE OF THE ACT 2 PROCESS IS THIS?

- Fate and transport analysis helps build the conceptual site model (CSM) initially developed during Remedial Investigation. The CSM is refined throughout the project lifecycle as additional information is gathered.
- The CSM is used to make decisions regarding additional investigation that may be needed and is used during remediation planning and execution.