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CATCHIS

Pesticide Model – Full Details

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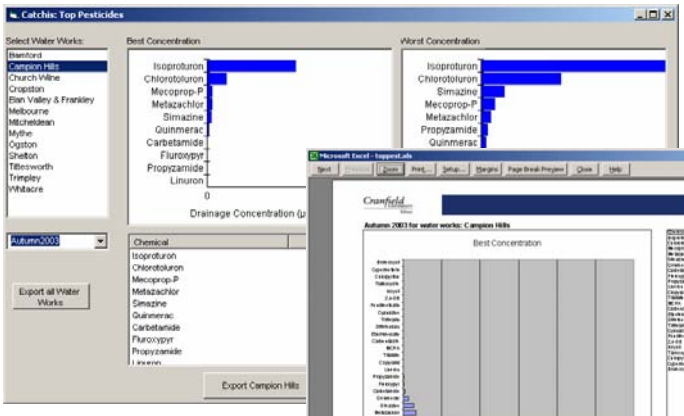
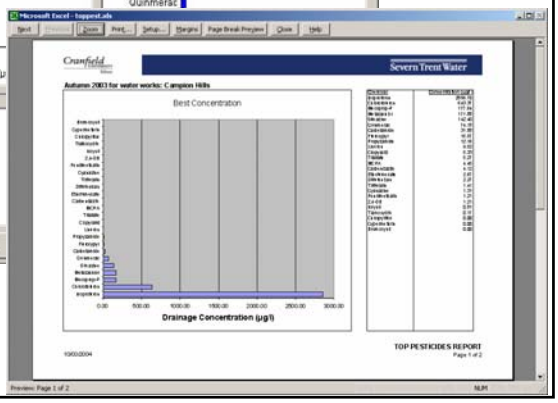
Top Pesticides

Runs for Surface Water Catchments and for Ground Water boreholes:



Data export option to Excel:



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SWAT Model - Top Pesticides

PESTICIDE CONCENTRATION
Best and worst case scenarios
best= short half life+large absorption
worst = long half life +small absorption

SOIL
Runoff potential
Physical and hydrological parameters

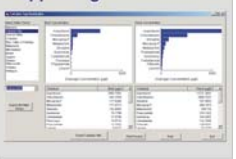
PESTICIDE
Half life
Application rate

CLIMATE
Hydrologically effective rainfall
Time from application to rainfall

SWAT calculations
attenuation factors
and return periods

VULNERABILITY CLASS
Based on concentration in relation to threshold values (0.1ug l^{-1})

seasonally specific list of top pestiicides appearing in SW source



Catchment- wide assessment of pesticide-specific hot-spot

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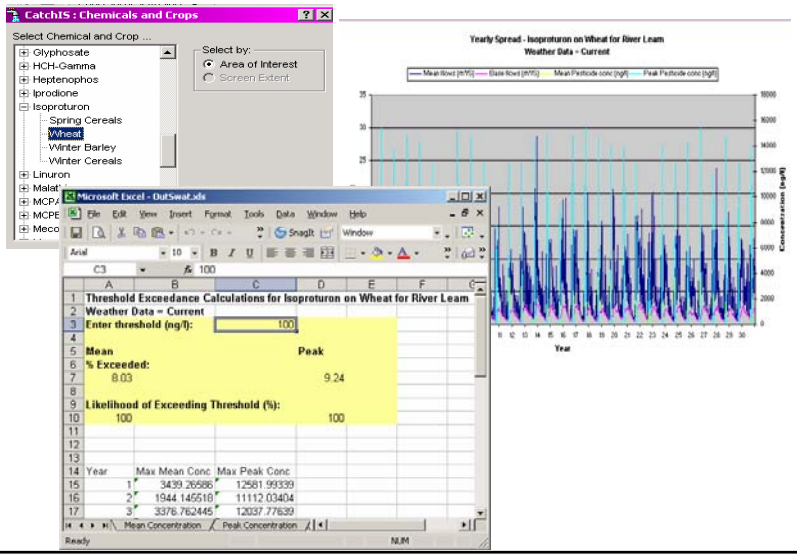
Catchment based threshold exceedence

Uses either Seasonal exposure or Pesticide specific loadings :



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SWATCATCH Model

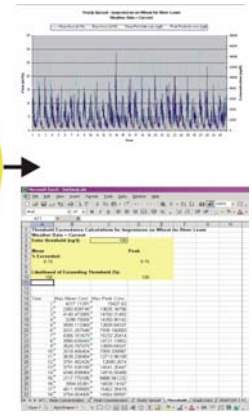
SOIL
Runoff potential
Physical and hydrological parameters (HOST)

PESTICIDE
Half life
Application rate

CLIMATE
Hydrologically effective rainfall
Time from application to rainfall

SWATCATCH calculations
Flow model- soil-stream response
SWAT model for pesticide conc

Integrated over timeseries and catchment



Catchment based threshold exceedence

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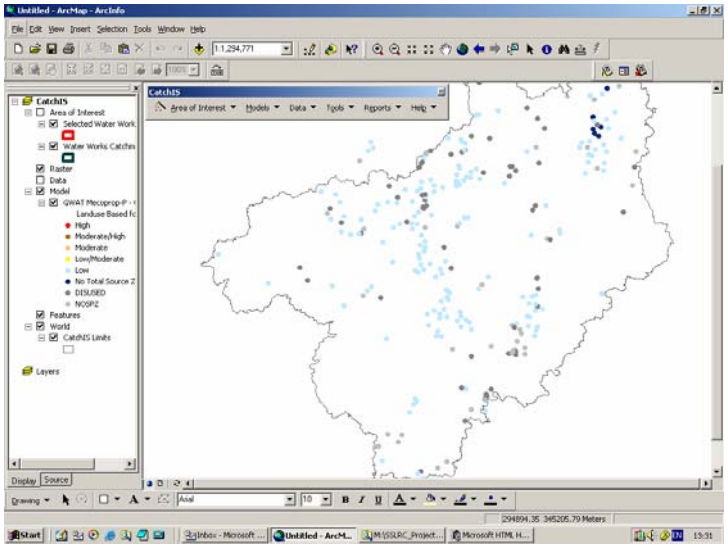
Groundwater assessment for all boreholes



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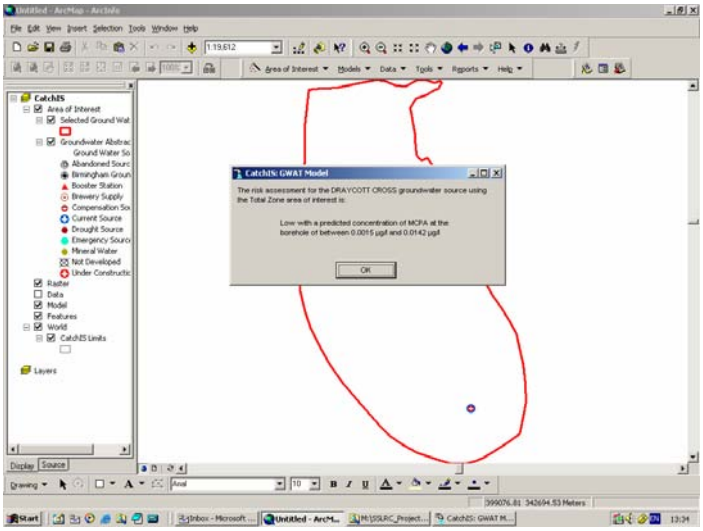
Groundwater assessment for a single borehole



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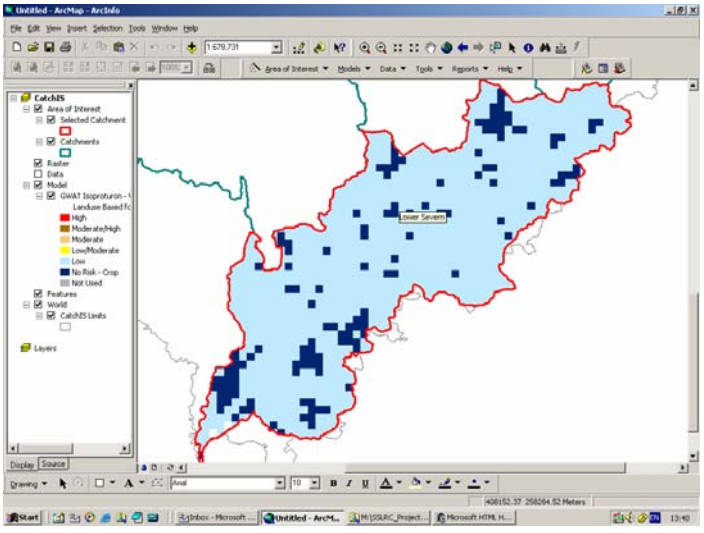
Identify Catchment Hot-Spots:

Ground Water:



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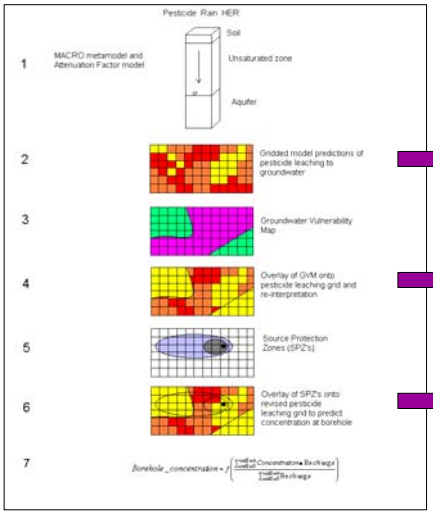
GWAT Model



Soil, pesticide, climate data
g/w resources identified from EA g/w vulnerability mapping and SPZs

Soil leaching model (MACRO)

Attenuation factor model (unsat zone)

'local' g/w
Using id for likely g/w resources

aquifers
Using id EA major/minor aquifers

boreholes
Grids in SPZ

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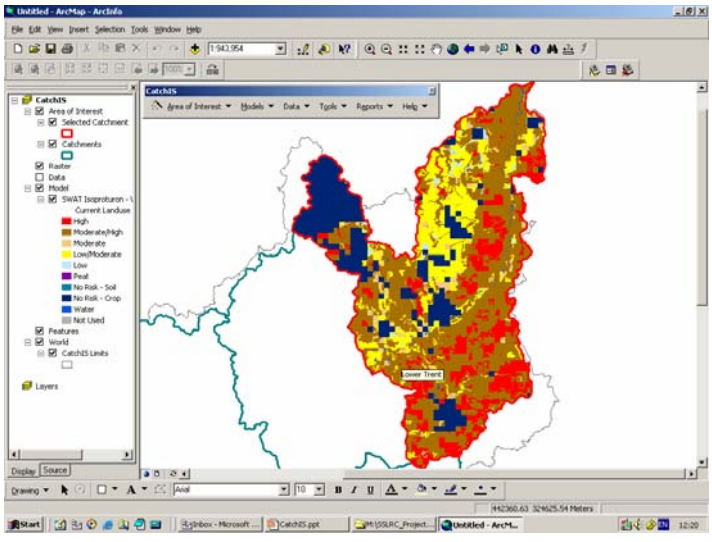
Identify Catchment Hot-Spots

Surface Water:



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SWAT Model - Catchment Hot-spots

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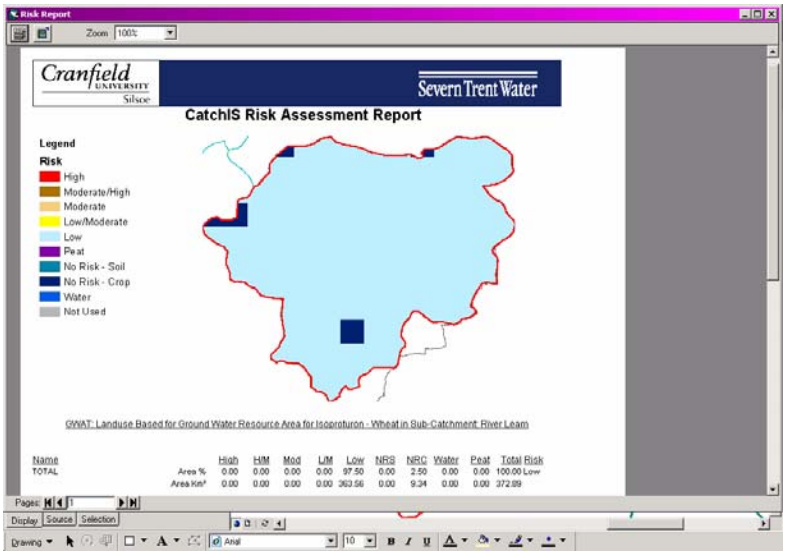
Bespoke Reporting Output



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Current Developments

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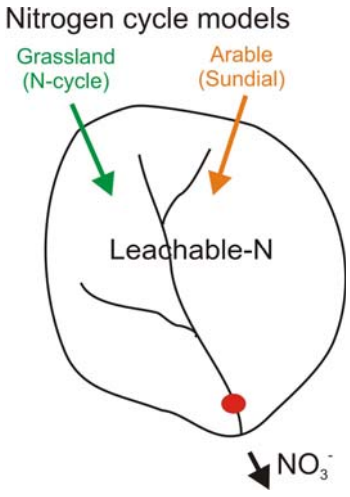
Current Developments - Nitrates

Surface water Nitrate model



Calculates the agriculturally-derived nitrate concentrations at the surface water abstraction point based on the amount of leachable N available for transport over the whole sub catchment area that feeds the surface water source

Integrates land use, soil and climate zone data over the sub catchment

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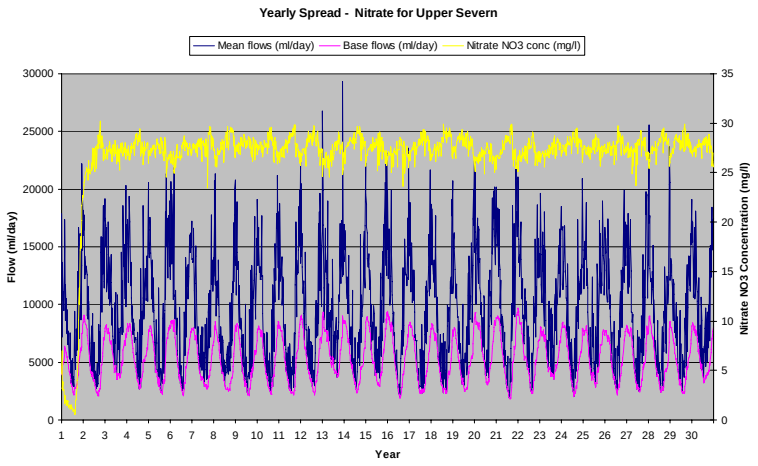
Current Developments - Nitrates

Surface water Nitrate model - Output



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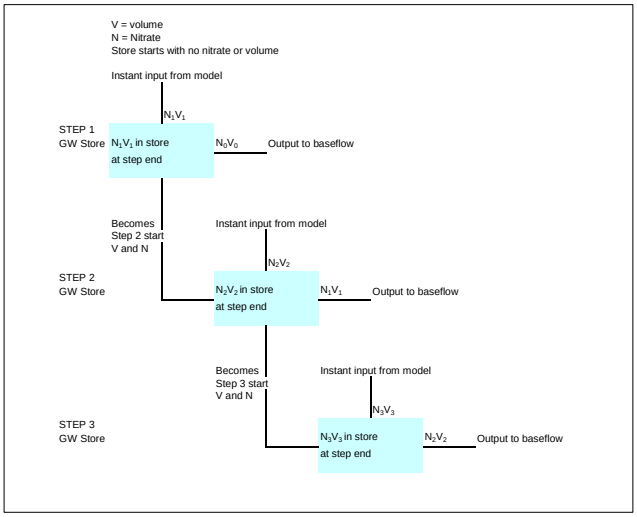
Current Developments - Nitrates

Groundwater Nitrate model



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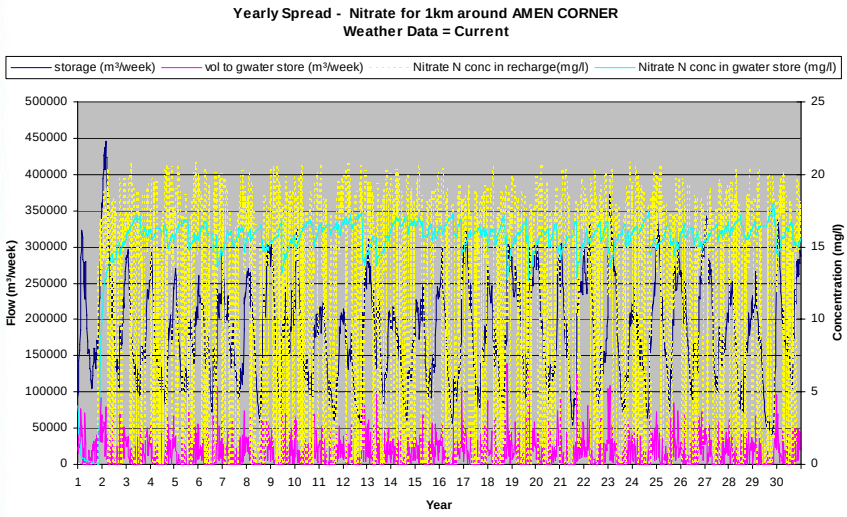
Current Developments - Nitrates

Groundwater Nitrate model - Output



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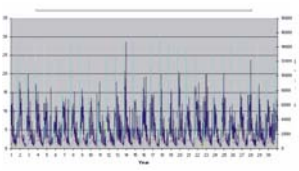
Current Developments – Climate Change

	WEATHER DATA	CLIMATE DATA
	30 year synthetic timeseries x10 stations	Derived parameters (XWR, FCD) spatial coverage
Current Data	Used to derived a HER timeseries as input for the SW and GW models	Used to select appropriate weather station data for the grid square to account to spatial variability in climate across the catchment



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Derivation of Scenario Weather Data

UKCIP02 climate change scenario data
Monthly precipitation and temperature for 30 year timeslice (e.g. 2020's =2011-2030)

↓

Calculation of simple water balance model
Precipitation – potential evapotranspiration balance to derive monthly HER. Problems with PET calculation from temperature

↓

Derivation of weekly HER
Distributed corresponding to current patterns within each month

↓

Scenario HER
Weather time-series for each10 weather stations snapped into CatchIS module

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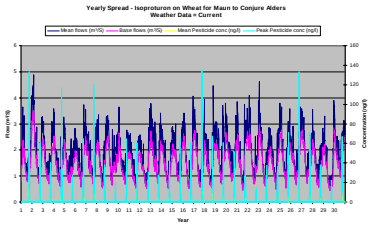
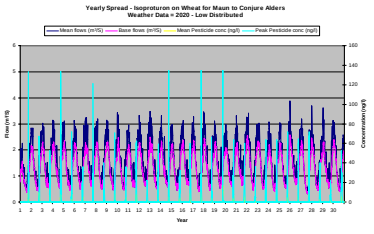
Impact on Pesticide Risk

Maun to Alders sub-catchment
Isoproturon on wheat





CURRENT 2020 LO

- Lower mean flows
- Smoothing extreme events
- Likelihood of threshold exceedence slightly increased

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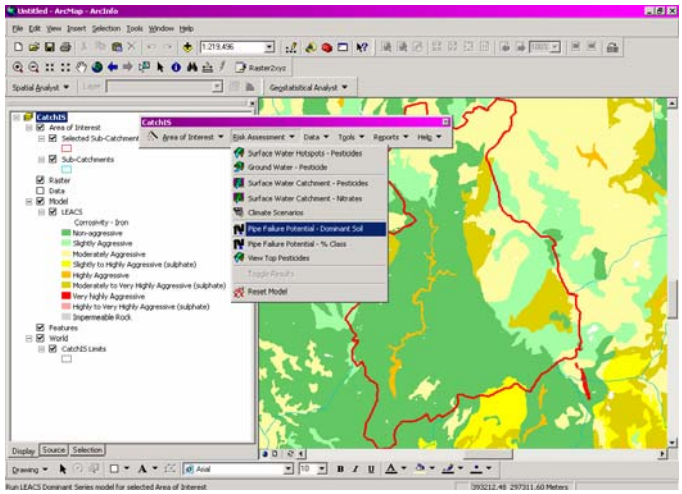
Current Developments – Leakage and Asset Management

Pipe failure (Corrosivity, Sharps, Sand and Heave)



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Leakage and Asset Management

- Leakage management is an important element in the supply-demand balance and AMP for water supply companies.
- Progressively leakage has become a political issue and OFWAT has imposed annual mandatory targets for all water companies.
- Leakage reduction is important in the management of water supplies and its contribution to the sustainable management of water resources.

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CIWEM's position

- CIWEM recognises the considerable reductions in leakage made by water companies in recent years.
- CIWEM recommends that a Best Available Technique not Entailing Excessive Cost (BATNEEC) type approach be considered for leakage target setting within an economic framework.
- CIWEM recommends that the ownership of supply pipes be transferred to the water companies.
- CIWEM recommends that in the long term, all water use should be metered for the purposes of water conservation and more accurate leakage measurement.
- CIWEM supports an holistic approach to leakage control, by considering the components of leakage and selection of appropriate policies.

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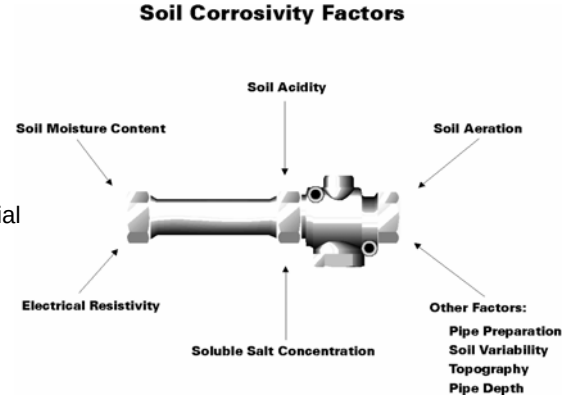
Causes of leakage

Failure in the water mains network

How?

- Age of pipe
- Diameter of pipe
- Source of feed
- 'Bus' loading
- Soil Heave potential
- Soil Corrosivity potential



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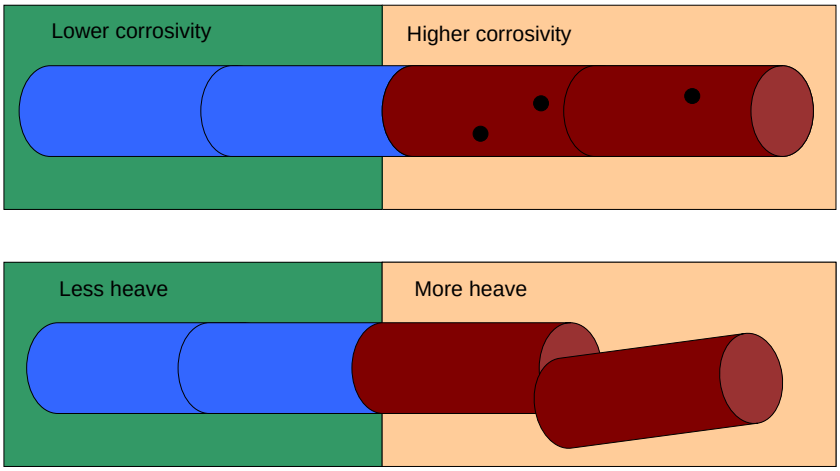
How soils affect leakage



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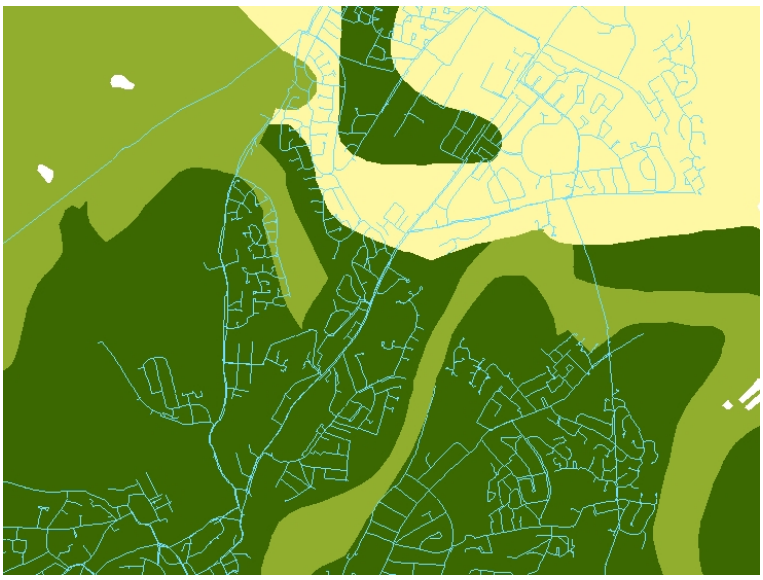
How soils affect leakage



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Potential areas of development

- Erosion risk
- Cryptosporidia risk