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Creating the environment for business

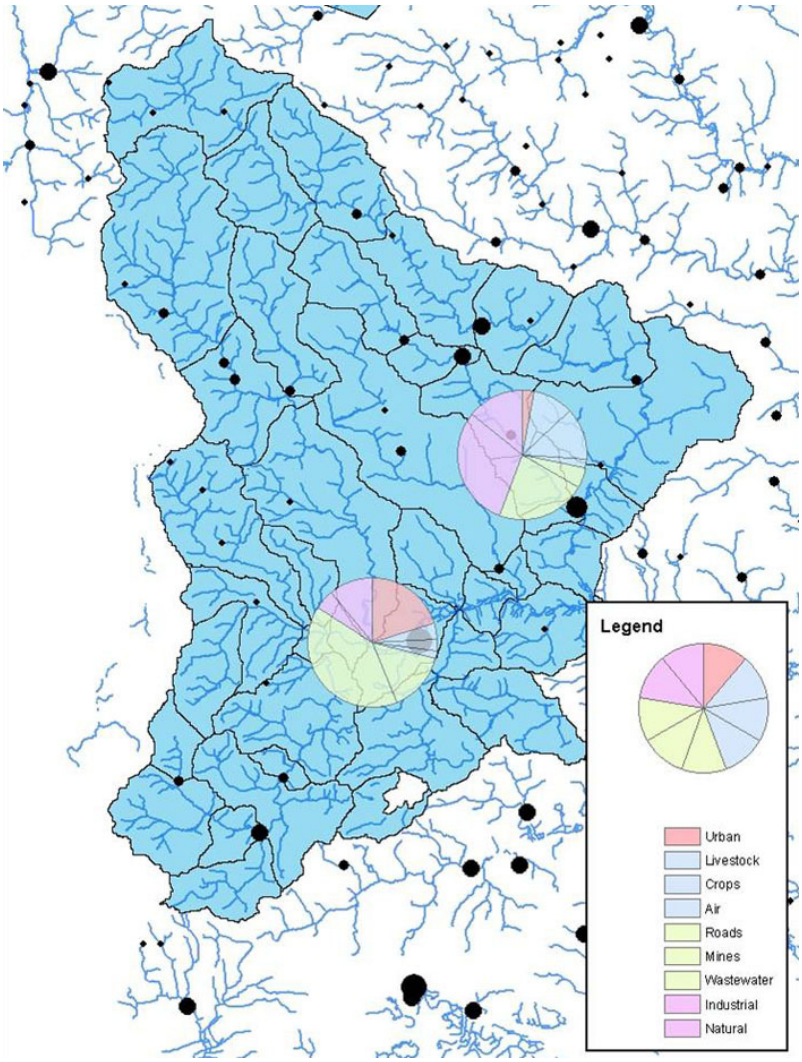
Environment Agency Chemical Source Apportionment

Evaluating the merits and appropriateness of modelling tools to apportion pollution sources and inform the selection of effective and proportionate measures

Chemicals enter the environment via a number of routes, including natural sources, direct industrial discharges, atmospheric deposition, wastewater treatment works effluent, agricultural runoff, highway and urban runoff and mine water drainage. Under the Water Framework Directive where exceedances of an Environmental Quality Standard (EQS) are identified, a Programme of Measures (PoMs) will be required to reduce inputs to the aquatic environment in order to achieve the EQS. However, in order to identify effective and proportionate PoMs it will be necessary to identify and quantify the relative contribution and influence of any significant sources of the chemical of concern.

To separately monitor inputs of all chemical sources to the environment would be excessively costly and technically infeasible. Therefore a source apportionment modelling exercise is required.

Entec were commissioned by the Environment Agency, alongside Atkins, to review available modelling approaches that could be used for this purpose and make recommendations for any necessary development work to fulfil the requirements of adopting a modelling framework with the Environment Agency's IT infrastructure. The merits and drawbacks of the available models were considered and matrices created to compare and assess their features and functionality.



However, no one model was identified through this review and a significant gap was identified between the functionality of SIMCAT and more dynamic catchment models. SIMCAT provides a robust estimate of the point source contribution but cannot allocate the relative contribution of other 'diffuse' sources.

SIMCAT, however, does have the advantage that it is already widely used and integrated with Environment Agency infrastructure and, therefore, recommendations were made on how to improve the functionality of SIMCAT as part of a tiered modelling framework as follows:

- SIMCAT model where point sources are known to be the contributors;
- GIS source inventory used to derive export coefficients and summary statistics that better represent diffuse source contributions and can be fed into SIMCAT and other models; and
- More complex time series models where the influence of storage or event based inputs are important.

The study culminated in recommendations for models to be taken forward for further development and testing as part of a wider Environment Agency / UKWIR initiative to develop a common platform for deriving source apportionment estimates.