

Department for Environment, Food and Rural Affairs

List of business critical models

September 2015

In line with recommendations in the Macpherson review¹ of quality assurance of government analytical models and our commitment in the 2014/15 Defra Annual Report and Accounts we have prepared a list of Business Critical models for 2015.

To prepare this list we have engaged with model owners and operators. Those models that scored high on at least three of the five following risks: reputational, financial/economic, legal, operational/user impact and future effect have been defined as business critical.

Each business critical model has a Senior Responsible Owner who is aware of the quality assurance which has been undertaken for their model.

Additionally Defra also uses some models owned by other government departments which are business critical, these are not included in the below list.

Defra's business critical models 2015

Common agricultural payment (CAP) Disallowance projection model (DAP)

This model projects Common agricultural payment (CAP) disallowance costs for England each year and provides a tool for assessing the impact of policy decisions on future disallowance costs. This model is still in development.

Modelling and Decision Support Framework (MDSF2)

The MDSF2 model is used to calculate the flood risk (likelihood and consequences) in areas at risk of flooding from rivers and the sea across England. It is currently being used to update the National Flood Risk Assessment (NaFRA) and is available as Open Data through the Risk of Flooding from Rivers and Sea (RoFRS) products on Gov.uk. NaFRA is primarily used to describe the scale and impact of flood risk when flood defences are modelled to include breach and overtopping. NaFRA products are used to report to Defra the progress we make in reducing flood risk.

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https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/206946/review_of_qa_of_govt_analytical_models_final_report_040313.pdf

Environment Agency Water Resources Geographic Information System (WR GIS)

The WRGIS is a collection of water resources information viewable via Geographic Information System software (ArcGIS). Driving the tool are the 116 Resource Assessment and Management (RAM) ledgers which the WRGIS links together to provide a national picture of long term water availability for England and Wales. The main role of the WRGIS is to calculate the national water resources input to Water Framework Directive (WFD) reporting for both surface water and groundwater. Associated tools are used to manage the data upload process.

Pollution Climate Mapping model

Model provides estimated concentrations for key air pollutants at background locations (1x1km maps) and at roadside locations (approx. 10,000 major road links) throughout the UK to calculate population exposure, area and road length exceeding European Limit and Target Values.

The model also allows for projections of future concentration fields.

Outputs are visual map images, geographic information system (GIS) data layers and compliance summary information that inputs to the '461 Questionnaire' submitted to European Commission annually to comply with the requirements of the Air Quality Directive.

Impact Pathways Model (IPM)

Provides values of the approximate monetised impacts of emissions of a unit mass of a range of pollutants to assist with appraisal of air quality policies.

National Atmospheric Emissions Inventory

Model provides national estimates of key air quality pollutants by sector on an annual basis to meet European Union (EU) and United Nations Economic Commission for Europe (UNECE) reporting requirements. A consistent time series is calculated back to at least 1990 and current year data are disaggregated to 1x1km grid squares.

Outputs include database, visual map images and geographic information system GIS data layers.

Water Bills Projection Model

This model has been developed in conjunction with Ofwat and Environment Agency to inform a long-term view of the potential progression of household water bills in response to water industry investment levels, environmental requirements and market reform.

Thames Tideway Tunnel financial model – developed by consultants UBS on behalf of Thames Water Utilities Limited (TWUL).

The model has been developed by consultants UBS for Thames Water Utilities Limited with input from HM Treasury, Ernst & Young (on behalf of Defra), and Ofwat. It is available to all those organisations and will be used for the development of the delivery structure of the Tunnel and its procurement, and models the project up to completion of the tunnel. It is commercially confidential and so is not available to the public. The model has been subject to external audit by consultants KPMG.

Exodis-Foot and Mouth Disease™

To forecast the potential range of outcomes and resources used in an outbreak of Foot and Mouth disease (FMD), as well as monitoring disease control. Used between outbreaks for developing contingency plans and investigating control options including vaccination.

Appraisal modelling framework for flood and coastal erosion risk management investments.

The generic model takes input data on flood levels, flood probabilities and floor levels of properties, and uses depth-damage relationships from research to generate probabilistic monetary estimates of flood damage for different flood management options, for specific proposed investment projects. Modelling can also involve the estimation of the economic value of other impacts, such as on agricultural output and land, risks to health and life, and of disruption.

Models are generally constructed and operated by private sector consultants to economic appraisal principles established by Environment Agency (EA) and Defra.

Models are used to recommend substantial (up to £m) investments with long lives (up to 100 years in some cases).

Tree/plant disease spread model

A suite of models that can be used to:

- (i) assess the risk associated with outbreaks of novel pests and diseases
- (ii) optimise strategies for detecting and mapping invading pathogens and
- (iii) optimise strategies to manage invading pathogens.

Future Funding Model

The model converts business assumptions and policy targets into financial commitments. Rural Development Programme for England agreements are largely 5 or 10 years. The model provides outputs of financial commitments going forwards over the longer term. Annual budgets are set and future years funding pressures feed into policy development

Budget Management Model

The model assesses the impacts of spend, forecast spend and exchange rates on the EU budget for Rural Development Programme for England 14-20.



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