Behind the scenes
3: Building the model in Netica

e-Bulletin #14

The data and knowledge you have provided throughout the first four workshops are now being used to build a model of the Hebden Water catchment. This model captures the understanding that you have shared with us in the workshops, and the uncertainty that exists over the many different relationships we have identified as being part of the 'bigger picture' of flood risk in Hebden Bridge.

In this festive bulletin:
- Behind the scenes modelling in Netica

- Remember to RSVP
  Fifth modelling workshop
  Tuesday 14th January

In the example below you can see the effects of fixing [take-up of property level protection] in the [high] state.

Top = before, bottom = after
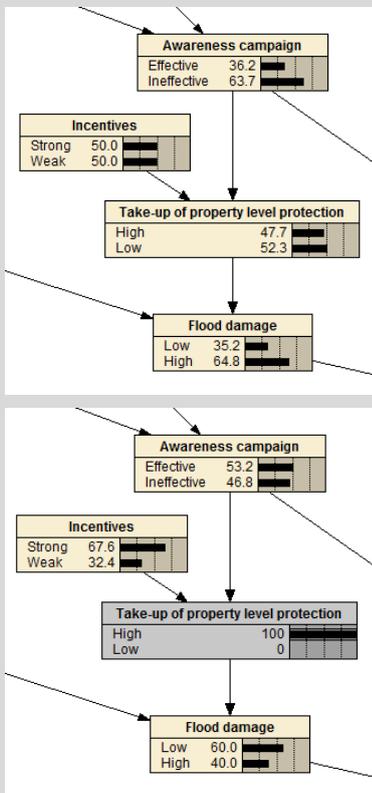
Questions and answers

What is it?
Netica is a piece of software designed for building Bayesian networks (a way of showing how different variables in a system are related).

What will it look like?
The network will look very similar to the network diagram that we have been using in the workshops, with one significant difference. Each variable will have a series of belief bars showing how likely it is to be in each state, given the states of other variables in the system.

Belief bars

Probability of being in each state
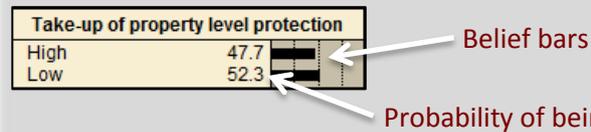
What does it do?
Netica allows us to set variables in certain states, and see the effect this has on other variables in the system. We can do this in two ways:

1. **Top-down**
Switch 'on' a number of different interventions, and see the effect this has on our catchment objectives. Which combinations have the greatest effect? Is this what we would expect? Do some combinations have surprise negatives effects? We can call this **predicting**.

2. **Bottom-up**
Set an objective or number of objectives to the desired state (for example set flood damage to low), and see which combination of interventions is most likely to bring about this change. Another way of picturing this is asking which interventions a particular objective is most **sensitive** to changes in. We can call this **diagnosing.**

An example is shown to the left and we will work through several more examples in the fifth workshop.

All that's left is for me to wish you all a wonderful Christmas, and a prosperous new year.

Shaun Maskrey   shaun.maskrey@nottingham.ac.uk   07887 398337