

Monitoring and modelling of visitor use on access land across Rombalds Moor, Ilkley, England

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Keywords: visitor, monitoring, modelling, access, assessment, landscape

The Countryside and Rights of Way (CROW) Act 2000 created a new right of open access to mountain, moor, heath and down, in 2004/05. Over half of mapped access land in England is nationally designated as a site of special scientific interest (SSSI) or as a Natura 2000 site. An access assessment was carried out in line with Habitat Regulations (1994) on Rombalds Moor in 2004 (Natural England, 2009) using the Predictive Site Use Model (Thurston & Taylor 2002) to understand changes in access use to pre-empt and manage potential impacts on biodiversity from the new rights, using statutory restrictions and positive access management (PAM) techniques.

The aim is to test the predictive power of the model by ground truthing with spatial visitor data from the Open Access National Visitor Survey (OANVS) collected across Rombalds Moor between 2005 and 2007 (Johnson *et al.* 2009a). The main objectives were to determine the model accuracy, assess its ability to accept visitor data, understand if this improves accuracy and test the potential in assessing the relationship between upland bird trends and changes in access use, in conjunction with the annual Upland Breeding Bird Survey (UBBS) (Noble *et al.* 2007 & 2008).

The method was designed to compare dataset 1: predictive, and dataset 2: actual, gathered on the levels and patterns of access use across Rombalds Moor. Dataset 1 was gathered using the spatial access assessment method (Natural England, 2009) to assess the change in use on access land pre-CROW, in 2004. Dataset 2 was collected via interview and observation methods to monitor visitor usage post-CROW between 2005 and 2007, through the OANVS survey. Dataset 1 and 2 were modelled producing a predictive and actual model, using the Predictive Site Use Model.

The model produces a GIS output that identifies high, medium, low change in use across a site (Fig: 21) producing a simplified picture of change in access use to aid decision making in developing the appropriate management. The distribution of visitors on foot are influenced by points of entry, relative landscape attractiveness of different areas, topography, variations in the distance (a distance decay mechanism was developed) and patterns people will travel from their point of entry (Thurston *et al.* 2002).

Additional site factors or predictors of change was also gathered: location and capacity of entry points onto the site, unmarked routes/desire lines, unusual features of interest (e.g. crashed aircraft, archaeological sites), and site-specific factors that are likely to influence visitor behaviour such as attractive landscape features, e.g. waterfalls, reservoirs and detractors e.g. blanket bog (Thurston *et al.* 2002, Keane *et al.* 2008).

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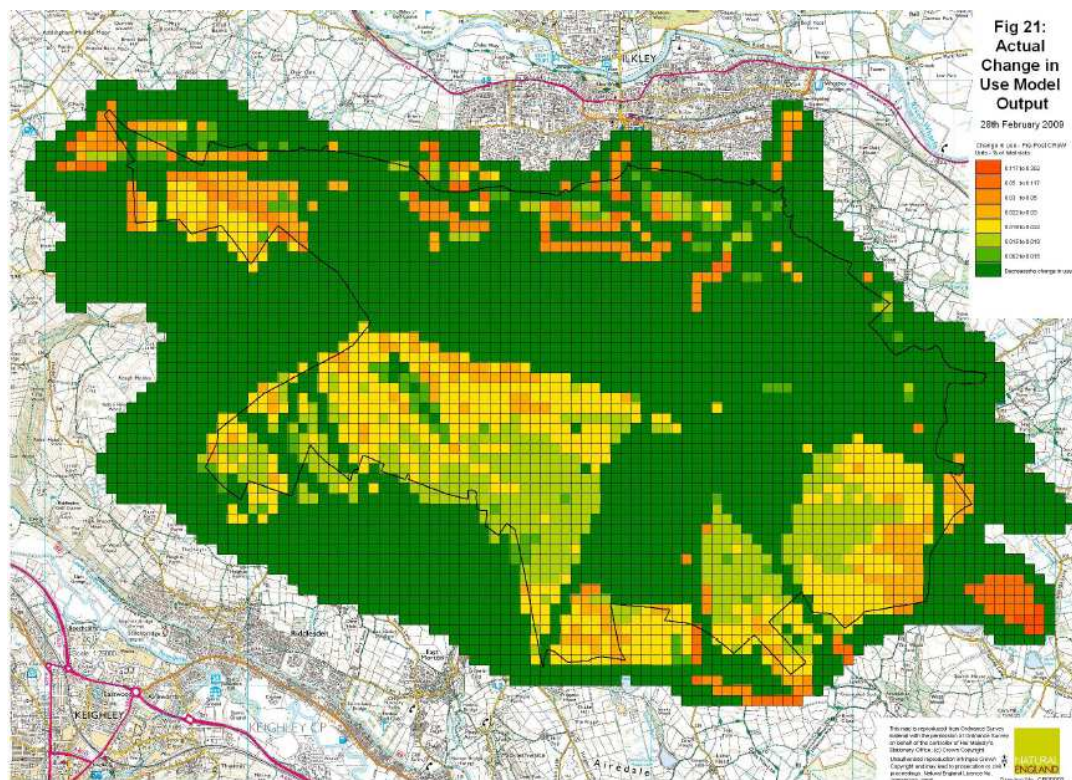
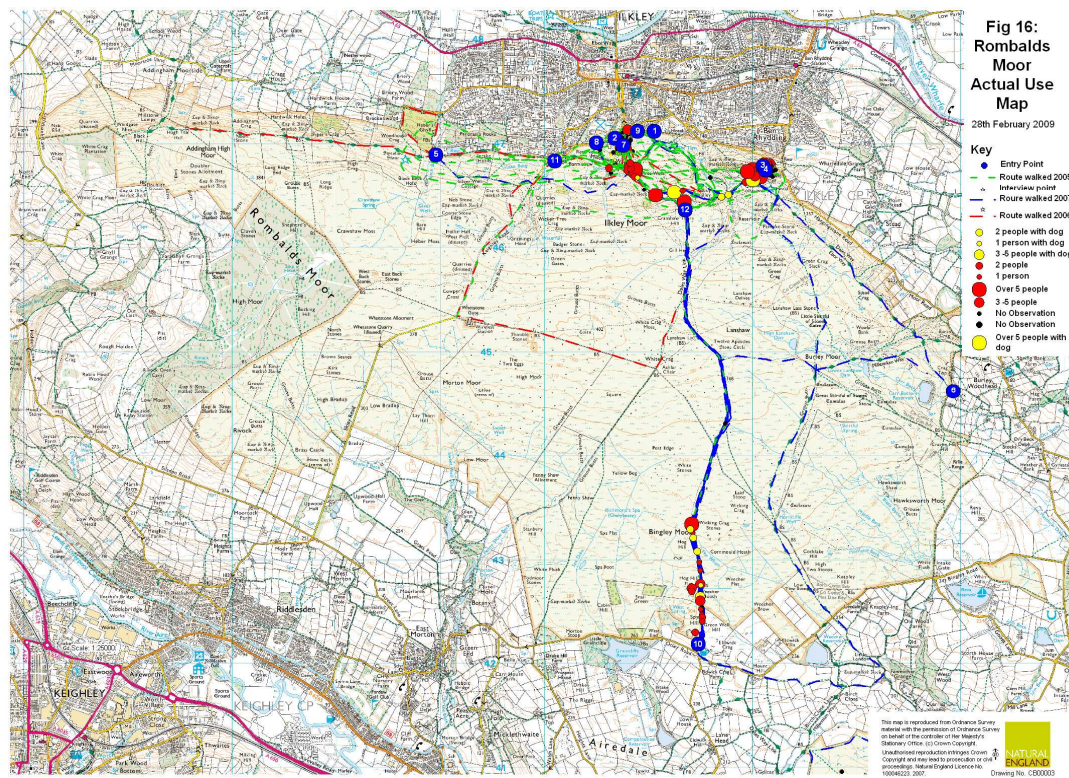


Fig: 16 & 21 show a spatial map of actual use and actual change model output, respectively.

The predictive model output (dataset 1) was directly compared through statistical analysis using paired t-test and Pearsons correlations to the actual model output (dataset 2) to identify the level of closeness in relationship of predicted visitor use compared to actual visitor use. Analysis of variance (ANOVA) using the General Linear Model (GLM) procedure was used to identify potential

predictors of change and test whether landscape features, existing entry points, routes and access management measures had a significant influence or relationship, with actual changes in levels and patterns of use.

The test results indicate that the predictive power and accuracy of the model is good for uplands. Combining visitor data with predictive data into the model improved the models predictive power. It was proved there is a highly significant correlation between the predictive and actual models, proving the model has good power to predict change in access use.

The results suggest that the management approach applied was appropriate and effective to protect the biodiversity sensitive areas as positive access management had the greatest influence on visitor use. The results confirmed the access assessment mapping and model approach worked well in predicting change to understand the spatial interaction between people and biodiversity sensitive areas across a landscape. It can also be packaged with the monitoring approach as a set of access management tools for integrating access, biodiversity and land management objectives on an area wide basis.

The findings indicate that 3-4 years after the implementation of CROW there has not been a significant change in visitor use across Rombalds Moor. Therefore, it can be reasonably stated that there has been no significant impact on the integrity of the Natura 2000 designated site a Special Protection Area (SPA) across Rombalds Moor, as there has not been a significant change in access use.

This approach could potentially be used to understand the impact of CROW at the landscape scale on upland bird trends for the whole of England by correlating bird trends with high, medium and low access change areas over the longterm. The model could potentially be used to extrapolate long term national visitor survey data across all the uplands in England to compare to longterm bird data gathered by the Upland Breeding Bird Survey (UBBS) developed by BTO, RSPB and Natural England.

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