

ORVal Short Case Study: Number 1

Valuing Recreational Sites in West Norwich (Version 2.0)

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Introduction

The ORVal Tool is a web application (accessed at <https://www.leep.exeter.ac.uk/orval>) developed by the Land, Environment, Economics and Policy (LEEP) Institute at the University of Exeter with support from DEFRA.

ORVal's primary purpose is to help quantify the benefits that are derived from accessible outdoor recreation areas in England. Those outdoor recreation areas, or *greenspaces*, include an array of features such as beaches, parks, nature reserves and country paths

This short case study uses ORVal to explore the visits and welfare values that are generated by existing greenspaces in West Norwich. It provides both practical details as to how tasks are performed in ORVal and explanations as to how the numbers reported by the Tool should be interpreted.

The Case Study Area

The ORVal interface is a navigable map which illustrates the location of existing greenspaces

in England and Wales. In *Figure 1*, we have zoomed into the area of the case study in West Norwich. Then, by choosing the 'Map Layers' tab and selecting the information button next to the 'Recreation Sites' list, we have displayed the key to the colour-coding used to roughly classify the different recreation areas.

You can see from the map that West Norwich is served by a complex of greenspaces. To the right of the screen, for example, is a large municipal park, Eaton Park (light green area). Just above Eaton Park are two allotments (orange areas), while to the left is a woodland recreation area (dark green area). At the bottom of the screen is a network of connected paths (red lines) served by a series of access points (red dots) centred on the University of East Anglia Broad.

Note that the greenspaces identified in ORVal have been drawn together from an array of national data sources. While every attempt has been made to ensure that this dataset is comprehensive and accurate, there can be no guarantee that all greenspaces have been correctly identified or allocated to their most appropriate classification.

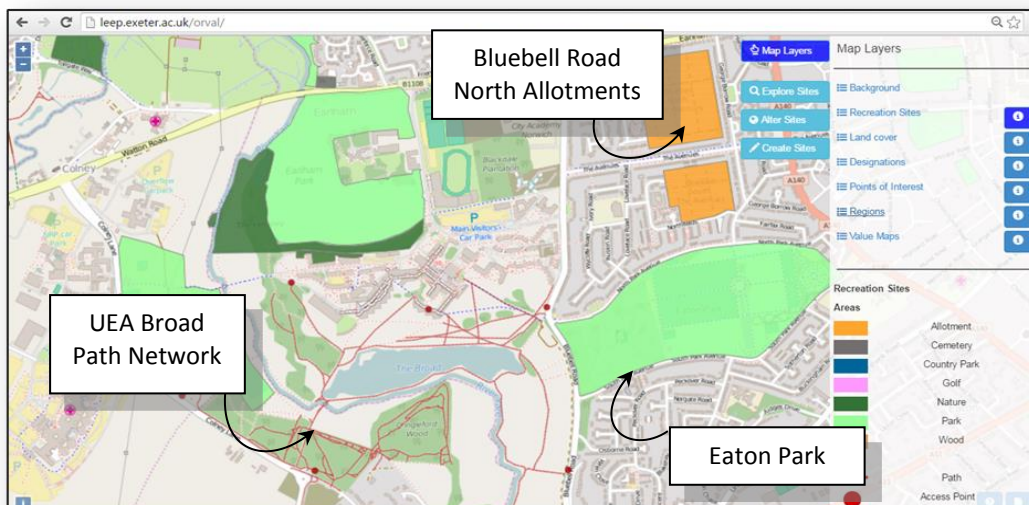


Figure 1: Recreation Sites in West Norwich

ORVal's Value Estimates

The visits and welfare values reported by ORVal are estimates derived from a sophisticated *Recreation Demand Model* (Day and Smith 2017). The model is estimated from a very large national dataset and establishes how visits and values tend to vary according to; (1) the size of a greenspace, (2) its land covers, (3) the proximity and socio-economic composition of nearby populations and (4) the availability of alternative sites.

Note that the model does not capture the idiosyncrasies of individual greenspaces. Its

greenspace.¹ More specifically, welfare values for a particular greenspace are calculated for each adult (over 16) by using the model to predict how the welfare that they enjoy from outdoor recreation would change if they could no longer access that particular site.

Importantly the model accounts for the fact that individuals will mitigate that welfare loss by choosing to visit other greenspaces instead. ORVal's welfare values specifically account for this substitution behaviour.

In ORVal the predicted visits and welfare values (in 2016 prices) are reported as aggregates across the population of adults over the period of one year.

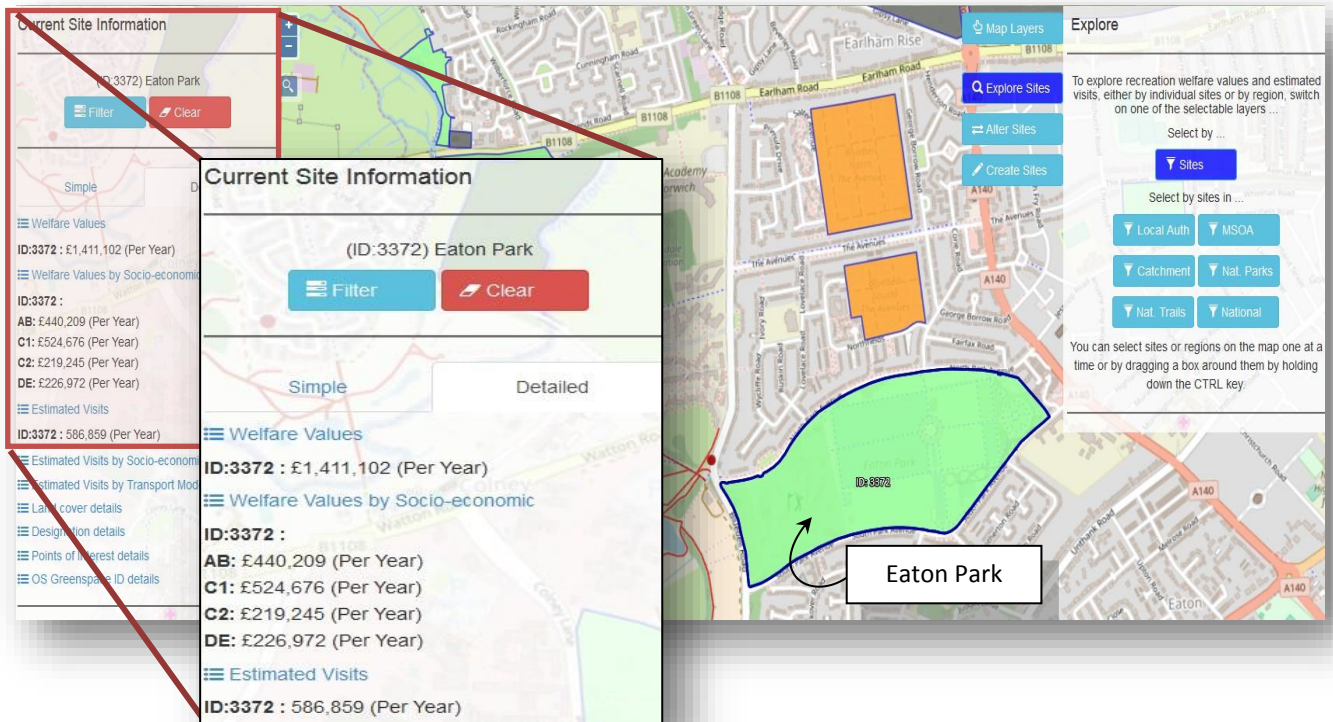


Figure 2: Welfare and Visit Predictions for Eaton Park

predictions should be interpreted as indicating the visits and values that might be expected from an 'average' greenspace of that description in that location.

To be clear, ORVal reports 'welfare values' conforming to the standard economic definition; value is a figure describing the monetary equivalent of the welfare enjoyed by individuals as a result of having access to a

Values & Visits: Areas

Estimates of values and visits to particular recreation areas can be accessed in ORVal by clicking on the *Explore Sites* tab and selecting the *Sites* button. Each of the greenspaces on the map now becomes a selectable feature. In Figure 2, we have selected Eaton Park by

¹ In economics this welfare value is often called an 'economic value' or a 'willingness to pay'.

clicking on that recreation area. The *Current Site Information* Panel appears to the left of the screen populated with information on Eaton Park, including details of estimated levels of annual visitation, annual welfare values, landcovers, designations and points of interest. In Figure 2, we have expanded the lists for *Welfare Values*, *Values by Socioeconomic Group* and *Estimated Visits* and then magnified the panel to make it easier to read the outputs.

The ORVal model estimates the welfare value of Eaton Park to be £1,411,102 per year. Recall that an individual's welfare value is the monetary equivalent of the welfare loss that they would experience if Eaton Park were no longer accessible. The £1,411,102 figure is the sum of those welfare values across everyone in the population and will be made up of some large values, probably for those who live close by, and some relatively smaller values, probably for those that live further away. The total welfare value can also be viewed disaggregated by socioeconomic groups. In this case, the C1 group enjoy the most benefits from Eaton Park (£524,676 per year), while the C2 group enjoy the least (£219,245 per year).

Park over the course of a year. Again it is worth understanding exactly how ORVal comes to this figure. The model works out the probability that each individual in England will take a trip to Eaton Park on each day of the year (as you might expect, visits are more common on weekends and during the summer months). That probability tends to be relatively high for individuals living near to Eaton Park and increasingly low for individuals living further away. The visitation figures reported in ORVal are the sums of those probabilities over all individuals over all days of the year.

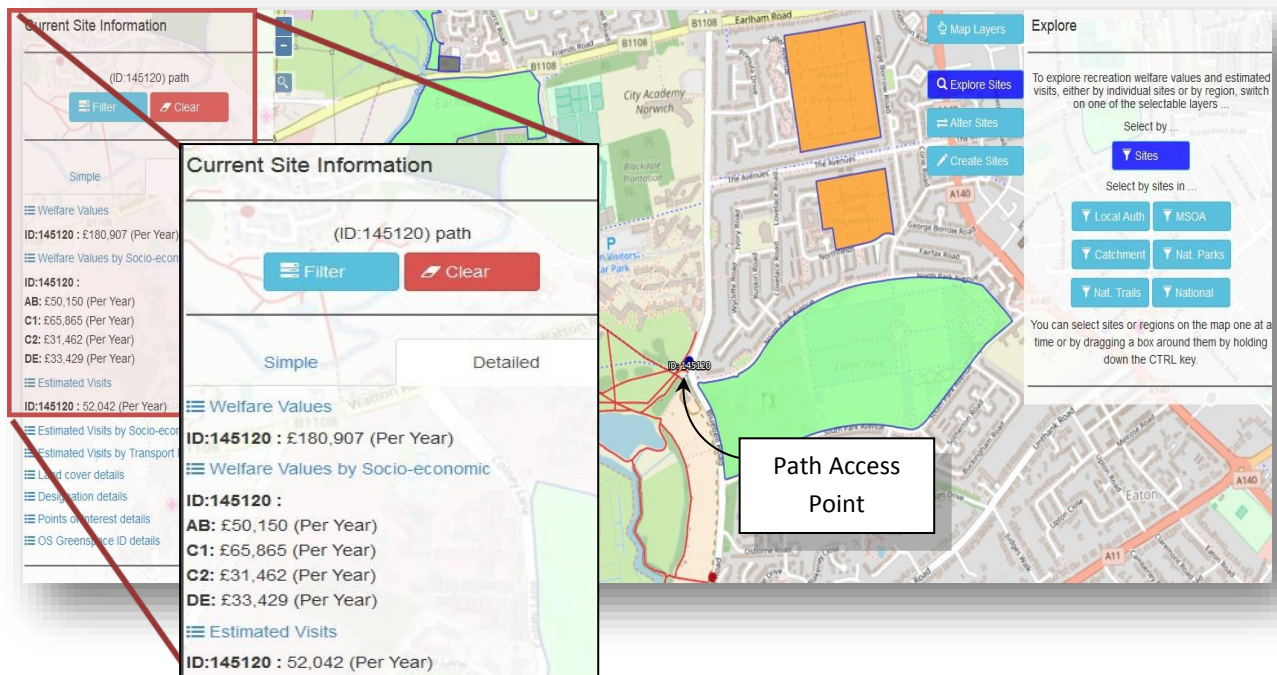


Figure 3: Welfare and Visit Predictions for a Path Access

In Figure 2, you can also see that the model predicts that 586,859 adults will visit Eaton

Values & Visits: Paths

ORVal also allows you to estimate visits and values for paths. Since path networks may be very extensive ORVal, visits are disaggregated according to the different points at which a visitor can access that network. The idea here is that by choosing an access point, visitors determine the landscapes that they will encounter when traversing a path network. In Figure 3, we have pressed the *Clear* button to clear the information on Eaton Park from the *Map Information Panel* then selected an access point to the UEA Broad Path Network. The model's predictions for visits and values to that path network through that access point are now reported.

In this case ORVal estimates 52,042 visitors a year will use that access point in order to enjoy the recreation experience offered by the UEA Broad Path Network. In terms of welfare value, that equates to some £180,907 each year

If you wanted to find out the values and visits to a path network, irrespective of where individuals accessed that network then ORVal

can do that too. In Figure 4, we have cleared down the *Current Site Information* panel and then clicked on the UEA Broad Paths Network itself (rather than on one of its access points). The tool now shows the visit and value estimates for the entire network. We find that the annual welfare value is £945,911 with 252,506 predicted visits.

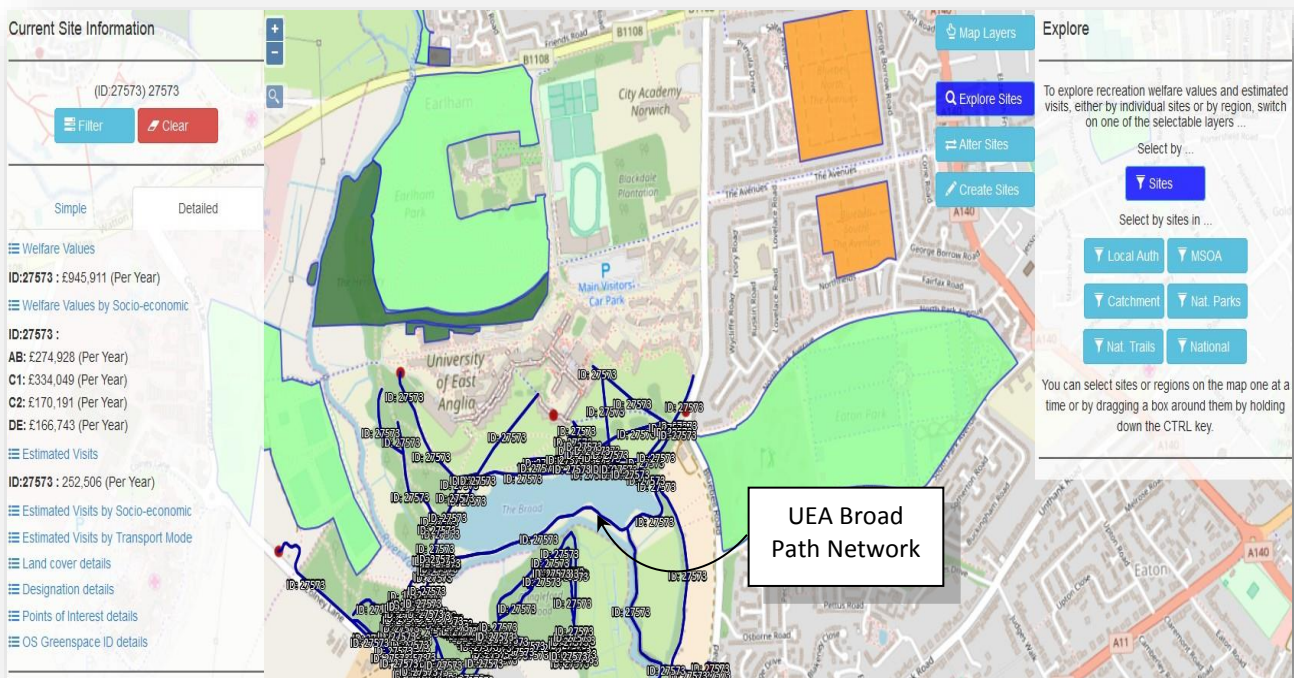


Figure 4: Welfare and Visit Predictions for the UEA Broad

Values & Visits: Multiple Sites

Finally, we may wish to establish visits and values to a whole series of greenspaces. In ORVal one way to do that is to simply click on each of those greenspaces in turn. Provided you do not press the *Clear* button, then the estimates for each of those greenspaces will be added to a growing list in the *Current Site Information* panel. Alternatively, you can drag a box around them by holding down the CTRL key.

Figure 5 illustrates what that looks like once each of the recreation areas and paths networks shown in the case study area of West Norwich have been selected. Adding up the values reveals that this complex of greenspaces attracts an estimated 891,872 visits each year creating a welfare benefit of approximately £2,600,000.

It is worth noting that the welfare values calculated by adding together the individual values for each greenspace could be considered a lower bound estimate of the

value of the whole complex of recreation sites. To understand why, recall that the values ORVal reports are estimates of the welfare loss imposed on an individual if a particular greenspace were no longer accessible, *but nothing else changed*. Accordingly, the welfare value of one path access point, for example, is limited by the fact that making that access point inaccessible does not preclude a visitor walking another 200m down the road to join the path network at another access point. An alternative way to calculate the value of a set of sites would be to estimate the welfare loss of making the whole complex of sites inaccessible at the same time. Since the ability to swap visits to other sites must be more greatly curtailed under those circumstances the total welfare value calculated in this way must be greater. To economists the first approach is termed ‘summing marginal values’ while the latter is the calculation of an ‘aggregate value’. Unfortunately, the functionality to calculate aggregate values is not yet implemented in the ORVal tool.

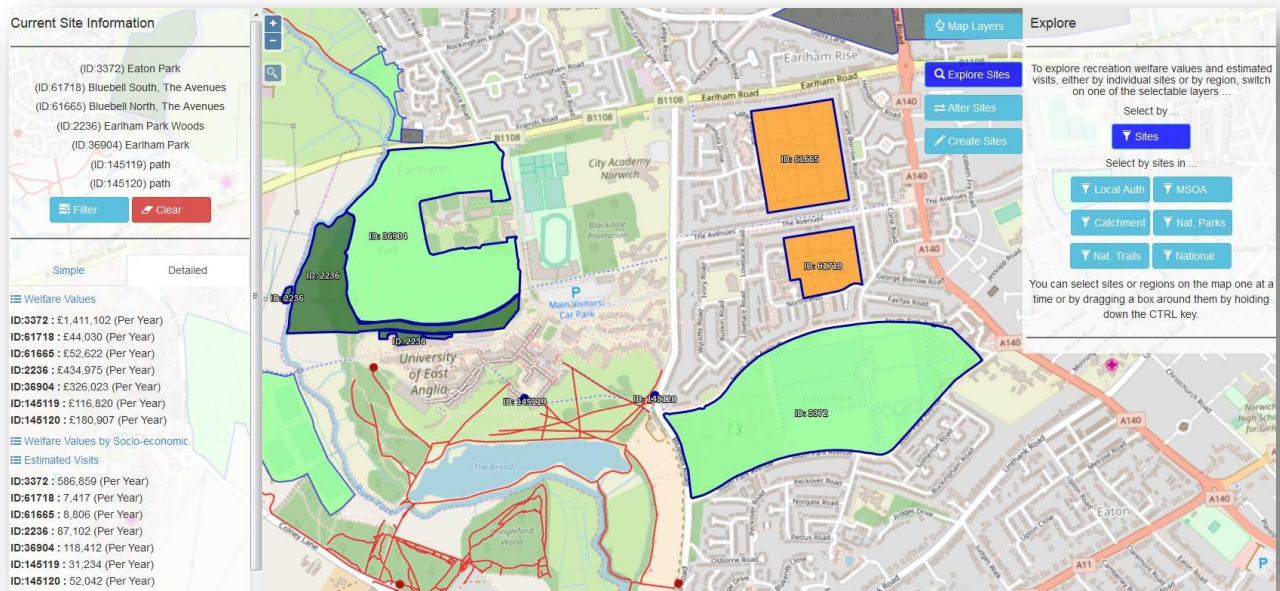


Figure 5: Welfare and Visit Predictions for the Greenspaces of West Norwich

References

Day, B. H., and G. Smith (2017). The ORVal Recreation Demand Model: Extension Project, Land, Environment, Economics and Policy (LEEP) Institute, Business School, University of Exeter.

Day, B. H., and G. Smith (2018). Outdoor Recreation Valuation (ORVal) User Guide: Version 2.0, Land, Environment, Economics and Policy (LEEP) Institute, Business School, University of Exeter.