

Participatory GIS techniques to determine the value of vulnerable open spaces in Portsmouth

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Summary: Coastal squeeze is predicted to undermine the survival of habitats of international importance in Portsmouth. The North Solent Shoreline Management Plan currently assesses the impacts on bird populations. Participatory GIS techniques were used in this case study to determine the value of open spaces in Portsmouth. The techniques used consisted of a face-to-face survey, interactive activities during a Fair and an online survey. These techniques have enabled initial observations of participants' use of mapped visualisations in answering questions on coastal change and open spaces. It is hoped that this study will give an insight into how maps may help or hinder participants' expression of their views.

KEYWORDS: Public Participation, Participatory GIS, online survey, conflict resolution

1. Introduction

Identification of land use conflicts in UK coastal cities is under-researched. Land use conflicts in the context of coastal management often exist because of conservatism (de la Vega-Leinert and Nicholls 2008); people preferring to keep things the way they are rather than risking an unpredictable change. However French (2004) demonstrates that people's perception needs to be taken into account when making decisions on coastline management. In the UK, Shoreline Management Plans (SMPs) assess the risks to existing and planned future development of flooding. Currently, the first round of updates of the SMPs is being written in all regions of the UK. These seek to take into account contemporary predictions on the consequences of climate change. Sea level rise, likely to be between 30 cm and 50 cm before the end of the century (Lowe et al. 2009), will have damaging consequences for the British coast, especially in the South East (de la Vega-Leinert and Nicholls 2008). Effective ways of identifying land use conflicts are therefore required in order to support informed decision-making regarding the future of the British coast, especially considering the high level of coastal urban settlement.

Geographic Information Systems (GIS) are increasingly used for the identification of forestry/wildlife conflicts (Brown et al. 1994); land use conflicts (Carr and Zwick 2007) and local government decision-making (O'Looney 2003). In this context, Participatory GIS (PGIS) techniques are used to capture local community and stakeholder opinions. This application of PGIS is therefore attempting to reduce the implementation of imposed solutions that do not represent or reflect local public concerns. The research reported here explores the use of PGIS techniques in the identification of land use conflicts on a vulnerable coast with a high density of urban settlement. The techniques used draw from the work of Cinderby (2010) to address the participation of hard-to-reach groups (children and teenagers) in consultation and research exercises and PPGIS concepts that try to make GIS more accessible to the general public, as described by Obermeyer (1998).

It is hypothesised that PGIS techniques, if appropriately designed, could be used effectively during public consultation, particularly in areas subject to conflicts. In order to test this thesis three PGIS techniques have been used in this study investigating the uses and values attached to the Farlington Marshes.

2. Methods

2.1 Case study



Figure 1: Map of Portsmouth and the Farlington Marshes

Portsmouth is a low-lying city in the south of the UK. With a population of 200,000, its density is one of the highest in the country, and most of its population is centred on the western side of Portsea Island. 10% of the city is covered by green space, lower than the European average (18.6%) for cities (Fuller and Gaston 2009). The biggest open spaces are on the east of the island, far away from the busy historic centre, which makes them less accessible to the resident and working populations. Also, most open spaces are situated on low-lying reclaimed land, leaving them vulnerable to flooding and future sea-level rise.

The Farlington Marshes, a SSSI (Special Site of Scientific Interest), SPA (Special Protected Area) and SAC (Special Area of Conservation) protected wetland site in Portsmouth is used as a case study for this research project (The Wildlife Trust 2010) and shown on figure 1. The new SMP for the area initially recommended a managed realignment of the Farlington Marshes in 40 years time, potentially losing half of the surface area of the Marshes. After a public consultation on the plan at the start of 2010 through public exhibitions, it was decided to study the role of the Marshes on the local ecosystem and the possibility of compensating for the loss of habitat that would occur in case of managed realignment. However, the loss of recreational amenity was not considered and only well-established stakeholders were consulted. This case demonstrates the need to reach a wide public in assessing the values of vulnerable open spaces.

2.2 Approach

The approach followed during this project attempted to encourage participation from as wide a range of social groups as possible, including those who would not have thought of participating in the public exhibitions that were held in Portsmouth. Three participatory techniques were used, all of them adapted to attract different populations of participants. All of the techniques aimed to capture the value of open space to the population of Portsmouth, their knowledge of flooding and their willingness to pay to protect these open spaces.

2.3 Research Design



Figure 2: Face-to-face survey

Three different participatory techniques were used. The first was a questionnaire survey enhanced by maps and GIS visualisations designed to be administered by the researcher, see figure 2. This ‘face-to-face survey’ was undertaken in open spaces and therefore attracted only visitors of the open space surveyed. The questionnaire was made up of 45 questions and took 15 to 30 minutes. The maps were used for direct data collection (participants were allowed to mark the maps) and aid visualisation of the space for participants. To survey a representative sample of the open space visitors, weekdays and weekend days, mornings and evenings, sunny and cloudy days were chosen for the this fieldwork. Whereas the main field site was the Farlington Marshes, another open space (Milton Common) was used as a secondary field site, in order to establish how views of visitors to the Farlington Marshes were specific to that site.



Figure 3: Summer fair (open space use activity)

The second technique consisted of four interactive activities undertaken during the Portsmouth Summer Fair. This event was selected and the activities (whilst similar to those in the ‘face-to-face survey’) were designed to attract a different demographic of the population – in particular families with young children (see on figure 3) and elderly people. The research themes addressed were the same as those of the face-to-face survey, including open space use, knowledge of flooding extent, land use priority and willingness-to-pay for the open spaces.

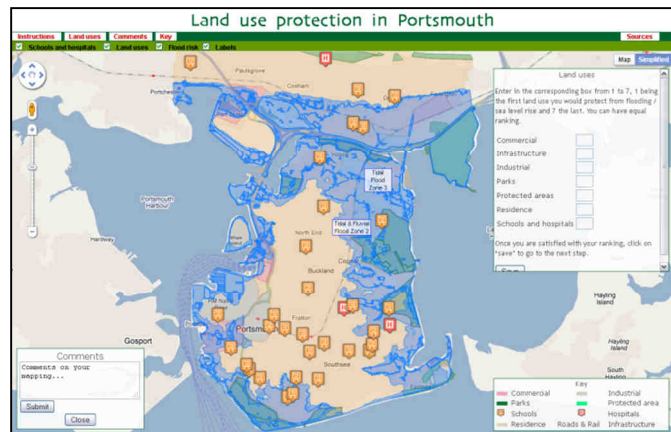


Figure 4: Step 5 of the online survey

Finally the online survey was designed to attract participation from a wider general public with Internet access. No assumptions here were made as to whether or not they made use of any open spaces. Made of seven steps, the online survey more or less replicated the questionnaire administered face-to-face and addressed the core research themes. The mapping parts of the online survey used Google Maps mash-ups (see figure 4), allowing participants to add data to an interactive map in a simple web page. This approach makes it possible to display participants' data on an interactive map as they complete the survey.

2.4 Data analysis

The face-to-face survey has so far gathered data from 142 participants, more than half of them in the main field site, the others being taken from secondary field sites. Thus far, responses have only been analysed in part and qualitatively. Eventually, basic statistics will be derived from the data to give an idea of the demographics of the open space visitors, and mapped data will be used to investigate the possible conflicts between the activities of marsh visitors.

3. Preliminary results

From the sample of visitors surveyed in this research it would appear that the catchment area for visitors to the Marshes is relatively large, as visitors travelled on average 25 km (as the crow flies, based on 79 participants) to visit the marsh. Activities undertaken in the marsh are varied, including recreational activities as well as bird and butterfly watching.

Maps have been recognised as a tool to facilitate discussions (Cinderby 2010) because they encourage participants to focus their energy on the map rather than the potential conflicts being identified or discussed. The results from the face-to-face surveys so far seem to validate this claim, as they created very few heated discussions around climate change issues relating to sea level rise. Most participants so far have indicated that they enjoyed the use of maps during the survey, reasons given for satisfaction including the attractive visual properties of the maps, the ease of use and their usefulness to explain spatial issues. The satisfaction of the face-to-face participants is highlighted by the fact that almost a third of the short feedback questionnaires (containing three questions concerning the participant's use of maps) given to them at the end of the survey (with a prepaid envelop) were returned. This rate is above the 10% rate usually expected for sending back a questionnaire (Veal 2006).

Discussions around the map have proven to be sometimes very fruitful as participants used the maps to add different and unexpected information. For example, one of the participants of the face-to-face survey took the initiative to indicate and label his winter and summer walks, highlighting on the map the reasons for changing (such as a winter pond favoured by his dog). Another from the Summer Fair, some participants indicated 'safe areas' rather than 'risk areas'. Finally, when shown a map of all

Portsmouth's open spaces, someone suggested the addition of part of the beach to the map. These examples highlight how maps facilitate talking about spatial issues.

The online survey is attracting a very small number of respondents, even though considerable effort has gone into advertising it through community and activist networks, social media and direct contact with open space users. Strategies to overcome these difficulties are currently being implemented, such as widening promotion of the website and the survey in other media and offering a small reward to participants.

4. Conclusion

Further data are currently being gathered for the face-to-face and online surveys. So far, the preliminary results show that PGIS techniques of engagement with users of the Farlington Marshes can generate interesting data that may not be possible to collect using traditional surveys that do not involve the use of maps. It is too early to say with certainty whether the PGIS techniques used in this study may be of use in resolving conflicts.

5. Acknowledgements

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6. References

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7. Biography

Hélène Draux is a Vice-Chancellor scholar PhD candidate in the Cities Institute, London Metropolitan University. She started her PhD in January 2010 on land use conflicts identification using Participatory GIS as part of the European project SECOA (Solutions for Environmental contrasts in Coastal Areas). Her main interest is Participatory GIS.